

Supporting China's first passenger jetliner

Parker Aerospace, a business segment of Parker Hannifin Corporation (NYSE: PH), the global leader in motion and control technologies, was proud to support and celebrate the first flight of the C919 aircraft, the largest commercial passenger aircraft designed and built inside China. The first flight of the COMAC C919 took place Friday, May 5, 2017 in Shanghai, China. Mark Seidel, Vice President, Strategic Business Integration at Parker Aerospace, was present at the ceremony. "It was a proud moment for China too," he says. "We're all looking forward to the C919 maturing into commercial production."

Mr. Seidel has been with Parker Hannifin for over three decades, and has served in his current positions since 2013. He has responsibility for Parker Aerospace mergers and acquisitions as well as the company's aerospace OEM business in China. Parker Hannifin has been active in China since the early 1990s, initially with sales and service operations. Over the years it has added several manufacturing facilities, including two joint ventures to support the C919, ARJ21, and MA700. The company now employs more than 6,000 people in China. Its Aerospace business also operates an office in Shanghai, which is

the home of the COMAC (Commercial Aircraft Corporation of China), who developed the C919, the first Chinese-built passenger jetliner.

Development of the 919 started more than a decade ago as part of China's ambitions to become largely self-sufficient in high-tech, as summarised in the Made in China 2025 government strategy. In 2007, plans to develop a domestic large passenger jet were approved by the Chinese State Council. In November 2015, the first C919 jet rolled off the assembly line. The ARJ21, the country's first regional aircraft also produced by COMAC, began

commercial operations in June 2016 following its maiden flight in 2008.

Parker has been involved with the C919 virtually from the start, says Mr. Seidel. "The C919 is integrated and built in China, but relies heavily on parts developed by western companies such as Parker." Specifically, Parker Aerospace is providing flight control actuation, hydraulics, fuel, and inerting on the new C919. Parker is providing the three independent hydraulic systems, the primary flight control system including the horizontal tail trim system, the fuel gauging and management system, fuel tank inerting system, and landing gear conveyance. A total of more than 60 types of components make up Parker's systems and subsystems on the C919. All have been conformity processed and safety-of-flight qualified prior to the aircraft's overall flight testing. "We adapted existing technologies for the C919," Mr. Seidel point out. "So these are not new





to the world. They do represent the latest technology, however. The C919 is a world class aircraft.” Mr. Seidel respects COMAC and the Chinese effort to develop the C919. “They basically built an aircraft from scratch, and that’s a massive challenge. There have been delays, but it hasn’t taken them that much longer than more established manufacturers take to design and build the aircraft.”

COMAC says it already has 570 orders from 23 buyers; most of these buyers are Chinese, however. Mr. Seidel estimates that it will take another two years for safety regulators in Europe, the United States and elsewhere to certify the plane before it can be sold outside China.

In further support of the aircraft, Parker has formed two joint ventures with the Aviation Industry Corporation of China (AVIC) in Nanjing and Xi’an. NEIAS Parker Aero Systems Equipment (NPASE) provides engineering, manufacturing, assembly, and testing for fuel supply and management, fuel tank inerting, and hydraulic power products and service for the C919, as well as the ARJ21 and MA700. The joint venture features a center-of-excellence machining center with a special processing shop. Parker FACRI

Actuation Systems in Xi’an provides engineering support, final assembly, and testing for flight control products for the C919, ARJ21, and MA700. The joint venture also features a FAA 145 and CAAC 145-certified maintenance, repair, and overhaul shop that services Parker Aerospace products, as well as those manufactured by other companies. “This means that these joint ventures generate revenues even before volume production of the C919 starts,” Mr. Seidel points out. “Along with our key joint venture partners AVIC NEIAS and AVIC FACRI, we are investing for the future success of programs like COMAC C919 and ARJ-21 as well as AVIC XAC’s MA700 aircraft where Parker has large bills of material. Parker’s joint ventures will support these and future aerospace programs in China for many years to come.”

The Chinese market isn’t uniquely about COMAC for Parker. Boeing, the company COMAC aims to compete with, predicted that that China will become the world’s top aviation market within 20 years, projecting a demand for 6,810 new aircraft in the next two decades with a total value of \$1 trillion. And it’s not just China that has Parker Aerospace upbeat about growth potential. Overall, the aerospace industry has gone through a

tremendous upswing in the number of aircraft in recent years. Pretty much all in the select group of aircraft manufacturers have introduced new aircraft: Airbus with the A350, Bombardier with the C-Series, Gulfstream with the G650, and Embraer with its new legacy 450 aircraft, notably. “We have won a lot of this new business and also supported these manufacturers in getting systems certified,” says Mr. Seidel. He also expects developments in electric systems to drive growth for Parker in aerospace.



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