

AIR POWER TRENDS IN NORTHEAST ASIA: IMPLICATIONS FOR JAPAN AND THE U.S. – JAPAN ALLIANCE

Oriana Skylar Mastro and Mark Stokes



INTRODUCTION

The shifting balance of aerospace power in Northeast Asia is creating an increasingly uncertain strategic environment for Japan. Japan is warily eyeing China's growing military might while also vigilantly watching Russia's airpower modernization efforts and North Korea's bellicose actions to the north. The weight of these developments—how newfound and resurging military power will be employed in particular—are tilting and tipping the scale of regional aerospace power. Among these, China is drawing the most attention from Japanese long-term strategic planners as the People's Liberation Army (PLA) rapidly advances its capacity to apply aerospace power for defense against perceived threats to national sovereignty and territorial integrity. Thus far constrained by a relatively underdeveloped aviation establishment, the PLA is investing in aerospace capabilities that may offset shortcomings in the face of a more technologically advanced adversary.

Today, the PLA's growing arsenal of increasingly accurate and lethal ballistic and land attack cruise missiles serves as China's primary instrument of aerospace power projection and strategic attack. Theater missiles—defined as conventional ballistic and land attack cruise missiles with ranges between 500 and 5500 kilometers (km)—also enable the PLA Air Force (PLAAF) to compensate for its shortcomings in the suppression of enemy air defenses needed to attain limited air superiority, strategic strike, and other roles and missions. Over the longer term, the PLAAF aspires to conduct independent strategic attack missions as well as integrated air and space, or aerospace, operations. The deployment of Russian-manufactured Su-27 and Su-30 fighters as well as advanced indigenously produced aircraft such as the J-10 moves the PLAAF closer toward this goal. In addition to the sizeable number of aircraft currently in production, China's fifth-generation fighter, the J-20, conducted its maiden flight in January 2011 and U.S. intelligence community estimates currently anticipate the J-20 to achieve initial operation capability (IOC) around 2018.¹

China is not the only country in the region modernizing its air fleet, however. Russia launched an air power modernization program in 2008 to deal with its aging fleet and plans to field 50 to 60 of its own fifth-generation stealth fighters, the Su-50, by 2016. Lastly, even though North Korea does not pose an offensive threat in terms of fighter and strike aircraft, its missile development program has been a consistent headache for Japanese security specialists. In particular, many Japanese leaders have expressed concern that in a military conflict on the peninsula, their country would be a

¹ Gabe Collins and Andrew Erickson, "China's New Project 718/J-20 Fighter: Development Outlook and Strategic Implications," *China SignPost*, No. 18, January 17, 2011. See also Wayne A. Ulman, "China's Emergent Military Aerospace and Commercial Aviation Capabilities," *Testimony before the U.S. – China Economic and Security Review Commission*, May 20, 2010.

primary target for the estimated 200 medium-range ballistic missiles (MRBMs) currently in the Democratic People's Republic of Korea (DPRK) arsenal.

In the face of this shifting aerospace balance, Japan's Air Self Defense Force (JASDF) is planning to bolster its own air power stance. Desires to strengthen Japanese air defense have been tempered by longstanding fiscal woes and further complicated by the tragic triple disaster in early 2011. Barring decisive fiscal action, Japan will be faced with an existing public debt at a staggering 225.8 percent of GDP, disaster recovery costs of approximately \$300 billion, a possible ¥10 trillion (\$122.53 billion) budget deficit by 2015 according to the Economic and Fiscal Policy Ministry and other Japanese government estimates. Though defense spending has remained at a steady one percent of GDP for the last decade, actual expenditure has been declining slightly since the early 2000s. Even though the exact impact of the recent disaster on Japanese military expenditure is still undetermined, support for greater acquisitions may take a backseat to more pressing reconstruction and economic priorities.

This study will assess the steps that Japan should take to bolster its air power stance and how the United States can contribute to these efforts. Currently the JASDF operates approximately 350 fighters, including F-15J, F-4EJ, and F-2 fighters, but plans to shift to a smaller, more technologically advanced force of 260 aircraft. Traditionally, the JASDF has operated a front-line fighter fleet concurrent with the United States and has co-produced a number of American aircraft starting with the F-86 and continuing with the F-15 and F-2 fighters it currently deploys. The United States has a great interest in a stronger ally, a more capable JASDF that could take on a greater share of the security burden in Asia while advancing common strategic interests. Looking forward, in the wide spectrum of issues in which the interests of U.S. and Japan align, both parties and the Alliance stand as the ultimate beneficiaries of greater interoperability and closer cooperation in the realm of air power.

Yet, as it stands, the U.S.-Japanese alliance and the JASDF must make greater investments in order to meet the challenges posed by the shifting balance of air power in the region. In an attempt to appraise the means with which the JASDF could best meet future challenges, this assessment first evaluates key developments in Chinese, Russian, and North Korean airpower. This assessment then explores two regional crisis scenarios: conflict with China over the Senkaku/Diaoyu Islands and a conflict involving a North Korean conventional missile attack, both of which would mostly likely occur in the context of broader regional conflict scenarios involving the United States. Finally, a concluding section outlines recommendations for how Japan could enhance its security in the face of stronger regional actors and the contributions the United States could make toward these efforts.

REGIONAL TRENDS IN AEROSPACE POWER

Chinese Aerospace Modernization: The Real Game-Changer

Chinese thinking on the use of airpower—or aerospace power in a broader sense—and force modernization has evolved over the past decade. Because of budget constraints and a primary focus on homeland defense, China emphasized its missile arsenal over the modernization of its air force until the late 1990s. In more recent years, China had been content to rely heavily on conventional ballistic and land attack cruise missiles (LACM) to project aerospace power, in part due to recognition of the PLAAF shortcomings vis-à-vis the U.S. Air Force and the challenges facing the Chinese indigenous aviation industry.² This meant that discussions of air power in China used to be “confined to neutralizing an attacking air force through the use of anti-aircraft artillery (AAA), missiles, and forms of information warfare—for instance, jamming enemy targeting systems.”³

The PLAAF has been diversifying its roles and missions, moving away from a force that once was almost exclusively responsible for air defense, interdiction, and close air support, toward a service whose primary mission is deterrence and strategic attack. The relative priority that the PLA placed on missile modernization has influenced the evolution of Chinese doctrine, which stressed strikes on local enemy airfields and other strategic and operational targets for coercive effect, rather than a joint air campaign geared toward attaining and maintaining air superiority.⁴ In recent years, however, China has been transitioning toward the employment of conventional air forces for strategic strike. This is especially important for the balance of power in the region given that aircraft, not missiles, carry the most ordnance to the target and can fly multiple sorties.⁵ According to China’s *2010 Defense White Paper*, the PLAAF is working to ensure the development of a combat force structure that focuses on air strikes, air and missile defense, and strategic projection, to improve its leadership and command system and build up an informationized, networked base support system.⁶ Furthermore, the PLAAF is characterized as “a strategic service of the PLA, and the main force for carrying out air operations. It is responsible for such tasks as safeguarding the country’s

² See Jacqueline A. Newmyer, “China’s Air-Power Puzzle,” *Policy Review*, June-July 2003. China’s current ability to meet demand with indigenous aircraft is still limited. See Roger Cliff, Chad J.R. Ohlandt, David Yang, *Ready for Takeoff: China’s Advancing Aerospace Industry* (Santa Monica, CA: RAND Corporation, 2011).

³ Newmyer 2003.

⁴ Ibid.

⁵ Richard D. Fisher, Jr. “PLA Air Force Equipment Trends” in Stephen J. Flanagan and Michael E. Marti (eds) *The People’s Liberation Army and China in Transition* (Washington, DC: National Defense University Press, 2004).

⁶ *China’s National Defense in 2010* (Beijing: Information Office of the State Council of the People’s Republic of China, March 2011), http://news.xinhuanet.com/english2010/china/2011-03/31/c_13806851.htm.

territorial air space and territorial sovereignty, and maintaining a stable air defense posture nationwide.”⁷

Though the *2010 Defense White Paper* stops short of enshrining the strategic strike mission, PLAAF representatives have made no secret of the fact that the service’s long-term vision is to be able to conduct an independent air campaign to achieve decisive strategic effects.⁸ Such a goal should not be surprising. Since the publication of Giulio Douhet’s *Command of the Air* in 1921, airpower proponents have envisioned the transformation of warfare through long-range strategic strikes. PLAAF representatives have argued in favor of a gradual transition from supporting roles and predominantly defensive counterair missions and close air support, to joint operations, and finally to a fully independent service able to conduct strategic strike missions at extended ranges.⁹ According to one detailed Taiwanese assessment, the PLAAF had set the goal of being able to conduct an air campaign within 1000 km radius of China’s periphery by 2010—one that has not been successful to date—and extend the range to 3000 km by 2030.¹⁰

A related trend is an evolving Chinese air power doctrine that is shifting PLAAF focus from exclusively defensive uses of conventional airpower toward integrated offensive and defensive missions. According to General Liang Guanglie, China’s strategic plan calls for the PLAAF to “shift from defending national territory to defensive and offensive capabilities.”¹¹ Like most defense establishments, the PLA characterizes its modernization efforts as defensive in nature. To this end, aerospace power, in addition to supporting territorial and sovereignty disputes, is viewed as a vital element of territorial air defense with offensive air operations as a means to suppress adversary strike capabilities at their source. As the People’s Republic of China’s (PRC) 2008 Defense White Paper explains:

⁷ *China’s National Defense in 2008* (Beijing: Information Office of the State Council of the People’s Republic of China, January 2009), http://www.gov.cn/english/official/2009-01/20/content_1210227_4.htm.

⁸ The concept was first raised by Liu Huaqing in 1993. See “Unswervingly Follow the Path of Modern Military Construction with Chinese Characteristics” [坚定不移地沿着建设有中国特色社会主义现代化军队的道路前进], presentation before Central Party School, May 20, 1993, http://www.cass.cn/zhuantu/2008ggkf/show_News.asp?id=228926.

⁹ See Liu Yalou, “New Historical Starting Point in the Modernizing the Air Force” [在新的历史起点上推进空军现代化建设], *Qiushi* [求是], January 17, 2008, <http://www.chinavalue.net/Article/Archive/2008/9/18/135542.html>; Zhuang Jingqian, “Beijing Observation: Chinese Air Force Quickens Pace of Strategic Transition, Possibly by Taking Two Steps,” *Zhongguo Tongxun She*, November 10, 2009, at <http://www.haixiainfo.com.tw/print78917.html>. “From Defense to Attack: Sixty Years of PLA Air Force Development” [从防御到进攻：中国空军的 60 年建设], *Air Force World*, October 29, 2009, http://news.ifeng.com/mil/special/kongjun60/lishi/200910/1029_8387_1410457.shtml.

¹⁰ Wang Changhe, “PLA Air Force 20 Year Review and Outlook” [中共空軍 20 年的回顧與展望], in Li Chentong et. al., *The Philosophy of War and the Study on PRC’s Strategy* [戰爭哲學與中共戰略研究] (Taipei: National Defense University War Academy, 2008), 96-97.

¹¹ “China To Project Naval, Air Power Further Off Shore,” *Reuters*, September 22, 2009, <http://in.reuters.com/article/idINIndia-42612820090922>.

*China pursues a national defense policy which is purely defensive in nature. China places the protection of national sovereignty, security, territorial integrity, safeguarding of the interests of national development, and the interests of the Chinese people above all else.*¹²

The concept of integrated defense and offense is primarily applied in the context of joint air defense. Indeed, most aerospace industry studies address an anti-ship ballistic missile (ASBM) capability in the context of defending against sea-based assets, such as Tomahawk cruise missiles and other strike systems. Integrated attack and defense is intimately related to the concept of a joint counter-air strike campaign [联合反空袭战役]. In doctrinal writings, counter-air strike operations theory is divided into passive defense [防护], territorial air defense [抗击], and offensive counterair operations [反击]. PLAAF and the Second Artillery envision holding at risk facilities and assets around its periphery, including air bases, aircraft carriers and other surface assets, and missile-related facilities.¹³

A general concept appears to be to develop an ability to conduct offensive counterair strikes out to a range covered by persistent surveillance assets, notionally with an eye toward Guam at a distance of 3000 km from the east coast of China. Second Artillery and PLAAF force modernization is focused on systems able to suppress air operations on Guam, throughout the South China Sea, and other locations by the middle of this decade. At around the same time, systems currently under development may place U.S. military facilities on Guam at risk.¹⁴ Ostensibly to test these theories, the PLAAF and Second Artillery conducted one of the first large scale joint live fire exercises involving elements from four missile brigades and two PLAAF air divisions in the summer of 2009.¹⁵

An ambitious offensive air campaign as conceived has two general phases: first strikes and follow-on strikes. The PLA first strike operations would involve Second Artillery conventional missiles, the concentrated application of the PLAAF's best assets, as well as aviation assets from other services. In theoretical operational analysis, a first strike would consist of multiple waves in order to suppress enemy air defenses. This includes preventing key enemy aviation assets from taking off, effectively preventing

¹² *China's National Defense in 2008*.

