



Initial Fighter Pilot Training in the PLA Air Force

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Introduction

At the beginning of the 2010s, the Chinese People's Liberation Army (PLA) Air Force's (PLAAF's) program for the initial training of fighter pilots had three problems. First, the program was inordinately long and gradual. Second, the PLAAF lacked an advanced trainer aircraft that was suitable for training pilots who would eventually operate an aircraft in the PLAAF's growing fleet of fourth-generation¹ fighters. Third, despite the training program's inordinate length, its curriculum utterly failed to prepare pilot candidates for combat. However, by the end of 2020, the PLAAF had largely resolved these problems, and its initial fighter pilot training program is poised to produce pilots who are better trained, and to do so at a higher rate, than before.

Program Structure

At the beginning of the 2010s, the PLAAF's initial fighter pilot training took approximately ten years.¹ One reason for the inordinate length of the initial fighter pilot training program was that the program combined flight training with officer training. This was, and is still, done because the PLA has neither officer training schools nor single service academies like those of the U.S. armed forces. Instead, each service has multiple, specialized universities where officers are trained. Another reason for the inordinate length of the initial fighter pilot training program was that the PLAAF lacked a suitable advanced trainer aircraft and, therefore, trained fighter pilot candidates with three very different types of trainers, none of which approached the aircraft of the PLAAF's growing



Figure 1: CJ-6

¹ China defines aircraft generations differently. The Western definitions of aircraft generations are used in this report.



Figure 2: JL-8

fleet of fourth-generation fighters. This practice consequently extended the time that was needed for conversion training in what would otherwise still have been a plodding initial training program.

In 2010 all of the PLAAF's fighter pilot candidates would complete one year and eight months of officer training at Air Force Aviation University (AFAU) before beginning two years and four months of additional officer training, aviation-related studies, and basic flight training at AFAU's Basic Flight Training Base.² In Basic Flight

Training, cadets would be screened for their suitability for further flight training as they flew 110 hours in the PLAAF's primary trainer, the venerable, piston engine CJ-6 (Figure 1).³ After cadets completed Basic Flight Training, they would undergo Advanced Flight Training at one of the PLAAF's six flight academies, flying 150 hours in the subsonic JL-8, a two-seat jet trainer (Figure 2).⁴ Following Advanced Flight Training, new fighter pilots would undergo conversion training at one of several training bases and then undergo combat training in an operational unit.⁵ It is unclear how long each of these last three phases lasted, but it is likely that each lasted approximately two years.⁶

In 2012 the PLAAF streamlined the initial fighter pilot training program. It consolidated its six flight academies into three: the Harbin Flight Academy, the Shijiazhuang Flight Academy, and the Xi'an Flight Academy.⁷ It separated officer training and aviation-related studies from Basic Flight Training, lengthening the former to a period of three and one-half years and shortening the latter to a period of six months in which cadets would complete a reduced number of 70 flight hours, a number of hours that was increased to 80 in 2014.⁸ The PLAAF divided Advanced Flight Training into two, one-year phases, Intermediate Flight Training and Advanced Flight Training—both of which would be conducted at the PLAAF's flight academies—and it also eliminated the training bases where conversion training had been conducted.⁹ Thereafter, graduates of the flight academies would undergo conversion training in operational units. In effect, conversion and combat training were consolidated into a single phase. During Intermediate Flight Training, pilot candidates would complete 150 flight hours in the JL-8, which was downgraded to an intermediate trainer; during Advanced Flight Training, pilot candidates would complete 103 flight hours in the JJ-7 (Figure 3), a number of hours that was increased to 123ⁱⁱ in 2014.¹⁰

The JJ-7 is a relatively new lead-in trainer aircraft—its design was finalized in 1987—that was designed on the basis of an old aircraft, the third-generation MiG-21.¹¹ Before the PLAAF streamlined its initial fighter pilot training program in 2012, the JJ-7 was used for conversion training



Figure 3: JJ-7

ⁱⁱ Therefore, in this training program, new fighter pilots complete a total of 353 flight hours before beginning conversion training in an operational unit.



Figure 4: JJ-9

for the J-7 and the J-8.¹² (It seems that new fighter pilots were only being trained to operate third-generation aircraft and that the PLAAF would only select experienced pilots to train to operate its fourth-generation fighters.¹³) Unlike the JL-8, the JJ-7 is capable of supersonic flight, but its analog flight instruments, its mechanical flight controls, and, reportedly, its short range and poor controllability, made it unsuitable for training pilots who would operate aircraft in the PLAAF's growing fleet of fourth-generation fighters.¹⁴ By

streamlining its initial fighter pilot training program, the PLAAF shortened the program from ten years to seven or eight (six years of training as a pilot candidate plus one or two years of conversion training in a combat unit), but the PLAAF needed a new trainer if it was to further shorten the program.¹⁵

Whether as a remedy or as a stopgap, in 2015 the PLAAF began replacing the JJ-7 with the JJ-9 (Figure 4) in some units of its flight academies.¹⁶ (Pilot candidates at the flight academies are organized into multiple training brigades.) As of 2020, the JJ-9 had not completely replaced the JJ-7, probably because the PLAAF still operates some third-generation aircraft for which the JJ-7 is a suitable trainer, but perhaps also because the JJ-9 was never an ideal replacement for the JJ-7.ⁱⁱⁱ The JJ-9 is a lead-in trainer that was designed on the basis of the JJ-7, and it represents an improvement of the JJ-7, but because of its mechanical flight controls, it cannot approximate flight in a fourth-generation fighter.¹⁷ From 2017 the PLAAF seems to have further shortened conversion training for some types of aircraft to less than one year by conducting the training in several operational units that were re-subordinated to the flight academies in order to conduct conversion training in the course of their regular duties, but near the end of the decade, the PLAAF's initial fighter pilot training program was still hindered by the lack of an adequate trainer aircraft.¹⁸

This situation began to change in 2019. In the summer of 2019 the Shijiazhuang Flight Academy introduced a new lead-in fighter trainer, the JL-10 (Figure 5), to one of its training brigades.¹⁹ The JL-10, whose design is based on the Yak-130, is a supersonic aircraft with fly-by-wire flight controls and a glass cockpit, making it an excellent trainer for pilots who will next operate fourth- and fifth-generation aircraft.²⁰ (The JL-10 is being used to train pilot candidates for China's fifth-generation fighter, the J-20.²¹) In 2020 the Shijiazhuang Flight Academy eliminated Intermediate Flight Training for pilot candidates



Figure 5: JL-10

ⁱⁱⁱ Even so, because the JJ-9 was introduced as an advanced trainer as the PLAAF reduced its fleet of third-generation fighters, it is likely that pilot candidates who train in the JJ-9 are assigned directly to operational units with fourth-generation aircraft. Assuming that this is true, pilot candidates who train in the JJ-9 would complete 353 flight hours before piloting a JH-7, J-10S, or J-11BS.

entering the brigade that operates the JL-10 in August of the same year.²² It is unclear how the elimination of Intermediate Flight Training will affect the number of hours that these pilot candidates will fly, but it is likely that they will fly more than the traditional 123 hours because some training subjects from Intermediate Flight Training are likely to have been added to their course of Advanced Flight Training.^{iv}

The Harbin Flight Academy also introduced the JL-10 to one of its brigades in the summer of 2020, so it is possible that it, too, has eliminated, or will soon eliminate, Intermediate Flight Training for that brigade.²³ The introduction of the JL-10 has thus enabled the PLAAF to shorten some fighter pilot candidates' training programs by perhaps as much as one year.²⁴ And because the JL-10 is a fourth-generation aircraft itself, these new fighter pilots will likely require less time for conversion training in operational units with fourth-generation fighters, so, with officer training, it will probably take them little more than five years to complete their initial training.

