



Understanding Shuangxue

The PLAAF's Learning
Organization Initiative

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Jess Woo

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Cover: Mao Zedong's calligraphy saying "Study Hard and Keep Improving" ["天天学习, 天天向上"] - now a common exhortation to students in China.

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Preface

As the People's Liberation Army PLA continues to undergo a wide range of institutional and equipment changes, it garners much attention from think tanks, academics, and other militaries from around the world. While the organizational and technological changes of the PLA are certainly important and merit study, one aspect that often is overlooked is the 'softer' side, the people who actually operate that equipment, and occupy the positions that make up the organizations.

This study focuses on how the PLA Air Force is attempting to better educate their people, promote learning, and thereby improve their combat effectiveness, the ultimate goal of any military. While many western nations' militaries have a long history of multi-faceted education and learning built into their personnel systems, the PLA, like many other communist-modeled militaries, has tended to focus on military training, vice education, limited to an individual's specific position at the time, and left the 'education' portion to focus solely on political education in support of the Party. This appears to be slowly changing. With the introduction of the Shuangxue, aka double learning, model, the PLA is attempting to incorporate training and education across different levels and specialties. Inevitably this attempt to change not just a system, but a mindset, will have successes and failures, but it appears to have garnered enough momentum and senior level support to persist into the foreseeable future. This study seeks to explain the origins of Shuangxue, provide examples and insights as to how it is being applied through the force, and set a baseline against which the future may be judged.

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Understanding Shuangxue: The PLAAF's Learning Organization Initiative

The PLA is currently engaged in an ambitious modernization program that includes significant improvements to its equipment, reforms to training and educational practices, and wide sweeping reorganization. However, this process has exposed a wide gap between desired and current capabilities. “Shuangxue”, the topic of this study, is a learning initiative promoted by senior PLA Air Force leadership in response to these challenges. By encouraging individual learning and team learning activities, the PLAAF hopes to foster a lifelong learning culture within the service that will not only help it address current capability deficiencies but also adapt to future changes.

Key Findings

- Xi Jinping’s “Strong Military Dream” (强军梦) directive in 2012 greatly accelerated the PLA’s modernization.¹ Subsequent changes in equipment, training and organizational structure pose serious challenges for PLAAF personnel at all levels. Many individuals report experiencing “ability panic”—fear of knowing the inadequacy of ones’ skills.
- Shuangxue, the full title is “Create Learning Flight Groups, Strive to Be Learning Aviators”, was created by a frontline unit in 2011 to address serious deficiencies in military knowledge and skills.² Beginning in 2014, the PLAAF leadership promoted Shuangxue across the Air Force to create a learning culture in the service that encourages individual learning and team learning activities in operational units and work units to help active-duty personnel at all levels address deficiencies and better adapt to changes.

- Shuangxue is not a systematic training program. More analogous to a Chinese mass movement or political campaign, its goal is to foster a learning culture, and change military personnel's mindset. Shuangxue has its roots in the learning organization philosophy which advocates lifelong learning beyond the traditional classroom setting. Implemented ad hoc at the unit level, these activities take place outside of the military academic institutions and rely on individuals and teams taking initiatives with minimum centralized supervision. All units determine their own study methods according to their missions and capabilities. Only general guidance is given: that learning activities should focus on equipment, combat methods, system-of-systems, and the heroic traditions of the Chinese military.³
- Reports in Kongjun Bao and other PLA media indicate that Shuangxue-related activities are being carried out at all unit levels from the grassroots (基层) to the Air Force headquarters. Examination of Shuangxue activities reveals a common theme: PLA personnel identify an area of weakness or a research topic and decide on a plan of study. Time is set aside for individual or group study. When possible, experts are invited into the units to give lectures or demonstrations. Evaluation of these learning activities include giving reports, taking tests, publishing research papers, or through actual combat training.
- While assessing the progress and success of this initiative is difficult in the short term, it is noteworthy for its high-level support and widespread adoption. The PLAAF sees "learning power" as a key part of its service identity and prevailing intellectually as the cornerstone of fighting and winning wars and becoming a "Strategic Air Force" (战略空军).⁴ In February 2018, CMC Chairman Xi Jinping emphasized the importance of lifelong learning beyond the academy or specific training programs.⁵ It is likely that the PLAAF leadership will continue or rebrand the program and make the PLAAF a force devoted to continuous self-improvement.

Introduction

On 29 February 2016, the People's Liberation Army Air Force (PLAAF) held a ceremony to announce the service's institutional reorganization (体制改革).⁶ Then-Commander of the Air Force, General Ma Xiaotian (马晓天), announced the Central Military Commission's (CMC) order reorganizing the PLAAF Headquarters. In his speech, Ma called on the Air Force to resolutely carry out CMC Chairman Xi Jinping's reform and military strengthening strategy, to understand the necessity of the reform, and to clearly assess the necessary steps to achieve the goal of being able to fight and win. Ma highlighted the fact that "The process of institutional reform...is also a process of remolding people's thinking, upgrading people's capabilities and qualities, and reshaping the pattern of work."⁷ To accomplish these goals, he argued "We should keep a strong sense of crisis and feel an 'ability panic' (本领恐慌)."⁸

Originally coined by Mao Zedong (毛泽东) in 1938, this latter phrase, which means the "fear of knowing the inadequacy of one's skills," has become emblematic of a shared sentiment among PLAAF personnel since its strategic transformation picked up pace after the 18th Party Congress in 2012.⁹ To combat "ability panic" and "make sure that all comrades are comprehensively and perfectly capable as required", Ma emphasized the importance of carrying out Shuangxue "double learning" (双学) activities—self- and team-learning activities meant to improve combat proficiency.¹⁰ Originally titled "Create Learning Flight Groups, Strive to Be Learning Aviators" ("创建学习型飞行大队, 争当学习型飞行人员"), Shuangxue, as adopted throughout the PLAAF, is shorthand for the lengthy original title.^{11, i}

i Note that it is distinct from the similarly-named but entirely separate "Double Bachelors" degree (shuangxuewei or shuangxueji; 双学位/双学籍).

In contrast to other aspects of education and training in the military, Shuangxue is not a systematic training program, which the shorthand of the title appears to suggest. The key to understanding the nature of the Shuangxue initiative lies in the key word in the full title- “learning” (学习型) as an adjective, which has its roots in the learning organization or learning society concept that advocates lifelong learning beyond the traditional classroom setting.

