

SASM FEATURED
ARTIFACT:

THE F-1 ENGINE TURBINE WHEELS

Apollo 11's Saturn V F-1 Engine Turbine. Credit: www.bezosexpedition.com

Stafford
AIR & SPACE
MUSEUM



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F-1 ENGINE FACT

The mighty F-1 remains the most powerful American liquid-fuel rocket engine ever developed and still holds the record as the largest single-chamber, single-nozzle liquid fuel engine ever flown.

Jeff Bezos, the F-1 and the Stafford Air & Space Museum

In March of 2013, NASA Administrator Charles Bolden released a statement congratulating Jeff Bezos and his team on the recovery of the F-1 engine that powered Apollo 11's Saturn V rocket to the moon: *"Nearly one year ago, Jeff Bezos shared with us his plans to recover F-1 engines that helped power Apollo astronauts to the moon in the late 1960s and early 1970s. We share the excitement expressed by Jeff and his team in announcing the recovery of two of the powerful Saturn V first-stage engines from the bottom of the Atlantic Ocean. This is a historic find and I congratulate the team for its determination and perseverance in the recovery of these important artifacts of our first efforts to send humans beyond Earth orbit. We look forward to the restoration of these engines by the Bezos team and applaud Jeff's desire to make these historic artifacts available for public display. Jeff and his colleagues at Blue Origin are helping to usher in a new commercial era of space exploration and we are confident that our continued collaboration will soon result in private human access to space, creating jobs and driving America's leadership in innovation and exploration."*



As a result of this discovery, and with the support of our members, the Stafford Air & Space Museum

was able to acquire this historic engine's turbine wheels, now on display in our Powering the Race to the Moon gallery.

During NASA's 1960s and 1970s Apollo program, the F-1 engine was the chosen power needed to separate the Saturn V rocket from the massive pull of Earth's gravity and secured our victory to the moon. Five F-1 engines were used in the 138-ft tall first stage of each Saturn V, which depended on the five-engine cluster for the 7.5 million pounds of thrust needed to lift it from the launch pad. Each mighty engine stands 19 feet tall by 12 feet wide and weighs over 18,000 pounds.

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F-1 ENGINE FACT

Moving at the rate of 6,000mph, the F1 engine produced a massive 1,746,000 lbs of thrust at burnout.



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THE INCREDIBLE POWER OF THE F-1 ENGINE

Each Saturn V had a cluster of five F-1 engines that burned a mixture of liquid oxygen and kerosene fuel at more than 15 metric tons per second during its two-and-one-half-minutes of operation. Each engine had more thrust than three space shuttle main engines combined in order to lift the vehicle to a height of about 36 miles and to a speed of about 6,000 mph.

The decision to develop an engine capable of launching large orbital payloads into space was bolstered by Russian successes and also by U.S. plans for missions to the moon. The development of the F-1 was a major step forward in rocket engine technology.

The heart of the F-1 Engine was the thrust chamber, which mixed and burned the fuel and oxidizer to produce thrust. A domed chamber at the top of the engine supplied liquid oxygen to the injectors, and also served as a mount for the gimbal bearing which transmitted the thrust to the body of the rocket. Below this dome were the injectors, which directed fuel and oxidizer into the thrust chamber for mixing and combustion.

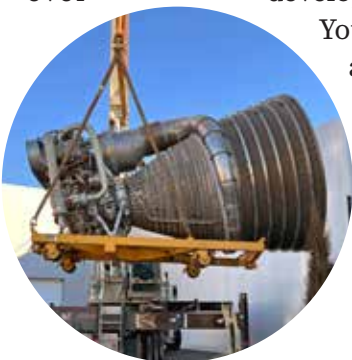
Fuel was supplied to the injectors from a separate manifold; some of the fuel first traveled in 178 tubes down the length of the thrust chamber - which formed approximately the upper half of the exhaust nozzle - and back in order to cool the nozzle.

The mighty F-1 remains the most powerful American liquid-fuel rocket engine ever developed and still holds the record as the largest single-chamber, single-nozzle liquid fuel engine ever flown. It is also the most powerful single-nozzle, liquid-fueled rocket engine ever developed.

You can see an actual F-1 Engine next to the Apollo 11 Turbine Wheels along with an actual J-2 Rocket, an actual Soviet N-1 rocket and much more in our Powering the Race to the Moon gallery at the museum. Thank you to our members who have been so generous in our growth.



Actual F-1 Engine artifact
Credit: Stafford Air & Space Museum



The first Launch of Saturn V – Nov. 9, 1967.
Credit: NASA.

source: https://www.nasa.gov/topics/history/features/fl_engine.html

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