It is unlikely that the PLAAF will immediately replace all of its JL-8s, JJ-7s, and JJ-9s with the JL-10 because it must still train some pilots to operate aircraft in its now very small fleet of third-generation fighters. The PLAAF is likely to balance the expense of replacing its older trainers with the costs of training new pilots for obsolete fighters that will probably be retired within the next decade.^v It is likely, though, that the PLAAF will introduce the JL-10 to more training brigades in the next few years, and that it will consequently eliminate Intermediate Flight Training for fighter pilot candidates undergoing training in those units. Therefore, the PLAAF will likely produce pilots for its fleet of fourth- and fifth-generation fighters more quickly over the next decade.

Program Content

The PLAAF's initial fighter pilot training program was hindered by more than just inadequate trainer aircraft; it was also hindered by an inadequate curriculum. Even after the PLAAF streamlined the program in 2012, it still very gradually trained pilot candidates for combat. However, despite the years that the PLAAF has taken—and in some training brigades, still takes—to train pilot candidates for combat, for most of the 2010s, the training program still failed to do so because it was unrealistic and rote.

At the beginning of the 2010s, the PLAAF's institutions conducting initial pilot training were fettered by the PLAAF's restrictive culture of safety that made realistic training almost impossible.²⁵ Training flights seem to have only been conducted in excellent weather conditions, and perhaps because this practice limited the number of days on which flights could be conducted, pilot candidates were rushed through multiple training sorties on the same day whether they had

^{iv} Assuming that pilot candidates training in the JL-10 complete half of the flight hours of the traditional Intermediate Flight Training program in addition to those of the traditional Advanced Flight Training program, then they would complete a total of 278 flight hours before being assigned to an operational unit and piloting a JH-7, J-10S, J-11BS, or a J-20. This would be less than those who train in the JJ-7 and JJ-9 complete, but that would accord with the PLAAF's efforts to reduce the time that initial pilot training takes. The JL-10 is a more effective bridge between the PLAAF's primary trainer and its fourth- and fifth-generation aircraft. The shorter the bridge, the better.

^v The PLA Navy has already retired its J-7s, doing so in 2014. Andreas Rupprecht, *Modern Chinese Warplanes: Chinese Air Force – Aircraft and Units* (Houston, TX: Harpia, 2018), 27.

grasped the lessons of those flights or not.²⁶ When training flights were conducted, they were “played safe,” 4 or 5 g being the maximum g-force that fighter pilot candidates ever experienced throughout their training.²⁷ Nighttime flight training was conducted, but AFAU’s training base and the flight academies would illuminate their runways with searchlights to make it easy for cadets and pilot candidates to find their airfields and land.²⁸ Flight instructors would immediately take the stick when pilot candidates faced a problem such as stalling, depriving their pupils of the opportunity to resolve the problem themselves.²⁹ Even a lesson that would ultimately enhance the pilot candidates’ safety was avoided because of its immediate risk: pilot candidates were not even taught how to recover from a tailspin.³⁰

While the PLAAF’s self-described “nanny-style” training at its flight academies ensured that pilot candidates would be unable to cope with the conditions of war, combat training at the PLAAF’s flight academies ensured that they would be ineffective in combat. Pilot candidates were evaluated on how well they flew as measured by their flight instruments, so they tended to bury their heads in their cockpits even when they flew under visual flight rules.³¹ Moreover, training in air combat maneuvering seems to have consisted of simple, scripted maneuvers, so pilot candidates never learned how to read a situation in combat and to instinctively apply appropriate tactics and fight as a formation.³² Training in air-to-surface strikes was limited to strafing a target with cannon fire—a target to which the way seems to have been indicated by markers on the ground that were visible from the air.³³ Consequently, fighter pilot candidates would graduate from the flight academies as less than rookies: they could competently pilot an aircraft, but they were woefully unprepared to fight in one. Therefore, the burden of training new fighter pilots for combat was left to their receiving operational units to bear.

A major factor contributing to the ineffectiveness of the PLAAF’s initial fighter pilot training program was the inexperience of the flight academies’ instructors. At the beginning of the decade, almost all of the flight academies’ instructors were selected from among the academies’ graduating classes.³⁴ This seems to have been so as late as 2017.³⁵ Consequently, for most of the decade, almost all of the instructors at the PLAAF’s flight academies had no experience piloting a fighter aircraft and conducting real-world missions. They were, therefore, ignorant of the shortcomings of the training program, and because they were, presumably, selected to become flight instructors because they excelled at an unrealistic and rote curriculum, they naturally perpetuated those very aspects of the program. The flight academies had created a vicious cycle.

In 2017 the PLAAF began implementing changes to the content of its initial fighter pilot training program and addressing the inexperience of its flight academies’ instructors. The content of the training program is ultimately determined by the PLA’s Outline of Military Training and Evaluation (OMTE), which sets new goals and guidelines for the entire PLA. The PLA issues a new OMTE every several years, and the PLAAF issues its own OMTE in line with that of the PLA. The PLA started devising its latest OMTE in 2013, issued a trial version in 2015, issued the OMTE in 2018, and then revised and reissued the OMTE in 2019.³⁶ The PLAAF seems to have done the same for its own OMTE, and from 2015 to 2017 it devised 56 new, nested flight training programs.³⁷ In mid-2017 it also announced an extensive new policy overhauling its corps of flight instructors, among other things.³⁸



Figure 6: A pilot candidate flies at low-altitude in a canyon.

The four major goals of the PLAAF's latest OMTE are to make all training relevant to operations, to improve the effectiveness of training, to ensure safety reasonably, and to cultivate pilots' independence.³⁹ Soon after the OMTE was issued, all of the PLAAF's flight academies were conducting training flights in relatively poor weather conditions, such as in crosswinds and when visibility was as low as three kilometers.⁴⁰ Probably because training flights could now be conducted on more days than in the past, pilot candidates were no longer being rushed through sorties, giving them time to address a failure to grasp a lesson before proceeding to the next one.⁴¹ The OMTE eliminated taking off and landing as separate training subjects, and it added short take-offs and short field-approaches to the curriculum.⁴² It is unclear whether the proportion of nighttime flight training increased or not—and it is unclear what the proportion of such training was before the latest OMTE was issued—but AFAU's training base and the flight academies stopped illuminating their runways with searchlights and began doing so only with edge lights.⁴³ Training flights were no longer being “played safe”: now pilot candidates began regularly experiencing 6 to 7 g during training flights.⁴⁴ Flight instructors began interfering in their pupils' flights as little as possible—and they also began teaching them to recover from a tailspin.⁴⁵ (The flight instructors first had to learn how to do so themselves.⁴⁶) Beginning in 2021, the Harbin Flight Academy even added low-altitude flight in canyons to the curriculum of its Advanced Flight Training (Figure 6).⁴⁷

In order to cultivate their independence, AFAU and the flight academies began requiring pilot candidates to prepare for each flight on their own and to devise their own flight plans after the flight instructors have informed them of the next training subject and by what principles the training will be conducted.⁴⁸ In order to cultivate their intuition, the flight academies stopped evaluating pilot candidates on how well they fly as measured by their flight instruments; flight instructors began encouraging pilot candidates to look outside their cockpits when they fly under visual flight rules.⁴⁹