Originating in the 1970s in the West and flourishing in the 1990s largely in the business sector, the learning organization philosophy argues that traditional educational institutions cannot keep up with the constant changes in the modern world and that decentralized, learning activities beyond the classroom that facilitate the ability of lifelong learning of individuals can help organizations stay current. It envisioned an organization with its personnel “skilled at creating, acquiring, and transferring knowledge,” therefore it “would be able to adapt to the unpredictable more quickly than their competitors could.”¹² For that to happen, organizations need to “tap people’s commitment and capacity to learn at all levels.”¹³

This concept became popular in China after then-President Jiang Zemin proposed “establishing a lifelong learning system and building a learning society” during an APEC meeting in May 2001.¹⁴ Jiang saw the concept as a way of helping China more rapidly modernize and achieving its economic development goals. In 2003, the Communist Party of China (CCP) announced plans to transform itself into a “Learning Party” (学习型政党).¹⁵ The CCP, therefore, has a tradition of viewing “continuous learning” as a means for unlocking rapid organizational change, both for achieving economic goals or in the PLA’s case, acquiring necessary technical knowledge to adapt to the requirements of a modern military.

Consistent with the learning organization philosophy, the PLAAF’s Shuangxue initiative aimed to create a learning culture in the service that encourages individual learning and team learning activities in operational units and work units to help active-duty personnel at all levels address deficiencies and better adapt to changes. In other words, these activities take place outside of the military academic institutions and rely on individuals and teams taking initiatives with minimum centralized supervision.

As the title suggests, in its infant stage, Shuangxue was limited in scope and applied primarily to aviation units. However, as sweeping changes in training, equipment, and organizational structure have made greater and greater demands of PLAAF personnel, the initiative gained prominence in the intervening years as a major driver of efforts to improve skills and capabilities across the force. In its current form, Shuangxue activities have become a key component of unit-level

“on-the-job education and training.”ⁱⁱ Reports in Kongjun Bao and other PLA press indicate that Shuangxue-related activities are being carried out from the grassroots level to the Air Force headquarters.

Organization and Sources

This report explores the origins of Shuangxue, and then analyzes the reasons why the PLAAF has taken a learning activity that was initially only promoted by a single unit and made it a force-wide priority. It explores the connection between “ability panic” and Shuangxue to explain how it fits into the PLAAF’s larger modernization effort. And then finally examines examples of Shuangxue activities to provide the reader with a greater context to understand this wide-reaching and nebulous learning initiative and concludes with an assessment of Shuangxue’s impact on these units.

This paper relies on open source Chinese media information between 2011 and 2017. Specific sources include the PLA’s official newspaper *PLA Daily* (Jiefangjun Bao; 解放军报), *PLA Daily Online* (81.cn), the PLAAF’s newspaper *Air Force News* (Kongjun Bao; 空军报), and *Air Force News Online* (kj.81.cn).

Origins of Shuangxue

In November 2011, the PLAAF conducted the largest, most competitive and most realistic opposition-force air battle competition assessment it had held until that point known as Golden Helmet (金头盔).¹⁶ A battalion leader-grade flight group (飞行大队) subordinate to one of the air regiments of the former Shenyang Military Region Air Force’s (MRAF) 1st Air Division, which is well-known for its combat performance during the Korean War, was eliminated on the first day.ⁱⁱⁱ A comprehensive review of the competition that included subject matter experts on electronic warfare and radar revealed that the pilots were clueless about how to operate effectively in a complex electromagnetic environment that included widespread jamming. Pilots were also found to be ignorant of important developments in modern avionics, PLAAF (Red Force) tactics, and enemy (Blue Force) tactics. Other elements were also found to be lacking in technical skills

ii The unit-level “on-the-job education and training,” combined with military academic institutions and military professional education, make up the three components of the “Triad” *New Type Military Talent Cultivation System* (三位一体新型军事人才培养体系). See “关于聚焦实战、瞄准一流，建设高素质新型飞行人员队伍的意见,” Kongjun Bao, 6 July 2017, 3. Of note, the PLA defines “military professional education” as “education outside of academic institutions.” See “划重点！军事职业教育与你我息息相关,” *Xinhuanet*, 1 March 2018, www.xinhuanet.com/mil/2018-03/01/c_129819877.htm.

iii This division shot down 16 UN aircraft. Mao Zedong personally wrote a citation for the unit, praising their valor. See Li Jianwen (李建文) and Wang Jun (王军), “空军航空兵第一师某飞行大队瞄准强军目标推动飞行员素质转型狠抓学习能力续写打赢传奇,” *PLA Daily*, 22 November 2013, http://kj.81.cn/content/2013-11/22/content_5660075.htm.

and basic job knowledge. Out of dozens of aircraft maintenance personnel, not a single one was familiar with electronic countermeasures.¹⁷

The air division's Party Committee decided that it was necessary to begin taking action at the unit level. The conclusion it reached, after multiple debriefings on the root cause of its failure, was that its personnel had insufficient capabilities to learn, research and grow along with the technological advances. It decided to adopt an aggressive learning initiative for pilots and flight groups. The resulting initiative, titled "Create Learning Flight Groups, Strive to Be Learning Aviators," formed the basis of Shuangxue.^{18, iv} This division's Shuangxue initiative was built around the idea that "learning power is combat power" (学习力就是战斗力) and a five-part study framework that created systems for objectives, content, methods, support and evaluation, as well as a digital database to share materials and ideas.¹⁹

Under this learning initiative, the division's subordinate regiment set up learning small groups that deliberately included personnel from different billets. For example, pilot Meng Xiangli (孟祥礼), regiment chief of staff Li Tong (李通), and aircraft maintenance group engine expert Le Zhonghua (乐中华) were in the same group. Meng revealed that his group made time for Shuangxue activities, "no matter whether we had regular flight training or a major mission, we all committed to 'study ten minutes before regular flight prep, and discuss for an hour after the flight debriefing,' constantly studying and reflecting to improve the quality of our training."²⁰ Additionally, pilots were expected to attend lectures from subject-matter experts on topics related to informationized equipment and their employment to help devise strategies to deal with new technologies and tactics. The same article revealed that more than 100 similar lectures were taught at this division.

According to this division's leadership, the Shuangxue learning initiative had an immediate result. In 2013, the 1st Air Division took first place in the same competition and received four out of the seven Golden Helmet pilot awards.²¹ Shuangxue is regarded as the cornerstone of their success in this rapid improvement.

iv Note: In the PLAAF, the term *feixingyuan* (飞行员) can be translated as "pilot" in any type of aircraft or "aviators," which refers to all personnel on an aircraft, such as a bomber or transport.

“Ability Panic” and Shuangxue: From a Single Unit Initiative to Widespread Adoption

Initially a learning activity promoted by a single unit, Shuangxue was later promoted by the Air Force Party Committee to aviation units and the three newly-created flight colleges in September 2013.²² According to Air Force Party Committee senior leadership, the Air Force must regard learning power as an important component of the Air Force’s strategic capabilities. At the 2014 Military Training Conference, General Ma Xiaotian, then-commander of the Air Force, made it clear that Shuangxue should be used by the entire PLAAF.²³ Ma explained the three key considerations behind this drive, CMC Chairman Xi Jinping’s requirement to build a strong armed forces; and the prominent problems that came to light during the Air Force’s transformation process; Shuangxue activities came out of front-line unit’s attempts to address their existing problems and have shown concrete results.

