

Preparing for Sky Wars:

Evaluating the Airpower of China vis-à-vis ASEAN

Eugene Yong and James W. Tong

Against the background of the U.S. Pivot to Asia policy and military tensions in the South China Sea, this paper evaluates the airpower of the People's Republic of China (PRC) in comparison with the Association of Southeast Asian Nations (ASEAN) to determine whether the latter has the capability for regional air defense, or can serve as an effective and able ally of the United States in the instance of a military confrontation with China. Based on a systematic comparison of financial funding, manpower base, aircraft inventory and defense industry support from 2009 to 2018, this paper finds that the People's Liberation Army Air Force (PLAAF) maintains a significant and widening advantage over ASEAN air forces, raising doubts over ASEAN member nations' ability for regional air defense or as a reliable hedge against Chinese ascendance.

Introduction

China's rise within the international system has sharpened perceptions that it aspires to challenge U.S. hegemony, reconfigure the existing regional and world order, and intensify its interests and capabilities to assert influence in regional politics.⁵² In response, the Bush administration initiated the US Pivot to Asia policy, which was then formalized by the Obama administration, and continued by the Trump administration.⁵³ This policy has further intensified U.S.-China rivalry by redeploying military resources from

⁵² Daniel C. Lynch, "Is China's Rise Now Stalling?" *Pacific Review* 32, no. 3 (2019): 446-474; Robert S. Ross, "Balance of Power Politics and the Rise of China: Accommodation and Balancing in East Asia," *Security Studies* 15, no. 3 (2006): 355-395; Joshua Shiffrin, "Should the United States Fear China's Rise?" *Washington Quarterly* 41, no. 4 (Winter 2019): 65-83.

⁵³ Hugh De Santis, "The China Threat and the 'Pivot' to Asia," *Current History* 111, (September 2012): 209-215; Chas Freeman Jr, "China's Rise and Transformation: Towards Pax Sinica?" *Washington Journal of Modern China* 10, no. 2 (Fall 2012): 1-33; Chin-Hao Huang, Review of Obama's Challenge to China: the Pivot to Asia by Chi Wang, *The China Journal* 77, (January 2017): 228-229; David Shambaugh, "Assessing the US 'Pivot' to Asia," *Strategic Studies Quarterly* 7, no. 2 (Summer 2013): 10-19.

Europe and Iraq to Asia, expanding naval and air bases in Guam, constructing a new military base in Darwin, Australia, and strengthening the Seventh Fleet and the Pacific Command.¹ Against this background, the military assets of ASEAN states assume a new significance in the international politics and regional security of the Asia-Pacific.² Their importance is highlighted not only by the United States' new military posture, but also by its collective defense structures and agreements erected against China.³ The pursuit of collective defense and security arrangements has become particularly salient under the Trump administration, which has repeatedly called on its allies and stakeholders to "share the burden" of maintaining security in the Indo-Pacific region.⁴

Prashanth Parameswaran, a fellow at Wilson Center, has argued that the United States must recognize ASEAN as central to this strategy, and integrate ASEAN accordingly.⁵ On its part, ASEAN has demonstrated concerns over China's rise through its competing maritime and territorial claims in the South China Sea, claims that have united ASEAN states.⁶ One key issue regarding ASEAN's role as a hedge against Chinese expansion, however, lies in the military dimension. That is, do ASEAN states have the collective military capacity to withstand China's burgeoning armed forces? To that end, published research has sought to assess the extent of military modernization in Southeast Asian militaries and the People's Liberation Army (PLA).⁷ However, there has not been an attempt at charting the year-on-year growth in airpower of the parties in contention – a surprising fact given the role of airpower in determining the outcome of any military campaign.

¹ David Scott, "The Indo-Pacific in U.S. Strategy: Responding to Power Shifts," *The "Indo-Pacific" - Regional Dynamics in the 21st Century's New Geopolitical Center of Gravity* 3, no. 2 (August 2018): 19-43; Rory Medcalf, "Reimagining Asia: From Asia-Pacific to Indo-Pacific," in *International Relations and Asia's Southern Tier*, ed. Gilbert Tozman and Joseph Chinyong Liow (Singapore: Springer, 2018), 9-28.

² Bhubhindar Singh, Henrick Tsjeng, and Shawn Ho, "ASEAN Unity in the Face of China's Unilateral 'Consensus,'" RSIS Commentary 151, (June 2016); Ian Storey, "ASEAN's Failing Grade in the South China Sea," "Reimagining Asia: From Asia-Pacific to Indo-Pacific," in *International Relations and Asia's Southern Tier*, ed. Gilbert Tozman and Joseph Chinyong Liow (Singapore: Springer, 2018), 111-124.

³ These include its support of the nuclear development program of India (2006), the Quadrilateral Security Dialogue with Japan, Australia and India (2007), construction of the new military base in Darwin, Australia (2011), expanding the Terminal High Altitude Air Defense System to include S. Korea in the regional missile defense system of Australia and Japan (2017); signing Enhanced Security Agreements with the Philippines (2014) and Singapore (2015).

⁴ The United States Department of Defense, *Indo-Pacific Strategy Report*, (Washington D.C.: US Department of Defense, 2019), 21.

⁵ Prashanth Parameswaran, *ASEAN's Role in a U.S. Indo-Pacific Strategy*, (Washington D.C.: Wilson Center, 2018).

⁶ Ian Storey, "ASEAN's Failing Grade in the South China Sea," 111-124; Bhubhindar Singh, Henrick Tsjeng, and Shawn Ho, "ASEAN Unity in the Face of China's Unilateral 'Consensus:."

⁷ Richard Bitzinger, "A New Arms Race? Explaining Recent Southeast Asian Military Acquisitions," *Contemporary Southeast Asia* 32, no. 1 (April 2010): 50-69; Richard Bitzinger, "Modernising China's Military, 1997-2012," *China Perspectives*, no. 4 (2011): 7-15.

Given this gap in literature, an analysis of comparing the military capabilities of ASEAN member states and the PRC is called for. This paper will focus on air power because military conflict between ASEAN and China is unlikely to involve a land war, since China only shares a land border with Vietnam, Myanmar and Laos. While a naval conflict with China is also possible and an analysis of the comparative naval power between ASEAN and China will have to be left for future research⁸

In terms of air power, this paper will focus on the strategic capabilities of the air forces of the ASEAN states. It is important to keep in mind that airpower is not limited to the air force for any given military. Many navies and armies have their own designated air branch to provide aerial support in their operations. A naval force, for example, may contain carrier-based fighter aircraft to protect the fleet. Nonetheless, not all militaries have such overlaps within their services. To make this analysis comparable, this study will be limited to the individual air forces of China and ASEAN states.