¹³ For an overview, see Wang Houqing and Zhang Xingye et. al., *Campaign Science* [战役学] (Beijing: NDU Press, University Press, 2000), 441-458. Also see Wang Wenrong (ed.), *Strategic Science* [战略学] (Beijing: NDU Press, 2000), 333-334. Also see "Regional Counter-Air Strike Operational Research" [区域性反空袭作战研究], Huzhou City Air Defense Office, undated, <http://www.hurf.gov.cn/rftd/191.html>.

¹⁴ Ulman 2010.

¹⁵ "Second Artillery and Air Force Conduct Joint Live Fire Exercise for First Time" [二炮与空军首次进行实兵实弹导空联合演习], *Xinhua*, July 19, 2009, <http://war.news.163.com/09/0719/13/5EJBGC2P00011MTO.html>.

ground based air defenses from organizing resistance along specific corridors, and eliminating enemy early warning assets. Achieving air superiority would facilitate follow-on air activity or landing operations.¹⁶

In seeking an independent strategic strike capability, the PLAAF appears to be encroaching upon a conventional mission that the Second Artillery has monopolized for almost two decades. The Second Artillery, however, serves in a supporting role in the PLA's strategy for suppressing adversary air assets on the ground or at sea. Augmenting traditional airpower, Second Artillery assets facilitate the occupation of the air domain and offset weaknesses of the PLAAF. To be sure, ballistic and LACMs offer advantages over traditional airpower due to an assured ability to penetrate defenses, ability to prepare and launch with little warning, short time of flight, and lower mission support costs. Yet, ballistic and LACMs have limited flexibility because they are unable to sustain flight and are not reusable after launch.¹⁷

China's previous emphasis on defensive air power is exemplified in its force structure, which consists mainly of fighters (used primarily for defensive purposes), exhibiting a scarcity in bombers (which are offensive in nature).¹⁸ As time goes on, the PLAAF may become less reliant on Second Artillery support as it develops "relatively independent" capabilities through economical "leapfrogs" [跨越式] in technology development.¹⁹ The PLAAF's diversification strategy is grounded in a body of theory that stipulates an independent air strike campaign could support national objectives.²⁰ These two shifts in doctrinal thought, from missiles toward integrated application of firepower, defensive to offensive uses of airpower, have had real implications for the orientation of the PLAAF and consequently for the balance of air power in the region.

Particularly relevant for the topic at hand, China's military modernization has extended beyond a Taiwan contingency to include Chinese preparations for conflict with

¹⁶ Mark Stokes, "The Chinese Joint Aerospace Campaign: Strategy, Doctrine, and Force Modernization," *China's Revolution in Doctrinal Affairs: Emerging Trends in the Operational Art of the Chinese People's Liberation Army*, ed. James Mulvenon and David Finkelstein (Alexandria: The CNA Corporation, 2005), 221 – 305, <http://forbes.house.gov/uploadedfiles/Center%20of%20Naval%20Analysis.pdf>.

¹⁷ Chai Deshou, "Revolution in Military Affairs Gives Birth to New Form of Warfare- Discussion of Rise and Trends in Missile Warfare" [军事变革催生新作战样式-兼论导弹战的崛起及趋势], *PLA Daily*, July 27, 2004, <http://www.chinamil.com.cn/item/newar/zxxl/28.htm>.

¹⁸ See Newmyer 2003.

¹⁹ "The Chinese Air Force's Economical Path to Realizing Strategic Leapfrogging" [中国空军实现战略性跨越的经济路径], *Xinhua*, August 10, 2010, http://news.xinhuanet.com/mil/2010-08/04/content_13964189.htm.

²⁰ "Liu Yazhou: The Chinese Air Force Must Prepare for Integrated Offense-Defense" [刘亚洲：中国空军必须具备攻防兼备], *ChinaWeek* [中国报道周刊], May 28, 2005, <http://www.china-week.com/html/2501.htm>. See also Zheng Dongxiao, "From History to the Future: Chinese Air Force Development from a Macro Perspective" [从历史到未来:中国空军建军思想的宏观演进], *New West*, Vol. 3, 2010.

the United States and Japan.²¹ Senior PLAAF leaders have outlined force development priorities, including the capacity to carry out long range precision strike, an ability to attain local or limited air superiority, stealth, “full spectrum” air and missile defense, new “trump card” [撒手锏] weapon systems, long range airlift [远程投送], and unmanned aerial vehicles.²² Over time, PLAAF capabilities are likely to expand more rapidly than in the past. For example, PLAAF Deputy Commander He Weirong outlined the PLAAF’s intent to procure a next generation fighter over the next six to eight years, which was corroborated by the J-20 prototype maiden flight in January 2011.²³ China is investing in fielding an advanced active electronically scanned array (AESA) radar, and the PLA’s General Armament Department has a dedicated expert working group with the purpose of achieving breakthroughs in stealth technology.²⁴

The PLAAF began its first large-scale modernization effort over 30 years ago. The following section of this report will evaluate China’s progression with respect to fighter aircraft, evaluating not only China’s ability to engage in air-to-air combat, but more likely its ability to strike potential counter air targets such as grounded aircraft, airbases and launch facilities, aircrews, warning and control facilities, and surface-based air defense such as surface-to-air missiles (SAMs) and anti-aircraft artillery (AAA). Finally, this study will explore some potential wildcards to consider when assessing the future of Chinese air power such as China’s recent foray into unmanned aerial vehicles (UAV) and developments in China’s indigenous aviation industry.

Fighter Aircraft

China has placed great emphasis in recent years on acquiring advanced multi-role fighter aircraft and support platforms. Specifically, older platforms such as the Chengdu Aircraft Factory J-6, Chengdu J-7II/III/E (based on Soviet models) and the indigenous J-8I/II are being replaced by the Russian Sukhoi Su-30MKK fighter bomber, J-10 and J-8III multi-role fighters, and the JH-7 attack aircraft.²⁵ Conventional air platforms include Su-27 air superiority fighters, procured from Russia in the early 1990s and a Su-27 variant, the J-11, assembled in Shenyang. The PLAAF’s first indigenously

²¹ Shirley A. Kan and Larry A. Niksch. “Guam: U.S. Defense Deployments,” *Congressional Research Service*, January 7, 2010, 6.

²² See Liu 2008. See also *China’s National Defense in 2008*.

²³ “Discussion with He Weirong: China Conducting R&D on Fourth Generation Aircraft” [对话何为荣：中国正在研制第四代战机], *Xinhua*, November 9, 2009, http://news.xinhuanet.com/mil/200911/09/content_12416003.htm.

²⁴ China’s leading figure in applied research in stealth is Dr. Wu Zhe [武哲]. An aircraft design specialist at Beijing University of Aeronautics and Astronautics (NUAA), Dr. Wu also serves as the PLA General Armaments Department S&T Committee’s Stealth Technology Working Group [隐身技术专业组组长]. See, for example, “Changjiang University Alumni and Scholar Wu Zhe” [长江学者特聘教授武哲校友], Harbin Institute of Technology announcement, May 7, 2010, <http://90.hit.edu.cn/news/Showfc.asp?id=1827>.

²⁵ Fisher 2004.

produced fourth-generation fighter,²⁶ the J-10, will gradually make up the bulk of China's fighter force; at least three regiments are equipped with the airframe already.²⁷ The J-10, a multi-role single-engine and single-seat tactical fighter, was allegedly developed by reverse engineering a F-16 provided to China by Pakistan.²⁸ Though many of the specific technologies employed by the J-10 are unknown, it is believed that the radar and fire-control system is the Israeli-made ELM-2021, which would allow the aircraft to simultaneously track six air targets and select the four most dangerous for destruction.²⁹

In terms of counter air operations, the Sukhoi Flankers (Su 27/30) and J-10 will be of the most concern in a conflict between Japan and China over the Senkaku/Diaoyu Islands. The Su-27/30 is the direct equivalent to the F-15E/I/K/S variants, though its supersonic performance and handling is inferior to that of the F-15. Sukhoi Flankers make up for these weaknesses in the fleet with exceptionally good low speed high alpha handling and performance.³⁰ According to Russian estimates, the ultimate size of China's PLAAF Su-27/30 fleet falls between 350 and 500 aircraft. The Su-30s have a range of over 1300 km (approx. 700 nautical miles), far beyond the range needed to conduct operations over the Senkaku/Diaoyu Islands. Furthermore, China reportedly acquired six Il-78MKKs tankers from Russia in late 2005, which could further extend the reach and sortie rate of its Sukhoi Flankers.³¹ Moreover, China has reportedly ordered from Russia the Kh-59ME standoff missile, the Kh-29T TV guided missile, the Kh-31R anti-radiation missile, and the KAB-500Kr electro-optically guided bomb kit for its Flanker fleet. In terms of defenses, PLAAF Su-27SKs reportedly come equipped with wingtip jammer pods designed to defeat the APG-63/65/68/70/73 radars and Hawk/Patriot SAM systems.³²

The indigenous J-10, which began its initial development in 1988, entered the PLAAF fleet in 2005. According to the Pentagon's annual study on China's military power, the J-10 is similar in weight and performance to the Eurofighter Typhoon and the Dassault Rafale.³³ Although the official Chinese media described the J-10 as a "breakthrough" for Chinese military aviation, these reports also suggested that the plane was inferior to U.S. fighters like the F-16. China is continuously updating and

²⁶ This platform is assembled in Chengdu.

²⁷ For more on the J-10, see Richard Fisher, "Chinese Chengdu J-10 Emerges," *Aviation Week*, January 14, 2010, http://www.aviationweek.com/aw/generic/story_generic.jsp?channel=defense&id=news/dti/2010/01/01/DT_01_01_2010_p65-188015.xml&headline=Chinese%20Chengdu%20J-10%20Emerges.

²⁸ Federation of American Scientists, "J-10 (Jian-10 Fighter aircraft 10) / F-10," <http://www.fas.org/man/dod-101/sys/ac/row/j-10.htm>.

²⁹ Ibid.

³⁰ Carlo Kopp, "Sukhoi Flankers: The Shifting Balance of Regional Air Power," September 2009, <http://www.ausairpower.net/APA-Flanker.html>.

³¹ Ibid.

³² Ibid.

³³ "Military Power of the People's Republic of China 2006," *Office of the Secretary of Defense*, 4.

developing the J-10; a two-seat fighter trainer J-10B allegedly has radar technology so advanced it makes the J-10 competitive with upgraded Western and Russian fourth-generation-plus fighters.³⁴

Although modest by U.S. or Russian standards, the PLA and the Chinese defense industry has established a solid foundation in the development of a low observable, next generation fighter platform. Ostensibly designated as the J-20 and targeting an initial operational capability (IOC) by 2018, Chinese and international media outlets in January 2011 reported on initial flight tests at the Chengdu Aircraft Factory.³⁵ Developed under a PLAAF contract, and supported by the PLA General Armaments Department (GAD) and aviation industry research and development infrastructure, the J-20 prototype that was flight tested in January 2011 was a testament to years of work by a national team of China's most talented engineers. As early as 1986, the aviation industry established a special working group to study stealth technology.³⁶ The AESA radar ostensibly being integrated with the J-20 underwent its first successful testing in 2007 and its design was verified in 2008.³⁷

*Unmanned Aerial Vehicles (UAV)*³⁸

China has an active program to develop and procure UAVs, primarily to support its airborne ISR program and the PLA's tactical C4I structure. One of the first UAVs to be successfully introduced into the PLA was the ASN-206, of which China currently fields six to ten.³⁹ This UAV is mainly used for reconnaissance and provides real time intelligence unlike older models, which had to be recovered for the data. Though its primary military applications are day and night time reconnaissance, battlefield surveillance, target location, artillery fire correction, and battle damage assessment, these UAVs can also conduct electronic warfare and countermeasures. Another UAV used primarily for reconnaissance is the WZ-5, also known as the ChangHong-1. Reverse engineered from the U.S. Firebee, it specializes in photographic reconnaissance of large areas such as battlefields. The WZ-5's utility, however, is limited due to a variety

³⁴ See, for example, "J-10 enters international market at \$40 million," *People's Daily Online*, January 21, 2010, <http://english.peopledaily.com.cn/90001/90776/90786/6875587.html>.

³⁵ Bill Sweetman, "Chinese J-20 Stealth Fighter In Taxi Tests," *Aviation Week*, January 3, 2011, http://www.aviationweek.com/aw/generic/story.jsp?id=news/awst/2011/01/03/AW_01_03_2011_p18-279564.xml&headline=China's%20J-20%20Stealth%20Fighter%20In%20Taxi%20Tests&channel=awst. Sang Jianhua appears to have been the chief designer of the J-10 fighter and plays a leading role in other low observable fighter programs, such as the J-20.

³⁶ See "Li Tian: China's Stealth Technology" [李天: 中国的隐身技术], Qinghua Alumni Association website, January 13, 2010, <http://www.tsinghua.org.cn/alumni/infoSingleArticle.do?articleId=10039266&columnId=1000068>.

³⁷ See "Zhang Chuanfang: Leading AVIC Figure" [章传芳——2008 年度“中航工业风云人物”入围人选], AVIC Culture Department, December 30, 2008, http://www.avicone.com/Article_Show.asp?ArticleID=3993.

³⁸ For a list of all the UAVs that China currently possess, see <http://www.nti.org/db/china/cuavp.htm>.