Ma’s remarks in 2014 demonstrated that the PLAAF had recognized that the 1st Air Division’s challenges were not unique within the Air Force. Although the PLA’s modernization has been underway for at least two decades, Xi Jinping’s ascension to the position of General Secretary of the Chinese Communist Party and the Chairman of the CMC at the 18th Party Congress in late 2012 put the PLA’s modernization into overdrive.

In March 2013, during a meeting with the representatives from the PLA at the 12th National People’s Congress, Xi made clear that the Party’s goal in regards to the military in the new era is to “build the people’s forces into world-class forces that obey the Party’s command, can fight and win, and maintain excellent conduct.”²⁴

In order to “fight and win” in future combat, Xi called for actual-combat training to be conducted across the PLA on a regular basis and pushed through sweeping reforms to its organizational structure.^v In January 2016, the PLA began “above-the-neck” (脖子以上), i.e. above the corps level, reforms that created a new command structure.^{vi} February 2017 saw the beginning of dramatic “neck-and-below” (脖子以下), i.e. corps and below, reforms that largely affected individual units.^{vii} At the same time, new aircraft and new equipment were commissioned into service at an accelerated pace.

These sweeping changes, which touched every corner of the Air Force and every level of personnel, helped further expose a number of major deficiencies in combat capabilities and uncover the previous unknown unknowns, contributing to the “ability panic.”

There are three major challenges the PLAAF personnel face and provides examples of “ability panic” and Shuangxue’s utility in addressing these challenges.

Challenge 1: New Equipment

The rapid introduction of new equipment starting in the late 1990s posed a problem as technology outstripped the pace at which aviators and other weapon system operators can become familiarized with it. Perhaps the best illustration of this issue is that China is attempting to go from an air force dominated by 2nd-generation aircraft (J-7, J-8) to 3rd- and 4th- generation aircraft (J-20, J-31) in less than a generation of pilots.^{viii} On 31 July 2017, a large military parade was held at Zhurihe (朱日和), Inner Mongolia, to celebrate the 90th anniversary of the founding of the PLA. A special report in *Kongjun Bao* noted the “explosive development” (“井喷式”发展) of the PLAAF’s weapons and equipment to include three J-20s, a new aerial refueling formation of HU-6/H-6DU tankers and J-10C and J-16 fighters, HQ-9B and HQ-22 surface-to-air missile (SAM) weapon systems, and unmanned aerial vehicles (UAVs) i.e. drones.²⁵

This can be daunting both in terms of new equipment but also capabilities. One comment that appears frequently across all of the PLAAF’s branches is that “new equipment does not automatically mean greater combat capability”, equipment must be matched with skill and understanding of how to use it.²⁶ Personnel with many years of experience operating one type of equipment can

v Actual-Combat (实战) is the term used by the PLA to differentiate between previous scripted exercises that had little relation to a real combat situation.

vi The PLA uses “above-the-neck” to refer to the organizational reform at anything above the corps level, e.g. TC services, TC HQ, CMC, etc.

vii The PLA uses “neck-and-below” to refer to the organizational reform at the corps-level and below.

viii Note that the United States and China refer to generations of aircraft differently.

experience the “ability panic” when forced to quickly learn whole new schools of tactics and technical capabilities.

One pilot named Liu Jun (刘俊) noted that while 3rd-generation aircraft, e.g. J-10, “..are easy to fly, but being able to fly is not the same as being able to fight.”²⁷ Another pilot who was transitioning to a 3rd-generation aircraft noted that there are “thousands of data points [on displays in newer aircraft], almost a hundred times more [information].”²⁸ Another article revealed that a husband-and-wife team that both served in the PLA Air Force, Sun Hongwei (孙宏伟) and Liu Yanhui (刘艳慧), who had spent 10 years at a former Beijing MRAF’s SAM regiment stationed in Inner Mongolia would be reassigned to a unit with a type of weapon three generations more advanced than the one they had been using.²⁹

Aircraft maintenance personnel faced similar challenges. The PLAAF’s slow phase-out of antiquated jet trainers, such the JL-8 and JL-9, has further exacerbated this problem.^{ix} For example, one article reported that a Southern Theater Command Air Force (TCAF) air brigade’s leaders noticed some officers and enlisted personnel were having a hard time transitioning to a type of 3rd-generation aircraft.³⁰ Some of the backbone personnel had flown or maintained a 2nd-generation aircraft for a long time, and they were held back by habits and practices formed during that time.

A separate article mentioned that, when a group of new-type bomber aircraft (新型轰炸机) was commissioned into service in an Eastern TCAF air regiment, the unit experienced problems due to the aircraft maintenance personnel having trouble adopting the new mindset that was needed to maintain a new-generation aircraft. For example, some maintenance personnel equated the idea of maintenance with “scrubbing everything clean and making it look shiny.”³¹

While many of these problems are being uncovered and resolved due to a new mindset being applied to daily tasks, other more systematic problems only became clear after units increasingly engaged in actual-combat training that seriously challenge PLAAF units’ capabilities.

Challenge 2: Actual-Combat Training

The PLA has placed more emphasis on realistic training since 2012. At the 18th Party Congress, Xi Jinping called for actual-combat training to be conducted across the PLA (向全军发出“大力开展实战化训练”). This followed the late 2011 introduction of the Air Force’s Golden Helmet (金头盔) competition, which was the first of the Air Force’s “Four Key Training Brands,” including Red Sword (红剑), Blue Shield (蓝盾), and Golden Dart (金飞镖).³²

ix The author is grateful to Andreas Rupprecht for this point.

PLA Air Force Actual-Combat Training Four Key Training Brands (实战化训练四大品牌) ^x	
Red Sword Exercise (红剑)	Campaign-level System-of-Systems Confrontation
Blue Shield Exercise and Golden Shield Competition (蓝盾 and 金盾)	Air Defense Opposition-Force
Golden Helmet Competition (金头盔)	Fighter Jet and Ground Attack Aircraft Air-to-air Opposition-Force
Golden Dart Competition (金飞镖)	Penetration and Ground Attack

These exercises have had a real impact in exposing areas for improvement. In one early exercise, likely Red Sword, a radar unit controller was unable to distinguish between friendly and opposition aircraft. The equipment was functioning correctly, but this individual’s training was not up to the task.³³

In another instance, a Western TCAF SAM brigade that had gradually introduced new equipment since September 2016 encountered major difficulties due to lack of familiarity with the new equipment.³⁴ During an exercise, likely Blue Shield, the brigade leaders discovered that some staff officers did not fully consider the performance parameters and characteristics of the new equipment. The staff officers simply used older and similar operational plans when operating new equipment, causing “inexact analysis of air situations, slow calculation of data on targets, mixed tactical plotting, and a series of other issues”.³⁵