The latest OMTE transformed how pilot candidates are trained for combat. Although the proportion of “tactical” content in the program only increased from 15 percent to 23 percent, the OMTE introduced unscripted air-to-air combat to the curriculum.⁵⁰ Air-to-air combat is practiced in one-on-one and two-on-one engagements, and the Harbin Flight Academy has even added an air-to-air combat competition to its curriculum.⁵¹ Now pilot candidates practice fighting in formations, whereas before they only practiced flying in formations.⁵² They also practice flying under radio silence and using hand signals to communicate from aircraft to aircraft.⁵³ It seems that those fighter pilot candidates who still undergo Intermediate and then Advanced Flight Training undergo training in basic fighter maneuvers during the former and then undergo training in air combat maneuvering during the latter.⁵⁴

Although the Xi'an Flight Academy introduced the use of live munitions to its air-to-surface strike training in 2017, after the latest OMTE was issued in 2018, all of the flight academies did the same.⁵⁵ Pilot candidates now drop small practice bombs on, and fire rockets and bullets at, target circles during the training (Figure 7).⁵⁶ The flight academies no longer lay out ground markers directing pilot candidates to the targets, and pilot candidates conduct sorties in three-ship formations, practicing avoiding enemy radar by flying to and from the training range at 100 meters (328 feet) above ground level.⁵⁷ Air-to-surface strike training is conducted in the JL-8, the JJ-9, and the JL-10, so it is likely conducted during both Intermediate Flight Training and Advanced Flight Training.⁵⁸ It is typically conducted in May and June of each year, and it seems that pilot candidates conduct approximately ten air-to-surface strike training sorties^{vi} during Advanced Flight Training.⁵⁹



Figure 7: A target circle used for air-to-surface strike training by pilot candidates at Shijiazhuang Flight Academy. The scale of the target is indicated by the vehicle tracks around the target.

The changes that the latest OMTE made to the PLAAF's initial fighter pilot training program are significant, but just as significant are the changes that the PLAAF made to its corps of flight instructors. In July 2017 the PLAAF issued a policy overhauling how flight instructors are selected, trained, and maintained. The policy requires that flight instructors be selected primarily from among those pilots who have completed "combat aircraft tactics training" (presumably, conversion training in an operational unit) and secondarily from among experienced, senior pilots.⁶⁰ It requires those flight instructors who have not done so to undergo conversion training in a fighter.⁶¹ It also demands that a system of qualification for flight instructors be established, and it requires operational units to stop training flight instructors for conversion training on their own and to have prospective instructors receive specialized training and obtain a qualification instead.⁶² In addition, the policy demands that a system of exchange be established between the flight academies and operational units, one that gives the flight academies' personnel

^{vi} During one sortie, pilot candidates at the Shijiazhuang Flight Academy flew "more than" 10 minutes between their airfield and the training range. They attacked a target "several tens" of times. During another sortie by pilot candidates at the same flight academy, the pilot candidates attacked a target "several tens" of times with "more than" 10 minutes between each pass. Assuming that the flight between the airfield and the training range takes 15 minutes, that each pilot candidate in the formation makes ten passes, that each pass lasts one minute, that there is an interval of 12 minutes between each pass, and—perhaps most unrealistically—that each sortie is conducted in the same way throughout air-to-surface strike training across the PLAAF, then each sortie would last seven hours. Therefore, air-to-surface strike training would total 70 hours during Advanced Flight Training. 林源 [Lin Yuan], 张学峰 [Zhang Xuefeng], and 刘凯 [Liu Kai], "在战斗力生成的源头植入“实战基因”" [Planting 'genes of actual war' at source of combat-power generation], 空军报 [Air Force News], August 9, 2018; 高迪 [Gao Di], "打靶归来信心培增" [Confidence increases after returning from shooting target], 空军报 [Air Force News], June 6, 2018.

the opportunity to spend two years in an operational unit and personnel in operational units the opportunity to spend two years at the flight academies.⁶³

In 2018 the Shijiazhuang Flight Academy seemed to be implementing this policy when it had its flight instructors compete for their positions at the academy: those flight instructors who performed poorly apparently lost their positions.⁶⁴ It is unclear whether the other flight academies have done something similar, but all of the flight academies are together using another method, one that is typical for the PLA, to encourage their flight instructors to improve their skills and to maintain their qualifications as flight instructors: in 2018 they began holding an annual skills competition for flight instructors called Eagle-Raising Trailblazer.⁶⁵ Altogether, while the PLAAF's policy ensures that new flight instructors be relatively experienced pilots and that the flight academies be more closely connected to operational units and their real-world missions, the flight academies are making efforts to give their current flight instructors opportunities to gain the experience and skills that their new colleagues should have.

Conclusion

As of 2021, the PLAAF has largely resolved the problems that hindered its initial fighter pilot training program at the beginning of the decade. The PLAAF will probably only gradually replace its other jet engine trainers with the JL-10 and thereafter eliminate Intermediate Flight Training for all of its future fighter pilot candidates, so parallel tracks to train prospective pilots of third-generation and fourth-generation fighters will likely continue to exist past the middle of the next decade. And although the effects of the changes that the PLAAF has made to the content of the training program are unlikely to be manifest until a similar point in time, the PLAAF is poised to produce pilots who are much better prepared to conduct real-world missions as soon as they undertake their first assignments, and it is poised to do so at a higher rate than ever before.^{vii}

^{vii} It is unclear how many fighter pilots the PLAAF produces annually. The washout rate for cadets and fighter pilot candidates throughout the entire initial training program is apparently 70 percent, but because this includes four years of officer training and classroom study, it cannot be used to measure the difficulty of initial flight training. Because of the costs that are incurred as pilot candidates progress through Intermediate and Advanced Flight Training, it is reasonable to assume that the PLAAF would try to eliminate those whom it must eliminate before or during Basic Flight Training and then pass as many as possible during subsequent phases of training. In fact, in 2016 the washout rate in Advanced Flight Training at the Harbin Flight Academy was 20 percent. One fighter training brigade at the Harbin Flight Academy appeared to have 60 pilot candidates in 2020. If the washout rate at the Harbin Flight Academy is still 20 percent, the brigade should produce 48 new fighter pilots in 2021. Assuming that washout rates and the size of training brigades are the same across the PLAAF, and that each flight academy has two to three fighter training brigades conducting Advanced Flight Training, the PLAAF should produce between 288 and 432 new fighter pilots in 2021. Therefore, the PLAAF may annually produce a number of fighter pilots within this range for the next several years. “直冲云霄 战斗机飞行员选拔纪实” [Charging straight into the skies: a documentary on the selection of fighter pilots], 军事纪实 [Military Documentary], aired November 18, 2020, on CCTV-7, accessed November 23, 2020, <https://tv.cctv.com/2020/11/18/VIDEhswITsRvUfLkjjsp0zaC201118.shtml>; “蓝天骄子” 冒酷暑砺翅长空” [‘Favorites of the blue sky’: braving sweltering heat to sharpen wings into vast sky], 解放军报 [Liberation Army News], posted on 空军新闻 [Air Force News], September 6, 2016, accessed November 23, 2020, http://kj.81.cn/content/2016-09/06/content_7242526.htm; 王天巍 [Wang Tianwei], “猎鹰待飞，我们准备好了！” [The falcon stands by for flight and we are ready!], post to the Harbin Flight Academy’s WeChat account, October 14, 2020, accessed October 20, 2020.

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Endnotes

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² 王洪山 [Wang Hongshan] and 李宣良 [Li Xuanliang], “中国高级教练机研制生产实现历史性跨越(图)” [China’s research, development, and production of advanced trainer makes historic stride (with pictures)], 新华社 [Xinhua News Agency], posted on 新浪军事 [Sina Military], November 1, 2006, accessed November 1, 2020, <http://mil.news.sina.com.cn/2006-11-01/1331481685.html>; 丁吉 [Ding Ji] and 孙妍菲 [Sun Yanfei], “空军航空大学飞行基础训练基地庆祝成立 65 周年” [Air Force Aviation University’s Basic Flight Training Base celebrates 65th anniversary of founding], 新华网 [Xinhua Online], June 4, 2015, accessed November 1, 2020, http://www.xinhuanet.com/mil/2015-06/04/c_127879212.htm.