³⁹ Ibid.

of factors including an endurance of only three hours, lack of real-time link and control (which means it must stay on a prepositioned path), and ability to only conduct daytime optical reconnaissance. Another UAV that is allegedly modeled after a U.S. system (the Global Hawk) is the W-50.⁴⁰ The utility of this system is also limited due to its operational radius of a hundred km and endurance of four to six hours.⁴¹

Communication links are one of the main obstacles to UAV development; according to an interview with Tu Jida, chief designer at the Aviation Industries of China (AVIC), China is still working on developing more secure and resistant control communication links.⁴² Of primary concern for the PRC is an adversary's ability to interfere with the control of China's UAVs or the transmission of their reconnaissance information. The WZ-9, for example, supposedly can transmit reconnaissance data via a satellite communications antenna in its nose bulge. Once some of these technical issues involving operating UAVs in real time are resolved, perhaps UAV prototypes such as the CH-3, Anjian or Yi-long, will actually be produced.

Sources of unknown reliability indicate that the Northwest Polytechnical University (NPU) has been assigned the task of developing and producing a high altitude, long endurance UAV. AVIC's Chengdu Aircraft Factory has been engaged in R&D on a UAV, dubbed the Xianglong [祥龙], with a cruise speed of 750 km/h, altitude of 20,000 meters (m), and a maximum range of 7000 km. This UAV is said to utilize electro-optical and SAR sensor packages, and a variant is allegedly being developed for communications relay and electronic warfare. The system completed ground testing in

October 2008, and conducted its maiden flight in November 2009.⁴³ According to China military expert Richard Fisher, Chinese universities like Beijing University for Aeronautics and Astronautics, the Nanjing University for Aeronautics and Astronautics and Northwestern Polytechnical University still play a key role in unmanned aircraft research and development but mainline corporations have radically increased their investment in this sector since the 10th Five-Year Plan (2001-2005).⁴⁴

⁴⁰ Ibid. See also Prepared Statement of Mr. Richard D. Fisher, Jr. "China's Emergent Military Aerospace and Commercial Aviation Capabilities," *Hearing before the U.S.-China Economic and Security Review Commission*, May 20, 2010, 91.

⁴¹ Unless otherwise noted, information in this paragraph comes from "Unmanned Aerial Vehicles (UAVs)," *globalsecurity.org* and *Nuclear Threat Initiative*, <http://www.nti.org/db/china/cuavp.htm> which cites Robert Karniol, "China adds to drone stable," *Jane's Defense Weekly*, vol. 38, no. 23, December 4, 2002; Ji Xiumin, "PRC Unmanned Aerial Vehicles Described," *Beijing Zhishi in Chinese 4 June 2000*, 14-16, in *FBIS CPP20000616000156*; "China Seen expanding Development of UAVs for Reconnaissance," *Aerospace Daily*, vol. 188, no. 26, November 5, 1998, 207.

⁴² Nicholas von Kospoth, "China's Leap in Unmanned Aircraft Development," *Defence Professionals*, Oct 14, 2009, <http://www.defpro.com/daily/details/424/->.

⁴³ "The Dragon Soars to the Ninth Heaven - China's "Soaring Dragon" High Altitude Long Endurance Unmanned Aerial Vehicle," *Xiandai Bingqi*, March 1, 2007, 4-8, in *OSC CPP20070507436001*.

⁴⁴ Fisher "China's Emergent Military Aerospace and Commercial Aviation Capabilities."

Even with more corporate involvement, Chinese drones are likely to remain several years behind American models because Chinese activities still focus on analyzing with the intent on copying existing models such as the Global Hawk, Predator, and Reaper as well as Israel's Harpy and Heron.⁴⁵ Regardless, the emerging focus on unmanned systems is a source of national pride in which advancements are publicly and proudly displayed. For example, ten short and mid-range tactical reconnaissance UAVs were displayed in the PRC 60th anniversary parade.⁴⁶ According to a weaponry expert at the PLA's National Defense University, these systems demonstrate that "China has made substantial progress in intelligent control systems, precise measuring-controlling systems and computer information processing for military uses."⁴⁷

Chinese development of unmanned combat aerial vehicles (UCAV) is much more limited compared to reconnaissance UAVs. At the 2000 Zhuhai show a twin-jet powered delta winged high altitude long endurance UAV, the WZ-2000, was revealed. By 2008, this system appeared to form the basis for an armed turbofan powered UCAV similar in size to the U.S. General Atomics MQ-9 Reaper.⁴⁸ While China has yet to develop an indigenous UCAV, China did purchase around a hundred Harpy attack drones from Israel in the 1990s. The Harpy is designed to destroy a target by crashing into it and detonating its thirty-two kilogram explosive warhead. China's possession of these drones may prove problematic in a conflict over the Senkaku/Diaoyu Islands given that they are designed specifically to detect, track and destroy enemy radar and SAM emplacements regardless of weather conditions or time of day at a range of 500 kilometers.⁴⁹

In addition, development of "near space" sensors appears to have a relatively high priority. Chinese analysts view the near space realm as an area of future strategic competition. Near space is generally characterized as the region between 20 and 100 km (65,000 to 328,000 feet) above the earth's surface. The 100 km altitude point, sometimes called the Kalman Line, is a rough border dividing the earth's atmosphere and outer space. The near space realm is too high for fighter jets and too low for orbiting satellites.⁵⁰ Chinese engineers note that that near space flight vehicles have can cover footprints similar to satellites in low earth orbit, but could offer significant

⁴⁵ Jeremy Page, "China's New Drones Raise Eyebrows," *The Wall Street Journal*, November 18, 2010; Von Kospoth 2009.

⁴⁶ Von Kospoth 2009.

⁴⁷ Ibid.

⁴⁸ Ibid.

⁴⁹ "Reports: Israel Frozen out of F-35 Development," *Defense Industry Daily*, April 19, 2005, <http://www.defenseindustrydaily.com/reports-israel-frozen-out-of-f35-development-0377/>.

⁵⁰ See Li Yiyong and Shen Huairong, "Key Technologies for Developing Near Space Flight Vehicles" [发展近空间飞行器系统的关键技术], *Journal of the Academy of Equipment Command & Technology*, October 2006, 52-55. For a U.S. perspective on near space, see Lt Col Ed "Mel" Tomme and Col Sigfred J. "Ziggy" Dahl, "Balloons in Today's Military? An Introduction to the Near-Space Concept," *Air & Space Power Journal*, Winter 2005. Also see Lt Col Edward B. Tomme, "The Paradigm Shift to Effects-Based Space: Near-Space as a Combat Space Effects Enabler," *Airpower Research Institute Research Paper*, 2005-01.

improvements in resolution. Duration of flight for near space vehicles far exceeds that of UAVs and their small radar and thermal cross-sections make them difficult to track and target. Powered in part by high efficiency solar cells, near space vehicles are viewed as a relatively inexpensive means of persistent broad area surveillance.⁵¹ Over the decade, near space flight vehicles [近空间飞行器] may emerge as a dominant platform for a persistent region-wide surveillance capability during crisis situations.⁵² While technical challenges exist, the PLA and China's defense R&D community have become increasingly interested in near space flight vehicles for reconnaissance, communications relay and electronic countermeasures.⁵³ For reconnaissance missions, synthetic aperture radar surveillance and electronic intelligence appear to be priorities.⁵⁴

As a final note, authoritative sources indicate that preliminary R&D funds are being invested into a more advanced hypersonic aerospace flight vehicle program.⁵⁵ Next generation flight vehicles may adopt airbreathing supersonic combustion ramjet (scramjet) engine technology able to accelerate to hypersonic speeds in excess of Mach 5 (e.g., five times the speed of sound). In addition to scramjet engine technology, R&D is focused on advanced heat resistant materials, radar and infrared signature reduction (e.g., "stealth"), micro-electromechanical systems (MEMS), smart structure, and autonomous control.⁵⁶ One Chinese study in particular outlined the results of modeling and simulation of a scramjet-powered vehicle with a range of 1000-2000 km, flying toward its target at an altitude of between 25-30 km and speed of Mach 6.⁵⁷ In a *Xinhua*

⁵¹ For a general Chinese analysis, see Wang Shengkai, Quan Shouwen, Li Binhua, and Ma Qin, "Near Space and Near Space Flight Vehicles" [临近空间和临近空间飞行器], *CONMILIT* [现代军事], 2007(7), 36-39.

⁵² Guo Weimin, Si Wanbing, Gui Qishan, and He Jiafan, "Coordination and Applicability of Near Space Flight Vehicles in Missile Warfare" [导弹作战中临近空间飞行器与航天器的协同应用], *Winged Missiles* [飞航导弹], May 2008.

⁵³ For a representative Second Artillery overview, see Li Chao, Luo Chuanyong and Wang Hongli, "Research into Near Space Flight Vehicle Applications for the Second Artillery" [近空间飞行器在第二炮兵部队的应用研究]; *Journal of Projectiles and Guidance*, January 2009; see also Mark Stokes, *Evolving Aerospace Trends in the Asia-Pacific Region* (DRAFT), Project 2049 Institute, December 1, 2010, http://www.npolicy.org/article_file/EVOLVING_AEROSPACE_TRENDS_260111_1837.pdf.

⁵⁴ Wang Wenqin, Cai Jingye Cai, and Peng Qicong, "Conceptual Design Of Near-Space Synthetic Aperture Radar For High-Resolution And Wide-Swath Imaging," *Aerospace Science and Technology* (2009), 1-8. Wang is from the University of Electronic Science and Technology of China (UESTC) and claims to be a leading advocate within China for near space SAR remote sensing.

⁵⁵ "Key Fundamental Issues in the Major Research Plan for Aerospace Flight Vehicles" [空天飞行器的若干重大基础问题重大研究计划], undated, National Natural Science Foundation website, <http://www.nsfc.gov.cn/nsfc/cen/00/kxb/sw/introduction/2004introdu-6.htm>.

⁵⁶ *Basic Issues in the 2005 Aerospace Flight Vehicle Program* [空天飞行器的若干重大基础问题], http://www.nsfc.gov.cn/nsfc/cen/02/htmlcreated/2004jh/2005_06_28.htm.

⁵⁷ Among various sources, see Che Jing and Tang Shuo, "Research on Integrated Optimization Design of Hypersonic Cruise Vehicle," National Natural Science Foundation study, August 21, 2006. The authors are from the Northwest Polytechnical University's College of Astronautics, which hosts a GAD-funded laboratory on flight vehicles. At least one leading figure overseeing scramjet engine R&D is Liu Xingzhou [刘兴洲] from the CASIC Third Academy. See "CASIC's Liu Xingzhou Reviews and Assesses Domestic

interview, a founding father of China's space and missile program, Zhuang Feng'gan [庄逢甘], argued that that aerospace flight vehicle testing could begin as early as the end of the 11th Five-Year Plan (2006-2010).⁵⁸ Hong Kong's *Wen Wei Po* reported in 2006 that R&D could be completed by 2020.⁵⁹ The variety of medium- and high-altitude long-endurance unmanned vehicles, when deployed, will expand the PLAAF's options for long-range reconnaissance and strike.

Russian Air Power: A Dying Institution?

The lack of adequately trained personnel and an aging fleet has downgraded the Russia Air Force (known as the VVS) from the once formidable Cold War force to more of an afterthought in Northeast Asian security considerations. In 2001, Benjamin S. Lambeth of the RAND Corporation posited a bleak outlook for Russian force modernization given the combination of a lack of adequate state funding and the competition between procurement demands and unmet personnel needs. Aircraft reductions are one manifestation of these fiscal issues; Frontal Aviation, which is Russia's tactical aviation arm, has cut aircraft from 5000 to less than half of that number, with only 1/3 of the remaining aircraft being fourth-generation aircraft (MiG-29s and Su-27s). The remainder consists of older aircraft set to retire, leaving Frontal Aviation with an estimated 870 aircraft by 2015. Other reductions include the number of long-range bombers from 700 to 400 after the fall of the Soviet Union.⁶⁰ Though the first two Sukhoi Su-34 strike aircraft did enter service in 2006, the complete replacement of the almost 500 aging Su-24s in service is close to impossible given the low Su-34 production levels (24 operational by 2010 and 36 to be inventory by 2015).⁶¹

Air force personnel training has also decreased in quality and quantity since the fall of the Soviet Union; the aircrews that flew unopposed in the war in Chechnya had no night flying training and an average of 30 flight hours the year before.⁶² Though flight hours have increased in recent years, with front-line aviation pilots flying over 80 hours

Scramjet Engine Research" [中国航天科工集团刘兴洲院士为我校师生做国内超燃冲压发动机研究的回顾与分析], BUAA News, November 8, 2007,

http://news.buaa.edu.cn/dispsnews.php?type=1&nid=15667&s_table=news_txt and "The Eternal Pursuit" [永恒的追求], *Scientific Chinese*, September 30, 2007, <http://www.scichi.com/new/Article/1486.html>.

⁵⁸ "Expert: China's Scramjet Engine Achieves Breakthrough: Aerospace Plane Enters a New Phase" [独家：中国超燃冲压发动机取得突破 空天飞行器 进入试验阶段], December 11, 2007,

<http://www.zaobao.com/special/newspapers/2007/12/hongkong0712110.html>.