In addition to major training missions, the PLAAF has emphasized normalization of actual-combat training, posing challenges for units which in the past preferred to avoid more risky or difficult training subjects. A Central TCAF SAM battalion, for example, failed to deploy electronic counter measures (ECM) equipment during training exercises until after the new training directives in 2012 due to fears of complicating training and lack of familiarity with the equipment.³⁶ Similarly, an Eastern TCAF SAM brigade, for example, had previously deliberately turned off equipment during training to maintain a low-malfunction rate. In another instance, a Western TCAF SAM brigade’s battalion reported that it used to treat nighttime training as a mere formality (走过场).³⁷

When these units were forced to reevaluate their training standards and incorporate more elements that better resembled duties they would carry out in a real conflict, they were met with many previous unknown unknowns. For instance, a rescue drill taken place in an Eastern TCAF unit revealed that an emergency response team was only capable of using a vehicle disguised as an aircraft, and was

^x For a more comprehensive examination of these training brands, see: Jana Allen and Kenneth Allen, “The PLA Air Force’s Four Key Training Brands, CASI, 31 May, 2018, <https://www.airuniversity.af.mil/CASI/Display/Article/1536348/pla-air-forces-four-key-training-brands/>.

caught off guard when asked to conduct a drill using a real aircraft.³⁸ The medical team's first-aid setup did not match the aircraft type; the pilot suffered a second injury when the medical team tried to get them out of the cabin; the firefighting subunit sprayed water all over the aircraft, ignoring the danger of fuel leaking from the aircraft. These individual examples are illustrative of the large deficiencies in the PLAAF's training across all branches.

Challenge 3: Organizational Reforms

The PLA's "above-the-neck" reform, which abolished its seven MR Air Force (MRAF) Headquarters and created five TCAF Headquarters, was initiated in February 2016. The second stage of the reform, the neck-and-below reform which was initiated in February 2017, involved units at the corps-level and below. Concerning the PLAAF, several additional corps deputy leader-grade bases (基地) were created from existing command posts, as well as the former Jinan MRAF and Lanzhou MRAF Headquarters. Many units were abolished, merged, upgraded, downgraded, and/or resubordinated. As a result, the aviation branch's fighter and ground attack aircraft organizational structure has been shifted from a Command Post-Air Division structure to a Base-Brigade structure.^{xi} The chart below shows the shift in organizations from air divisions (left) to air brigades (right).

Air Division & Brigade Structure Comparison

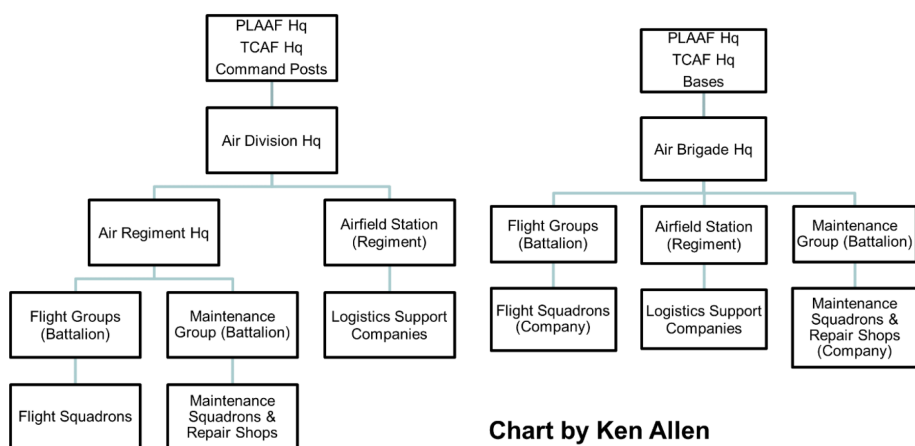


Chart by Ken Allen

xi For a detailed examination of the PLA Air Force's transition to a brigade structure, see Laurence "Sid" Trevethan, "Brigadization" of the PLA Air Force, CASI, 31 May, 2018, <https://www.airuniversity.af.mil/CASI/Display/Article/1536338/brigadization-of-the-pla-air-force/>.

At the heart of the “neck-and-below” reform was the new base-brigade structure (基地-旅体制) which integrates battle, training, management and support (战训管保), and is considered essential to the development of system-of-systems operational capabilities (体系作战能力).^{39, xii} Training and unit management have both seen dramatic shifts, reflecting this priority.

Together, these reforms had extensive and far-reaching consequences.^{xiii} During the reorganization, many personnel were reassigned, repositioned across branches, assuming billets without any previous experience. Old methods are being discarded, requiring personnel at all levels to familiarize themselves with completely new systems. This affected units at a range of organizational levels, and the following analysis gives examples starting at the headquarters-level down to battalion.

One article revealed the impact of the reform in the Air Force Headquarters Staff Department. After the reorganization, many staff officers went from being experts in one field to becoming a beginner in a different field. Wang Chenguang (王晨光), a former ECM staff officer (电抗参谋) who had worked at the Staff Department for more than 10 years, became an ECM and radar staff officer (电雷参谋). He revealed that this new title brought with it significantly more responsibilities. He told reporters that changes in job functions and work patterns made him feel a “ability panic.”⁴⁰ Wang Yaokang (王耀康), a former Staff Department’s Military Training Department’s staff officer in charge of academic institutions training was assigned to oversee academic institutions recruitment and National Defense Student (国防生) program training. With so much to learn, Wang commented that he felt like he was an elementary school student again.⁴¹

Tan Shengfang (谭胜芳), a staff officer from an Eastern TCAF air brigade’s Staff Department’s Operations and Training Office, explained that the base-brigade command structure allowed the brigade level to organize training independently. In turn, it also demanded training organization personnel be proficient in not just executing specific duties, but also in formulating flight plans and organizing tactical subjects training.⁴²

xii In 2005 the PLA was directed to conduct systematic and detailed research to support implementation of “system-of-systems operations,” envisioned as bringing advanced combat capability by linking PLA units to sensors and to each other through an integrated command information system. This requires the PLA to adopt a much more sophisticated approach to communications, and involves much greater volumes of information being passed between different echelons. See Kevin McCauley, “PLA System-of -Systems Operations Enabling Joint Operations”, The Jamestown Foundation <https://jamestown.org/wp-content/uploads/2017/01/System-of-Systems-Enabling-Joint-Operations.pdf?x87069> January 2017.

xiii Setting aside the strategic considerations for the stages of the reforms, the analysis here focuses on personnel changes, and particularly changes in individual’s job functions that resulted in “ability panic.”

Under the older system, regiment-level units relied on their associated division for guidance. A Kongjun Bao article reported that aviators and staff officers of a Southern TCAF air regiment had virtually zero command experience.⁴³ After the reform, some former regiment officers assumed billets in brigades, resulting in an experience gap. Ma Dengyun (马登云), a navigation staff officer of an Eastern TCAF air brigade, who was previously assigned as a regimental navigation staff officer, said that, in the past, his job was simply to pass flight route data to commanders, but that now his duties included assisting commanders in decision-making and providing tactical guidance to aircraft in training.⁴⁴ Ma admitted to frequently experiencing panic due to his lack of abilities.

