National Aeronautics and Space Administration

Flight Dynamics Research Facility

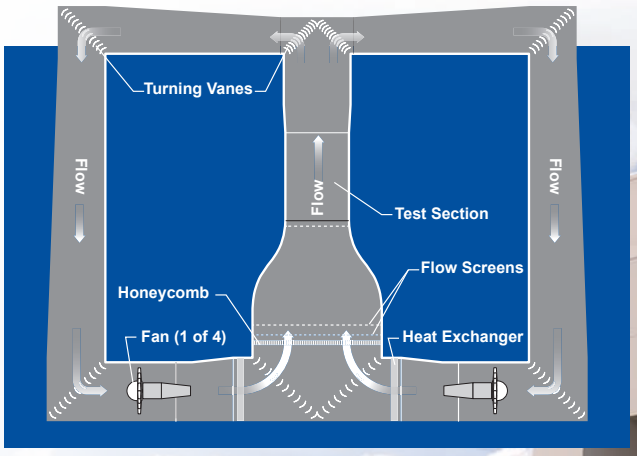
The Flight Dynamics Research Facility (FDRF), located at NASA's Langley Research Center in Hampton, Virginia, is NASA's newest wind tunnel. The facility is the first major NASA wind tunnel built in more than 40 years. The FDRF offers a highly versatile and cost-effective vertical wind tunnel for conducting research and technology development that supports NASA's aeronautics, space exploration, and science missions.

The FDRF replaces two legacy facilities, consolidating their test capabilities into a single, state-of-the-art wind tunnel with significantly greater performance and reduced maintenance and operating costs.

The 25,000-square-foot facility will support entry, descent, and landing of human exploration and science missions returning from the Moon and Mars, as well as exploration of Venus and Saturn's moon, Titan. The FDRF will also play a major role in experimental research for NASA's future autonomous flight vehicle development, unmanned aircraft systems (UAS), and X-planes.

The U.S. General Services Administration awarded the design-build construction contract for the FDRF to BL Harbert International, whose design team includes architecture and engineering firm Mason & Hanger and wind tunnel design by Calspan ASE (now North Wind). The FDRF honors NASA Langley's commitments to transformation and providing world-class facilities and research.

CROSS SECTION VIEW



FACILITY SPECS	
Test Section Dimensions	20 ft. diam. by 24 ft. high
Speed	0 – 172 ft/s (0 – 117 mph)
Dynamic Pressure	(0 – 35 psf)
Reynolds Number	0 – 1.10x10^6 per ft
Pressure	Atmospheric
Temperature	Actively cooled (79° F)
Test Gas	Air
Facility Height	131 ft

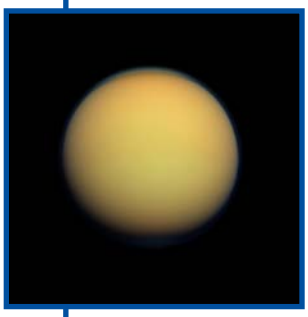
The **Flight Dynamics Research Facility** will usher in a new era of research and technology development in support of:

Human Exploration and Space Operations

As NASA returns astronauts to the Moon through the Artemis campaign in advance of human exploration of Mars, the FDRF will play a vital role in testing the technologies for entry, descent, and landing that will ensure a safe return to Earth. The FDRF will also support vehicle development and risk reduction for NASA and commercial crew capsule and launch abort systems, including aerodynamic modeling, analysis of vehicle dynamics, and stabilizing parachute sizing.

Aeronautics

The first “A” in NASA stands for aeronautics, and the FDRF will help NASA continue our commitment to push technology and boundaries and enable United States global leadership in aviation, including the emerging advanced air mobility market. The FDRF will enable advanced vehicle concepts and risk reduction for fight demonstrators, autonomous vehicle research and development, rapid aerodynamic modeling for complex urban air mobility designs, computational fluid dynamics for poststall flight conditions, and spin characterization and recovery method development.



Science

For decades, NASA has advanced scientific understanding of our solar system in extraordinary ways, pushing the limits of spacecraft and robotic engineering design and operation. The FDRF will support risk reduction for science mission probes to planets and moons with atmospheres such as Venus and Saturn’s Moon, Titan, as well as testing and analysis for entry, descent, and landing of Earth-entry vehicles.

The FDRF’s test techniques and capabilities include:

Free Flight

Forced Oscillation System

Rotary Balance System

Flow Visualization