⁵⁹ Peng Kailei, "Chinese 'Lifting Body' Outline Revealed for First Time" [中国「穿梭机」外形首度曝光], *Wenweipo*, December 1, 2006, <http://paper.wenweipo.com/2006/12/01/YO0612010003.htm>.

⁶⁰ For more, see Benjamin S. Lambeth, *The Continuing Crisis of Russian Air Power* (Santa Monica, CA: RAND Corporation, 2001).

⁶¹ Olga Olikier, Keith Crane, Lowell H. Schwartz, Catherine Yusupov, *Russia Foreign Policy: Sources and Implications* (Santa Monica, CA: RAND Corporation, 2009), 159.

⁶² Benjamin S. Lambeth, *Russia's Air Force: An Institution in Painful Transition* (Santa Monica, CA: RAND Corporation, 1996).

a year, many fighter and bomber pilots still fly less than 40 hours a year.⁶³ Low morale of pilots and ground crews remains a major problem for the Russian Air Force; an average of 400 pilots leave the service every year due to low pay, lack of flight time and better job prospects.⁶⁴ Because of Russia's reduction in power projection capability and the increasingly strong economic relationship between Russia and Japan, the threat perception of Russia in Japan has reduced sizably since the end of the Cold War.⁶⁵ Given these trends, both sides have sought, without success, to resolve the long-standing territorial dispute over the Kurile Islands, which would allow Japan and Russia to finally normalize relations.⁶⁶

Even with these reductions in equipment and personnel, it is important to remember that Russia's military is still more technologically advanced than most militaries and constitutes one of the world's largest fighting forces.⁶⁷ Moreover, oil revenue in the mid-2000s allowed Russia to proceed forward more quickly than Lambeth's report predicted with some much-needed advancements in its air fleet. According to a 2009 RAND study, Russia's 15 Tu-160s, Tu-22M3s, and Tu-95s are being upgraded to allow them to drop precision-guided weapons and operate in all weather conditions.⁶⁸ The Russian Air Force Chief of Staff also announced plans to revamp Russia's air-space defenses by 2020 to include creating air defense brigades equipped with S-400 and S-500 air defense systems.⁶⁹ Though the S-400 system has been slow to deploy, if Russia eventually does so on the southern Kurile Islands as Russian media reported in February 2011, these defenses could negate the capabilities of every fighter currently in the Japanese inventory.⁷⁰ Also relevant for the balance of air power in the region, Russia completed the initial development of its fifth-generation fighter aircraft, the Su-50 (also known as the PAK FA). This stealth fighter, designed to compete with the F-22 and F-35, is said to outperform fourth-generation fighters such as the F-15, F-16, and F/A-18.⁷¹ The Su-50 conducted a test of the second prototype March 2011 and it has been reported that the VVS will field approximately 60 of them by 2016.⁷² The bulk of the Russian force will still be comprised of third-generation and fourth-generation

⁶³ Oliker, Crane, Schwartz and Yusupov 2009, 159.

⁶⁴ Ibid, 158.

⁶⁵ Bilateral trade increased to \$18 billion annually in 2007. See Oliker, Crane, Schwartz and Yusupov 2009, 120.

⁶⁶ Ibid.

⁶⁷ By some estimates, Russia still has the world's second largest air force. See RIA Novosti, "The Future of the Russian Air Force: 10 Years On," <http://en.rian.ru/analysis/20100317/158228523.html>.

⁶⁸ Oliker, Crane, Schwartz and Yusupov 2009, 160.

⁶⁹ Although it is unclear now that oil revenues have decreased whether this plan is still realistic.

⁷⁰ J.E. Dyer, "Peace in Our Time: Russia Air Defense to Kuril Islands," *Commentary (online)*, February 15, 2011, <http://www.commentarymagazine.com/2011/02/15/peace-in-our-time-russian-air-defense-to-kuril-islands/>.

⁷¹ David Crane, "Raptor Beware: Russia Test-Flies PAK FA Sukhoi T-50 5th Generation Supercruise-Capable Low-Observable/Stealth Aircraft. Look out F-22," *Defense Review*, February 1, 2010.

⁷² Ibid; RIA Novosti, "Russian Air Force to buy over 60 5th generation aircraft," July 13, 2010, at: http://en.rian.ru/military_news/20100713/159797767.html; RIA Novosti, "Russia tests 2nd prototype of fifth-generation fighter," March 3, 2011, http://en.rian.ru/military_news/20110303/162844406.html.

aircraft for the foreseeable future.⁷³ Furthermore, Russia continues to lack large numbers of precision-guided munitions, modern fire control and damage-assessment systems, reconnaissance assets, and sufficient all-weather/night capable aircraft.⁷⁴

Among its various functions, the Su-50 is highly maneuverable, needs just 300-400 m for takeoff, and performs sustained supersonic flight at speeds over 2000 km/h.⁷⁵ In terms of firepower, it can carry eight next generation air-to-air R-77 missiles, two large controllable anti-ship bombs, or two long-range missiles.⁷⁶ Yet, how well the PAK FA performs in combat scenarios is dependent on the quality of its pilots, who are still undertrained. The VVS Commander Colonel General Alexander Zelin continues to push hard for procurement funds and to increase flying hours,⁷⁷ but given the volatility of oil prices, it is possible that the Defense Minister's modernization plans for the VVS will be put on hold or exhibit a reduction in ambition.

Though these domestic limitations as well as the nature of Russian-Japanese relations today make it unlikely that Japan will have to defend its interests against a Russian air offensive in the foreseeable future, a conflict over the Kurile Islands remains a distinct possibility. These islands, known as the Northern Territories in Japan, were seized by the Soviet Union at the end of WWII and are rich in natural resources, especially minerals. The territorial issue has been heating up since Russian president Dmitry Medvedev made a provocative visit to the islands in dispute in November 2010.⁷⁸ A Japanese newspaper reported last April that in 2010 the JASDF scrambled fighters to intercept Russian aircraft near Japanese air space on 264 occasions, an increase of 30 percent.⁷⁹ This is likely due to Russia's increasing emphasis on its ownership of the Southern Kuril Islands. Indeed, in 2008 after an annual rally in Japan to demand the return of the disputed island chain, a Russia Tu-95 allegedly violated Japanese airspace over an uninhabited Japanese island.⁸⁰ According to a Japanese defense ministry senior official, Russia is most likely testing Japan's capabilities to defend its claims to the island chain.⁸¹

⁷³ Olikier, Crane, Schwartz and Yusupov 2009, 161.

⁷⁴ Ibid, 162.

⁷⁵ RIA Novosti, "FACTBOX: Russia's fifth generation fighter T-50 (PAK FA)," January 29, 2010.

⁷⁶ Ibid.

⁷⁷ Roger McDermott, "Russian Air Force Modernization Linked to Future U.S. 'Threat,'" *Eurasia Daily Monitor* 6, Issue 160, August 19, 2009.

⁷⁸ Ellen Barry, "Kurile Islands Visit by Medvedev Angers Japan," *The New York Times*, November 1, 2010.

⁷⁹ "Airspace border tensions soar/ASDF scrambled 386 times to ward off foreign aircraft in FY10," *The Yomiuri Shimbun*, April 30, 2011.

⁸⁰ "Japan Says Russian Bomber Violated Its Airspace," *The Associated Press*, February 10, 2008, <http://www.nytimes.com/2008/02/10/world/asia/10japan.html>.

⁸¹ "Airspace border tensions soar/ASDF scrambled 386 times to ward off foreign aircraft in FY10," *The Yomiuri Shimbun*, April 30, 2011, <http://www.yomiuri.co.jp/dy/national/T110429004888.htm>.

The conflict in Georgia in August 2008 also demonstrated the risks associated with an inadequate threat assessment and underestimating Russian responses.⁸² In this campaign involving over 300 hundred combat aircraft, the Russian air force demonstrated that its close air support capabilities had improved significantly since the Second Chechen War.⁸³ Russia was also able to quickly establish air dominance by targeting Georgia's C2, leveraging coordinated electronic warfare and cyber-attacks, and target-bombing the runways of Georgian military bases. Though Georgia was in a poor state of readiness compared to Japan, with S-125 air defense systems and only one S-200 missile system, the speed and scope of the Russian campaign demonstrated that as a nation, Russia is still very capable at conventional warfare.

North Korea: A Coercive Diplomacy Nightmare

Due to its antiquated aircraft and poorly trained pilots, the primary North Korean threat from the air comes in the form of its ballistic missiles. The North Korean missile threat has been acutely on the minds of Japanese political leaders ever since Kim Jong-il's 1998 Taepodong missile launch. North Korea currently possesses two types of missiles that could be used against Japan. The first, the Nodong-1, is a MRBM with a range of 1300 km; the DPRK is said to possess estimates of 100-200 of these mobile, liquid-fueled missiles, each with the potential payload of 700 kilograms (kg).⁸⁴ In 2003, credible reports emerged that the DPRK had developed an improved version of the Nodong-1, called Nodong-2. Specific differences between the two missiles as well as the current status of the Nodong-2 are unknown, but the Nodong-2 is supposedly modeled after the Soviet SS-N-6 and has better accuracy. It is possible that the Nodong-2 was successfully tested in July 2006, the first time a Nodong was successfully tested since 1993.⁸⁵ In 2010, there were reports of the creation of a new army division responsible for the newly developed intermediate range missiles; if confirmed, this could suggest that the DPRK has been successful at developing more missiles since 2007 and consequently needs a bigger unit to manage them.⁸⁶ The South Korean government estimates that the DPRK missile arsenal, which includes these intermediate range

⁸² Richard Giragosian, "Georgian planning flaws led to campaign failure," *Jane's Defence Weekly*, August 15, 2008.

⁸³ Olikier, Crane, Schwartz and Yusupov 2009, 162. For details on the air campaign, see Roy Allison, "Russia resurgent? Moscow's campaign to 'coerce Georgia to peace'," *International Affairs* 84, 6 (2008): 1157.

⁸⁴ The lower estimate comes from Andrew Feickert, "Missile Survey: Ballistic and Cruise Missiles of Selected Foreign Countries," CRS Report for Congress, July 26, 2005. The higher estimate comes from General B. B. Bell, "Statement before the Senate Armed Services Committee," March 7, 2006 cited by the National Committee on North Korea, "An Overview of North Korea's Ballistic Missiles Program. Other details about the Nodong-1 come from "CNS Special Report on North Korean Ballistic Missile Capabilities," *Center for Nonproliferation Studies at the Monterey Institute of International Studies*, March 22, 2006.

⁸⁵ The above information on the Nodong-2 comes from Daniel Sneider, "Missiles are pivotal to North Korea's military strategy," *San Jose Mercury News*, July 25, 2006.

⁸⁶ "North Korea's army division handles missiles," *The Washington Times*, March 10, 2010, <http://www.washingtontimes.com/news/2010/mar/10/north-koreas-army-division-handles-missiles/>.

missiles, did indeed increase by 25 percent in the past three years to a total of 1000 missiles.⁸⁷

The second missile of interest, the Taepodong-1, is a two-stage missile, which consists of the Nodong in the first stage and a Scud variant in the second. Depending on the range, the Taepodong can carry a payload of up to 1500 kg. Though theoretically this missile could reach anywhere in Japan's territory, it has yet to be successfully tested. North Korea is allegedly developing a third type of missile that could strike anywhere in Japan, the Taepodong X, which would be a land-based mobile liquid fueled missile with a range of 4000 km and a payload of 1500 pounds (lbs). This missile, however, is still in development and has yet to be tested.⁸⁸

North Korean missiles pose less of a threat to Japan's military capacity than they do to civilian targets due to their inaccuracy. According to a Center for Nonproliferation Studies report, a ballistic missile must be accurate at least within tens of meters before the weapon has a useful direct military role. The medium range Nodong, however, has an average circular error of two to four km and the Taepodong is even less accurate.⁸⁹ Furthermore, given the testing and development required to improve accuracy to these levels, the DPRK has significant obstacles to overcome to be able to do so in the foreseeable future. Specifically, for the Taepodong, the DPRK would need accelerometers and thrusters that could be controlled more precisely to improve inaccuracies stemming from guidance and control errors that occur during boost and reentry.⁹⁰ Given the inaccurate nature of DPRK ballistic missiles, they would more likely be used as weapons of terror within the context of a larger conflict. By holding Japan at risk, the DPRK may hope to prevent the United States from using its bases in Japan in the event of a future conflict on the peninsula. Its ability to hold Japan and South Korea at risk also complicates offensive options of U.S. preemptive strike on DPRK nuclear facilities due to the likely belligerent DPRK response.

REGIONAL SCENARIOS

North Korean Coercive Diplomacy

Given North Korean reliance on ballistic missiles over aircraft and the inaccurate nature of their medium and long-range ballistic missiles, the DPRK is unlikely to rely on airpower to destroy Japanese military capacity, but instead will use its missiles as a tool of conventional or nuclear coercion or retaliation. For example, the threat of unleashing

⁸⁷ "North Korea has 1,000 missiles, South says," *Reuters*, March 17, 2010, <http://www.reuters.com/article/2010/03/17/us-korea-north-missiles-idUSTRE62G1ZC20100317>.

⁸⁸ "CNS Special Report on North Korean Ballistic Missile Capabilities."

⁸⁹ *BBC News*, "North Korea's missile programme," <http://news.bbc.co.uk/2/hi/asia-pacific/2564241.stm>.