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⁵ 王洪山 [Wang Hongshan] and 李宣良 [Li Xuanliang], “中国高级教练机研制生产实现历史性跨越(图)” [China’s research, development, and production of advanced trainer makes historic stride (with pictures)].

⁶ If the pace of Advanced Flight Training was similar to that of Basic Flight Training (110 flight hours over two years and four months), then it would probably have taken pilot candidates about two years to complete 150 flight hours. It was taking new pilots two years to complete conversion training in the J-7 even after the PLAAF streamlined the initial fighter pilot training program in 2012, so it is possible that conversion training took as long for other types of fighters. If Advanced Flight Training and conversion training took four years, then combat training would have taken two more years of a ten-year program. 谢永兵 [Xie Yongbing], 吴德华 [Wu Dehua], and 张昌文 [Zhang Changwen], “打仗意识植入学员心田” [War-fighting consciousness planted in hearts of students], 空军报 [Air Force News], December 21, 2017.

⁷ 军事科学院 [Military Science Academy], “中国军校改革背后的战略指向” [The strategic direction behind Chinese military schools’ reform], 中国青年报 [Chinese Youth News], January 6, 2012, accessed October 22, 2020, http://zqb.cyoil.com/html/2012-01/06/nw.D110000zqnb_20120106_2-09.htm.

⁸ Cadets would still attend AFAU for four years, but Basic Flight Training was shortened to six months, so their officer training must have been lengthened to three- and one-half years. 黄书波 [Huang Shubo] and 张泪泪 [Zhang Leilei], “中国空军改革飞行员培养模式 启用“四阶段”新体制” [Chinese air force reforms pilot training model, starts using new system with four phases]; U.S. Air Force, China Aerospace Studies Institute, *Little Eagles: People’s Liberation Army Developing Its Next-Generation Pilots*, 7; 黄书波 [Huang Shubo] and 张泪泪 [Zhang Leilei], “中国空军教练机家族“传承”“换代”进行时(图)” [When ‘inheritance’ and ‘replacement’ of Chinese air force’s trainer aircraft families is conducted (with pictures)]; 邵朝鹏 [Shao Chaopeng] and 李开强 [Li Kaiqiang], “空军调整飞行学员训练内容和时间” [Air force adjusts content and time of flight academy students’ training], 解放军报 [Liberation Army News], posted on 中国军网 [China Military Online], June 18, 2014, accessed October 23, 2020, http://www.81.cn/kj/2014-06/18/content_5972205.htm.

⁹ 黄书波 [Huang Shubo] and 张泪泪 [Zhang Leilei], “中国空军改革飞行员培养模式 启用“四阶段”新体制” [Chinese air force reforms pilot training model, starts using new system with four phases].

¹⁰ 黄书波 [Huang Shubo] and 张泪泪 [Zhang Leilei], “中国空军教练机家族“传承”“换代”进行时(图)” [When ‘inheritance’ and ‘replacement’ of Chinese air force’s trainer aircraft families is conducted (with pictures)]; 邵朝鹏 [Shao Chaopeng] and 李开强 [Li Kaiqiang], “空军调整飞行学员训练内容和时间” [Air force adjusts content and time of flight academy students’ training]. The source only reported that the number of hours that pilot candidates would fly in an “advanced trainer” would increase, but

because advanced trainers are used in Advanced Flight Training, it is reasonable to conclude that all of the additional hours were added to Advanced Flight Training.

¹¹ “歼教 7” [JJ-7], 新浪军事 [Sina Military], accessed October 20, 2020, <http://mil.news.sina.com.cn/kongjun/172/42.shtml>; Andreas Rupprecht, *Dragon's Wings: Chinese Fighter and Bomber Aircraft Development* (Hersham, UK: Classic, 2013), 73-74.

¹² “穹顶之下守护者：中国空军飞行员培训体系调查” [The defenders under the dome: An investigation of the Chinese air force's pilot training system], 新浪军事 [Sina Military], March 2, 2015, accessed October 20, 2020, http://slide.mil.news.sina.com.cn/k/slide_8_62085_34461.html#p=2.

¹³ Ibid.; 夏阳 [Xia Yang], “哈飞院列装升级版教-10 教练机：可为歼-20 培养飞行员” [Harbin Flight Academy receives upgraded JL-10 trainer, can train pilots of J-20], 东方网 [Eastday.com], October 14, 2020, accessed November 2, 2020, <https://n.eastday.com/pnews/1602669462024962>.

¹⁴ “歼教 7” [JJ-7], 新浪军事 [Sina Military]; “穹顶之下守护者：中国空军飞行员培训体系调查” [The defenders under the dome: An investigation of the Chinese air force's pilot training system], http://slide.mil.news.sina.com.cn/k/slide_8_62085_34461.html#p=8.

¹⁵ 妮爾硯 [Ni Eryan], “止戈為武：空軍轉型建設發展走向” [Win without fighting: course of air force transformation, improvement, and development]. A combat unit that is subordinate to the Xi'an Flight Academy seems to have been conducting conversion training for the J-7 over two years until 2014 or 2015. In 2014 the unit undertook an experiment in shortening conversion training from two years to one year, an experiment that seems to have been successful because conversion training was being conducted in one year by 2018. 谢永兵 [Xie Yongbing], 吴德华 [Wu Dehua], and 张昌文 [Zhang Changwen], “打仗意识植入学员心田” [War-fighting consciousness planted in hearts of students]; 崔保亮 [Cui Baoliang], “新飞行员首飞，这些精彩镜头不容错过！” [New pilots' first flights—these wonderful scenes must not be missed!], 中国军网 [China Military Online], August 20, 2018, accessed October 26, 2020, http://www.81.cn/2018zt/2018-08/20/content_9258500.htm.

¹⁶ 李开强 [Li Kaiqiang] and 产继斌 [Chan Jibin], ““山鹰”教练机正式在空军院校服役” [“Mountain eagle” trainer aircraft formally enters service with air force], 解放军报 [Liberation Army News], posted on 中国军网 [China Military Online], October 24, 2015, accessed October 20, 2020, http://81.cn/jwgz/2015-10/24/content_6737414.htm.

¹⁷ Andreas Rupprecht, *Modern Chinese Warplanes: Chinese Air Force – Aircraft and Units* (Houston, TX: Harpia, 2018), 65.

¹⁸ New fighter pilots undergoing conversion training in an operational unit that is subordinate to the Harbin Flight Academy completed conversion training in “a little more than” six months, implying that it took less than one year. 房磊磊 [Fang Leilei] and 王志佳 [Wang Zhijia], “开训就闻硝烟味” [One smells gunpowder as soon as training begins], 空军报 [Air Force News], January 18, 2018.

¹⁹ 李敏 [Li Min] and 曹凡 [Cao Fan], “空军首批某新型高教机飞行学员全优结业” [Air force's first batch of flight academy students trained with new type of advanced trainer complete course with all-round excellent grades], 解放军报 [Liberation Army News], July 20, 2020, accessed October 20, 2020, http://www.81.cn/jfjbmap/content/2020-07/20/content_266438.htm. Because the first class of students who had undergone flight training in the JL-10 underwent one year of training before graduating in July 2020, it is likely that the JL-10 was first introduced just before pilot candidates began training in August 2019.

²⁰ Andreas Rupprecht, *Modern Chinese Warplanes: Chinese Air Force – Aircraft and Units* (Houston, TX: Harpia, 2018), 66.

