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Ready for Takeoff

China's Advancing Aerospace Industry

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*Cover photo: A Chinese-made ARJ21 commercial aircraft is parked at the 8th China International Aviation and Aerospace Exhibition (Zhuhai Airshow) in Zhuhai, southern coast of Guangdong province, China, November 15, 2010.
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Summary

China's aerospace industry has advanced at an impressive rate over the past decade. While some of this progress can be attributed to rapidly growing governmental support for China's aerospace sector, China's aerospace capabilities have also benefited from the increasing participation of its aerospace industry in the global commercial aerospace market and the supply chains of the world's leading aerospace firms. This monograph assesses China's aerospace capabilities and the extent to which China's participation in commercial aerospace markets and supply chains is contributing to the improvement of those capabilities. Specific areas assessed include China's commercial aviation manufacturing capabilities, its commercial and military capabilities in space, efforts of the Chinese government to encourage foreign participation in the development of China's aerospace industry, transfers of foreign aerospace technology to China, the extent to which U.S. and other foreign aerospace firms are dependent on supplies from China, and the implications of all of these issues for U.S. security interests.

Chinese airlines, which today operate about 1,400 large commercial aircraft and regional jets, are projected to purchase roughly 4,000 new jetliners over the next 20 years. Actual purchases could be more or less than this projection, depending on whether China's economy grows at the expected rate and on the availability of alternative forms of transportation such as high-speed rail. Chinese air freight companies will likely purchase another 100 to 200 cargo aircraft, but many of them may be converted aging passenger planes. In September 2009, there were about 200 civil helicopters in China, and approximately

1,200 additional civil helicopters are expected to be purchased by 2018. China's general aviation market may be set for an explosion of growth. As of late 2009, the nation's severely restrictive airspace management regime had limited the number of fixed-wing general aviation aircraft in China to about 800 (compared with 230,000 in the United States). Reforms are under way, however, and the number of fixed-wing general aviation aircraft in China is expected to increase by 30 percent per year over the next five to 10 years, resulting in more than 10,000 new aircraft by 2020.

Except possibly in the case of helicopters, China's current ability to meet demand with indigenous aircraft is limited. Its indigenous regional jet, the ARJ21, will begin deliveries in 2011, but the regional jet market in China is small. China's indigenous large commercial aircraft, the C919, will not begin deliveries until the middle of the decade, at the earliest, and it will be a narrow-body aircraft that competes only with the Boeing 737 series and Airbus A320 series. All wide-body aircraft will be imported at least through 2020. Although Chinese airlines will apparently be required to buy at least some C919s, their preference, and that of their customers, will continue to be for Boeing and Airbus aircraft with proven safety and reliability records. If the C919 can establish a comparable safety and reliability record, however, and can offer improved comfort and fuel efficiency, it is possible that, over time, it will begin to take market share away from Boeing and Airbus (provided, of course, that Boeing and Airbus do not bring to market even better aircraft in the meantime).

Chinese manufacturers already produce light utility helicopters and medium transport helicopters, and a medium utility helicopter and possibly a heavy transport helicopter are in development. Given China's limited civil helicopter market, its domestic manufacturing capabilities may be sufficient to satisfy demand, although specialized types of helicopters may be imported. If the fixed-wing general aviation market in China grows as rapidly as projected, much of the demand will be filled by imported aircraft, as the variety of domestic offerings is extremely limited.

The Chinese government has attempted to leverage airliner purchases in exchange for arrangements that it hopes will lead to tech-

nology transfers into China's aviation manufacturing industry. In the ARJ21 regional jet and C919 airliner projects in particular, a condition for foreign aerospace firms to be selected as suppliers has often been that a local production facility be established. Partly as a result of these policies, U.S. and other foreign aerospace manufacturers are engaged in numerous joint ventures and other technology transfers with China's aviation industry. In many cases, however, foreign aerospace manufacturers have established joint ventures in China not to sell products there but to acquire access to China's low-cost, high-quality labor for manufacturing products that are sold throughout the world. As of today, only about 1 percent of U.S. aerospace imports come from China.

China's space capabilities have improved rapidly in the past decade and a half. China's Long March series have arguably become the world's most reliable medium space launch vehicles. China has also developed and deployed a series of weather satellites; electro-optical reconnaissance satellites; position, navigation, and timing (PNT) satellites; ocean-surveillance satellites; synthetic aperture radar (SAR) satellites; high-capacity communications satellites; and possibly signals-intelligence or electronic-intelligence satellites. China has also become the third country to put humans in space. Over the next decade, China's surveillance and reconnaissance, communications, and weather satellite capabilities will undoubtedly improve further, and by 2020, China will likely have a fully deployed satellite PNT system comparable to the U.S. Global Positioning System (GPS).

There is no question that China's growing civilian aerospace capabilities are contributing to the development of its military aerospace capabilities. Many aerospace systems are inherently dual-use or can provide a basis for the development of military systems. Moreover, many of the skills and technologies required to produce commercial or dual-use aerospace products are also applicable to purely military systems. And given that China and the United States have conflicting interests in East Asia and elsewhere, China's growing aerospace capabilities increase its ability and possibly its propensity to use force in ways that negatively affect U.S. interests and would increase the costs—human and material—of resisting such force.

Foreign involvement in China's civil aerospace sector has unquestionably contributed to its development and thus to the development of China's military capabilities. However, it is difficult to quantify the extent to which international cooperation in the civilian aerospace sector is driving improvements in those capabilities. This makes the implications for U.S. security policy unclear. A complete cutoff of international cooperation in the civilian aerospace sector is impractical, as many countries would refuse to go along with such an embargo. A U.S.-only ban would likely slow the development of China's military aerospace capability by only a small amount while handing business opportunities to European and Asian companies and aggravating relations with Beijing. Moreover, conflict or confrontation with China is not inevitable. Thus, whether the United States could significantly improve its security through alterations of its policy toward civil aerospace cooperation with China without having a significant negative effect on its own economic interests is unclear.