Lower levels have been similarly “bootstrapped” and given greater responsibility. Battalions, which in the past were considered grassroots units, now need to take initiative and improve management and command skills. An Eastern TCAF SAM battalion’s Party Committee realized that, under the new structure, there were many more units under the base and the brigade, and battalions were often several hundred kilometers away from brigade headquarters, making it difficult for brigade headquarters to oversee every issue at the grassroots level.⁴⁵ This required the battalion Party Committee to take the initiative and play its role as a “forward command post” (前沿指挥所) to the fullest. Battalions were also required to improve their ability to rapidly redeploy. Wang Jun (王军), commander of a battalion under an airborne brigade, stated that, in the future, battalions would have a very high mobilization rate, whether in Theater Command joint exercises or in regular training, and therefore battalion Party Committees must be capable of giving commands.⁴⁶ The clear implication here is that this has not been the case in the past.

The changes also extend to new types of equipment being introduced, including incompatible or dissimilar types. For example, airfield stations that once supported transport aircraft may now be assigned combat aircraft, and personnel from antiaircraft artillery (AAA) units are now assigned to units that field surface-to-air missiles and radar. Meanwhile, many AAA units are disappearing. Multiple articles reported former AAA troops experiencing “ability panic” after being charged with brand new tasks.⁴⁷ The training for these different types of equipment is often incompatible or has little overlap, requiring them to essentially start from scratch in their training.

In addition, the lack of emphasis in training for technical backbone personnel resulted in a serious deficit of technically-competent and trained military personnel. Multiple articles from Kongjun Bao highlighted this issue. For example, the leaders

of a Southern TCAF SAM brigade pointed out that a combination of an overly-long training cycle for specialty technicians and frequent personnel turnover resulted in a shortage of these personnel.⁴⁸ In another instance, a Northern TCAF airfield station noted that, when support backbone personnel were on leave, the unit frequently found itself short-staffed.⁴⁹ During the “neck-and-below” reform, with some skilled noncommissioned officers (NCOs) leaving the service, a Western TCAF airfield station struggled to fix vehicle breakdowns.⁵⁰ Sometimes persistent problems even affected training and support. In any organization, training and retaining such a force takes time and investment. In the United States, a civilian work force serves as a partial solution to this problem. But until very recently, the Chinese military had not even begun to recruit adequate numbers of these personnel, or train them to a sufficiently high standard.

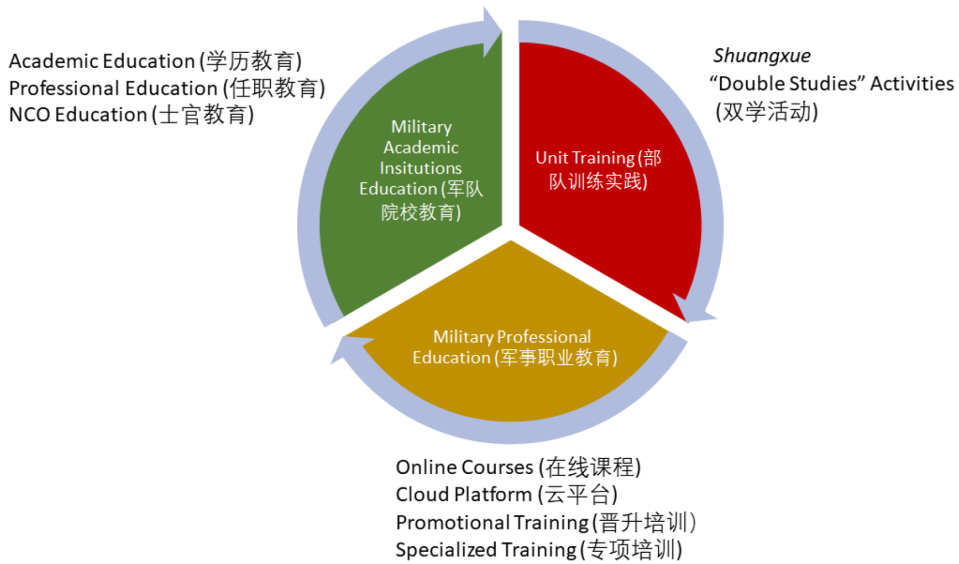
“To Prevail in Future Combat, One Must First Prevail Intellectually”⁵¹

The examples above show that, due to broad changes in organizational structure, equipment, and training, personnel across the PLAAF are confronting the gap between their current abilities and what are needed to “fight and win (能打赢仗).”⁵²

To strengthen the PLA’s education system, the Third Plenary Session of the 18th CPC Central Committee made an important decision to deepen the reform of military academic institutions and improve the PLA military personnel’s “‘Triad’ New-Type Military Personnel Cultivation System” (三位一体新型军事人才培养体系) consisting of military academic institutions education, military professional education, and unit on-the-job education and training.⁵³ As the PLAAF continued to explore ways to recruit and train high quality personnel, it also recognized the need to leverage the resources at hand to address these pressing issues.

The chart below illustrates the “cultivation” cycle for PLA personnel and how Shuangxue fits into the system.

“Triad” New-Type Military Personnel Cultivation System



Military academic institutions education encompasses cadet academic education, officer’s professional education, and NCO education. It follows admission procedures and standard curriculums, and provides comprehensive and systematic education programs. However, it also has its limitations. A 28 February 2017 PLA Daily article described Xi Jinping’s recommendations for improving the “Triad” New-Type Military Personnel Cultivation System.”⁵⁴ According to Xi, a focus on academic institutional education to the neglect of more practical training has led to an imbalance in their skills and insufficient numbers of competent personnel. He believes that on-the-job training has the most direct effect in helping individual personnel improve. He also noted that the concept of lifelong learning beyond the academy or specific training program is not currently a universal part of the Chinese military mindset.

As military academic institutions are not accessible to all active-duty personnel, the PLA is committed to building a platform for military professional education to expand educational options for the rest of the force. There are different schools of thought regarding military professional education in China, but according to the prevailing view, military professional education refers to internet-enabled learning platforms that are open to all military personnel in service. In theory, military professional education should be able to provide all PLAAF personnel, officers and enlisted personnel alike, with training opportunities as envisioned in

the cultivation system, yet a PLA Daily article indicates that the program is still under development and will be operational in 2019.^{55, xiv}

While the PLAAF continues to develop its military professional education programs and recruit better-qualified personnel into academic institutions, the PLAAF leadership saw Shuangxue as a workaround of the traditional educational system to help the PLAAF personnel cope with the rapid changes that are occurring organizationally and technologically. The flexible and decentralized nature of Shuangxue means that it could take place outside of traditional classrooms and be applied to all PLAAF personnel regardless of their billets, grades, and ranks.