²¹ “逐梦天空（上）” [Chasing dreams into the heavens (part one)], 国防科工 [National Defense Science and Industry], aired October 19, 2019, on CCTV-7, accessed October 20, 2020, <http://tv.cctv.com/2019/10/20/VIDE4eyLeTGFPm1i67vMN9E191020.shtml>.

²² 李敏 [Li Min], 卢江松 [Lu Jiangsong], 杨冠军 [Yang Guanjun], 杨晓川 [Yang Xiaochuan], and 胡迁 [Hu Qian], “空军飞行学员跨代开飞加速战斗力生成” [Trans-generational flight by an air force flight academy's students hastens the generation of combat power], 军事报道 [Military Report], aired October 9, 2020, on CCTV-7, accessed October 9, 2020, http://www.js7tv.cn/video/202010_231265.html; 曹凡 [Cao Fan] and 李敏 [Li Min], “跨代“雏鹰”今振翅” [Trans-generational ‘young eagles’ now flap their wings], 解放军报 [Liberation Army News], October 19, 2020, accessed October 19, 2020, http://www.81.cn/jfjbmap/content/2020-10/19/content_273671.htm.

²³ 王天巍 [Wang Tianwei], “猎鹰待飞，我们准备好了！” [The falcon stands by for flight and we are ready!], post to the Harbin Flight Academy's WeChat account, October 14, 2020, accessed October 20, 2020. Assuming that the pilot candidates at Harbin Flight Academy, like their peers at Shijiazhuang Flight Academy, underwent two months of preparation before their first flights in the JL-10 in October 2020, the JL-10 was introduced to the brigade just before they began training in August 2020.

²⁴ It was reported that pilot candidates' flight training was shortened by almost “one third,” which could mean approximately 10 of 30 months, but a reduction of only ten months does not correspond with the flight academies' annual cycles, so “one-third” may instead refer to one of three stages of initial pilot training. “新闻链接：新模式缩短飞行学员培养周期” [News link: a new model shortens flight academy students' training cycle], 李敏 [Li Min], 卢江松 [Lu Jiangsong], 杨冠军 [Yang Guanjun], 杨晓川 [Yang Xiaochuan], and 胡迁 [Hu Qian], 国防军事早报 [Morning Report on Defense], aired October 9, 2020, on CCTV-7, accessed October 21, 2020, http://tv.81.cn/jshj/2020-10/09/content_9915406.htm.

²⁵ For information about the PLAAF's culture of safety, see 江永红 [Jiang Yonghong], 中国蓝军——实战化训练改革纪实 [China's blue forces: a record of the reform of realistic training] (Beijing: 解放军出版社 [Jiefangjun chubanshe], 2019), 215.

²⁶ Around the time that changes to the curriculum were made in 2018, each institution emphasized its new practice of flying in relatively poor weather conditions. 谢永兵 [Xie Yongbing], 吴德华 [Wu Dehua], and 张昌文 [Zhang Changwen], “打仗意识植入学员心田” [War-fighting consciousness planted in hearts of students]; 卢潭照 [Lu Tanzhao], “向战而飞, 雏鹰翼渐丰” [Flying to war, young eagles’ wings gradually fledge], 空军报 [Air Force News], February 6, 2018; 吴坤 [Wu Kun] and 高迪 [Gao Di], “强化“升空即作战”意识” [Strengthen consciousness of having to fight right after take-off], 空军报 [Air Force News], March 2, 2018; 曹步强 [Cao Buqiang], 梁嘉轩 [Liang Jiaxuan], and 严巧宇 [Yan Qiaoyu], ““特定套餐”破解昔日瓶颈” [‘Specially made set meal’ resolves bottleneck of former times], 空军报 [Air Force News], March 13, 2018. For information about rushing pilot candidates through training flights, see 张宇洋 [Zhang Yuyang] and 王志佳 [Wang Zhijia], “翅膀硬了向战飞” [Their wings harden, they fly to war], 空军报 [Air Force News], March 12, 2018.

²⁷ 张宇洋 [Zhang Yuyang] and 王志佳 [Wang Zhijia], “翅膀硬了向战飞” [Their wings harden, they fly to war]; 高迪 [Gao Di], “面向战场, 蹚出一条育鹰新路” [Facing battlefield, fording new path to raise eagles], 空军报 [Air Force News], February 22, 2018; 胡瑞 [Hu Rui], 刘鸣真 [Liu Mingzhen], and 刘凯 [Liu Kai], “练翅归来, 身披“硝烟”” [‘Gunpowder smoke’ wafts around their bodies after they return from exercising their wings], 空军报 [Air Force News], May 16, 2018; 林源 [Lin Yuan], 张学峰 [Zhang Xuefeng], and 刘凯 [Liu Kai], “在战斗力生成的源头植入“实战基因”” [Planting ‘genes of actual war’ at source of combat-power generation], 空军报 [Air Force News], August 9, 2018.

²⁸ 钱秀杰 [Qian Xiujie], 高德占 [Gao Dezhan], and 李建文 [Li Jianwen], “雏鹰夜航告别“强光引路”! 让“飞之初”成为“战之初”” [Young eagles say goodbye to ‘guidance with strong lights’ in nighttime flight training! Making ‘first flight’ into ‘first fight’], 空军新闻 [Air Force News], April 30, 2019, accessed November 24, 2020, http://kj.81.cn/content/2019-04/30/content_9492912.htm; 钱秀杰 [Qian Xiujie] and 李建文 [Li Jianwen], “雏鹰夜航告别“强光引路”” [Young eagles say goodbye to ‘guidance with strong lights’ in nighttime flight training], 解放军报 [Liberation Army News], May 6, 2019, accessed November 24, 2020, http://www.81.cn/jfjmap/content/2019-05/06/content_233019.htm; 王达 [Wang Da], 邵文杰 [Shao Wenjie], and 王志佳 [Wang Zhijia], “飞天记” [Chronicle of flying in sky], 中国青年报 [China Youth Daily], June 21, 2019, accessed November 24, 2020, http://zqb.cyol.com/html/2018-06/21/nw.D110000zgqnb_20180621_1-12.htm; 岳云鹏 [Yue Yunpeng], 杨本元 [Yang Benyuan], and 王志佳 [Wang Zhijia], ““雏鹰” 暗夜出击” [‘Young eagles’ launch attack in darkness of night], 解放军报 [Liberation Army News], March 10, 2020, accessed November 24, 2020, http://www.81.cn/jfjmap/content/2020-03/10/content_256065.htm.

²⁹ 卢潭照 [Lu Tanzhao], “向战而飞, 雏鹰翼渐丰” [Flying to war, young eagles’ wings gradually fledge].

³⁰ 林源 [Lin Yuan], 张学峰 [Zhang Xuefeng], and 刘凯 [Liu Kai], “在战斗力生成的源头植入“实战基因”” [Planting ‘genes of actual war’ at source of combat-power generation]; 张汨汨 [Zhang Leilei] and 王志佳 [Wang Zhijia], “失速尾旋训练重新成为空军飞行学员训练内容” [Tailspin training again becomes part of training for students at air force flight academies], 新华网 [Xinhua Online], October 16, 2018, accessed October 24, 2020, http://www.xinhuanet.com/2018-10/16/c_1123566408.htm.

³¹ 高迪 [Gao Di] and 刘凯 [Liu Kai], “开年就飞低气象” [Flying in poor weather conditions as soon as year begins], 空军报 [Air Force News], January 18, 2018; 高迪 [Gao Di], “面向战场, 蹚出一条育鹰新路” [Facing battlefield, fording new path to raise eagles]; 林源 [Lin Yuan], 张学峰 [Zhang Xuefeng], and 刘凯 [Liu Kai], “在战斗力生成的源头植入“实战基因”” [Planting ‘genes of actual war’ at source of combat-power generation].