⁹⁰ David Wright, "North Korea's Missile Program," <http://www.ucsusa.org/assets/documents/nwgs/north-koreas-missile-program.pdf>.

a wave of explosives against Seoul was one of the primary reasons then Secretary of Defense William J. Perry opted not to bomb areas housing North Korea's nascent nuclear program. In order to reduce the probability that North Korea will fire missiles at Japan, the first step is to reduce the effectiveness of such a strategy. If Japanese strategic thinkers are correct in thinking that Kim Jong-il would target Japan to influence U.S. strategic thinking, then in addition to air defense measures Japan needs to take steps to credibly signal its dedication to the alliance. Most observers focus on U.S. credibility to protect its Asian allies, but in the case of North Korea coercive diplomacy, Japan would benefit from clearly and convincingly signaling to the DPRK that it is willing to bear the costs of supporting U.S. efforts in a conflict on the peninsula. Consequently, changes need to be made in both political and military posture to adequately address the North Korean ballistic missile threat.

Before one can discuss changes Japan needs to make to better address this regional contingency, key questions need to be addressed: What is the potential capability of North Korea in this scenario? How is the damage sustained by Japan a function of the number of missiles striking their targets? And lastly, what are the alternatives Japan can employ to meet this threat?

In the first week of a conflict, North Korea could potentially launch a large amount of its 100-200 medium range Nodong ballistic missiles. The DPRK has at least four stationary launch sites and mobile launchers have been deployed to at least two sites—one near Pyongyang.⁹¹ At the maximum end of the scale in this scenario, the DPRK utilizes all of its launch sites in this operation and launches the missiles as fast as it can prepare them. From a strategic point of view, however, given that the primary goal is likely to be coercion, not destruction of Japanese or U.S. military capabilities, the imperative to launch as many missiles as possible reduces. Instead, North Korea is likely to pause to bargain between launching rounds. If the missile attacks fail to turn Japanese public opinion against national involvement as the DPRK hopes, the DPRK could move to use the missiles to disrupt and delay mobilization and deployment of assets. Yet again, given the limited accuracy of North Korean medium and long-range ballistic missiles, they would be able to cause some friction in the system, but not to halt it altogether. The DPRK has a better shot at preventing U.S. mobilization against them by holding Japan or South Korean allies hostage rather than through direct employment of military force against U.S. military forces. Given the coercion scenario, Japan has three options, which are not mutually exclusive.

First, Japan could rely on its air defense system to protect it from incoming DPRK ballistic missiles. Japan's air defense system underwent a significant revamping three decades ago. The Basic Air Defense Ground Environment (BADGE), which is an integrated network of radar installations and air defense direction centers maintained

⁹¹ "No-dong-A," Globalsecurity.org, <http://www.globalsecurity.org/wmd/world/dprk/nd-1.htm>.

by JASDF, is the foundation for JASDF's ability to prevent incursions into Japanese airspace. This system, which relies on 28 air defense radar sites, was modernized in the late 1980s when a detachment of E-2C airborne early warning aircraft was added.⁹² Japan is beginning to deploy four FPS-5 along with seven improved FPS-3 long range early warning radar systems capable of detecting ballistic missile launches.⁹³

A key part of Japan's air defenses has been theater missile defense (TMD). Though limited talks between the United States and Japan about TMD began as early as 1983, Japan did not seriously consider acquiring a ballistic missile defense system until the DPRK's August 1998 test of its three-stage Taepodong missile. Currently, Japan is establishing a layered, integrated air and missile defense system consisting of Patriot PAC-3 fire units for terminal defense against ballistic missiles and Aegis-equipped destroyers with Standard Missile-3 (SM-3) interceptors for mid-course defense. With its first unit deployed in March 2007, PAC-3 fire units are located at five bases around the country.⁹⁴ Eventually, 16 fire units covering Japan's major cities will be equipped with PAC-3 missiles. Media reports indicate that Japan is also equipping four existing and two planned destroyers with the SM-3 Block IA, and these upgrades will be deployed by 2011. Currently, a joint program between the United States and Japan is also seeking to produce an upgraded interceptor variant, the SM-3 Block IIA. Japan's Ministry of Defense (MOD) intends to link its missile defenses to its four FPS-5 radar sites and its seven upgraded FPS-3 radar sites via a C3 (command, control, and communications)

⁹² "Japan Air Self Defense Force," Globalsecurity.org, <http://www.globalsecurity.org/military/world/japan/jasdf.htm>; Ministry of Defense (MOD), Defense of Japan 2009, (Ministry of Defense, Tokyo, 2009), reference section, http://www.mod.go.jp/e/publ/w_paper/pdf/2009/45Location.pdf.

⁹³ Ministry of Defense (MOD), Japan's BMD, (Ministry of Defense, Tokyo, February 2009), 15, http://www.mod.go.jp/e/d_policy/bmd/bmd2009.pdf. Japan's first FPS-5 radar, deployed on Shimokoshiki island in the Sasebo District, was officially unveiled on May 20, 2009. The FPS-5 radar costs an estimated 18 billion yen (\$234.6 million) per unit, and by FY11 will also be deployed at Ominato, Sado and Yozadake, with an additional FPS-5 radar being deployed at Mineokayama, outside Tokyo, as a research facility. Seven FPS-3 radar sites at (from North to South) Tobetsu, Kano, Otakine, Wajima, Kasadoriyama, Kyogamisaki and Seburi will be upgraded and are expected to be operational by FY09. These radar sites and their associated air defense units are organized into six air defense missile groups, which are grouped geographically with their associated air wings and central aircraft control and warning wings into four air defense forces, each of which will maintain one advanced FPS-5 missile defense radar site. Also see

"Japan's Most Advanced Missile Defense Radar Publicly Unveiled [日最尖端導弾監視雷達公開亮相], *TaKungBao*, May 21, 2009, <http://www.takungpao.com/news/09/05/21/junshio3-1085706.htm>.

⁹⁴ See "Successful PAC-3 Flight Test," Ministry of Defense website, <http://www.mod.go.jp/e/jdf/no11/special.html>. Patriot-3s (PAC-3s) are assigned to four fire units at Narashino, Takeyama, Kasumigaura and Iruma, respectively, under the 1st Air Defense Missile Group. One PAC-3 fire unit (FU) was also deployed at Gifu under the 4th Air Defense Missile Group, and another PAC-3 FU was deployed at the Air Defense Missile Training Group and 2nd Technical School in Hamamatsu. See Ministry of Defense (MOD), *Defense of Japan 2009* (Ministry of Defense, Tokyo, 2009), Chapter 1, Section 2, 185, http://www.mod.go.jp/e/publ/w_paper/pdf/2009/28Part3_Chapter1_Sec2.pdf.

network known as the Japan Aerospace Defense Ground Environment (JADGE) by FY 2011.⁹⁵

There are a number of reasons why reliance on TMD is currently insufficient to protect Japanese national security. Though when considered in tandem with those of U.S. forces, air defense assets in Japan are substantial, there are serious limitations to the ability of these systems to intercept advanced Chinese DF-21Cs and cruise missiles. To enhance its missile capabilities against these threats, Japan could consider acquiring newer updated systems such as THAAD or SM-3 IIA.⁹⁶ This would mean more money toward TMD research, development, and deployment; spending for which has already been cut significantly over the past decade. In 2003, the budget for the missile defense system was cut given the fiscal environment to 100 billion yen (about \$930 million);⁹⁷ in 2009, Japan froze spending for the program altogether.⁹⁸ Furthermore, there has been speculation that the budgetary tradeoffs exist between the F-X fighter program and TMD, meaning that more spending on TMD would require a reduction in the quality and quantity of fighters procured. Secondly, the PAC-3 system was designed to defend relatively small areas against incoming missiles, thereby assuming military targeting. Yet, given the goals of the DPRK and the inaccuracy of its missiles, in this scenario the DPRK are employing missiles primarily for coercive purposes, not for the destruction of military capabilities. In light of this scenario, the PAC-3 may be useful in protecting U.S. forward-deployed forces in Japan, but less effective at protecting against missiles launched at civilian targets.

The second option is for Japan to focus on developing the capability to destroy DPRK missiles in the launch stage. TBMs are inherently difficult to defend against because of their long range, accuracy (within 100 m), extreme difficulty in pre-launch detection, and low radar signature. However, it is important to note that DPRK ballistic missiles often fail to meet these standards of low pre-launch detection and high accuracy. Even though some observers argue that the JASDF is moving away from its 'defensive defense only' doctrine to expand its ability to defend offensively, preemptive strikes against missile facilities are still difficult to promote politically. The development and employment of cruise missiles or ballistic missiles would be the most distasteful to those in Japan that support the continued prohibition against perceptibly offensive weapons systems. However, if Japan chose to procure a stealth fighter, such as the F-35, in its pending decision to upgrade its air fleet, Japan could use them to penetrate the DPRK air defenses to strike missile sites before the missiles are fired if the

⁹⁵ Ibid.

⁹⁶ The authors would like to thank Ian Easton for clarifying this point. Also, Japan has not purchased an amount comparable to the threat; in 1998, JASDF received twenty-four PAC-2 fire units and sixteen PAC-3 interceptors in 2006; for comparison, Taiwan requested 330 in 2007.

⁹⁷ "Japan eyes missile defense budget," *CNN World (online)*, December 15, 2003.

⁹⁸ "Japan Cuts Funds for Joint Missile Defense Program," *Agence France-Presse*, December 17, 2009, <http://www.defensenews.com/story.php?i=4423809>.

threat was imminent.⁹⁹ In 1999, Japanese Defense Agency officials asserted that counter-offensive strike would be constitutional; in 2006, former Prime Minister Koizumi suggested such a move may be politically feasible when he commented that “there is no harm in discussing how to respond when a missile has been launched [by North Korea].”¹⁰⁰

Regardless of the political feasibility of striking a DPRK missile in its launch phase, Japan should not rely on this option alone. Even though DPRK missiles do not meet the highest standards for concealment, there have been times that the United States has failed to detect the preparations for missile launch. For example, in July 2006 when the DPRK tested the Taepodong-2, they also launched several tactical missiles. Although U.S. intelligence services were watching the missile site closely, little information was known about the launches of these tactical missiles prior to the event. Furthermore, longer than usual set up times may still not necessarily be enough time to target and attack before launch.

This option touches upon the contemporary debate in Japan about whether to expend its limited resources on better integrating with the U.S. Air Force or to develop more autonomous air defenses. The alliance stipulates a basic division of responsibility: the United States will support JASDF with offensive strike capability to repel enemy attacks and Japan is expected to withstand enemy invasion by defensive operations. This would suggest that the United States is responsible for offensive missions such as strikes against missile deployment areas, bases, and facilities. In addition to the general desire for Japan to develop more autonomous air defenses, there are important political reasons to develop an independent strike capability. Specifically, by taking on a greater responsibility to defend itself, Japan can change the DPRK’s strategic calculus so that coercion through missile attack is no longer an attractive option. In other words, the nature of the U.S.-Japan alliance has an impact on the probability that North Korea will leverage its ballistic missiles to compel Japan to do its will.

As it currently stands, the 1960 Treaty of Mutual Cooperation and Security is one of the most asymmetric treaties in the international system, requiring the United States to defend Japan without any reciprocal requirement of Japan. This is partly a remnant of the Cold War era in which a series of Japanese prime ministers disagreed with the U.S. about the severity of the Soviet threat and were more concerned about how their relationship with the United States could drag Japan into conflict. Yet this logic does not apply to the contemporary North Korean threat, which both the United States and Japan take quite seriously. Furthermore, even if Japan would opt to stay out of a broader conflict on the peninsula, any suspicion that attacking Japan would gain

⁹⁹ Wendell Minnick, “Japan AF Expands Definition of ‘Defense,’” *Defense News*, July 14, 2008.

¹⁰⁰ Daniel A. Pinkston and Kazutaka Sakurai, “Japan Debates Preparing for Future Preemptive Strikes against North Korea,” *The Korean Journal of Defense Analysis*, Vol. XVIII, No 4, Winter 2006, 117.

leverage against the United States could compel the DPRK leadership to take that course of action.

In light of the DPRK's plausible calculus (i.e., that Japan can be coerced into denying U.S. support), a provision should be added to treaty that requires Japan to allow the United States to use its bases in Japan in a DPRK contingency. Such a provision would undermine any incentive North Korea may have to blackmail the Japanese into disallowing the United States to deploy their forces based in Japan. Given that this provision solely concerns a North Korean contingency, such a change in the treaty is unlikely to solicit great backlash from the Chinese, who are concerned primarily with the role of Japan in a Taiwan conflict. Though a provision requiring collective defense against North Korea if the United States were attacked may be a more credible signal, there are two main reasons why this is not ideal. First, from the U.S. perspective, if Japan is required to defend the United States in a Korean contingency, Japan will demand more of a say in how the United States deals with the DPRK more generally, especially within the context of the Six-Party Talks. Secondly, Japan is legally barred against collective defense against other countries, and making changes to the Japanese constitution to allow for defense of the United States in the case of DPRK aggression may not be politically feasible.

