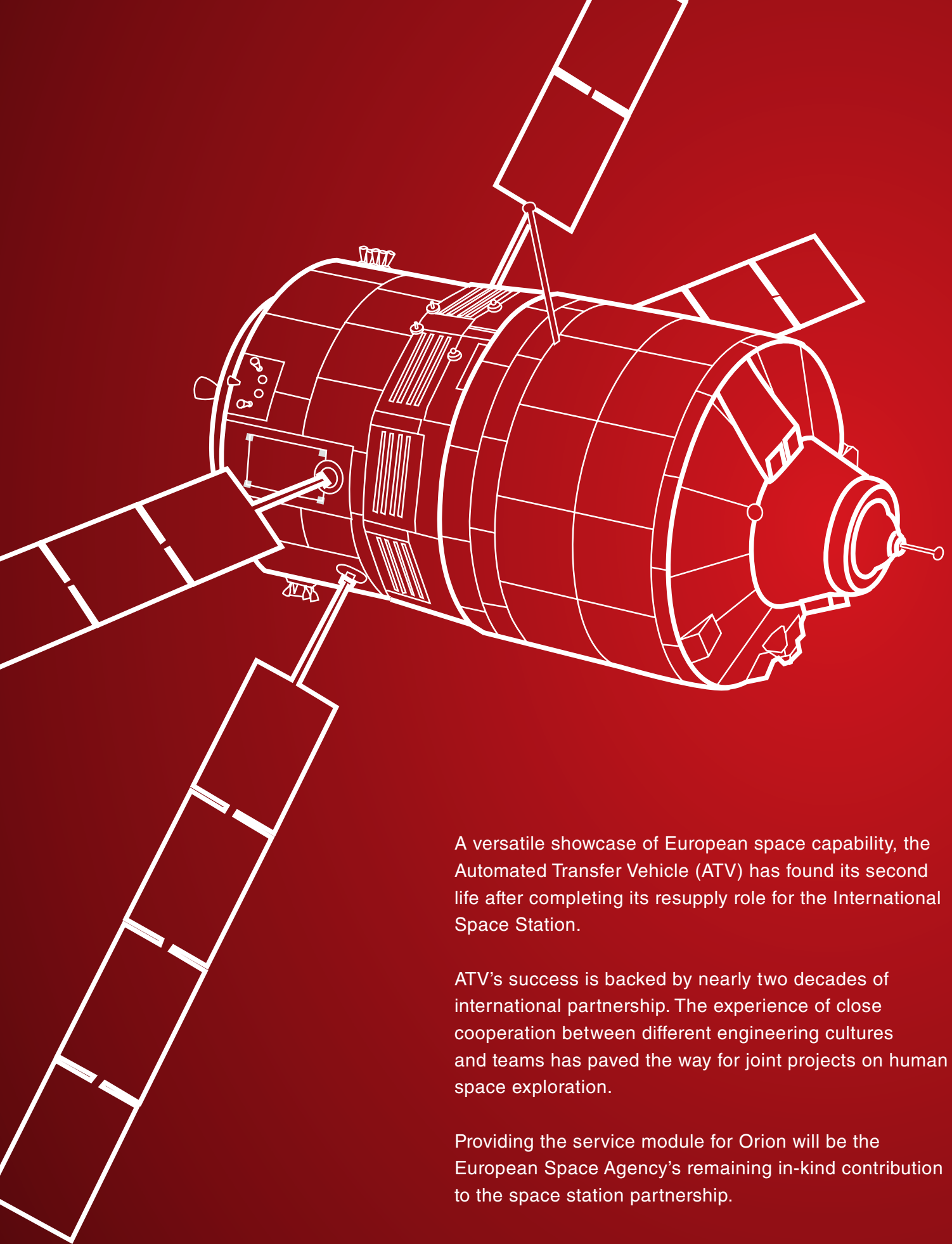


A photograph of the Orion Service Module in space, showing its four solar panel arrays and the central service module structure. The background is a dark space with a large, cratered celestial body (likely the Moon) visible on the right side.

# ORION'S SERVICE MODULE

Orion's service module is the powerhouse of the spacecraft, supplying it with the electricity, propulsion, thermal control, air and water it needs in space. After the Space Launch System rocket gives Orion the push it needs to venture toward deep space and detaches from it, the service module will propel the uncrewed spacecraft on its mission 40,000 miles beyond the Moon and help it return to Earth, detaching before the crew module re-enters Earth's atmosphere. For the first time, NASA will use a European-built system as a critical element to power an American spacecraft. Provided by ESA (European Space Agency) and its partner Airbus Defence and Space, the service module extends NASA's international cooperation from the International Space Station into deep space exploration.



A versatile showcase of European space capability, the Automated Transfer Vehicle (ATV) has found its second life after completing its resupply role for the International Space Station.