The official air arm of the Chinese military is known as the People's Liberation Army Air Force (PLAAF). The member states of the Association of Southeast Nations (ASEAN) are Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam. Each of these states has its own official air force and will thus be included in the analysis.

Of critical importance is the fact that ASEAN is not yet a cohesive international alliance and military organization like NATO. For much of its institutional history, it has been little more than a regional intergovernmental organization and platform for regional cooperation. At a 1997 meeting in Kuala Lumpur, the heads of state/government of ASEAN member states committed to an ideal of greater partnership by 2020. As its title suggests, however, the "ASEAN Vision 2020" is only a visionary statement, an integration roadmap, and not an architectural blueprint or binding charter, much less a political reality for the Asia-Pacific region. In military terms, ASEAN has never developed a defense agreement, a unified force structure, a joint command protocol, a system-wide training program or common military exercises. It can thus be questioned whether an assessment of its collective military capability is warranted.

⁸ On China's rising naval power, the interested reader may want to consult Lim and Terpening, Yves-Heng Lim, "Expanding the Dragon's Reach: The Rise of China's Anti-Access Naval Doctrine and Forces," *Journal of Strategic Studies* 40, no. 1-2 (2017): 146-168; Ellery Terpening, "China's Naval Rise, France's Naval Genius," *U.S. Naval Institute Proceedings* 141, (February 2015): 68-73. For an analysis of a potential naval conflict between The United States and China, read Geoffrey Till, "The New U.S. Maritime Strategy: Another View from Outside," *Naval War College Review* 68, no. 4 (Autumn 2015): 34-45. For those interested in naval cooperation between India and individual ASEAN states including Indonesia, Vietnam, Thailand, Malaysia, and Myanmar, the analyses of Hedrick and Kumar will prove useful, Brian K. Hedrick, *India's Strategic Defense Transformation: Expanding Global Relationships* (Carlisle, PA: Strategic Studies Institute, U.S. Army war College, 2009); Das Ajaya Kumar, "Soft and Hard Power in India's Strategy towards Southeast Asia" *India Review* 12, no. 3 (July-September 2013): 165-185.

Nonetheless, regional military alliances are often formed not by mutual amity or long term institutional integration, but as a response to short-term geopolitical developments, such as a regional crisis created by an emergent common threat, in which member states perceive the benefits of engaging in military cooperation as outweighing the costs. The territorial disputes in the South China Sea, U.S.-China rivalry, and the U.S. Pivot to Asia provide the requisite geopolitical conditions for military conflict. Reinforcing this development is the increasing apprehension of Japan, India, and Australia towards what they perceive as the growing military threat of China, which has propelled them to join the Quadrilateral Security Dialogue,⁹ and form closer military ties with individual ASEAN states.¹⁰ Thus, the military capabilities of ASEAN, and their potential contribution to the collective defense of the Asia-Pacific region is part of a plausible scenario, if a war between global and regional powers were to break out. This scenario will be examined after an analysis of the military resources of ASEAN states and China.

Airpower Strategic Resources

The timeframe to be considered in this paper is 2009 to 2018, the most recent decade with available yearly data, because it provides one with the best indication for the path ahead for both parties. In their RAND monograph, Tellis, *et al.* measure military capability as available strategic resources (funding, manpower, assets, industry base) and variables that convert such resources into warfighting capacity, specifically, combat experience and military doctrine.¹¹ This paper will analyze only strategic resources. Neither the PLAAF nor ASEAN airpower has had significant combat experience over the last decade. Information on doctrinal development is difficult to assess empirically and it is often not published, as it may be regarded as a military secret.¹²

To elaborate on the strategic resources, *funding* refers to financial resources to conduct operations or acquire and maintain new assets. It is measured by the official military budgets in current U.S. dollars (USD). The overall ASEAN military budget rather than budgets allocated for the individual air forces will be used, as the latter are not disclosed for most of the relevant militaries.¹³

Manpower is measured by the number of active air force personnel. Data on specific career fields (*e.g.* pilots and weapon controllers) are not accessible and are thus not used in this study. In addition to the size of personnel, manpower quality is measured by the number of dedicated air force academies and the length, breadth, and depth of their curriculum.

⁹ H.D.P. Envall, *The Quadrilateral Security Dialogue: Towards Indo-Pacific Order?* (Singapore: Rajaratnam School of International Studies, 2019), 1-11

¹⁰ Das Ajaya Kumar, "Soft and Hard Power in India's strategy towards Southeast Asia," *India Review* 12, no. 3 (July-September 2013): 165-185.

¹¹ Ashley Tellis, Janice Bially, Christopher Layne, and Melissa Mcpherson, *Measuring National Power in the Postindustrial Age*, (Rand Corporation, 2000), 135.

¹² Roger Cliff, *China's Military Power: Assessing Current and Future Capabilities*, (New York: Cambridge University Press, 2015), 20.

¹³ Only budgets for the Indonesian, Malaysian and Thai air forces are openly available.

As the physical tools used to overwhelm the adversary and dominate airspace, air force *assets* can range from fighter planes to anti-air systems. This is measured by the numbers of fixed-wing aircraft per year. Rotary aircraft are excluded from this analysis due to their relatively limited impact on contests over air space and variances in force structure regarding the governance of such assets.¹⁴ Surface-to-air air defense systems (such as anti-air guns), unmanned aircraft and radar systems will also not be included due to a lack of consistent information. As a separate measure, the number of fifth-generation fighter aircraft in service will be used to compare the relative level of technological advancement.

As suggested by Tellis *et al.*, the local *Industrial Base* provides a pipeline of military instruments to support the maintenance and upgrading of existing aircraft and anti-air systems, while providing an avenue for technological innovation (*e.g.* designing and testing new aircraft) – all of which contribute to the ability to assert control over airspace. Furthermore, a strong local defense industry also minimizes dependency on foreign sources in times of conflict.¹⁵ The strength of the industrial domain will be measured by the number of local aerospace or defense firms that appear in the *Fortune* Global 500, compiled yearly by the Fortune media group, based on revenue in that given fiscal year. The appearance of any Southeast Asian or Chinese aerospace/defense firm is therefore indicative of the level of development in the given defense industry. For this study, only firms that supply military platforms or provide specialised services dedicated to the military are included.