Given the political, fiscal and security costs and benefits of these three options in addressing the DPRK missile threat, a balanced combination of these three options is the best way for Japan to protect and defend itself in the face of North Korean aggression. The primary budget priority should be for Japan to acquire stealthy fighters because the DPRK TBMs would be a high-priority target for airstrikes if a conflict on the peninsula were to unfold and would enhance Japanese deterrence against DPRK aggression more generally. Secondly, Japan should rely on its limited ballistic missile defense capabilities only in the cases in which U.S. intelligence fails to detect missile launch preparations. After the FX program is adequately funded, if possible given budget constraints, Japan should procure more missile defense interceptors. Lastly, Japan should make an effort to credibly signal to North Korea that it will allow the United States to use their forces based in Japan in a Korean peninsula contingency, possibly by adding this stipulation to the treaty.

Chinese Seizure of the Senkakus

While the implications of Chinese air power development for Taiwan's security have been thoroughly detailed in other studies,¹⁰¹ implications for Japanese security and

¹⁰¹ See Davis A. Shlapak, David T. Orletsky and Barry A. Wilson, *Dire Strait? Military Aspects of the China-Taiwan Confrontation and Options for U.S. Policy* (Arlington, VA: RAND Corporation, 2000); John Stillion and Scott Perdue, *Air Combat Past, Present and Future* (Arlington, VA: RAND Corporation, 2008); Kenneth W. Allen, "Air Force Deterrence and Escalation Calculations for a Taiwan Strait Conflict: China, Taiwan, and the United States," in *Assessing the Threat: China's Military and Taiwan's Security*,

the U.S.-Japanese alliance remain underexplored. For Japan, these developments in Chinese air power may lead to Chinese confidence in the effectiveness of employing force to resolve its territorial dispute over the Senkaku/Diaoyu Islands, especially in the context of a greater conflict between the two countries. Consequently, this study will look at some of the challenges PLAAF modernization poses for the JASDF in its mission to protect Japanese interests in this offshore island dispute, which includes detecting and destroying invading missiles or aircrafts, reacting to violations of Japan's territorial airspace and air incursions, engaging in the interdiction of airborne or amphibious landing invasions and air support for ground units as necessary.¹⁰² Moreover, U.S. forces in Japan, which may be called upon to assist JASDF, are not immune from the growing Chinese threat; a recent RAND study argues that China could deny the United States the "ability to operate efficiently from nearby bases or seas." The study has dire predictions for the survivability of U.S. air bases in Japan, arguing that a Chinese attack with thirty-four missiles with submunition warheads "could damage, destroy or strand 75 percent of aircraft based at Kadena."¹⁰³ This is especially pertinent given that the Senkaku/Diaoyu Islands are under Japanese administrative jurisdiction and therefore U.S. obligations under the Treaty of Mutual Cooperation and Security would apply to their protection.

The disputed island group, known as the Senkaku in Japanese and the Diaoyutai in Chinese, consists of eight uninhabited islands found approximately 100 miles (mi) northeast of Taiwan and 250 mi west of Okinawa.¹⁰⁴ The disagreement over these islands and consequently maritime rights in the East China Sea is exacerbated by the fact that waters near the islets are thought to be rich in oil and gas deposits, and control over the islands would give the country in question an extra 40000 sq mi of exclusive economic zone (EEZ).¹⁰⁵ In the words of a prominent China scholar, "given the strategic and economic value attached to the islands and periods of tension in the broader China-Japan relationship, the absence of armed conflict or even tense military confrontations is nothing short of remarkable."¹⁰⁶ A partial explanation for the lack of conflict is that even though the United States remains neutral about the question of sovereignty over the islands, U.S. defense officials have clarified that the protection of the islands does indeed fall under the 1960 Treaty of Mutual Cooperation and Security.¹⁰⁷

ed. Michael D. Swaine, Andrew Yang, Evan Medeiros and Oriana Mastro (Washington, DC: Carnegie Endowment for International Peace, 2006), 153-183.

¹⁰² "Japan Air Self Defense Force," [Globalsecurity.org](http://www.globalsecurity.org/military/world/japan/jasdf.htm), <http://www.globalsecurity.org/military/world/japan/jasdf.htm>.

¹⁰³ Wendell Minnick, "RAND study suggests US Loses War with China," *Defense News*, October 16, 2008.

¹⁰⁴ Joseph Ferguson, "The Diaoyutai-Senkaku Islands Dispute Reawakened," *The Jamestown Foundation China Brief*, Vol. 4, Iss. 3.

¹⁰⁵ *Ibid.*

¹⁰⁶ M. Taylor Fravel, "Explaining Stability in the Senkaku (Diaoyu) Islands Dispute," in *Getting the Triangle Straight: Managing China-Japan-US Relations*, ed. Gerald Curtis, Ryosei Kokubun and Wang Jisi (Washington, DC: The Brookings Institution Press, 2010), 145.

¹⁰⁷ The United States position on the Senkaku/Diaoyutai territorial dispute, articulated in 2004 by then Deputy spokesman at the U.S. State Department is as follows: "The Senkaku Islands have been under the

A Senkaku/Diaoyu Islands scenario in which China attempts to occupy one of the islands that both countries have formally claimed sovereignty over since 1970 is a scenario worthy of attention. The PRC could test Japan's ability to gain air superiority, defend against a Chinese air campaign and amphibious invasion operations, and ensure that its air bases remain operable even when under attack. Given this, Japan has been taking steps to modernize its defenses. Although a shift in the strategic environment could alter its direction, Japan has maintained an operationally defensive strategy, consisting of conventional air forces and ground based air defenses, to defend against threats from above. Relying on the United States to conduct operations outside its territory, Japan's defense establishment has chosen to forgo theater missiles for strategic strike missions. As a result, it places a premium on early warning and engagement of inbound threats. Therefore, Japanese priorities include the procurement of next generation fighters, integrated air and missile defenses, intelligence, surveillance, and reconnaissance systems.¹⁰⁸

Such a scenario is also a possibility given the conventional wisdom derived from Chinese behavior that Beijing wants to develop a sphere of influence in the South China and East China Sea. In two of its offshore island disputes, China has already occupied contested territory by force: in 1974, China seized an island chain in the western Paracels held by South Vietnam and in 1988 it occupied six features in the Spratly Islands, which were claimed by both Vietnam and the Philippines. One prominent China scholar argues that China is sensitive to the long-term implications of the weakening of its claims, and has apparently resorted to force to strengthen its claims.¹⁰⁹ In 1994, China moved to occupy Mischief Reef, a section of the Spratly Islands claimed by the Philippines.

China has become increasingly assertive about its offshore island claims in recent years as its military might grows, suggesting China will only become more aggressive in the future. A June 2010 article in the *Economist* posited that China's neighbors are wary that China's rapid naval build-up foreshadows a territorial grab. An acceleration of military exercises out of Hainan Island only serves to intensify these concerns.¹¹⁰ An article in the *Global Times* in April 2009 asserted that even though the Chinese military

administrative control of the Government of Japan since having been returned as part of the reversion of Okinawa in 1972. Article 5 of the 1960 U.S.-Japan Treaty of Mutual Cooperation and Security states that the treaty applies to the territories under the administration of Japan; thus, Article 5 of the Mutual Security Treaty applies to the Senkaku Islands. Sovereignty of the Senkaku Islands is disputed. The U.S. does not take a position on the question of the ultimate sovereignty of the Senkaku/Diaoyu Islands. This has been our longstanding view. We expect the claimants will resolve this issue through peaceful means and we urge all claimants to exercise restraint." See "Senkaku/Diaoyutai Islands," www.globalsecurity.org.

¹⁰⁸ Ministry of Defense (MOD), *Defense of Japan 2009*, Chapter 1, section 3, 212, http://www.mod.go.jp/e/publ/w_paper/pdf/2009/29Part3_Chapter1_Sec3.pdf.

¹⁰⁹ M. Taylor Fravel, *Strong Borders, Secure Nation* (Princeton, NJ: Princeton University Press, 2008).

¹¹⁰ "Lost Horizon," *The Economist*, June 10, 2010, http://www.economist.com/node/16321702?story_id=16321702.

is getting stronger, China does not intend to “challenge the U.S. in the central Pacific or engage in a military clash with Japan in close waters, though it is willing to protect its core interests at any cost.”¹¹¹ Yet Chinese actions are not encouraging on this last point; Chinese PLAAF fighters exercises increasingly exhibit a pattern of infringing on Japan’s airspace near the islands and just last year Japanese maritime Self-Defense Force P-3C spotted a Chinese Ming-class attack submarine in waters close to islands.¹¹² This was not the first time a Chinese submarine was found in what Japan considers its territorial waters. In November 2004, Japan mobilized its maritime forces to chase away what was believed to be a Han-class nuclear powered Chinese submarine. To protect against incursions of Chinese marine survey ships, Japan’s Maritime Safety Agency last year reportedly positioned a patrol vessel in nearby waters.¹¹³

There have also been numerous incidents involving ostensibly nongovernment entities; in March 2004 a group of Chinese protesters were arrested by the Japanese for landing on the main island in the group. Strong nationalist sentiment about the islands and the inability or unwillingness of Beijing to control third party activities in nearby waters increases the probability of inadvertent escalation over these offshore islands. In September 2010 tensions between the two countries flared once again when the Japanese coast guard arrested the crew of a Chinese fishing vessel operating in the waters off the islands. Given this flashpoint, it is understandable that the hypothetical recapturing of a remote island from the enemy was the scenario for the November 2010 U.S.-Japan joint military exercise, the largest held to date.¹¹⁴

China has indeed become more aggressive in the East China Sea, indicating an increasing probability that China will attempt to seize the islands by force, especially in the context of a wider conflict. The U.S.-Japan alliance most likely compels some caution in the minds of Chinese planners, but that does not mean the alliance should be unprepared to meet the challenge. Just as analysts hope that the increased economic ties between China and Taiwan coupled with Chinese promises to rise peacefully will prohibit any attempts to resolve the cross-strait issue by force, many analysts hope that a similar dynamic will deter Chinese aggression over the Senkaku/Diaoyu Islands. Even if an outright amphibious assault of the islands does not occur, a prepared Japan and United States are still necessary to deter Chinese attempts to use limited force to enhance its claims. In this spirit, the biannual joint Japan-U.S. Army command-post exercise focused for the first time in 2006 on a counteroffensive scenario against enemy

¹¹¹ Michael Richardson, “Beijing projects power in South China Sea,” May 9, 2010, <http://search.japantimes.co.jp/cgi-bin/eo20100509mr.html>.

¹¹² Ferguson 2004.

¹¹³ “Senkaku/Diaoyutai Islands,” Globalsecurity.org, <http://www.globalsecurity.org/military/world/war/senkaku.htm>

¹¹⁴ U.S.-Japan naval drills start as N Korea tensions rise,” *BBC News*, December 3, 2010, <http://www.bbc.co.uk/news/world-asia-pacific-11907026>; Kei Koga, “East Asia’s Territorial Disputes: Times for Preventive Diplomacy,” *RSIS Commentaries*, No 134/2010, October 27, 2010, <http://www.rsis.edu.sg/publications/Perspective/RSIS1342010.pdf>.

forces occupying one or more small southwestern islands of the Senkaku/Diaoyu island group.¹¹⁵

Moreover, because Japan occupies and controls the islands, China may consider the use of force as one of the few options available to strengthen its claims or compel concessions out of Japan with the ultimate goal of regaining sovereignty of the islands.¹¹⁶ For example, China could begin to fly dangerously close to Japanese air space to signal resolve by increasing the risk of escalation and conflict. The *2006 Defense of Japan* mentioned that the PLAAF had increased the number of reconnaissance flights against Japan and posited potential rationales for Chinese maritime action against Japan.¹¹⁷ The number of times the JASDF has had to send out fighters to address possible Chinese violations of Japanese territorial airspace have increased in recent years, from 141 in fiscal year 2005 to 239 in fiscal year 2007.¹¹⁸ Though countermeasures against coercive scenarios include components of policy beyond military capabilities, the modernization of the JASDF could do much to discourage China from engaging in coercive diplomacy.

If China did move to occupy part of the islands, a Japanese counteroffensive would require dispatching troops, warplanes, destroyers and submarines.¹¹⁹ From the initial phases of gathering intelligence to the final stage of an amphibious assault to retake the captured islands, air power plays a critical role. Specifically, aircraft units are necessary for early detection, reconnaissance, transporting Self-Defense Forces and supplies to the theater, and lastly, capturing and sustaining air superiority to facilitate the counteroffensive amphibious assault. To meet these diverse goals, JASDF maintains 12 fighter squadrons, which consist of nine units whose mission is to intercept intruding aircraft and three support fighter units to counter landing invasions and to support from the air the GSDF and MSDF units fighting against invading forces.¹²⁰

Early detection of Chinese aggression is key because if Japan's response was expected to be "too little, too late," it could affect Chinese calculations;¹²¹ specifically,

¹¹⁵ Michael Pillsbury, "An Issue for President Obama's First Visit to China: China's Worry about Japan's Military," September 17, 2009, <http://www.michaelpillsbury.net/pillsburyarticle3.php>.

¹¹⁶ Fravel 2010, 149.

¹¹⁷ "Defense of Japan 2006," Japan Ministry of Defense website, <http://www.mod.go.jp/e/publications/wp2006/pdf/1-2-2.pdf> and <http://www.mod.go.jp/e/publications/wp2006/pdf/1-2-3.pdf>.