³² 高迪 [Gao Di] and 刘凯 [Liu Kai], “开年就飞低气象” [Flying in poor weather conditions as soon as year begins]; 高迪 [Gao Di], “面向战场, 蹚出一条育鹰新路” [Facing battlefield, fording new path to raise eagles]; 吴坤 [Wu Kun] and 高迪 [Gao Di], “强化“升空即作战”意识” [Strengthen consciousness of having to fight right after take-off]; 张宇洋 [Zhang Yuyang] and 王志佳 [Wang Zhijia], “翅膀硬了向战飞” [Their wings harden, they fly to war].

³³ 张宇洋 [Zhang Yuyang], 杨阳 [Yang Yang], 王志佳 [Wang Zhijia], “实弹攻击越战越勇” [The more they conduct live-fire attacks, the braver they get], 空军报 [Air Force News], June 6, 2018; 刘磊 [Liu Lei] and 缙城 [Gou Cheng], “那一刻, 仿佛置身战场” [It was like being on battlefield at that moment], 空军报 [Air Force News], May 16, 2018.

³⁴ U.S. Air Force, National Air and Space Intelligence Center, *People’s Liberation Army Air Force 2010*, August 1, 2010, 79.

³⁵ 张汨汨 [Zhang Leilei] and 王志佳 [Wang Zhijia], “空军组织飞行教官体验战斗机飞行训练” [Air force organizes training for flight instructors to experience flight in fighters], 新华网 [Xinhua Online], March 5, 2018, accessed October 27, 2020, http://www.xinhuanet.com/mil/2018-03/05/c_1122490554.htm; The PLA AF took measures to change how flight instructors are selected in mid-2017. “空军党委《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》” [Opinion concerning focusing on the demands of war, aiming to be first-class, and building a corps of a new type of high-quality flight personnel], 空军报 [Air Force News], July 6, 2017. The author thanks Marcus Clay for bringing this source to his attention.

³⁶ 梁蓬飞 [Liang Pengfei] and 李玉明 [Li Yuming], “全军新训练大纲试训纲目完成集中会审” [Examination of trial compendium of joint force’s new training program completed], 中国军网 [China Military Online], February 5, 2015, accessed October 23, 2020, http://www.81.cn/jwgz/2015-02/05/content_6342480.htm; 黎云 [Li Yun] and 吴旭 [Wu Xu], “我军新军事训练大纲建设主体工程基本完成” [Principal part of devising our armed forces’ new military training and evaluation program

basically completed], 新华网 [Xinhua Online], January 3, 2019, accessed October 21, 2020, http://www.xinhuanet.com/2019-01/03/c_1123942829.htm.

³⁷ The PLA AF issued a trial version of its own OMTE in 2015 and then issued a final version in 2018 after a customary trial period in the latter half of the year before. 高迪 [Gao Di] and 吴坤 [Wu Kun], “向战而飞砺雏鹰” [Flying to war sharpens young eagles], 空军报 [Air Force News], July 12, 2017; 张玉清 [Zhang Yuqing] and 黄书波 [Huang Shubo], “空军新一代军事训练法规重塑战斗力生成模式” [Air force’s new generation of military training rules and regulations to remold combat-power generation model], 新华网 [Xinhua Online], March 9, 2018, accessed October 23, 2020, http://www.xinhuanet.com/2018-03/09/c_1122512992.htm; “奋力推进新时代军事训练创新发展” [Go all out to advance the development of innovation in military training of the new era], 空军报 [Air Force News], January 9, 2018.

³⁸ “空军党委《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》” [Opinion concerning focusing on the demands of war, aiming to be first-class, and building a corps of a new type of high-quality flight personnel]. In Chinese communist parlance, an official “opinion” is a statement of goals that subordinate units are permitted to achieve by their own methods. Timothy R. Heath, *China’s New Governing Party Paradigm: Political Renewal and the Pursuit of National Rejuvenation* (Farnham, UK: Ashgate, 2014), 203.

³⁹ “奋力推进新时代军事训练创新发展” [Go all out to advance the development of innovation in military training of the new era].

⁴⁰ 谢永兵 [Xie Yongbing], 吴德华 [Wu Dehua], and 张昌文 [Zhang Changwen], “打仗意识植入学员心田” [War-fighting consciousness planted in hearts of students]; 高迪 [Gao Di] and 刘凯 [Liu Kai], “开年就飞低气象” [Flying in poor weather conditions as soon as year begins]; 房磊磊 [Fang Leilei] and 王志佳 [Wang Zhijia], “开训就闻硝烟味” [One smells gunpowder as soon as training begins].

⁴¹ 张宇洋 [Zhang Yuyang] and 王志佳 [Wang Zhijia], “翅膀硬了向战飞” [Their wings harden, they fly to war].

⁴² Ibid.; 高迪 [Gao Di], “面向战场，蹚出一条育鹰新路” [Facing battlefield, fording new path to raise eagles].

⁴³ 钱秀杰 [Qian Xiujie], 高德占 [Gao Dezhan], and 李建文 [Li Jianwen], “雏鹰夜航告别‘强光引路’！让‘飞之初’成为‘战之初’” [Young eagles say goodbye to ‘guidance with strong lights’ in nighttime flight training! Making ‘first flight’ into ‘first fight’]; 钱秀杰 [Qian Xiujie] and 李建文 [Li Jianwen], “雏鹰夜航告别‘强光引路’” [Young eagles say goodbye to ‘guidance with strong lights’ in nighttime flight training]; 王达 [Wang Da], 邵文杰 [Shao Wenjie], and 王志佳 [Wang Zhijia], “飞天记” [Chronicle of flying in sky]; 岳云鹏 [Yue Yunpeng], 杨本元 [Yang Benyuan], and 王志佳 [Wang Zhijia], “‘雏鹰’暗夜出击” [‘Young eagles’ launch attack in darkness of night]; “直冲云霄 战斗机飞行员选拔纪实” [Charging straight into the skies: a documentary on the selection of fighter pilots], 军事纪实 [Military Documentary], aired November 18, 2020, on CCTV-7, accessed November 23, 2020, <https://tv.cctv.com/2020/11/18/VIDEhswlTsRvUfLkjjsp0zaC201118.shtml>.

⁴⁴ 高迪 [Gao Di], “面向战场，蹚出一条育鹰新路” [Facing battlefield, fording new path to raise eagles]; 胡瑞 [Hu Rui], 刘鸣真 [Liu Mingzhen], and 刘凯 [Liu Kai], “练翅归来，身披‘硝烟’” [‘Gunpowder smoke’ wafts around their bodies after they return from exercising their wings]; 林源 [Lin Yuan], 张学峰 [Zhang Xuefeng], and 刘凯 [Liu Kai], “在战斗力生成的源头植入‘实战基因’” [Planting ‘genes of actual war’ at source of combat-power generation].

⁴⁵ 高迪 [Gao Di], “面向战场，蹚出一条育鹰新路” [Facing battlefield, fording new path to raise eagles]; 王少飞 [Wang Shaofei] and 吴德华 [Wu Dehua], “以战领教，助力‘雏鹰’奋飞” [Guiding instruction with war helps ‘young eagles’ fly with vigor], 空军报 [Air Force News], March 12, 2018; 胡瑞 [Hu Rui], 刘鸣真 [Liu Mingzhen], and 刘凯 [Liu Kai], “练翅归来，身披‘硝烟’” [‘Gunpowder smoke’ wafts around their bodies after they return from exercising their wings]; 林源 [Lin Yuan], 张学峰 [Zhang Xuefeng], and 刘凯 [Liu Kai], “在战斗力生成的源头植入‘实战基因’” [Planting ‘genes of actual war’ at source of combat-power generation]; 张汨汨 [Zhang Leilei] and 王志佳 [Wang Zhijia], “失速尾旋训练重新成为空军飞行学员训练内容” [Tailspin training again becomes part of training for students at air force flight academies].