Data Source

The bulk of the data is drawn from annual editions of *The Military Balance*, published by the International Institute for Strategic Studies from 2009 to 2018, which lists the yearly military budgets (in USD) for all ASEAN militaries and the PLA (with the exception of Laos from 2015 to 2018, as the figures are not publicly available). Similarly, the manpower size and aircraft inventory of all air forces included in this study can be found within the same publication. United States foreign military aid data collected in this study comes from the Foreign Aid Explorer database on the USAID website. Information on the military academies that supply officers to these air forces was found on either the official websites for each of the academies or official reports on these academies. The data on airfields are drawn from intelligence gathered as part of the World Factbook program by the Central Intelligence Agency (CIA) of the United States. For the industrial domain, the *Fortune* Global 500 rankings lists for each year can all be found on the *Fortune* Global 500 website.

Data Analysis

Data for the ten ASEAN states along with those of the PRC, from the years 2009–2018,

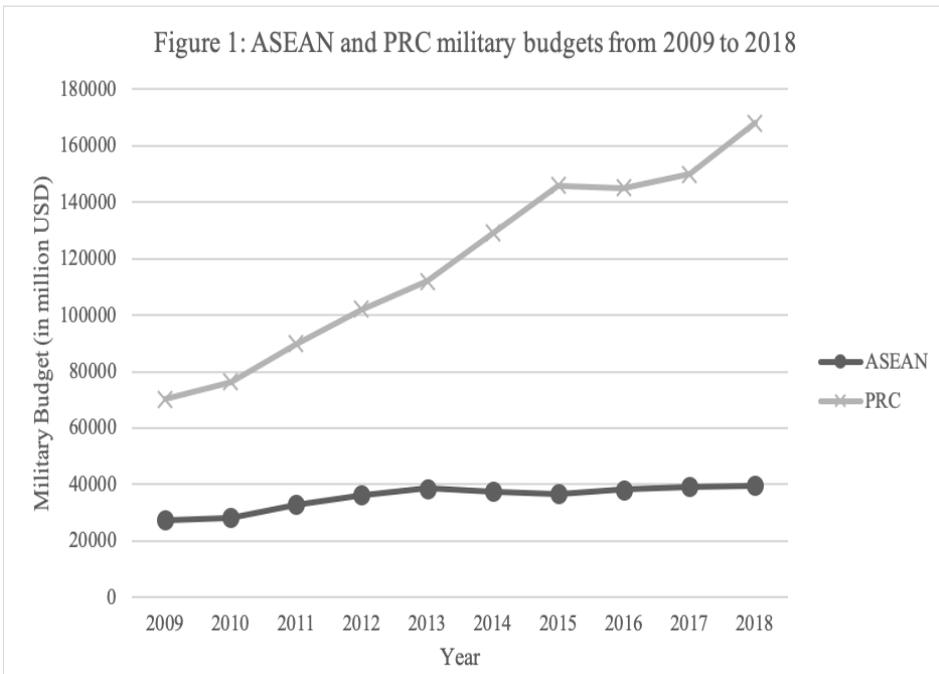
¹⁴ Some militaries choose to integrate most of their rotary assets into the ground forces and naval forces they support while others prefer to govern all rotary assets under the air force.

¹⁵ Ashley Tellis, Janice Bially, Christopher Layne, and Melissa Mcpherson, 140.

are presented below.

Funding

As shown in Figure 1, ASEAN states and China both experienced a net growth in their military budget size from 2009 to 2018. During this period, the combined military budgets of the ASEAN states rose by 45 percent from 27.3 billion USD to 39.6 billion USD, with changes varying greatly from state to state. For example, while the Indonesian military budget more than doubled over this decade (from 3.5 billion USD to 7.3 billion USD), the Malaysian military budget saw a net decrease. By comparison, the growth in military budget for China was even more astounding, skyrocketing from 70.3 billion USD to 168 billion USD, a staggering 139 percent increase over this short span of time. Thus, while both ASEAN and PRC military budgets are increasing, the growth rate of the Chinese military budget far outpaces its Southeast Asian counterparts.



Sources: “The Military Balance 2010–2019,” *The International Institute for Strategic Studies*, (London: IISS, 2010–2019).

Although ASEAN states receive military aid from the United States, the amount of aid received by each state is relatively insignificant when compared to overall budget figures. Hence, the inclusion of foreign military aid from the United States into calculations of military funding does not affect the budgetary gap between ASEAN and the PRC. Even in 2016, when the overall foreign military aid from the United States to ASEAN was at its highest, foreign military aid was less than 1 percent of the overall

ASEAN military budget figure. Thus, the overall trend in funding remains consistent with the findings from the budget data – there is an enormous and widening funding gap between the two parties.

The continual hike in defense budgets for both parties can be attributed to their modernization efforts. For the Chinese military, modernization efforts were prompted by the desire to narrow the technological gap between the U.S. and China, and the need for a modern, flexible force to deal with potential conflicts with Taiwan and other South China Sea claimants.¹⁶ The increased defense budget (and therefore, spending) has direct implications on the PLAAF, which received much of the defense outlay – evidenced by the costly development of stealth fighter aircraft like the Chengdu J-20 and Shenyang J-31.¹⁷ Consequently, this upward trend in the Chinese military budget is likely to further strengthen its abilities to contest airspace. In contrast, the modernization budgets for most ASEAN militaries were directed at replacing barely functional weapons systems.¹⁸ The widening spending gap between ASEAN militaries and the PLA demonstrates an already immense and increasing financial advantage of the PLAAF over the ASEAN air forces.