¹¹⁸ Defense of Japan 2006, "October 2006, Japan Ministry of Defense, July 12, 2007, 174, <http://www.mod.go.jp/e/publications/wpaper/pdf/2006/3-2-2.pdf>; "Hot Scrambles," Japan Air Self-Defense Force, July 12, 2007, <http://www.mod.go.jp/asdf/en/mission/boue1>. Cited by Richard Bush, "China-Japan Tensions, 1995-2006- Why They Happened, What to Do," Brookings Institution, *Policy Paper No 16*, June 2009, 20.

¹¹⁹ Pillsbury 2009.

¹²⁰ "Japan Air Self Defence Force," www.globalsecurity.org.

¹²¹ For a detailed discussion of this point, see Ashley J. Tellis, Chung Min Lee, James Mulvenon, Courtney Purrington, and Michael D. Swaine, "Sources of Conflict in Asia," in *Sources of Conflict in the 21st*

Chinese leaders may believe that the United States and/or Japan would be constrained in the range of diplomatic, economic, and military responses they could employ if faced with a *fait accompli*. Currently, the JASDF BADGE system relies on 28 air defense radar sites to provide such detection.¹²² Japan has developed and is beginning to deploy four FPS-5 along with seven improved FPS-3 long-range early warning radar systems, which will allow for earlier detection and characterization of ballistic missile launches.¹²³ Yet, Japan still relies on the United States for detection and early warning from the U.S. geostationary infrared missile launch detection and tracking satellites stationed over the eastern region. These satellites would detect a missile launch minutes before the ground-based radars in Japan itself, crucial time in a crisis scenario.¹²⁴

Japan is establishing a layered, integrated air and missile defense system consisting of Patriot PAC-3 fire units for terminal defense against ballistic missiles and Aegis-equipped destroyers with Standard Missile-3 (SM-3) interceptors for mid-course defense.¹²⁵ The JASDF is organized into four regional air defense forces, with the Western Air Defense Force (headquartered in Kasuga) and the Southwestern Composite Air Division (headquartered in Naha) most likely to be engaged in a crisis over disputed territories.¹²⁶ All four air defense forces are unified at Japan's Air Defense Command Headquarters. According to previously reported plans to relocate from Fuchu Air

Century: Regional Futures and U.S. Strategy, ed. Zalmay Khalilzad and Ian O. Lesser (Santa Monica, CA: RAND Corporation 1998), 113.

¹²² Ministry of Defense (MOD), *Defense of Japan 2009* (Ministry of Defense, Tokyo, 2009), reference section, http://www.mod.go.jp/e/publ/w_paper/pdf/2009/45Location.pdf.

¹²³ Ministry of Defense (MOD), *Japan's BMD* (Ministry of Defense, Tokyo, February 2009): 15, http://www.mod.go.jp/e/d_policy/bmd/bmd2009.pdf. Japan's first FPS-5 radar, deployed on Shimokoshiki island in the Sasebo District, was officially unveiled on May 20, 2009. The FPS-5 radar costs an estimated 18 billion yen (US\$) per unit, and by fiscal year (FY) 2011 will also be deployed at Ominato, Sado and Yozadake, with an additional FPS-5 radar being deployed at Mineokayama, outside Tokyo, as a research facility. Seven FPS-3 radar sites at (from North to South) Tobetsu, Kano, Otakine, Wajima, Kasadoriyama, Kyogamisaki and Seburi will be upgraded and are expected to be operational by FY2009. These radar sites and their associated air defense units are organized into six air defense missile groups, which are grouped geographically with their associated air wings and central aircraft control and warning wings into four air defense forces, each of which will maintain one advanced FPS-5 missile defense radar site. Also see "Japan's Most Advanced Missile Defense Radar Publicly Unveiled" [日最尖端導弾監視雷達公開亮相], *TaKungBao*, May 21, 2009, <http://www.takungpao.com/news/09/05/21/junshio3-1085706.htm>.

¹²⁴ Desmond Ball, "Whither the Japan-Australia security relationship?" *Austral Policy Forum* 06-32A 21, September 2006, <http://rmit.nautilus.org/forum-reports/0632a-ball.html#n1>.

¹²⁵ More information of theater missile defense can be found on page 14 of this report.

¹²⁶ Ministry of Defense (MOD), "Organization (JASDF) Japan Air Self-Defense Force," <http://www.mod.go.jp/asdf/english/formation/organization01.html>. The Western Air Defense Force is comprised of the 5th and 8th Air Wings at Nyutabaru and Tsuiki, respectively; and the 2nd Air Defense Missile Group, the Western Air Defense Force Headquarters Support Flight Squadron and Western Aircraft Control and Warning Wing at Kasuga. The Southern Composite Air Division is comprised of the 83rd Air Wing, the 5th Air Defense Missile Group, and the Southwestern Aircraft Control and Warning Wing at Naha, Okinawa.

Station in 2010, Japan's air defense network will be centrally controlled at an Air Defense Command (ADC) headquarters at Yokota Airbase.¹²⁷

In order to defend the offshore islands in the face of a Chinese attempt to seize them, Japan needs the ability to seize and maintain air superiority. This implies that Japan should be capable of executing air attacks on China without significant opposition and be free of the danger of Chinese air incursions. Since the incorporation of air power into the armed forces, "no country has won a war in the face of enemy air superiority, no major offensive has succeeded against an opponent who controlled the air, and no defense has sustained itself against an enemy who had air superiority. Conversely, no state has lost a war while it maintained air superiority, and attainment of air superiority consistently has been a prelude to military victory."¹²⁸ In the case of a Senkaku/Diaoyu Island conflict, Japan needs to seize and maintain local air superiority at the very least, which means JASDF would have freedom of movement around the islands for a finite period of time.

To meet this necessity, Japan maintains fighter aircraft units "to respond swiftly and appropriately" to any violation of Japan's airspace.¹²⁹ Yet, Japan's F-15s are nearly 30 years and are in dire need of upgrading and airframe strengthening.¹³⁰ Japan also flies about one hundred F-4EJ Kai Phantom aircraft, which are over forty years old.¹³¹ Because Japan still employs outmoded fighter interceptor aircraft, the conventional wisdom is that Japan essentially relies on U.S. forces to provide interceptor capability.¹³² Most relevant for a potential conflict with China over the Senkaku/Diaoyu Islands is the fact that JASDF's 200 F-15Js and F-16s are likely insufficient to counter China's

¹²⁷ This move strengthens early warning and bilateral command and control, and the move is viewed as conducive for joint cooperation between U.S. and Japanese forces as the new bilateral air operations center will link up with the 613th Air and Space Operations Center (AOC) at Hickham AFB in Hawaii which synchronizes all U.S. air, space and cyberspace missions in the theater. Bilateral Joint Operations Coordination Command Center (BJOCC) under the USFJ headquarters building is said to hold up to 150 people in wartime and every position on the main floor has a Japanese counterpart working alongside U.S. personnel to foster bilateral cooperation and augment bilateral operability. See Rita Boland, "Partnership in the Pacific," *Signal*, June 2008, http://findarticles.com/p/articles/mi_qa5438/is_200806/ai_n27901531/?tag=content;col1; General Howie Chandler (USAF), "An Airman's Perspective: Air, Space, and Cyberspace Strategy for the Pacific," *Strategic Studies Quarterly*, Summer 2008, 15, <http://www.au.af.mil/au/ssq/2008/Summer/chandler.pdf>; and Vince Little, "Control Hub Used To Direct Exercise," *Stars and Stripes*, November 17, 2007, <http://www.stripes.com/article.asp?section=104&article=50313>; Leandra D. Hernandez, "Ceremony Marks Japan's Air Defense Command Move to Yokota," *Yokota Air Base News*, February 20, 2008, <http://www.yokota.af.mil/news/story.asp?id=123088254>.

¹²⁸ Col John A. Warden, III. *The Air Campaign: Planning for Combat* (Washington DC: National Defense University Press, 1988).

¹²⁹ "Defense of Japan 2010, Part II: The Basics of Japan's Defense Policy and Build-up of Defense Capability," 143, http://www.mod.go.jp/e/publ/w_paper/pdf/2009/22Part2_Chapter2_Sec2.pdf.

¹³⁰ Michael Auslin, "Japan's FX Travails," *AEI Center for Defense Studies*, <http://www.defensestudies.org/?p=1303>.

¹³¹ Ibid.

¹³² "Japan Air Self Defence Force," Globalsecurity.org.

estimated 230-280 J-11 and air superiority fighters and 100-140 J-10 multi-role fighters.¹³³

As the air balance stands now the quantity of Japan's fighters are insufficient to counter Chinese fighters, which is why Japan established the F-X program. The program requires Japan to procure a new fighter to enter the service. Japan is currently looking to buy 40 to 60 fighter aircraft to replace the F-4EJ in its air-to-air role, which is set to be retired in 2015. Considerations when purchasing equipment include curbing costs of procuring defense equipment and obtaining an aircraft that will be effective against the continuously developing Chinese air force.¹³⁴ Because of this, senior leaders of the program want an air superiority fighter that could handle not only 4.5-generation fighters but also any fifth-generation stealth fighters that might be introduced into the region in the mid-term future.¹³⁵ This requirement rules out the option of upgrading F-15Js, which are at a disadvantage vis-à-vis China's current fleet of SU-30MKKs, let alone against any future aircraft China might procure like SU-35.¹³⁶ Furthermore, the Flanker B can match the speed, acceleration and climb performance of the F-15, exceed the instantaneous and sustained transonic turn performance of the F-15, exceed the radar detection range of the baseline APG-63 radar, and exceed the number of externally carried air-air missiles, compared to the F-15.¹³⁷ The PLAAF is currently operating 76 imported Flanker B/C and around one hundred domestically built J-11 Flanker B from bases in Guangdong, Ningxia, Hebei, Jiangxi, Henan, and Chongqing.¹³⁸ Japanese companies such as Mitsubishi Heavy Industries (MHI) were pushing for the development of an indigenous F-X option, but given cost and time constraints associated with manufacturing only 40 aircraft, this seems ill-advised and unlikely.¹³⁹ As one Japan expert argued, Japan "simply lacks the technology, the experience of system integration, and the risks are just too high in terms of finance and getting something that is combat-effective."¹⁴⁰

Also, according to aircraft specialist Carlo Kopp, F/A-18E/F fighters also fail to offer a decisive capability margin over the Su-30 series, the gap only widening over time

¹³³ High estimates found in L.C. Russell Hsiao, "China's Fifth-Generation Fighters and the Changing Strategic Balance," *China Brief*, The Jamestown Foundation, Vol IX, Iss. 23, November 19, 2009; Low estimates found at "PLAAF equipment," [Globalsecurity.org](http://www.globalsecurity.org).

<http://www.globalsecurity.org/military/world/china/plaaf-equip.htm>.

¹³⁴ See "Additional Elements for Consideration," *The Basics of Japan's Defense Policy and Build-up of Defense Capability*, http://www.mod.go.jp/e/publ/w_paper/pdf/2010/Part2_Capter2.pdf.

¹³⁵ Auslin "Japan's FX Travails."

¹³⁶ "F-22 Raptors to Japan?" *Defense Industry Daily*, December 2, 2009, at:

<http://www.defenseindustrydaily.com/f22-raptors-to-japan-01909/>.

¹³⁷ Carlo Kopp, "The Flanker Fleet – The PLA's 'Big Stick,'" *International Assessment and Strategy Center*, May 3, 2006, http://www.strategycenter.net/research/pubID.106/pub_detail.asp.

¹³⁸ Ibid.

¹³⁹ Wendell Minnick, "Western Jetmakers Vie for Asian Contracts," *DefenseNews*, June 20, 2011,

<http://www.defensenews.com/story.php?i=6862646&c=FEA&s=SPE>.

¹⁴⁰ Wendell Minnick, "Japan's Defence Competition Stalled," April 14, 2008,

<http://www.defensenews.com/story.php?i=3482768>.

as the sensors, avionics, and weapons in the Sukhoi evolve.¹⁴¹ The F-X program is considering Boeing's new F-15SE, which is designed for long-range, over water combat patrols pertinent in the protection of the Senkakus. As mentioned before, Japan however needs to acquire a fighter that will be effective against China during its lifetime, given Chinese developments; the F-15SE may not measure up against potential adversaries such as Sukhoi's PAK-FA or China's J-XX.¹⁴²

Japan could also buy a European aircraft, such as the Eurofighter Typhoon or to a lesser extent the Dassault Rafale. The Eurofighter with its twin engine is a highly capable air-to-air fighter, and with limited ground attack capabilities. The limited nature of the Typhoon's air-to-ground capabilities may be sufficient to satisfy the constraints of Japan's defensive strategic culture.¹⁴³ Such a procurement decision, however, would reduce interoperability between the USAF and JASDF; given that most regional conflicts over the Senkaku/Diaoyu Islands or North Korea involving Japan would most likely involve the United States as well, the ability for the USAF and JASDF to operate together seamlessly has a huge impact on mission effectiveness. Furthermore, the Eurofighter does not offer the long-term deterrent value in the face of evolving Chinese and North Korean air and missile capabilities. Yet the Eurofighter is attractive because of BAE's declaration that it would be willing to share more of its technology with Japanese aviation companies and establish Japan as a market where it manufactures and sells its products.¹⁴⁴ Because it is equally important for U.S. national security that Japan and the United States continue to enhance their interoperability, U.S. companies should consider offering similar incentives. Brig. Gen. Joseph M. Reheiser, vice commander of 5th Air Force, asserted that based on talks with his counterparts, Japan most likely would prefer to buy from the United States and conclude a licensing agreement so they can produce the aircraft there, like both countries did with the F-15J.¹⁴⁵

Japanese authorities do not suffer from a lack of ambition or desire to improve their military capabilities. But current economic conditions and budget constraints may force a reevaluation of government spending priorities, perhaps at the expense of defense expansion. Moreover, the estimated \$300 billion price tag for this year's triple disaster in Japan- earthquake, tsunami, and a nuclear power plant crisis-may push Japan to consider cost over performance in its decision.¹⁴⁶ As previously noted, defense spending has remained at a steady one percent of GDP for the last decade, but actual expenditure has been declining slightly since the early 2000s. Plans for new acquisitions (of the F-35 for example) have been pushed back due to development and production

¹⁴¹ Carlo Kopp, "Sukhoi Flankers: The Shifting Balance of Regional Air Power."