At the 2014 PLAAF Annual Military Training Meeting held from 11 to 12 January, Ma Xiaotian made it clear that Shuangxue should be used by the entire PLA.⁵⁶ He called on the Air Force to make effective use of Shuangxue to conduct research on weapons and equipment and master the skills of operating and using the equipment, to learn about the opponents and create new combat methods, to conduct research on the employment of system-of-systems (体系), and to study political theory and foster a mindset that aims at winning in combat. In short, Shuangxue should stress “equipment (装备), combat methods (战法), system-of-systems (系统), and the heroic traditions of the Chinese military (军魂),”⁵⁷ Ma also emphasized that Shuangxue activities should be mainly aimed at meeting job requirements.

The Shuangxue initiative also fits into the PLAAF’s broader objectives. In April 2014, CMC Chairman Xi Jinping charged the PLAAF with becoming a “strategic air force” (战略性空军).⁵⁸ To accomplish this, the Air Force’s leadership wanted to harness a key part of the PLAAF’s service identity: studiousness (好学). The PLAAF sees prevailing intellectually as the cornerstone of fighting and winning wars and becoming a strategic Air Force. It saw Shuangxue activities as a way to change military personnel’s mindset, unleash potential human capital and drive outcomes. By emphasizing Shuangxue, the Air Force sent a message to all who are feeling inadequate that acknowledging the problem is good and is the first step toward making improvement. It encourages units to find that limit, feel the “ability panic” and work to overcome it. In May 2017, the PLAAF held the “Air Force Concentrated Training for Principal Officers at the Division, Brigade and Regiment levels” (2017年空军师旅团主官集训), an event labeled “a large-scale, high-level Shuangxue activity.”⁵⁹ “How far is the PLAAF from being able to fight and win fights?” was a question raised during the training.⁶⁰ Participants recognized that the ultimate success of its force building could only be proven

xiv It is worth noting that the PLA’s military professional education differs from professional military education (PME) in the United States.

on the battle field, yet they reached a consensus that the PLAAF must strive to answer that question in daily practices, especially through various platforms including the PLAAF's four key training brands and Shuangxue activities.

How is Shuangxue being implemented?

According to Ma, all units should determine their own study methods based on their tasks and capabilities.⁶¹ Ma emphasized the importance of being practical about these activities and focusing on crucial and difficult issues. Since Shuangxue is aimed at improving individual job skills, each person's study activities must be closely related to their specific job proficiency requirements. He encouraged learning as a team and through exchanges with brother units or outside organizations. He concluded his speech by calling on all PLAAF personnel to "treat continuous learning as a job requirement, a practical need, a spiritual pursuit, and a way of life."⁶²

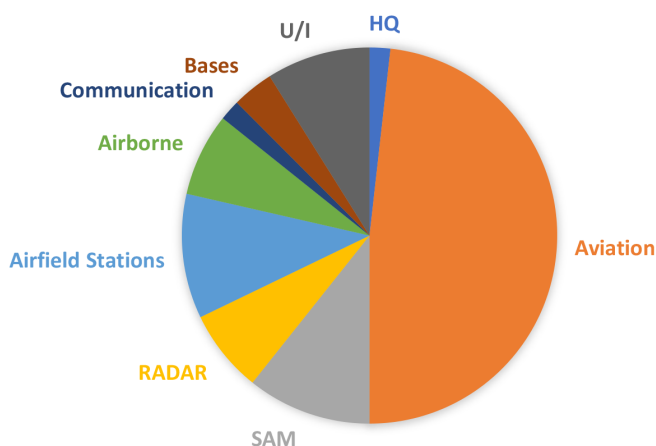
On the one hand, the flexibility of Shuangxue made it possible to be conducted in all units. As the PLAAF leadership only provided general guidance on how to conduct the activities, each unit is free to design activities on their own that could address its unique challenges. As noted previously, the Shuangxue initiative is consistent with the learning organization philosophy and is aimed at creating a learning culture in the service that encourages individual learning and team learning activities that take place outside of the military academic institutions and rely on individuals and teams taking initiatives with minimum centralized supervision. On the other hand, this means that Shuangxue lacks formal, unified guidelines regarding content, timelines for achieving results or even setting the length for courses of study.

Available information on Shuangxue is fragmented, but examination of Shuangxue activities in media reports reveals one common theme: discover an area of weakness or a research topic, preferably in Ma's four categories (equipment, combat methods, system-of-systems, and heroic traditions of the Chinese military) then establish a study plan. Set aside time to study individually or as a unit. For example, several units set aside Monday or Thursday evenings as Shuangxue night school, but this is by no means universal. When possible, experts are invited into the units to give lectures or demonstrations. Evaluation of these learning activities include giving reports, taking tests, or through actual combat training. Many reports emphasized the benefit from preparing to brief others. It is also worth noting that Shuangxue has seen several updates and expansions. Updated versions include "study, research and combat" (学, 研, 战) activities, "let's

talk about actual combat training” (实战化训练规律大家谈), and “learn about the opponent, conduct research on the opponent, and defeat the opponent” (学习对手, 研究对手, 战胜对手).⁶³

A review of articles translated by CASI found 56 reports about units holding Shuangxue activities in the 2017 edition of *Kongjun Bao*. Further breakdown of these units by branch and organization type reveals that each of the branches (Aviation, SAM, RADAR, Airborne)^{xv} has held at least one Shuangxue activity over the course of that year.^{xvi}

MILITARY UNITS HOLDING SHUANGXUE ACTIVITIES (REPORTS IN THE 2017 EDITION OF KONGJUN BAO)



A number of examples drawn from PLA and PLAAF open source media reports are included below to provide the reader with context as to the nature of Shuangxue activities. It should be noted that in many cases the content or length of these activities is unknown.

PLAAF Headquarters

An April 2017 article in *Kongjun Bao* provided a detailed overview of Shuangxue activities in the PLAAF Headquarters Staff Department (空军参谋部) and is worth reviewing at length.⁶⁴ The article noted that since 2016, Air Force Staff Department has been actively exploring more effective ways of organizing the Shuangxue activity in keeping with the new structure and the new missions. It promoted research and discussions on a fixed topic each month to help staff

xv While Anti-Aircraft Artillery is still believed to be an active branch, it is currently in the process of being reorganized into Air Defense units and is not mentioned separately in *Kongjun Bao*.

xvi Shuangxue activities frequently take place over a course of weeks or months.

officers to adopt new mindsets and upgrade capabilities. Each second-level functional bureau (业务局) would pick a key research topic each month. There were no specific rules on how these activities should be carried out. Bureaus were encouraged to hold an all-personnel discussion, as well as to invite outside experts. The topic being discussed at the time of the reporter's tour of the department was the Air Force's plans for airfield systems (空军机场体系建设).