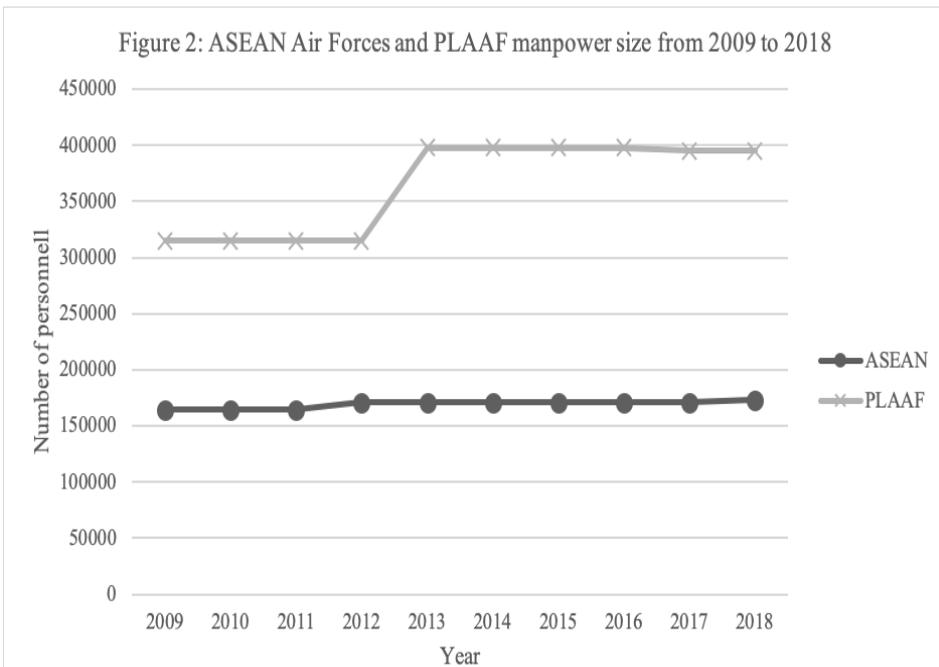
Manpower

As with the budget figures, the personnel size for both the PLAAF and the ASEAN air forces increased over this period. The reported figures for manpower remained largely the same throughout the decade for most of the ASEAN air forces, except for the Indonesian and the Philippine air forces, which registered substantial increments. Buoyed by these two air forces, the total manpower size of the ASEAN air forces increased notably – rising by 5.3 percent from 164,600 in 2009 to 173,300 in 2018. The PLAAF on the other hand, expanded its manpower base significantly, from approximately 315,000 individuals in 2009, to 395,000 in 2018, an increase of 25.4 percent.

¹⁶ Ben Blanchard, “Taiwan concerns mean China defense budget likely to defy slowing economy,” *Reuters*, February 25, 2019. <https://www.reuters.com/article/us-china-parliament-defense/china-defense-budget-likely-to-defy-slowing-economy-due-to-taiwan-worries-idUSKCN1QE2NR>.

¹⁷ Paul Mcleary, “Pentagon: Chinese Military Modernization Enters ‘New Phase,’” *Foreign Policy*, May 13, 2016., <https://foreignpolicy.com/2016/05/13/pentagon-chinese-military-modernization-enters-new-phase/>.

¹⁸ Felix Heiduk, “Is Southeast Asia really in an arms race?” *East Asia Forum*, February 21, 2018. <http://www.eastasiaforum.org/2018/02/21/is-southeast-asia-really-in-an-arms-race/#more-110941>.



Sources: “The Military Balance 2010-2019,” *The International Institute for Strategic Studies*, (London: IISS, 2010-2019).

As with funding, the manpower data also reflects the divergence in the modernization drives of the ASEAN air forces and the PLAAF. Modernization generally entails either gradual reductions or minimal changes in manpower to facilitate more streamlined operations, as the workload is transferred to advanced assets. The 2009 figure of approximately 315,000 members in the PLAAF for example, was the result of a 25 percent reduction of manpower under the ongoing modernization program.¹⁹ Despite effects of overall modernization, the PLAAF continued to grow in manpower from 2009 to 2018. The numerical advantage of the PLAAF over the ASEAN air forces, like the budget figures, is unlikely to decrease anytime soon.

¹⁹ Sebastian Heilmann, and Dirk Schmidt, *China's Foreign Political and Economic Relations: An Unconventional Global Power* (Plymouth: Rowman and Littlefield, 2014), 63.

Table 1: List of Military Academies in ASEAN States and the PRC that provide Ab Initio Training for Air Force Officers²⁰

Country/ Organization	Name of Academy	Remarks
Brunei	Defense Academy RBAF	Does not provide college-level academic education
Cambodia	National Defense University	Offers Bachelor's and Master's Degree programs in Military Sciences and Social Sciences
Indonesia	Indonesian Air Force Academy	Offers a Bachelor's Degree in Applied Defense Science
Laos	Kaysone Phomvihane National Defense Academy	Does not provide college-level academic education
Malaysia	National Defense University of Malaysia	Offers Bachelor's, Master's, and Ph.D. programs across multiple areas of expertise
Myanmar	Defense Services Institute of Technology	Offers Bachelor's programs in Engineering
	Defense Services Academy	Offers Bachelor's Degree programs in Arts and Sciences
Philippines	Philippine Military Academy	Offers a Bachelor's Degree in Science
Singapore	SAFTI Military Institute	Does not provide college-level academic education
Thailand	Royal Thai Air Force Academy	Offers Bachelor's, Master's, and Ph.D. programs across multiple areas of expertise
Vietnam	Vietnam Air Force – Air Force Academy	Offers Bachelor's, Master's, and Ph.D. programs across multiple areas of expertise
China	Air Force Engineering University	Offers Bachelor's, Master's, and Ph.D. programs in Engineering
	Air Force Aviation University	Offers Bachelor's, Master's, and Ph.D. programs across multiple areas of expertise
	Air Force Early Warning Academy	Offers Bachelor's and Master's Degree programs in Military Affairs
	Air Force Medical University	Offers Bachelor's and Ph.D. programs in Biomedical fields