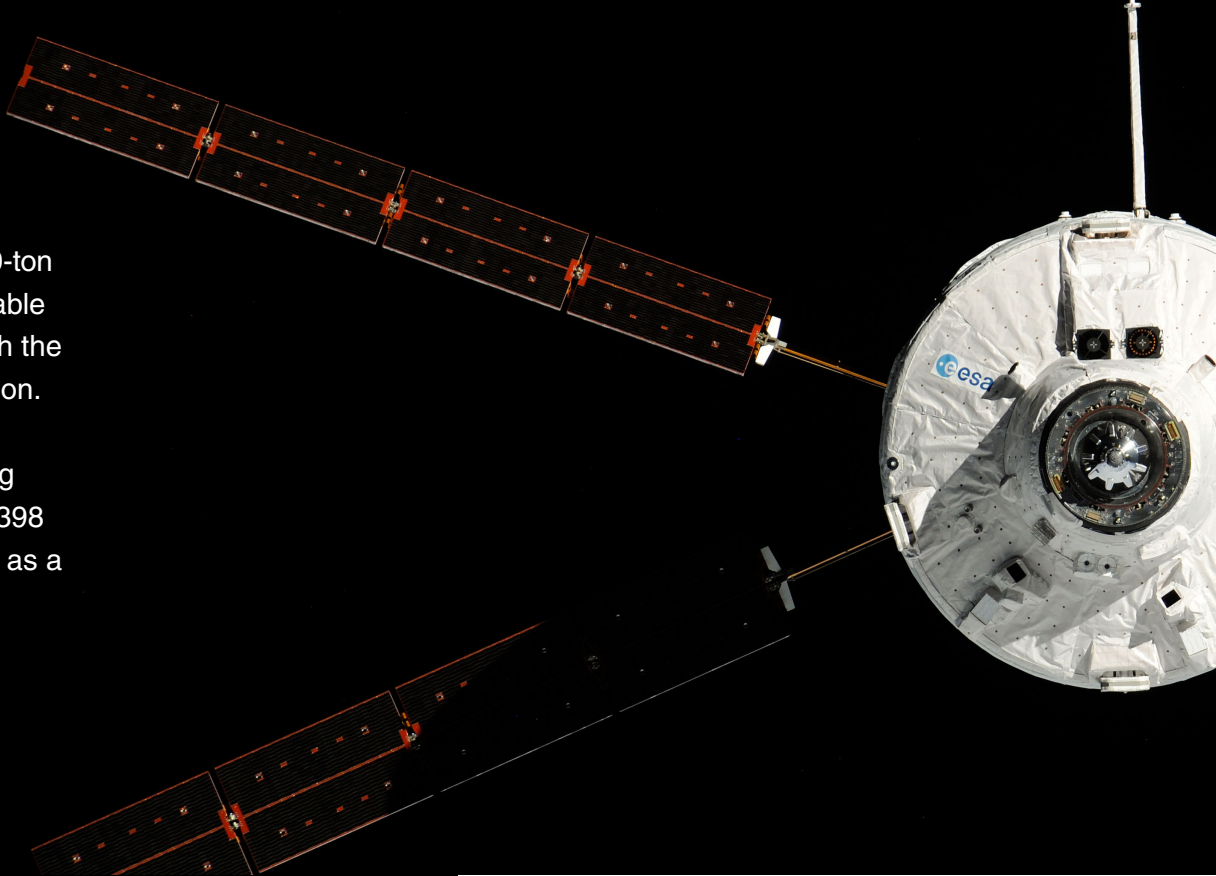
ATV's success is backed by nearly two decades of international partnership. The experience of close cooperation between different engineering cultures and teams has paved the way for joint projects on human space exploration.

Providing the service module for Orion will be the European Space Agency's remaining in-kind contribution to the space station partnership.



The ATV was the only 20-ton class supply spacecraft able to automatically dock with the International Space Station.

This autonomous docking occurred at speeds of 17,398 miles per hour, as gently as a bee landing on a flower.