The Staff Department also set up staff officer symposiums. In March 2017, two aviators coming from front-line units separately told the audience about the performance characteristics of the advanced combat aircraft and personal feelings in using the equipment, and briefed the audience on the training conditions of their units, the latest tactical concepts, and their thoughts and suggestions about shaping combat capabilities as quickly as possible with the new equipment.

When commenting on Shuangxue activities for combat duty staff personnel at the command post of the Air Force Headquarters, Hu Debiao (胡德彪), commander of the Air Force Headquarters Command Post (空军指挥所所长), told the reporter: "The biggest hindrance to on-duty staff personnel's training is that they cannot persist in getting involved in regular training."⁶⁵ From the beginning of the Shuangxue activity, they formulated a specific study and training plan for operation on-duty personnel, guaranteeing the training time and the personnel's participation.

According to Ning Jiangtao (宁江涛), director of the Air Force Command Post's General Affairs Division (空军指挥所综合处处长), staff personnel took turns giving a lecture every day, "imparting knowledge of their own specialties in the simplest and clearest form to all others". Behind each lecture-giving staff officer, there is a support team, whose members work together to study the relevant subject, and help the lecturer prepare the lesson. At the same time, they also improve their work capabilities.

According to staff personnel's own assessments, the program is having a positive impact. While reporting on Shuangxue activities in the PLAAF Headquarters Staff Department, the reporters noted that Shuangxue has resulted in prompting the staff personnel to update thoughts, change mindsets, and establish a clear-cut orientation of focusing on actual operations, as well as studying and defeating the enemy.⁶⁶ Gan Xuewu (甘学武), staff officer in the ECM and Radar Bureau (电雷局), told the reporter that, to prepare the lesson on the operational use of a type of radar, he systematically studied the operational effects, equipment support, and work regularities of the radar.⁶⁷ According to him, the knowledge he learned through preparing the lesson was more valuable than his appearance on

the lecture podium. Many staff officers told the reporter: In the past, on-duty staff officers of various subunits were used to viewing things from the perspectives of their own specialties, and all felt that the work they were responsible for was the most important.⁶⁸ Through Shuangxue activities, personnel helped, instructed, and learned from each other. This deepened their mutual understanding and promoted the integration of their work knowledge.

Aviation Units

In the Golden Helmet 2016 opposition-force air combat competition assessment (金头盔2016对抗空战竞赛考核), a Central TCAF air regiment came in second place and two young pilots from this regiment took home the Golden Helmet award.⁶⁹ This was considered a great breakthrough for this regiment, which in October 2014 suffered its third defeat in the same competition assessment. This regiment attributed this success to the implementation of Shuangxue activities, which included lectures given by outside experts, visits to brother units, and enhanced research on weapons and equipment through a problem-tackling small group made up of aircrew members, aircraft maintenance personnel, and civilian experts. This regiment emphasized that through these learning activities, personnel became accustomed to arguments and debates over issues large and small, and they would not rest until a satisfactory solution were found. In August 2016, this regiment arranged a rest and recuperation vacation for pilots and family members. One day during breakfast, a casual chat led to a heated debate regarding some air combat data. As they were close to a research institute, regiment leaders proposed a visit to the institute to find out the answers. The reporters concluded that because all personnel were committed to learning, this regiment was able to make the breakthrough in 2016.

Other aviation unit examples in the Kongjun Bao reveal that in units transitioning to a new type/variant of aircraft, Shuangxue was often used to supplement theoretic training and transition training. In the Central TCAF, one air brigade transitioning from J-7 to the J-10B was able to complete all its tasks within six months.⁷⁰ They used Shuangxue group studying activities to gain a deeper understanding of air-to-air missiles, air-to-ground attacks, electronic warfare, free air combat and other subjects. The aviators and ground crew all together made 42 presentations of their study to the other groups to help speed up their familiarization with the new techniques and equipment.

A similar success story involved an Eastern TCAF air regiment whose commander Yang Deshan (杨德山), a special-grade pilot, sorted through all the

difficult issues arising from combat-readiness training and formed several key-problems-tackling small groups to conduct research on these topics.⁷¹ He also led the efforts in compiling the regiment's self-published "Shuangxue Journal", in which he collected articles his unit's research on equipment maintenance, combat methods and special situation management. These efforts paid off. In less than a year's time, more than 10 aircrews in this regiment all completed the transition. They also made breakthroughs in the areas of ECM, datalinks, and photoelectric equipment.

Shuangxue has also been used to improve language study in aviation units. With the PLAAF participating in more and more international training, as well as during confrontation flights, it is important that Chinese aviators be able to communicate at least basic commands in other languages. An air [transport] regiment under the former Chengdu MRAF, now part of the Western TCAF, devoted half an hour every day until the aviators were able to give basic commands in English.⁷²

System-of-Systems Operations and Joint Operations

Shuangxue has been adopted to promote the general understanding of complex theories and subjects, such as system-of-systems operations and joint operations. Notable examples in Konjgjun Bao include the following.

In July 2014, despite being occupied with the summer's busy training session, the Beijing MRAF sent close to 1,000 principal officers at corps-, division-, regiment-, battalion- and company-level units (五级主官) to participate in a Shuangxue inter-branch training event.^{73, xvii} The goal of the event was to increase communication and knowledge about other branches and break down the knowledge gap between, for example, fighter pilots and SAM troops. During the training, each branch gave an overview of its recent development, then answered questions from other branches. The audience was interested in the answers to questions such as "how do SAM units receive early-warning information and does it meet the demands of future warfare," "how to evade radar during penetration and attack operations," "what could SAM units teach radar units about camouflage and protection and battlefield survival." The Beijing MRAF also sent regiment-level and above principal officers to aviation, SAM and radar units to observe first-hand the operations of weapons and equipment, and the way combat is

xvii Since 2013, the Air Force had held multiple service-wide training events for principal officers at the Corps-, Division-, Regiment-, Battalion- and Company- level units (五级主官) to promote understanding of the Party's directives and hold discussions on key issues. See Qin Chao (秦超), Zhang Li (张力), "空军连续3年组织五级主官培训3.6万人次参加在'生动的重复'中培养强军带头人", *PLA Daily*, 17 May 2015, <http://military.people.com.cn/n/2015/0517/c172467-27011635.html>.

organized. One of the participants, Kuang Qiang (匡强), a regiment flight group commander, revealed that he had the opportunity to talk with a SAM unit division commander to find out how they were able to successfully lock on to his aircraft in a penetration and attack drill.

To further improve command officers' (指挥军官) understanding of joint operations, joint campaigns and system-of-systems operations (体系作战), in 2016 the Central TCAF created a list of 100 recommended and required books.⁷⁴ As a drafter of the plan at the Central TC remarked, "[sometimes] lopsided stress is laid on hardware, and inadequate attention is paid to software..." The books are meant to make sure that commanders have an adequate understanding of the 'software' component, especially joint operations.