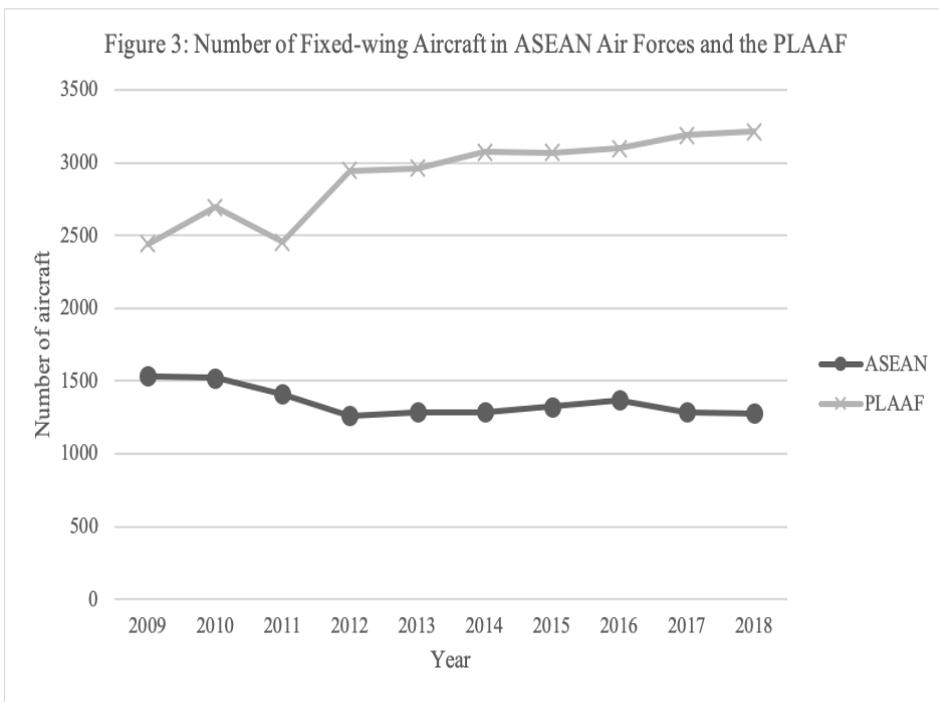
²⁰ “大学简介” *Air Force Engineering University*, accessed 10 September 2009, <http://www.afeu.cn/web/afeu/dxgk/gk/>; “Kurikulum,” *Indonesian Air Force Academy*, accessed September 10, 2019, <http://aau.ac.id/kurikulum/>; “2017军校巡礼第十五站：空军预警学院（附报考指南）” 中国军网, June 9, 2017, http://www.81.cn/jwgz/2017-06/09/content_7634167_2.htm; “中国人民解放军第四军医大学” 中国军网, June 14, 2017, http://www.81.cn/jwzl/2017-06/14/content_7748285_2.htm; Van Hieu, “Vietnamese military political delegation visits Kaysone Phomvihane Defense Academy,” *People's Army Newspaper*, October 20, 2011, <https://en.qdnd.vn/military/news/vietnamese-military-political-delegation-visits-kaysone-phomvihane-defense-academy-425403>; “SAFTI MI Units,” *Ministry of Defense Singapore*, accessed September 10, 2019, https://www.mindef.gov.sg/oms/imindef/mindef_websites/atozlistings/saftimi/SAFTIMIUnits.html; “飞行学员介绍：空军航空大学,” *Ministry of National Defense of the People's Republic of China*, September 9, 2009, http://www.mod.gov.cn/service/2009-09/09/content_4086516.html; “Program Offer,” *National Defense University of Malaysia*, accessed September 10, 2019, <http://www.upnm.edu.my/en/index.php?req=26>; “National Defense University,” *National Defense University, Cambodia*, accessed September 10, 2019, <http://ndu.edu.kh/en>; “Navaminda Kasatriyadhiraj Royal Air Force Academy,” accessed September 10, 2019 <http://www.nkrafa.rtaf.mi.th/index.php/th/>; “Defense Academy,” *Royal Brunei Armed Forces*, accessed September 8, 2019, <http://www.da.mindef.gov.bn/Theme/Home.aspx>; “History, Traditions and General Information,” *The Philippine Military Academy*, accessed September 10, 2019, <https://www.pma.ph/about.php#history>; “Air Defense - Air Force Academy,” *Vietnam Air Force Academy*, accessed September 10, 2019, <http://hocvienpkkq.com/tin/index.php/vi/gioi-thieu/Gioi-thieu-HV/Gioi-thieu-ve-Hoc-vien-PKKQ-1/>.

The quality of professional training also needs to be part of a comparison of manpower. As shown in Table 1, all ASEAN states have military academies that provide *ab initio* training for military officers. Almost all of the states studied offer at least a Bachelor's Degree program in their military academies, except for Brunei and Singapore. Two ASEAN military academies (Cambodia and Vietnam) offer Master's Degrees, and two others (Malaysia and Thailand) offer both Master's and Ph.D. degrees. In China, two PLAAF academies offer Master's Degrees, and two offer both Master's and Ph.D. degrees. Unlike other ASEAN air force officers, who can receive their tertiary education from local military academies, Singaporean officers generally acquire their college and advanced degrees from national universities. Another key difference is the number of dedicated service academies that each air force possesses. While the ASEAN air forces only had three air force academies (in Indonesia, Thailand, and Vietnam), the PLAAF alone had four different university-level institutions that cater to different vocations within the air force.

Assets: Aircraft and Airfields

Fixed-wing aircraft refer to aircraft that generate lift using forward airspeed. This category of aircraft excludes all helicopters and can range from fighter aircraft like the PLAAF's J-20, to transport aircraft like the Singaporean air force's C-130. The data in Fig. 3 demonstrates a divergent trend for the Chinese and ASEAN air forces. From 2009 to 2018, the total number of fixed-wing aircraft in the ASEAN air forces decreased by 20 percent from 1,533 to 1,278. Within ASEAN, the changes in fixed-wing aircraft inventory vary greatly from state to state. For example, while Myanmar saw a net accumulation of fixed-wing aircraft from 156 in 2009 to 193 in 2018, Vietnam drastically reduced its inventory from 279 in 2009 to 144 in 2018.

Additionally, many of the ASEAN air force fixed-wing inventories increased in some years and decreased in others. Reductions in inventory occur when older aircraft are phased out from service. Overall, the decrease in ASEAN inventory size precludes any form of expansionary airpower growth. In contrast, the PLAAF fixed-wing aircraft inventory exhibits a clear upward trend, having increased every year except for 2011 and 2015. In all, the number of PLAAF fixed-wing aircraft rose by 31.5 percent from 2,442 in 2009 to 3,212 in 2018. By the end of the decade under study, the PLAAF now possesses more than twice the number of all ASEAN air force fixed-wing aircraft combined.



Sources: “The Military Balance 2010-2019,” *The International Institute for Strategic Studies*, (London: IISS, 2010-2019)

Both size and quality determine the capability of any aircraft inventory. An additional point worth noting, therefore, is the increasing quality of PLAAF aircraft as compared to ASEAN air forces. In 2009, the most advanced fighter platform operated by any of the studied air forces was the F-15SG – a multi-role fighter aircraft equipped with advanced avionics operated by the Republic of Singapore Air Force (RSAF). By the end of 2018, however, through its deployment of six Chengdu J-20, the PLAAF had managed to attain “fifth-generation” fighter aircraft capabilities (distinguished from earlier generations through their stealth and network capabilities), which none of the ASEAN air forces possess.²¹ In comparison, the ASEAN air force closest to attaining fifth-generation fighter planes is the RSAF, which has only recently announced its plans to acquire four F-35 fifth-generation fighter aircraft from the U.S. government for testing.²²

Airpower assets also include the number of airfields in ASEAN states and the PRC. This is the only domain in which the ASEAN states enjoy a numerical superiority over China. While in 2013, China had 507 airfields, most of which were located in the

²¹ “The Military Balance 2018,” *The International Institute for Strategic Studies*, (London: IISS, 2018), 255.

²² Kelvin Wong, “Singapore to place initial buy of four F-35 JSFs for further evaluation,” *Jane’s*, March 1, 2019, <https://www.janes.com/article/86950/singapore-to-place-initial-buy-of-four-f-35-jsfs-for-further-evaluation>.