⁴⁶ 刘永俊 [Liu Yongjun] and 王志佳 [Wang Zhijia], “首批参训教官顺利单飞” [First batch of instructors conduct solo flights smoothly], 空军报 [Air Force News], April 3, 2018. Even in operational units, fighter pilots did not train to recover from a tailspin before the latest OMTE was issued. 林源 [Lin Yuan], 张学峰 [Zhang Xuefeng], and 刘凯 [Liu Kai], “在战斗力生成的源头植入‘实战基因’” [Planting ‘genes of actual war’ at source of combat-power generation].

⁴⁷ 李扬威 [Li Yangwei] and 王志佳 [Wang Zhijia], “雏鹰亮翅向险飞” [Young eagles show wings, fly towards danger], 解放军报 [Liberation Army News], January 25, 2021, accessed January 26, 2021, http://www.81.cn/jfbmap/content/2021-01/25/content_281358.htm. In photographs of one such training event, pilot candidates appeared to be piloting JJ-9s, so this training is likely being conducted during Advanced Flight Training. 李扬威 [Li Yangwei] and 王志佳 [Wang Zhijia], “挑战低空山谷飞行！雏鹰亮翅向险飞” [Taking on the challenge of low-altitude flight in canyons! Young eagles show their wings and fly towards danger], 空军新闻 [Air Force News], January 29, 2021, accessed February 2, 2021, http://kj.81.cn/content/2021-01/29/content_9976906.htm.

⁴⁸ 王少飞 [Wang Shaofei] and 吴德华 [Wu Dehua], “以战领教，助力‘雏鹰’奋飞” [Guiding instruction with war helps ‘young eagles’ fly with vigor]; 李宗徽 [Li Zonghui], “摒弃了保姆式教学，雏鹰们的自主飞行还好吗？” [After abandoning the nanny-

style teaching style, will the young eagles be all right conducting independent flight?). 空军新闻网 [Air Force News Online], April 20, 2018, http://kj.81.cn/content/2018-04/20/content_8009951_3.htm. This is so even in Basic Flight Training. 卢潭照 [Lu Tanzhao], “向战而飞, 雏鹰翼渐丰” [Flying to war, young eagles’ wings gradually fledge].

⁴⁹ 高迪 [Gao Di] and 刘凯 [Liu Kai], “开年就飞低气象” [Flying in poor weather conditions as soon as year begins]; 高迪 [Gao Di], “面向战场, 蹚出一条育鹰新路” [Facing battlefield, fording new path to raise eagles].

⁵⁰ 高迪 [Gao Di], “面向战场, 蹚出一条育鹰新路” [Facing battlefield, fording new path to raise eagles]; 余晓威 [Yu Xiaowei], “自由空战有了‘雏鹰版’” [Unscripted dogfighting has ‘young eagle version’], 空军报 [Air Force News], February 6, 2018; 张汨汨 [Zhang Leilei] and 王志佳 [Wang Zhijia], “自由空战首次进入空军飞行院校教学” [Unscripted dogfights enter curriculum of air force’s flight academies for first time], 新华网 [Xinhua Online], February 3, 2018, accessed October 29, 2020, http://www.xinhuanet.com/2018-02/03/c_129804892.htm. It is unclear whether this proportion refers to the entirety of initial pilot training or to only one or two phases of it, but the former seems more likely because of the low proportion. Another source indicates that the time that is spent training in tactical subjects is now more than two-thirds of total time that is spent training, but it is unclear if this refers to the time that is spent training throughout initial pilot training or only during a particular phase of the program, but the latter seems more likely because this proportion referred to a program that had not been affected by the introduction of the JL-10. The PLA tends to report quantitative data bereft of the context that is necessary to assess their true value. 张宇洋 [Zhang Yuyang] and 王志佳 [Wang Zhijia], “翅膀硬了向战飞” [Their wings harden, they fly to war].

⁵¹ 张汨汨 [Zhang Leilei] and 王志佳 [Wang Zhijia], “自由空战首次进入空军飞行院校教学” [Unscripted dogfights enter curriculum of air force’s flight academies for first time]; 张宇洋 [Zhang Yuyang] and 王志佳 [Wang Zhijia], “飞行学员在对抗中感知战场” [Flight academy students sense battlefield in dogfight], 空军报 [Air Force News], February 9, 2018; 张宇洋 [Zhang Yuyang] and 王志佳 [Wang Zhijia], “翅膀硬了向战飞” [Their wings harden, they fly to war].

⁵² 胡瑞 [Hu Rui], 刘鸣真 [Liu Mingzhen], and 刘凯 [Liu Kai], “练翅归来, 身披‘硝烟’” [‘Gunpowder smoke’ wafts around their bodies after they return from exercising their wings]; 林源 [Lin Yuan], 张学峰 [Zhang Xuefeng], and 刘凯 [Liu Kai], “在战斗力生成的源头植入‘实战基因’” [Planting ‘genes of actual war’ at source of combat-power generation]; 李宝星 [Li Baoxing] and 董超 [Dong Chao], “编队, 为打仗而组合, 为打赢而配合!” [Formations are made for fighting and formation fighting is for winning!], 空军新闻网 [Air Force News Online], April 9, 2020, accessed October 30, 2020, http://kj.81.cn/content/2020-04/09/content_9787854.htm. This source indicates that pilot candidates fight in formations, and it mentions that they practice flying in four-ship combat formations, so it seems reasonable to conclude that they practice fighting in four-ship formations in four-on-four engagements. If so, then it would be odd if they did not also practice air-to-air combat in two-on-two engagements.

⁵³ 吴坤 [Wu Kun] and 高迪 [Gao Di], “强化‘升空即作战’意识” [Strengthen consciousness of having to fight right after take-off].

