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Summary

Prolonged systemic challenges continue to strain and divide China's military aviation industry, especially over structural consolidation, institutional reorganization, and lack of technological sophistication. Nonetheless, the sector's overall modernization drive is among the most prominent of China's defense industries. During the past decade, China's military aviation industry has been gradually transforming its defense, science, technology, and innovation capabilities and narrowing the once-wide technological gaps with advanced aviation powers. In the fighter aircraft arena alone, it has been modernizing its 'legacy' fighters while developing a diverse portfolio of new indigenous designs, including modern fourth-generation fighters, and preparing to break into the fifth-generation aircraft market. The recent unveiling of China's next-generation fighter aircraft prototypes the J-20 and J-31, along with accelerated modernization of the Chengdu J-10 and Shenyang J-11 fleets, shows not only the increased sophistication of Chinese combat aircraft but also, more importantly, the ongoing transformation of China's military aviation sector.

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THE RISE OF THE AVIATION INDUSTRY CORPORATION OF CHINA

China's largest aviation industrial group, Aviation Industry Corporation of China (AVIC), has been on a new path of reforms since November 2008 when the Chinese government remerged twin aircraft manufacturers AVIC I and AVIC II after a decade of separate operations. The principal aim of the remerger was to move from traditional geographical divisions and consolidate overlapping areas of responsibility that limited the industry's capacity for innovation and technological development. The transformation of AVIC created a new corporate structure and strategy aimed to enhance China's aerospace competitiveness and improve systemic efficiency, particularly in equipment delivery for the PLA through product line integration, best business practices, resource allocation, and acceleration of industrial R&D innovation and production capabilities in both the civil and military aviation sectors.

AVIC's structure now includes five core defense-aerospace prime contractors: Chengdu Aircraft Industry Corporation (J-10, J-20, and FC-1 fighters), Shenyang Aircraft Corporation (J-8, J-11, J-15, and J-31 fighters), Hongdu Aviation Industry Group (K-8, L-15 trainers), Xi'an Aircraft Company (H-6, JH-7 bombers), and Changhe/Hafei Aviation (Z-8, Z-9, Z-11 helicopters). These are supported by Tier-1 suppliers and system integrators such as Shenyang Liming Aero-Engine (fighter engine WS-10), Xian Aero Engine (fighter engine WS-9, supplier of WS-10), and AVIC Avionics (flight control, power systems). The defense supply chain is further supported by Tier-2 and Tier-3 suppliers of systems and components.

As of 2012, the state-owned AVIC operates through 10 principal business units and has nearly 200 subsidiaries that design and produce a wide range of commercial and military platforms for both the Chinese market and for export. These include defense, transport aircraft, aviation engines, helicopters, avionics, general aviation aircraft, aviation R&D, flight test, trade and logistics, and asset management. The group has 25 dependent companies currently listed on the Shanghai and

Shenzhen stock exchanges and 33 R&D institutions, and employs around 450,000 people.

According to Lin Zuoming, the group's president, between 2008 and 2011, AVIC Group recorded a 20 percent compound annual growth rate in revenues. In 2011, AVIC's revenue increased 20 percent to RMB 250 billion (USD 39.6 billion) and net earnings increased more than 15 percent to RMB 12 billion (USD 1.89 billion). AVIC's figures compare favorably with major Western primes such as BAE Systems, which posted annual sales of USD 34.7 billion in 2010.

MEETING THE OPERATIONAL REQUIREMENTS OF THE PEOPLE'S LIBERATION ARMY AIR FORCE

AVIC's financial performance reflects China's continued robust defense spending growth, with more resources allocated for procurement of new equipment. With the People's Liberation Army Air Force (PLAAF) widening operational requirements, there is a need to replace China's aging third-generation fighter jets (J-7 and J-8) and modernize supporting logistical infrastructure and equipment. This is projected to drive defense spending higher, leading to the expansion of China's military-aviation sector from helicopter, trainer, and transporter fleets to fourth- and fifth-generation fighter jets.

Notwithstanding China's ongoing reliance on Russian assistance in the development of core systems such as engines and avionics, China's indigenous aerospace manufacturing base and capabilities are now increasingly able to supply the PLAAF with the portfolio of aircraft platforms, technologies, and systems it requires for its modernization. This is evident from the proportion of fourth-generation aircraft in service, which has risen from 23 percent in 2005 to 33 percent in 2010 and is expected to reach more than 50 percent by 2015.

Indeed, as early as the late 1990s, the bulk of the PLAAF was based almost exclusively on the obsolete 1950s-era Soviet combat aircraft based on MiG-19 and MiG-21s. In 1999, China's fourth-generation fighters included fewer than 100 op-

erational Su-27s armed with beyond-visual range air-to-air missiles. The PLAAF had no inventory of precision-guided munitions (PGMs), and its pilots received limited training, constrained by time and weather conditions. By 2010, however, the PLAAF retired most of its obsolete aircraft, acquired more than 300 fourth-generation fighters (J-10, J-11, Su-30 variants) armed with advanced air-to-air missiles and PGMs (Kh-31/AS-17 Krypton) and capable of flying in all-weather conditions. The flight training of PLAAF pilots has increased to more than 200 flying hours annually, supported by China's first domestically produced airborne warning and control system (AWACS) aircraft and a new generation of air defense systems (HQ-9).

TOWARD STEALTH INNOVATION

With more capable defense aerospace systems and platforms comparable to global Tier-2 arms-producing countries possessing the capabilities for advanced, but still limited, defense production, China is likely to improve its position in the global military aircraft export market. Currently, AVIC controls less than 4 percent of the global military aircraft exports by value. However, this is likely to increase in the next decade as key programs mature and new opportunities arise in emerging markets in South America and Central and Southeast Asia.

Until now, China exported its combat aircraft primarily to Egypt (F-7) and Pakistan (J-10, JF-17), while its trainers and helicopters have been used in Nigeria (F-7NI, FT-7NI), Kenya (Z-9WA) Sudan, Angola, and Zimbabwe (K-8s). However, China's military aircraft clients may soon include Venezuela and Bolivia (K-8s), and possible sales in Ecuador, Peru, Uruguay, Argentina, Azerbaijan, Indonesia, and Ukraine. In this con-

text, China may leverage on the lower cost of its airpower platforms relative to Western and even Russian products, which is likely to attract developing countries with limited defense budgets. At the same time, China will seek alternatives such as joint development and collaboration programs in order to mitigate existing political and strategic barriers (sanctions and export controls) that keep its defense aerospace industry from access to advanced Western technologies.

CONCLUSION

Taken together, these factors and trends are insufficient to set China's military aviation sector on a course to become a global Tier-1 "critical innovator" comparable to the United States. However, with its accelerating pace, qualitative orientation, and continuous massive resource allocation, China's defense aviation industry is likely to overcome its structural and technological deficiencies and, in the long run, raise its sophistication relative to global standards. Indeed, depending on the ability and pace of China's aerospace prime contractors to keep up with the latest technological developments while solving existing problems in the development of core systems such as engines and avionics, China's fifth-generation combat aircraft the J-20 and J-31 may become operational by the beginning of the next decade.

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