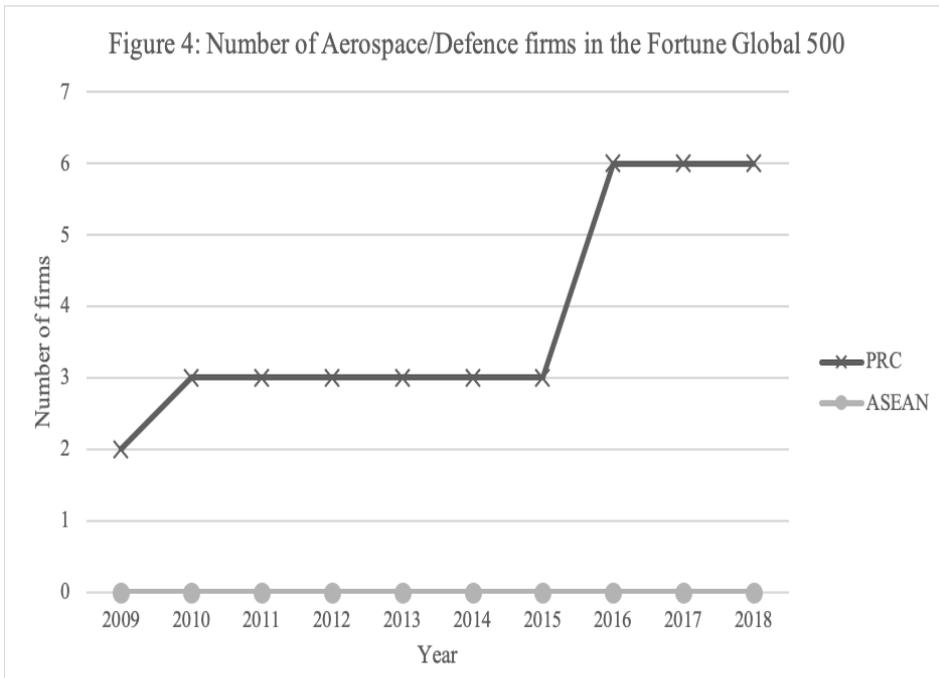
Chinese mainland far away from Southeast Asia, ASEAN had a whopping 1,311 in the region. Given the scarcity of information published on this subject, it was not possible to determine if this difference in airfields has changed since 2013.

The difference in the number of airfields available points to one glaring limitation of the PLAAF's air power efforts. Given that airfields are necessary for the launch and recovery of aircraft, a numerical advantage in airfields suggests a greater ability to execute multiple missions within a given period. ASEAN's numerical superiority in airfields, therefore, partially mitigates the widening gap in aircraft quantities and capability. Furthermore, the location of airfields also plays a part in determining the outcome of an air campaign – having an airfield close to the operating area, expedites the launch and recovery process. Thus, should tension over the South China Sea escalate to aerial combat, the relative proximity of ASEAN claimants to the territories in dispute provides them an advantage.²³ However, China has been actively seeking to overcome this operational limitation through an aircraft carrier program and runway-building efforts in the South China Sea.

Industrial Base

There is great contrast between the industrial bases of the PLAAF and ASEAN air forces. As shown in Fig. 5, none of the ASEAN defense or aerospace firms throughout this entire decade made the *Fortune* Global 500 list. On the contrary, the number of Chinese aerospace and defense firms increased significantly, from two in 2009 to six by 2018. Most impressively, all these firms have improved in their rankings during this period. The Aviation Industry Corporation of China (AVIC), for example, was 426th on the 2009 list and moved up to 161st on the list by 2018. Likewise, the China North Industries Group (Norinco) reached the 140th spot in the 2018 list despite its absence on the 2009 list. Overall, the graph below depicts a diverging trend between the industrial backing of the ASEAN and Chinese air forces, with the following implications.

²³ Michael Beckley, "The Emerging Military Balance in East Asia: How China's Neighbors Can Check Chinese Naval Expansion," *International Security* 42, no. 2 (Fall 2017): 78-119.



Source: "Fortune Global 500," *Fortune*, accessed September 9, 2019. <https://fortune.com/global500/>.

The prosperity of these firms attests to the overall growth of China's defense industry – buoyed in large part by the increasing financial prowess of the PLA. The lack of any ASEAN defense firm on the Global 500 list can be attributed to the relative underdevelopment of the defense industries in ASEAN states. Any defense firm from these states can only grow as much as its military requires. Unfortunately, none of the ASEAN militaries has the spending power to match the PLA. Consequently, Southeast Asian companies in aerospace or defense are unlikely to grow to the size necessary to appear on the rankings. The disparity in industrial backing has two key implications for airpower. First, the PLAAF will have access to more advanced defense technology than ASEAN air forces. The technological superiority made possible by a more powerful local defense industry is exemplified by the PLAAF's possession of fifth-generation fighter aircraft like the J-20, manufactured by Chengdu Aerospace Corporation – a subsidiary of AVIC. Secondly, a robust industrial base allows for greater operational independence as the various components do not come from foreign sources. The ability to locally manufacture most of its assets allow the PLAAF to engage in conflicts without fear that its supply chain will be affected. Most of the ASEAN air forces' assets, on the other hand, are imports from foreign defense manufacturers. The Myanmar Air Force fleet contains JF-17 fighter jets manufactured by Chengdu Aerospace Corporation.

Both the technological edge and greater independence possessed by the PLAAF over the ASEAN air forces will remain significant if the Chinese defense industry continues to

grow according to the positive trend identified in this study. Consequently, the PLAAF will maintain an advantage over the ASEAN air forces in the industrial domain.

Discussion and Conclusion

The above findings have several limitations. Available sources do not provide more detailed financial data. The budget outlay pertains to the entire military, not that of the air force. Likewise, air force manpower refers to total air force personnel, and not those in specific commands. There is also no data to differentiate the quality of recruits and their training. Similarly, where technology matters most, systematic data are lacking on the make and model, vintage year, and functional capabilities of the aircraft, or those of the air defense systems. As inadequate as the data is, even if more refined data was available, this would not substantially change the conclusion concerning the power asymmetry between the PLA and ASEAN member states' air forces.

To elaborate on the last point, the preceding analyses of all four strategic resources in financial funding, manpower base, relevant aircraft inventory, and defense industry support, suggest an overwhelming resource superiority for the PLAAF. Furthermore, in each of these four domains, the gulf between the PLAAF and ASEAN air forces has been gradually widening. Thus, regarding the capacity for aerial dominance, the PLAAF far exceeds the ASEAN air forces. More concerning for ASEAN is the reality that its increasing gap with China – is unlikely to be bridged anytime soon without drastic changes to the regional political and economic situation.