⁵⁴ A pilot candidate who had completed Basic Flight Training in 2017 was practicing basic flight maneuvers in the summer of 2018, which would be during his Intermediate Flight Training. 高迪 [Gao Di] and 刘凯 [Liu Kai], “开年就飞低气象” [Flying in poor weather conditions as soon as year begins]; 林源 [Lin Yuan], 张学峰 [Zhang Xuefeng], and 刘凯 [Liu Kai], “在战斗力生成的源头植入‘实战基因’” [Planting ‘genes of actual war’ at source of combat-power generation]. In addition, pilot candidates can be seen practicing basic flight maneuvers in the JL-8. “飞行学员自由空战 全程自主制订战术” [Unscripted air combat by flight academy students making own tactical decisions throughout training], 翁艺文 [Weng Yiwen], 李生寿 [Li Shengshou], 张云鹤 [Zhang Yunhe], 左斌 [Zuo Bin], and 杨泽华 [Yang Zehua], 军事报道 [Military Report], aired June 2, 2020, on CCTV-7, accessed October 24, 2020, <https://tv.cctv.com/2020/06/02/VIDE06beDP1dd4CRWTiy6LOP200602.shtml>. Air combat maneuvering is usually practiced in advanced trainers. 闫腾飞 [Yan Tengfei], 李建文 [Li Jianwen], 李生寿 [Li Shengshou], “师徒论剑 蓝天对决” [Master and apprentice face off in sky], 解放军报 [Liberation Army News], April 1, 2020, accessed October 24, 2020, http://www.81.cn/jfjbmmap/content/2020-04/01/content_258011.htm; “空军西安飞行学院某旅: 将自由空战对抗引入日常教学” [A certain brigade of the air force’s Xi’an Flight Academy: unscripted air combat introduced to routine training], 李生寿 [Li Shengshou], 张天才 [Zhang Tiancai], 闫腾飞 [Yan Tengfei], and 潘建飞 [Pan Jianfei], 中国军视网 [China Military Television Online], March 26, 2020, http://www.js7tv.cn/video/202003_211427.html, posted on 西瓜视频 [Watermelon Video], accessed October 24, 2020, <https://www.ixigua.com/6808794952483471876/>; “老教官到龄停飞前 1 小时问徒弟: 你看外面的天空美不美?” [One hour before reaching grounding age an old flight instructor asks his disciple: ‘Look. Isn’t the sky outside beautiful?'], 央视新闻 [China Central Television News], January 26, 2020, accessed October 24, 2020, <http://m.news.cctv.com/2020/01/26/ARTIsFfhky5ILupQq56rP58l200126.shtml>. In fact, “Combat Fundamentals” or “Combat Aircraft Fundamentals” seems to be a distinct part of Advanced Flight Training. 唐廷磊 [Tang Tinglei], 崔玉坤 [Cui Yukun], and 王志佳 [Wang Zhijia], “他们从这里飞向战场” [They fly towards battlefield from here], 解放军报 [Liberation Army News], June 30, 2020, accessed November 24, 2020, http://www.81.cn/jfjbmmap/content/2020-06/30/content_264865.htm; 李敏 [Li Min], “直上新型高教机! 空军飞行学员跨代开飞” [Straight up into new type of advanced trainer! Air force pilot candidates start flying across generations of aircraft], 空军新闻 [Air Force News], October 12, 2020, accessed November 24, 2020, http://kj.81.cn/content/2020-10/12/content_9916830.htm.

⁵⁵ 杨记荣 [Yang Jirong], 缙城 [Gou Cheng], and 曹步强 [Cao Buqiang], “展翅长空向战飞” [Soar into the vast sky towards war], 空军报 [Air Force News], November 6, 2017; 张宇洋 [Zhang Yuyang] and 王志佳 [Wang Zhijia], “翅膀硬了向战飞” [Their wings harden, they fly to war]; 高迪 [Gao Di], “打靶归来信心倍增” [Confidence increases after returning from shooting target], 空军报 [Air Force News], June 6, 2018; 张宇洋 [Zhang Yuyang], 杨阳 [Yang Yang], 王志佳 [Wang Zhijia], “实弹攻击越战越勇” [The more they conduct live-fire attacks, the braver they get].

⁵⁶ 刘万立 [Liu Fangwei], 冯楠 [Feng Nan], and 贺钰文 [He Yuwen], “翅膀硬了，才能飞得更高！” [One can only fly higher after one’s wings have hardened!], 空军新闻网 [Air Force News Online], May 30, 2019, accessed November 3, 2020, http://kj.81.cn/content/2019-05/30/content_9518888.htm; “空军西安飞行学院：战术背景融入轰炸射击训练” [Air force’s Xi’an Flight Academy: tactical scenario fused into bombing and shooting training], 卢载光 [Lu Zaiguang], 李生寿 [Li Shengshou], and 严巧宇 [Yan Qiaoyu], 军事报道 [Military Report], aired May 16, 2020, on CCTV-7, accessed October 26, 2020, <https://tv.cctv.com/2020/05/16/VIDE9kZ7hMlpFisBlliegJzy200516.shtml>.

⁵⁷ 刘磊 [Liu Lei] and 缙城 [Gou Cheng], “那一刻，仿佛置身战场” [Like being on the battlefield at that moment], 空军报 [Air Force News], May 16, 2018; 林源 [Lin Yuan], 张学峰 [Zhang Xuefeng], and 刘凯 [Liu Kai], “在战斗力生成的源头植入‘实战基因’” [Planting ‘genes of actual war’ at source of combat-power generation].

⁵⁸ Pilot candidates at a single flight academy, the Harbin Flight Academy, have conducted air-to-surface strike training in the JL-8 and the JJ-9. 张汨汨 [Zhang Leilei] and 王志佳 [Wang Zhijia], “空军组织飞行学员多类型实弹打靶训练” [Air force organizes target practice with multiple types of live ordnance for flight students], 新华网 [Xinhua Online], June 6, 2018, accessed November 3, 2020, http://www.xinhuanet.com/mil/2018-06/06/c_129888352.htm; “空军飞行学员完成多类型实弹打靶” [Air force flight students complete target practice with multiple types of live ordnance], 赵健 [Zhao Jian], 王志佳 [Wang Zhijia], 张宇洋 [Zhang Yuyang], 余晓威 [Yu Xiaowei], and 丁荟萌 [Ding Huimeng], 军事报道 [Military Report], aired June 12, 2018, on CCTV-7, accessed November 3, 2020, <http://tv.cctv.com/2018/06/12/VIDEnYpy6tjIXNjEfDaKcMcc180612.shtml>; 岳云鹏 [Yue Yunpeng] and 马冲 [Ma Chong], ““可以攻击！”飞行学员异地实弹打靶火力全开” [‘You can attack!’ Flight students open fire with live ordnance on targets in a different place], 空军新闻网 [Air Force News Online], May 13, 2020, accessed November 3, 2020, http://kj.81.cn/content/2020-05/13/content_9812327.htm. For the first air-to-surface strike training by pilot candidates flying the JL-10, see 李敏 [Li Min], “打得好！教-10飞行学员首次实弹地靶攻击训练全员通过” [Nice shot! Flight students flying JL-10s all pass first training in attacking ground targets with live ordnance], 空军新闻网 [Air Force News Online], June 4, 2020, accessed November 3, 2020, http://kj.81.cn/content/2020-06/04/content_9828025.htm.

⁵⁹ 张宇洋 [Zhang Yuyang], 杨阳 [Yang Yang], 王志佳 [Wang Zhijia], “实弹攻击越战越勇” [The more they conduct live-fire attacks, the braver they get]; 张汨汨 [Zhang Leilei] and 王志佳 [Wang Zhijia], “空军组织飞行学员多类型实弹打靶训练” [Air force organizes target practice with multiple types of live ordnance for flight students].

⁶⁰ “空军党委《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》” [Opinion concerning focusing on the demands of war, aiming to be first-class, and building a corps of a new type of high-quality flight personnel].

⁶¹ Ibid. The summary of the opinion did not specify those “who had not done so,” only mentioning “current flight instructors,” but at the time, none of the flight instructors had undergone conversion training. The distinction, then, is not when a flight instructor had been selected, but whether he had undergone conversion training or not.

⁶² Ibid.

⁶³ Ibid.

⁶⁴ 胡瑞 [Hu Rui], 刘鸣真 [Liu Mingzhen], and 刘凯 [Liu Kai], “练翅归来，身披‘硝烟’” [‘Gunpowder smoke’ wafts around their bodies after they return from exercising their wings].

⁶⁵ 王锐涛 [Wang Ruitao], “首届空军飞行院校“育鹰尖兵-2018”比武竞赛在空军航空大学举行” [First air force flight academy military skills competition Eagle-Raising Trailblazer 2018 held at Air Force Aviation University], 央广网 [China National Radio Online], November 26, 2018, accessed November 3, 2020, http://m.cnr.cn/mil/20181126/t20181126_524426851.html; 邵文杰 [Shao Wenjie] and 王志佳 [Wang Zhijia], “新型飞行教官活跃在“蓝天讲台”” [New kind of flight instructor active on ‘blue rostrum’], 解放军报 [Liberation Army News], March 12, 2019, accessed November 3, 2020, http://www.81.cn/jfjbmapp/content/2019-03/12/content_229133.htm.