¹⁴² "F-22 Raptors to Japan?" December 2, 2009.

¹⁴³ "F-22 Raptors to Japan?" December 2, 2009.

¹⁴⁴ Ibid.

¹⁴⁵ John A. Tirpak, "Air Force Alliance' for the US and Japan," *The Air Force Magazine*, June 2007, <http://www.airforce-magazine.com/MagazineArchive/Pages/2007/June%202007/0607japan.aspx>.

¹⁴⁶ "Western Jetmakers Vie for Asian Contracts," June 20, 2011.

delays on the manufacturing side. Looking forward, it is not clear that the recent triple disaster and budget concerns will dramatically impact defense expenditure. As it stands, national defense accounts for only 5.2 percent of total government expenditure, dwarfed by spending on education and science and public works. Current conditions would not appear to support any increase in military expenditure, but its marginal role in overall government appropriations and its increasing importance regionally make deep cuts equally unlikely. Even in this austere fiscal environment, given the regional aerospace trends, Japan should prioritize the procurement of a fifth-generation aircraft.

Conclusion

In sum, Japan faces a number of challenges in its force modernization. A weak and ineffectual Japanese government could encourage China to be more aggressive in its pursuit of its claims to the Senkaku Islands. By pushing through the modernizing and maintaining its aircraft, the Japanese government could signal its strength and ability to implement policies to defend Japan's national interests.¹⁴⁷ While it has not demonstrated clear ill intent, the PLA may present the most stressing challenge to Japan in the event of future disputes. A PLA that is confident of attaining air superiority over a contested territory could over time be more assertive in enforcing its claims. Whoever dominates the skies over a given geographic space, whether Taiwan, disputed territories in northern India or Japan, and the South China Sea, has a decisive advantage on the surface.

Tokyo has increasingly taken the threat of a DPRK missile attack and Chinese island seizure seriously in its defense planning. For example, the 2005-09 Mid-Term Defense Program established the Central Readiness Force (CRF), which brings many of Japan's mobile and special units under a single command reporting directly to the defense chief. CRF units include Japan's Helicopter Brigade, Airborne Brigade, Special Operations Group and Chemical Defense Unit to allow for quick response to such contingencies.¹⁴⁸ Contingency plans for operations against China have also been generated for the first time, and training has been adjusted accordingly. In November 2004, the Japan Defense Agency compiled plans for counteroffensive operations in the event China seized the disputed Senkaku/Diaoyu Islands east of Taiwan.¹⁴⁹

Yet much more could be done. Japan has been taking steps to enhance its security, with the United States contributing to such efforts. As mentioned previously, Japan is seeking to replace aging F-4EJ with 40 to 60 F-X aircraft beginning in 2015 and supplant the F-15 with new F-XX aircraft beginning in 2020. There are three aircraft currently under serious consideration: the F-35 Joint Strike Fighter (JSF), the

¹⁴⁷ Tellis et al 1998, 113.

¹⁴⁸ Pillsbury 2009.

¹⁴⁹ Ibid.

Eurofighter Typhoon, and the F/A-18E/F Super Hornet.¹⁵⁰ Although not clear, the procurement process may emphasize factors such as air-to-air capability (necessary in the face of advanced fighter aircraft and missile systems deployed by China, Russia and the DPRK), industrial participation (a traditional feature of Japanese aircraft acquisition efforts), risk, and price.

Japan had reportedly set its sights on procurement of the F-22 due to its high stealth capability to evade radar detection and mobility at supersonic speed. Yet, a Congressional law, the Obey amendment, prohibits the export of the F-22 to other countries, even allied nations. Japan prefers to procure an aircraft used by the U.S. Air Force because this would enhance interoperability and consequently effectiveness of any future U.S.-Japan joint operations to defend against an attack on Japan.¹⁵¹ Given that the defense of the Senkaku/Diaoyu Islands falls under the U.S.-Japan Mutual Security Treaty, and a DPRK missile attack may be designed to undermine the alliance, considerations about development of Japanese airpower must include a discussion of interoperability. During the Cold War, interoperability was based primarily on the need to own and employ the same assets.¹⁵²

Though this remains a minimal requirement, interoperability in the modern battlefield now includes considerations of gaps in capabilities and information sharing. For example, capability gaps between the United States and its coalition partners during Operation Allied Force in Kosovo 1999 “served to place increasing challenges on the ability of allied air forces to contribute effectively to missions planned and conducted during the campaign, and to be interoperable with U.S. forces.”¹⁵³ Air defense, intelligence, surveillance and reconnaissance (ISR) operations, including increasing capabilities and effectiveness of operations by UAVs and maritime patrol aircraft were listed as one of the key areas needing further enhancement of bilateral cooperation.¹⁵⁴

Procuring the F-35 could allow Japan to meet this goal of enhancing interoperability in a way that the Eurofighter could not. The F/A-18E/F Super Hornet is said to emit a prominent signature that could increase risk of detection in defending against a DPRK missile attacks and other potential challenges. Lastly, the F-35 enjoys advantages over older F-15 fighters, though the latter are less expensive.¹⁵⁵ U.S. Secretary of Defense Robert Gates recommended to his former Japanese counterpart, Minister of Defense Yasukazu Hamada, that Japan chooses the F-35 to be their next

¹⁵⁰ Western Jetmakers Vie for Asian Contracts,” June 20, 2011.

¹⁵¹ “Gates recommends F-35 as Japan’s next main striker,” *Japan Today*, May 24, 2009.

¹⁵² Statement by Col Hiroaki Uchikura, *Brookings Institution Online*, March 26, 2010, http://www.brookings.edu/~media/Files/events/2010/0326_defense_challenges/statement_uchikura.pdf.

¹⁵³ Ibid.

¹⁵⁴ “Security Consultative Committee: U.S.-Japan Alliance: Transformation and Realignment for the Future,” October 29, 2005, <http://www.mofa.go.jp/region/n-america/us/security/scc/doc0510.html>.

¹⁵⁵ Ibid, 6.

main striker.¹⁵⁶ Yet, the F-35 will not be available until 2014 at best, and Japan's current inventory appears to be aging.¹⁵⁷ As a stopgap measure, Tokyo has moved to upgrade a proportion of its F-15 fleet, but if the F-35 is chosen, the switch from the F-4EJ fleet may be further delayed.¹⁵⁸ Furthermore, Obama administration officials told a congressional panel in March 2010 that the F-35 was likely to cost \$95 million apiece, nearly double the initial estimate.¹⁵⁹ The biggest issue for the United States, which ultimately decided to procure the F-35, was that the "difficulties of accurately predicting what might be needed in future conflict scenarios, how combat-effective JSF aircraft would be, and what it would cost to develop, procure, and operate these aircraft" ultimately meant that "any analyses of military requirements and the combat effectiveness and budgetary costs of such new-generation aircraft allow for a range of conjecture and debate."¹⁶⁰

In short, Japan is faced with the classic procurement dilemma on speed versus quality. The F-35 appears to be the optimal counterair platform, and primary option under consideration with avionics and radar that are more advanced than the F-22.¹⁶¹ Such advantages may be crucial in light of Chinese developments in stealth, UAVs, and electronic warfare.¹⁶² Though the F-22 is the premier air-to-air fighter, the F-35 is viewed as having advantages for maritime interdiction and as a surveillance and reconnaissance system.¹⁶³ Requirements for early warning, range for air-to-air operations, and maritime interdiction may drive Japan toward a system such as the F-35.¹⁶⁴ Yet, as one study on regional security dynamics articulates, "acquiring advanced combat aircraft and their associated technologies is a small part of ensuring overall proficiency in the exploitation of air power."¹⁶⁵ Additional transport and air refueling aircraft may also be worth considering.

Modernizing the JASDF is only one step that Japan needs to take to meet the challenges of a more capable PLAAF. Japan may also encourage China to engage in confidence building measures (CBMs), which will reduce the likelihood of a conflict generally and over the Senkaku/Diaoyu Islands in particular. First, as both the JASDF and PLAAF modernize their fighter interceptor capabilities and maintain patrols in the

¹⁵⁶ "Gates recommends F-35 as Japan's next main striker," *Japan Today*, May 24, 2009, <http://www.japantoday.com/category/politics/view/gates-recommends-f-35-as-japans-next-main-striker>.

¹⁵⁷ Auslin "Japan's FX Travails."

¹⁵⁸ "Gates recommends F-35 as Japan's next main striker."

¹⁵⁹ F-X Support Fighter. Available at: <http://www.globalsecurity.org/military/world/japan/f-x.htm>.

¹⁶⁰ Christopher Bolkcom, "F-35 Joint Strike Fighter (JSF) Program: Background, Status, and Issues." *CRS Report for Congress*, August 29, 2005, 14.

¹⁶¹ Christopher Bolkcom and Emma Chanlett-Avery, "Potential F-22 Raptor Export to Japan." *Congressional Research Service*, March 11, 2009, 5.

¹⁶² Ross Babbage, "F-35 Superiority in the Japan-U.S. Alliance," *SOURCE*, July 10, 2009.

¹⁶³ *Ibid.*

¹⁶⁴ Ronald O'Rourke, *Tactical Aircraft Modernization: Issues for Congress*, July 9, 2009, 3.

¹⁶⁵ Tellis et al 1998, 166.

airspace around the disputed islands, the two sides need to take steps to avoid inadvertent conflict and escalation. The EP-3 incident of 2001 in which a U.S. surveillance aircraft and Chinese fighter collided, leading to the Chinese pilot's death and the emergency landing of the EP-3 on Hainan where the Chinese government held the crew and aircraft hostage until the situation was resolved, highlights the potential for conflict and dangers of escalation. One recommendation from Asia expert Richard Bush is that China and Japan consider a system in which each side will refrain from intercepting the aircraft of the other if the latter provides prior notifications of routine flight patrols.¹⁶⁶ While diplomatic efforts to resolving security issues in Northeast Asia are critical, they need to be coupled with military readiness. Given the current and future challenges that the JASDF faces in light of the rapidly evolving air and missile capabilities in the region, most notably those of stemming from China and North Korea, it is of the utmost importance that Japan and the United States move forward to promptly address this long-term challenge and make the critical procurement and policy decisions necessary to ensure their security and the long-term strategic stability in the region.

¹⁶⁶ Bush 2009, 32.



Oriana Skylar Mastro is a doctoral candidate in the Politics department at Princeton University where she focuses on military operations and strategy, war termination, and Northeast Asia. In 2010-2011, she was also a Visiting Scholar at the Institute for Security and Conflict Studies at the Elliott School, George Washington University and a Next Generation National Security Leader at the Center for New American Security. She is author of "Signaling and Military Provocation in Chinese National Security Strategy: a Closer Look at the *Impeccable* Incident," (*Journal of Strategic Studies*, April 2011) as well as coauthor of two chapters in *Assessing the Threat: The Chinese Military and Taiwan's Security*. She has worked on US-China policy issues at the Carnegie Endowment for International Peace, RAND Corporation, U.S. Pacific Command, Project 2049 Institute, the US Department of Defense and has testified for the US-China Economic and Security Review Commission. Mastro recently embarked on a new endeavor, receiving her commission as a 2nd Lieutenant in the United States Air Force Reserve May 2010. Though originally from Chicago, she holds a B.A. in East Asian Studies with honors in International Security from Stanford University.



Mark Stokes is the executive director of the Project 2049 Institute. Previously, he was the founder and president of Quantum Pacific Enterprises, an international consulting firm, and vice president and Taiwan country manager for Raytheon International. He has served as executive vice president of Laifu Trading Company, a subsidiary of the Rehfeldt Group; a senior associate at the Center for Strategic and International Studies; and member of the Board of Governors of the American Chamber of Commerce in Taiwan. A 20-year U.S. Air Force veteran, Stokes also served as team chief and senior country director for the People's Republic of China, Taiwan and Mongolia in the Office of the Assistant Secretary of Defense for International Security Affairs. He holds a B.A. from Texas A&M University, and graduate degrees in International Relations and Asian Studies from Boston University and the Naval Postgraduate School. He is a fluent Mandarin speaker.