If geopolitical developments warrant and if the global and regional powers sound the alarm for military action, will ASEAN be willing and ready to join a collective defense arrangement against a common threat? In recent years, ASEAN states have stepped up their multilateral cooperation in collective security. In the last decade, there have been annual meetings among defense entity heads at different levels – ranging from the ASEAN Defense Minister Meeting (ADMM) to the ASEAN Air Chief Meeting (AACC). At the 12th ADMM in 2018, the ASEAN Defense Ministers broke new ground by agreeing to a set of multilateral guidelines on air military encounters.²⁴ Since 2010, ASEAN representatives have also convened for ADMM-Plus, a platform for ASEAN and eight other partner countries (Australia, China, India, Japan, Republic of Korea, New Zealand, Russia, and the United States) to foster greater cooperation. ADMM-Plus has culminated in multiple multilateral exercises that cover operations in military medicine, humanitarian and disaster relief, and counterterrorism.²⁵

²⁴ Dawn Wei Tan, "ASEAN Defense Chiefs Set to Ink First Multilateral Air Guidelines," *The Straits Times*, October 19, 2018, <https://www.straitstimes.com/singapore/asean-defense-chiefs-set-to-ink-first-multilateral-air-guidelines>.

²⁵ "About the ASEAN Defense Ministers' Meeting Plus (ADMM-Plus)," *ASEAN Defense Minister's Meeting*, February 6, 2017, <https://admm.asean.org/index.php/about-admm/about-admm-plus.html>.

Nonetheless, several factors impede the development of a coordinated military defense for dealing with a potential Chinese threat. One key issue is the difference in threat perception among ASEAN states.²⁶ While a growing PLA can threaten the existing order, it also presents many opportunities for militaries willing to cooperate with it. The acquisition of JF-17s by the Myanmar Air Force is an example of such beneficial cooperation with China. Thus, depending on the individual state's relations with China, ASEAN member states have varying perceptions of the urgency for multilateral military cooperation against a potential Chinese threat. This variance in threat perception is compounded by a greater focus on developing a sense of national resilience in individual ASEAN countries, rather than cooperating with other ASEAN member states.²⁷ An additional factor that prevents the development of a cohesive military defense is the fundamental mistrust that exists between ASEAN states. Many ASEAN states are still embroiled in disputes with one another on issues such as the treatment of Rohingya Muslims and territorial claims. In fact, the PLA has identified the aforementioned factors as sources of weakness in ASEAN military cooperation. Liu Yazhou, the political commissar for the PLA National Defense University from 2009 to 2017 articulated a "divide and rule" strategy for dealing with Southeast Asia.²⁸ This strategy takes advantage of the divisions within ASEAN to cultivate pro-China sentiments in individual ASEAN member states and prevent the formation of a common threat perception. Should a conflict break out, it is uncertain whether ASEAN states will choose to support one another. Even if they do so, the lack of a common strategic threat perception to guide their actions entails confusion and general ineffectiveness. Furthermore, ASEAN agreements are non-binding in nature and any future doctrinal developments, should they even be developed, do not guarantee cooperation. In that sense, the ASEAN air forces as a fighting unit is less than the sum of its parts. When combined with an already widening gulf in resources, this weakness highlights growing PLAAF airpower vis-à-vis ASEAN air forces.

Short of defending an outside air attack on its own, does ASEAN have the capacity to serve as a dependable and effective institutional ally of the United States like NATO? While the fire power and technology gap between ASEAN air forces and the PLAAF or the United States Air Force is significant, ASEAN air power may prove useful when combined with external support. The vast number of airfields in ASEAN states also provides the United States with an opportunity for power projection beyond aircraft carriers and U.S. military bases already established in the Asia Pacific region. However, the utility of ASEAN as a potential institutional ally is severely impeded by its disjointedness as a unit. In the foreseeable future, ASEAN is unlikely to become a cohesive regional military alliance, and major powers in the region may find it more effective to continue to work with individual ASEAN states rather than the entire organization as they have in recent decades.

²⁶ Richard Sokolsky, Angel Rabasa, and Neu Richard, *The Role of Southeast Asia in U.S. Strategy toward China* (RAND Corporation, 2001), 47.

²⁷ Sokolsky, Rabasa, and Richard, *The Role of Southeast Asia in U.S. Strategy toward China*, 46.

²⁸ Yazhou Liu, "The Grand National Strategy," *Chinese Law and Government* 40, no. 2 (March-April 2007): 35.

Eugene Yong is a Master of Arts candidate at the University of California, Los Angeles. He is a member of the Graduate Program in East Asian Studies at UCLA and concentrates on China as his area of specialization. Upon completion of his degree, he will work for the Singaporean Public Service.

James Tong is Professor in the Department of Political Science at UCLA where he teaches courses on Chinese Politics and Political Violence. He holds an M.A. from the University of Washington and a PhD from University of Michigan, and has taught at the Michigan State University and the California Institute of Technology. He has served as a Consultant for the World Bank and is the current Chief Editor of Chinese Law and Government.

Bibliography

- “About the ASEAN Defense Ministers’ Meeting Plus (ADMM-Plus).” *ASEAN Defense Ministers’ Meeting*. February 6, 2017. <https://admm.asean.org/index.php/about-admm/about-admm-plus.html>
- “Air Defense - Air Force Academy.” Vietnam Air Force Academy. Accessed September 10, 2019. <http://hocvienpkq.com/tin/index.php/vi/gioi-thieu/Gioi-thieu-HV/Gioi-thieu-ve-Hoc-vien-PKKQ-1/>.
- Beckley, Michael. “The Emerging Military Balance in East Asia: How China’s Neighbors Can Check Chinese Naval Expansion.” *International Security* 42, no. 2 (Fall 2017): 78-119.
- Bitzinger, Richard. “A New Arms Race? Explaining Recent Southeast Asian Military Acquisitions.” *Contemporary Southeast Asia* 32, no. 1 (April 2010): 50-69.
- Bitzinger, Richard. “Modernising China’s Military, 1997-2012.” *China Perspectives*, no. 4 (2011): 7-15.
- Blanchard, Ben. “Taiwan concerns mean China defense budget is likely to defy a slowing economy.” *Reuters*, February 25, 2019. <https://www.reuters.com/article/us-china-parliament-defense/china-defense-budget-likely-to-defy-slowing-economy-due-to-taiwan-worries-idUSKCN1QE2NR>
- Cliff, Roger. *China’s Military Power: Assessing Current and Future Capabilities*. New York: Cambridge University Press, 2015.
- “Defense Academy.” *Royal Brunei Armed Forces*. Accessed September 8, 2019. <http://www.da.mindef.gov.bn/Theme/Home.aspx>
- De Santis, Hugh. “The China Threat and the ‘Pivot’ to Asia.” *Current History* 111, (September 2012): 209-215.
- Envall, H.D.P. *The Quadrilateral Security Dialogue: Towards an Indo-Pacific Order*. Singapore: Rajaratnam School of International Studies, 2019.
- “Fortune Global 500.” *Fortune*. Accessed September 9, 2019. <https://fortune.com/global500/>
- Heiduk, Felix. “Is Southeast Asia really in an arms race?” *East Asia Forum*, February 21, 2018. <http://www.eastasiaforum.org/2018/02/21/is-southeast-asia-really-in-an-arms-race/#more-110941>