# 70,360

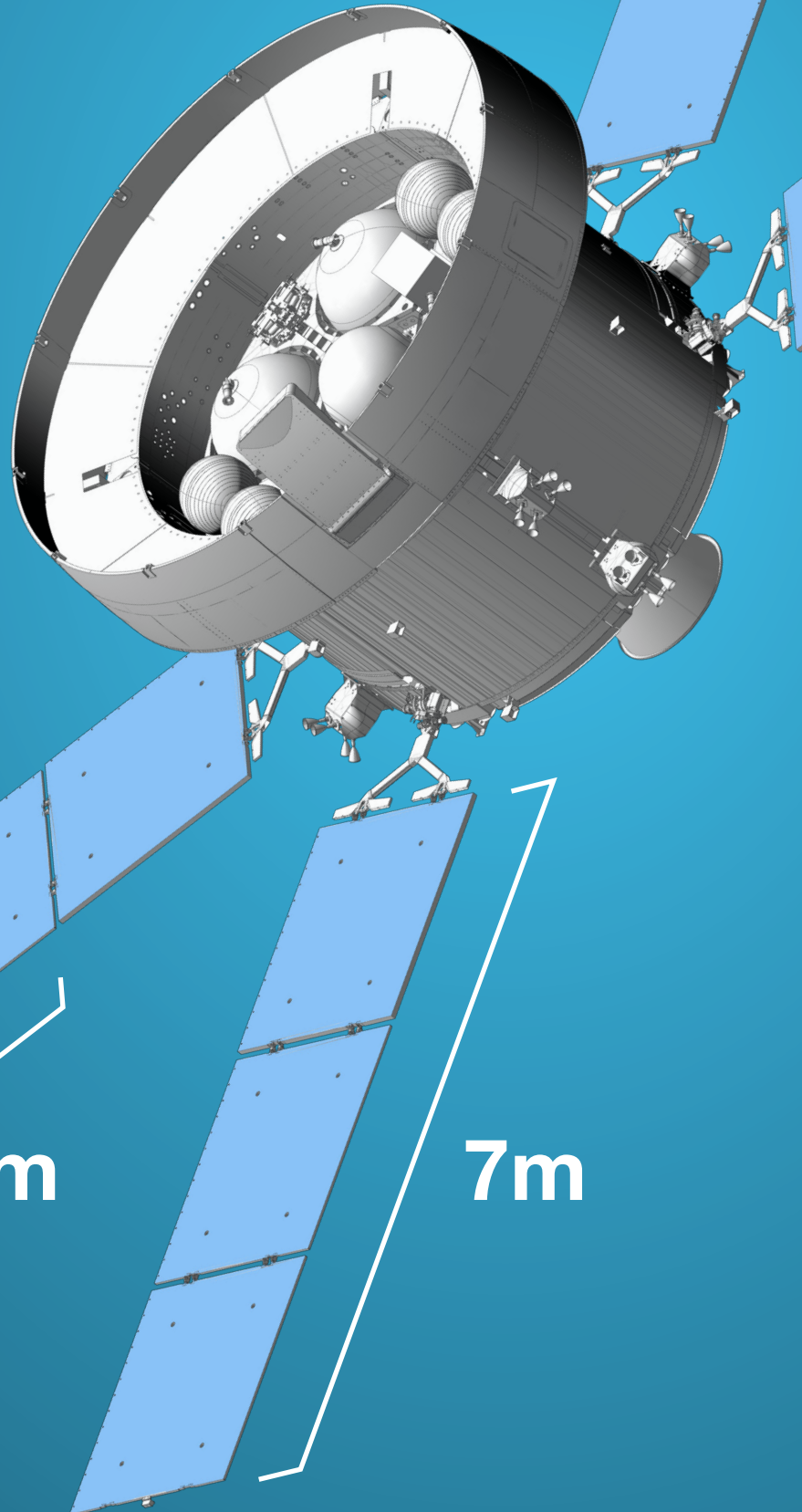
The ATV delivered 70,360 pounds of liquids, gas, propellant, water, and experiments as well as strawberries, tiramisu, Parmesan cheese and sleepwear to the International Space Station.



# 20,000

The Orion spacecraft is made of three primary elements - the launch abort system, the crew module, and the service module.

The European-built service module is comprised of 20,000 parts and components that must fit together perfectly and perform reliably. The service module has four solar array wings to provide power.



Launch Abort System



Crew Module



Service Module

2m

2m

7m

Each wing is about 2 meters wide by 7 meters long. Each solar array panel is about 2m by 2m in size.



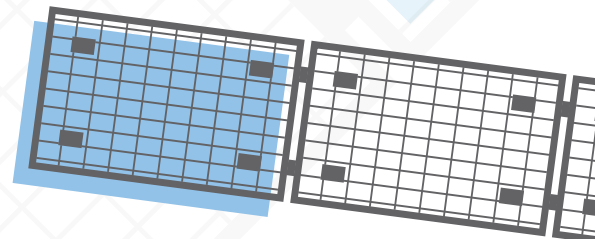
# 10

The European Service Module is being built by 10 European countries as part of an international agreement between NASA and ESA (European Space Agency). The countries include Belgium, Denmark, France, Germany, Italy, The Netherlands, Norway, Spain, Sweden, and Switzerland.

# 1250

Just one of the 2 meter by 2 meter panels of the four solar array wings has 1250 solar cells. All four wings combined have a total of 15,000 solar cells to convert light into electricity.

Many of the ESA countries are participants in the production of the solar arrays.



