

**Program:** History of Allison 1915 - 2017

**Speaker:** Larry Nightingale, Associate Fellow, Test and Measurement, Rolls-Royce

**Introduced By:** John Rathman **Attendance:**

111

**Guests:** Martha Berenyi, Glenn Bingle, Michael Donnelly, Jill Fewell, Patricia Jacob, Pat Markowski, Ed McKinler, Larry Nightingale, Philip Sowders, James Stohler, Kenny Swain, Sam Thrasher, Undecipherable

**Scribe(s):** Carol and Jim Mutter

**Editor:** Carl Warner

Our speaker was Larry Nightingale, Associate Fellow Test and Measurement, Rolls-Royce. He's a U. of West Michigan graduate in Aeronautical Engineering, and has been involved with the testing of every (locally produced) gas turbine engine in the past 40 years. He's also a member of AIAA Turbine Engine Working Group and an Aerospace Fellow. NOTE that Scientech Club members toured the Rolls Royce Museum downtown on the 13th of November 2017 and saw many of these engines.

Jim Allison started the Company in Indianapolis in 1915. It was also named Speedway Team Co, and later became the Allison Division of General Motors.

- Thousands of their Liberty Engines were sold during WW I. Their V-1710 was the first engine rated at over 1000 shp. While the number of engines completed varied month to month, the production reached a record high of 2,000 in one month. Many production aircraft were powered by it, including bombers.
- Their 250 series engines are in over 40 types of aircraft.
- The T-56 engine was started in 1954 and continues production today, albeit in a newer model.

Little known is that Allison also built engines for airships (blimps) and used their expertise in steel and aluminum, starting in the 1960s, to build Minuteman missiles as well as for other missiles that went into space, including support of the Apollo system. They also produced tanks for the Lunar Excursion Module (LEM). Allison engines competed with GE for the first lift engine, an XJ99, in the early 1970's but lost. They stayed involved with the evolution of vertical take-off engines, including one used on the British and US Marine Corps Harrier aircraft. They continue to analyze potential improvement areas for the production of lift fan aircraft, e.g. the F-35B.

In the early 70s, Allison explored developing and fitting gas turbines for wheeled vehicles including the AGT-5 for a Chevrolet and a coal fired engine for Cadillac. The GT-404 gas turbine engine powered many Mack semi-trucks and several Greyhound buses. But diesel was a more reliable and the fuel more economical for propelling wheeled vehicles. The production runs for this engine was fairly limited – especially because of the high fuel prices during 70s – and the program was canceled.

Allison also developed many varieties of turbo prop, turbo shaft, and propfan engines. The 538-DX propfan engine went into the MD80 aircraft at Andrews AFB. Around 5000 AE core engines were built and fly on 10 aircraft types.

In 1992 GM sold the Allison Division to New York bankers. Fortunately in 1995 Rolls Royce bought the Allison Division and put significant new investment into test facilities, plant technology, etc. There were significantly fewer employees in 2018 vs. 1995 but Rolls Royce still managed the same output as in earlier years through the implementation of improved technology and a dedicated workforce.

An exciting new technology being pursued by Rolls Royce (and others) is Electric Power Systems. Several Aurora Tech Demo systems have been built as part of a DARPA project. A computer simulation video was shown of an unmanned aircraft named Lightning Strike with three 1 MW generators producing sufficient power through 24 synchronized, motorized fans which can propel the aircraft vertically or horizontally. The purpose of this demonstrator aircraft is to prove that electric powered engines can fly.

Larry Nightingale