- Heilmann, Sebastian, and Dirk Schmidt. *China's Foreign Political and Economic Relations: An Unconventional Global Power*. Plymouth: Rowman and Littlefield, 2014.
- Hieu, Van. "Vietnamese military political delegation visits Kaysone Phomvihane Defense Academy." *People's Army Newspaper*, October 20, 2011. <https://en.qdnd.vn/military/news/vietnamese-military-political-delegation-visits-kaysone-phomvihane-defense-academy-425403>
- "History, Traditions and General Information." *The Philippine Military Academy*. Accessed September 10, 2019. <https://www.pma.ph/about.php#history>.
- Huang, Chin-Hao. Review of Obama's Challenge to China: the Pivot to Asia by Chi Wang. *The China Journal* 77, (January 2017): 228-229.
- "Kurikulum." *Indonesian Air Force Academy*. Accessed September 10, 2019. <http://aau.ac.id/kurikulum/>
- Kumar, Das Ajaya. "Soft and Hard Power in India's strategy towards Southeast Asia." *India Review* 12, no. 3 (July-September 2013): 165-185.
- Liu, Yazhou. "The Grand National Strategy." *Chinese Law and Government* 40, no. 2 (March-April 2007): 13-36.
- Lynch, Daniel C. "Is China's Rise Now Stalling?" *Pacific Review* 32, no. 3 (2019): 446-474.
- McLeary, Paul. "Pentagon: Chinese Military Modernization Enters 'New Phase'." *Foreign Policy*, May 13, 2016. <https://foreignpolicy.com/2016/05/13/pentagon-chinese-military-modernization-enters-new-phase/>
- Medcalf, Rory. "Reimagining Asia: From Asia-Pacific to Indo-Pacific." In *International Relations and Asia's Southern Tier*, eds. Gilbert Tozman and Joseph Chinyong Liow, 9-28. Singapore: Springer, 2018.
- "National Defense University." *National Defense University, Cambodia*. Accessed September 10, 2019. <http://ndu.edu.kh/en>.
- "Navaminda Kasatriyadhiraj Royal Air Force Academy." Accessed September 10, 2019. <http://www.nkrafa.rtaf.mi.th/index.php/th/>.
- Parameswaran, Prashanth. *ASEAN's Role in a U.S. Indo-Pacific Strategy*. Washington D.C.: Wilson Center, 2018.
- "Program Offer." *National Defense University of Malaysia*. Accessed September 10, 2019.

<http://www.upnm.edu.my/en/index.php?req=26>.

Ross, S. Robert. "Balance of Power Politics and the Rise of China: Accommodation and Balancing in East Asia." *Security Studies* 15, no. 3 (2006): 355-395.

"SAFTI MI Units." *Ministry of Defense Singapore*. Accessed September 10, 2019. https://www.mindef.gov.sg/oms/imindef/mindef_websites/atozlistings/saftimi/SAFTIMIUnits.html.

Scott, David. "The Indo-Pacific in US Strategy: Responding to Power Shifts." *The "Indo-Pacific" - Regional Dynamics in the 21st Century's New Geopolitical Center of Gravity* 3, no. 2 (August 2018): 19-43.

Shambaugh, David. "Assessing the US 'Pivot' to Asia." *Strategic Studies Quarterly* 7, no. 2 (Summer 2013): 10-19.

Shifrinson, Joshua. "Should the United States Fear China's Rise?" *Washington Quarterly* 41, no. 4 (Winter 2019): 65-83.

Singh, Bhuhindar, Henrick Tsjeng, and Shawn Ho. "ASEAN Unity in the Face of China's 'Unilateral Consensus'." *RSIS Commentary* 151, (June 2016).

Sokolsky, Richard, Angel Rabasa, and Neu Richard. *The Role of Southeast Asia in U.S. Strategy Toward China*. RAND Corporation, 2001.

Storey, Ian. "ASEAN's Failing Grade in the South China Sea." In *International Relations and Asia's Southern Tier*, eds. Gilbert Tozman and Joseph Chinyong Liow, 111-124. Singapore: Springer, 2018.

Tan, Dawn Wei. "ASEAN defense chiefs set to ink first multilateral air guidelines." *The Straits Times*, October 19, 2018. <https://www.straitstimes.com/singapore/asean-defense-chiefs-set-to-ink-first-multilateral-air-guidelines>

Tellis, Ashley, Janice Bially, Christopher Layne, and Melissa Mcpherson. *Measuring National Power in the Postindustrial Age*. Rand Corporation, 2000.

The Military Balance 2009-2019. *The International Institute for Strategic Studies*. London: IISS, 2009-2019.

Wong, Kelvin. "Singapore to place initial buy of four F-35 JSFs for further evaluation." *Jane's*, March 1, 2019. <https://www.janes.com/article/86950/singapore-to-place-initial-buy-of-four-f-35-jsfs-for-further-evaluation>

"2017军校巡礼第十五站：空军预警学院（附报考指南）" *China Military*, June 9, 2017. http://www.81.cn/jwgz/2017-06/09/content_7634167_2.htm

“大学简介.” *Air Force Engineering University*. Accessed 10 September 2009. <http://www.afeu.cn/web/afeu/dxgk/gk/>

“飞行学员介绍：空军航空大学.” *Ministry of National Defense of the People's Republic of China*, September 9, 2009. http://www.mod.gov.cn/service/2009-09/09/content_4086516.htm

“中国人民解放军第四军医大学.” 中国军网, June 14, 2017. http://www.81.cn/jwzl/2017-06/14/content_7748285_2.htm