# 4

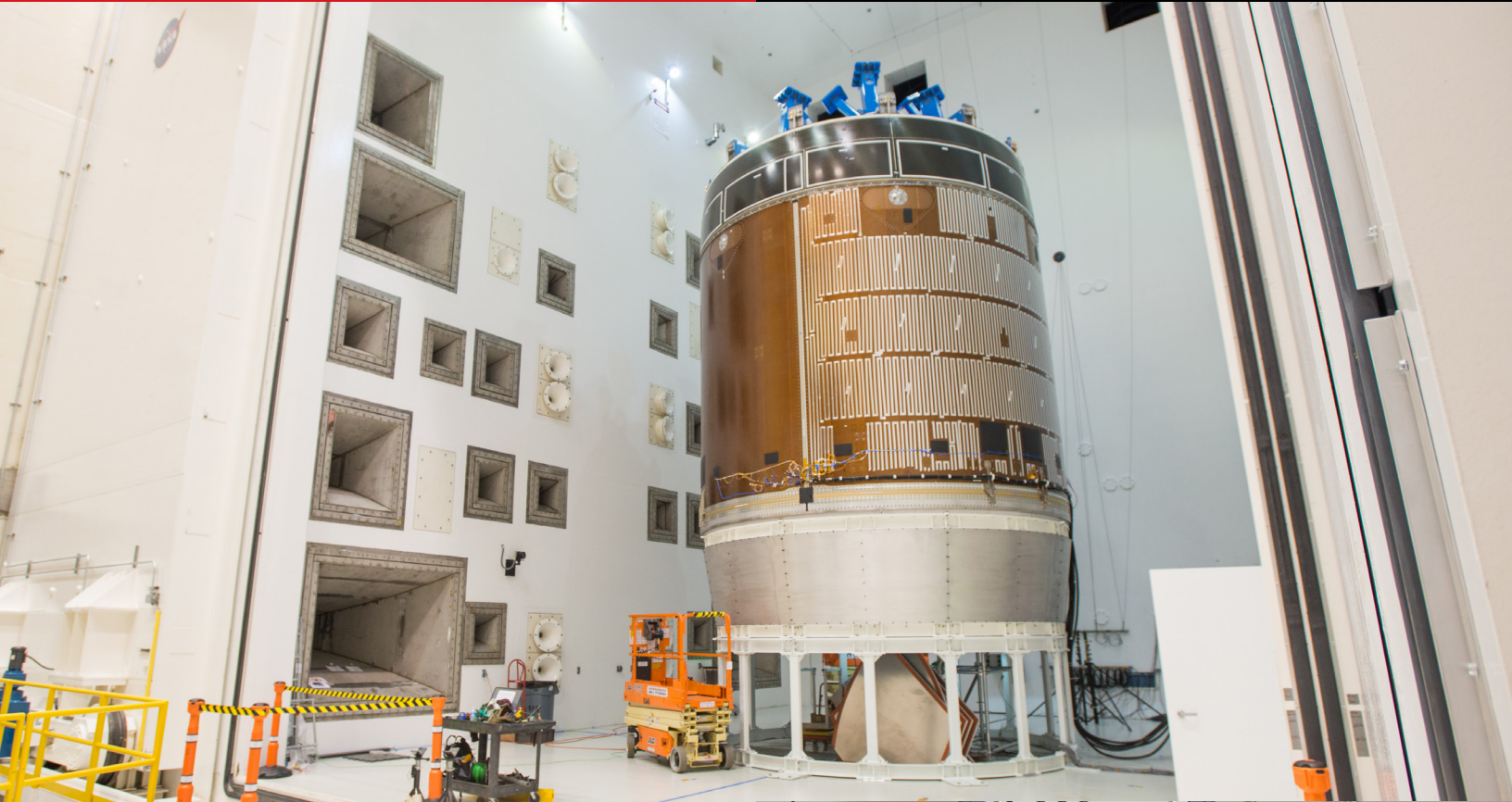
Orion's four solar array wings are made of three panels that provide enough electricity to power two three-bedroom homes.





1,000 sensors collected data on Orion's service module as it was shaken on a vibration table at NASA Glenn Research Center's Neil A. Armstrong Test Facility in Sandusky, Ohio. This testing simulated how Orion's structure flexed and stood up to 35 tons of spacecraft weight during a launch.

# 1,000



This Orbital Maneuvering System engine was used on the space shuttle to provide the thrust for orbital insertion, orbit circularization, orbit transfer, rendezvous, deorbit and abort situations and flew on 31 shuttle flights.

The engine flying on Artemis I flew on 19 space shuttle flights, beginning with STS-41G in October 1984 and ending with STS-112 in October 2002.

The Orion service module main engine provides nearly 6,000 pounds of force. The engine is also equipped to swivel from side to side as well as up and down.

# 19