Support Capabilities

Multiple reports noted support units making effective use of Shuangxue activities to build up a reserve of technical backbone personnel and improve support capabilities.

Multiple articles noticed a shortage of technical backbone personnel in units. One of the solutions adopted by multiple units was to train NCOs across billets to ensure that they have could take on tasks when necessary. These NCOs were called "[the one with] one specialty and multiple skills." Shuangxue is used to speed up the process of training. One good example concerned how an airfield station subordinated under a Western TCAF base's air brigade utilized Shuangxue and cross-billet training to transform the support model.⁷⁵ For a long time, when aviation units were deployed to other locations for training, airfield stations had to pack up everything and move with aviation units to provide support. In 2015, this airfield station was selected by the PLA AF as a pioneer unit to development and test the aviation unit's zero-escort support model (航空兵部队零伴随保障试点建设单位). In order to reduce the number of support personnel under the new support model, this airfield station focused on training "one-specialty, multiple capabilities" (一专多能) support personnel by switching billets. Over the years, whenever possible, this airfield station arranged relevant personnel to receive training at other airfield stations and academic institutions. In 2016 alone, it sent more than 300 personnel to various training institutions. The article reported that this initiative is seeing great results. By May 2017, this airfield station was capable of supporting all types of aircraft in this brigade.

A 2014 article reported that, by promoting Shuangxue activities, a Nanjing MRAF air regiment developed self-sustaining support capabilities.⁷⁶ Previously,

in many cases, maintenance units relied on technical personnel from aircraft factories to provide key support. However, in May 2014, all three of this regiment's subunits, which were on field deployments, encountered technical difficulties at the same time and requested help from the factories. After a delay kept these factory maintenance staff from arriving, one of the subunits failed to complete its mission on time.^{xviii} This regiment's Party Committee instituted change by first conducting surveys and assessments to get a general sense of the areas of weakness. It then combed through records of maintenance issues for the past ten years. As a result, it implemented a system where "backbone personnel", including experienced NCOs and officers, taught lessons. It held discussions on eliminating malfunctions, where experts offered advice and insight into tough challenges. It also invited factory experts to give lectures. In addition, it required approval from maintenance group commanders before maintenance personnel could ask for help from the factory, forcing them to improve their skills.

Equipment Research

Shuangxue also provides a route for new ideas and research, especially in regards to new equipment employment, to enter the broader PLAAF hierarchy from the bottom up. Two examples are worth noting:

While deployed in a remote part of the Gobi desert, a Central TCAF radar brigade's chief of staff made a careful study of combat techniques and tactics. His study of defense radar intelligence systems was passed to higher echelon and even won an All-Military Award for excellence.⁷⁷

When describing how actual-combat training could aid equipment research, Zhang Youshun (张友顺), a technical office assistant in an Eastern TCAF SAM brigade revealed that, before the 18th Party Congress, most research was conducted at the researchers' desks, without much communication between researchers and the grassroots units.⁷⁸ This made a stark contrast with the present, when there were significantly more training and deployment opportunities, which energized him and motivated him to utilize the "Shuangxue platform" (双学平台) to extend his research beyond his area of focus, previously just focusing on guided missile command and control, into missile large systems. As a direct result of that, in June 2017, while on an exercise mission, Zhang and his team helped eliminate a power outage for his battalion.

xviii Note this is pre-reform so the article, which refers to "南空航空" in this case is understood to mean the Nanjing Military Region.

Assessment of Shuangxue

The examples provided above are primarily PLAAF personnel self-assessments and are given in the context of interviews mean to promote a positive view of the Shuangxue initiative and of the PLAAF's ability to overcome obstacles.

The trumpeted success of Shuangxue in PLA media does not present a holistic or clear picture about that the status of PLAAF, whether there is resistance to the program, or how representative its successes are. Additionally, given Shuangxue's emphasis on transforming the PLAAF into a learning organization, it is worth noting that these initiatives have struggled to measure their own success. As an article in the Harvard Business Review's March 2008 issue pointed out, "the ideal of the learning organization has not yet been realized..."⁷⁹ Many of these initiatives failed or had mixed results because they offered "paens to a better world rather than concrete prescriptions." Moreover, "managers had no way of assessing how their teams' learning was contributing to the organization as a whole... Without [standards for evaluation], companies could declare victory prematurely or claim progress without delving into the particulars or comparing themselves accurately with others."

Since at least 2014 the PLAAF has held annual meetings to award "model" Shuangxue practitioners and units across the service as a way of encouraging participation; however, it is unlikely that the PLAAF is applying metrics to scientifically assess the results of Shuangxue activities.^{80, xix} Two separate articles in the 3 March 2017 Kongjun Bao featured two "model" Shuangxue practitioners in 2016: Chen Zhide (陈志德), a deputy commander of a Southern TCAF's air

xix There is currently insufficient evidence to conclude one way or the other whether the PLAAF is using metrics to scientifically assess the results of Shuangxue activities. However, more information may be available in the future.

regiment, and Wang Weizhen (王伟振), commander of the 2nd Flight Group of an airborne unit's air transport regiment. Chen spearheaded efforts to organize integration between research topic groups and brother units, such as naval fleets and ECM regiments, and was noted for his meticulous notes reviewing the results of training exercises.⁸¹ Wang received commendation from the Air Force for his creation of Shuangxue activities in his unit. He noticed issues arising from his units' transition to a new aircraft and created a detailed study plan to help his aviators become more familiar with the details of the new aircraft.⁸² In both cases, the officers exhibited strong initiative in starring learning and researching activities that addressed the pressing needs of their units.

Additionally, since Shuangxue activities are, ultimately, an investment in education, it is also difficult to assess their contribution to the development of combat capabilities in the near term. Education represents a long-term investment, and the skills being learned can only be tested on the battlefield; however, we cannot underestimate the cumulative effect of such an investment.

Conclusion

Thus far, it appears that the PLAAF is testing a wide variety of Shuangxue activities at different organizational levels. Shuangxue clearly has support within the top leadership of the PLAAF. Reports in Kongjun Bao and other PLA media indicate that Shuangxue-related activities are being carried out from the grassroots level to the Air Force headquarters. Shuangxue is forcing a cultural change within the PLAAF. The fact that the PLA is consciously attempting to resolve decades-old deficiencies in its training and has achieved successes in some cases is notable and should be carefully monitored.

Given the fact that Shuangxue was promoted by Ma Xiaotian during his term as the PLAAF commander, it is possible that under the new PLAAF leadership, the Shuangxue initiative will be rebranded or slowly phased-out; however, as China overhauls its military professional education programs and given Xi Jinping's support for continuing lifelong learning, elements of Shuangxue are likely to be incorporated into the PLA's military professional education and the PLAAF leadership will stay committed to making the Air Force a service devoted to continuous self-improvement.

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