



Electric Propulsion Research Building at NASA Glenn Research Center

The **Electric Propulsion Research Building (EPRB)** supports research in the areas of electric propulsion, spacecraft power, and space environmental effects at the component and conceptual levels (Technology Readiness Levels (TRLs) 2 to 7).

Facility Description

The EPRB has played a role in propulsion and power development for over 60 years. Originally it tested piston engines supporting U.S. World War II efforts. For the last 40 years, electric propulsion has been the focus of this facility providing the technology development necessary for NASA to explore the solar system. EPRB supports research and development of spacecraft power, electric propulsion, and space environmental effects. Presently, EPRB is supporting research focused on ion thrusters, magnetoplasma dynamic thrusters, pulsed plasma thrusters, Stirling engine converters, regenerative fuel cells, space plasma potentials, and atomic oxygen.

The cornerstone to EPRB's research capabilities results from its suite of space simulation chambers. EPRB chambers range in size from bench top bell jars to 3 m in diameter and are equipped with various pumping systems (cryopumps, diffusion pumps, oil-free pumping trains, and high-throughput roots blowers) depending upon the specific requirements of a test program. In addition, EPRB has over 20,000 sq ft of specialty labs and buildup and machine shop areas. EPRB works synergistically with other larger vacuum facilities located at Glenn Research Center.

Facility Benefits

- Vacuum facilities
 - Seven vacuum chambers
 - Over half-dozen bell jars

Production and Assembly Capabilities

- Grid hydroforming rig
 - Up to 50 cm in diameter
- Clean rooms
 - Class 10,000: 21 sq m
 - Class 100,000: 40 sq m
- Machine shop

Programs and Projects Supported

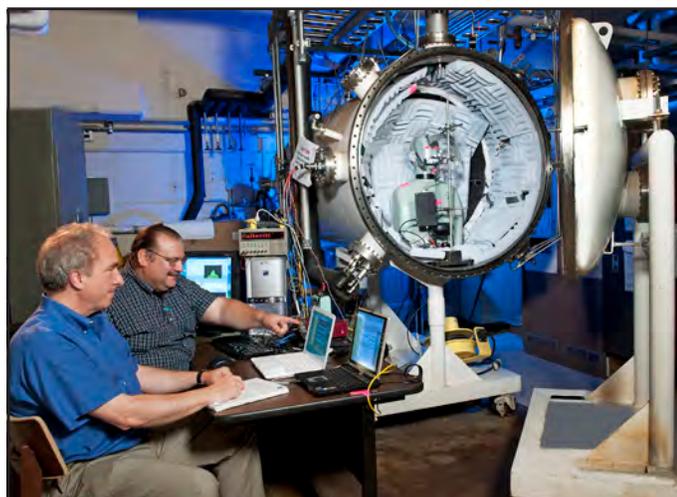
- In-Space Propulsion
- Advanced Stirling Duplex Technology
- Service Module's Dynamic Interaction System Test (DIST) Lab
- Cryogenic Propellant Storage and Transfer
- International Space Station



NASA's Evolutionary Xenon Thruster (NEXT) long-duration testing in Vacuum Facility 16 (VF-16).

Capabilities

Space Simulation Facilities—Electric Propulsion Research Building					
Vacuum facility	Dimensions (diam. by length)	Vacuum system	No load pressure, torr	Pumping speed liter/sec, air	Features
VF-1	5 by 15 ft long	(2) 35-in. oil diffuser pump (ODP)	3×10^{-7}	40,000	250 kJ capacitor bank 2-msec pulse duration >30-MW pulsed power
VF-2	3.5 by 7 ft long	Turbopump	1×10^{-6}	1,950	
VF-3	5 by 15 ft long	(4) 35-in. ODP	4×10^{-7}	80,000	Multiple test ports
VF-7	10 by 15 ft long	(5) 35-in. diffusion pumps	1×10^{-7}	125,000	
VF-9	2 ft wide by 5 ft long by 8 ft high	Roots blower pumps	1×10^{-3}	3,000 cfm	Atomic oxygen production facility
VF-10	40 by 60 in. long	Turbopump	8×10^{-7}	1,950	Cold wall 35 in. diam by 40 in. long Control: -250 to 300 °F or (-320 °F)
VF-11	7.5 by 27 ft long	(3) 48-in cryopump (4) 36-in cryopump	1×10^{-7}	270,000	
VF-14	22 by 22 by 36 in.	Turbopump	5×10^{-7}	1,000	
VF-16	9 by 28 ft long	(10) 48-in. cryopumps	7×10^{-8}	500,000	Electrostatic propulsion test facility, and supports long-duration testing
VF-19	6 by 9.5 ft	(4) 10-in. ODP	5×10^{-7}	5,300	Space plasma test facility
VF-20	71 by 72 in.	36-in. cryopump	1×10^{-6}	30,000	Space plasma test facility Thermal shroud available upon request
VF-21	30 by 60 in.	10-in. cryopump	1×10^{-6}	4,000	Horizontal turntable
VF-55	18 by 36 in.	10-in. cryopump	5×10^{-7}	1,000	
VF-61	40 by 60 in. long	36-in. cryopump	3.5×10^{-8}	30,000	Multiple test ports
VF-62	10 by 30 in.	10-in. cryopump	5×10^{-6}	4,000	
VF-65	18 by 36 in.	10-in. cryopump	1×10^{-6}		
CW-19	7 by 10 ft	(2) 35-in. ODP with dual baffles of LN ₂ and water	5×10^{-7}	25,000	



Rig setup for testing the Integrated Audio System for a new spacesuit design.



Technicians preparing the magnetoplasmadynamic (MPD) hardware for installation in VF-1 of the EPRB.

Facility Testing Information

<http://facilities.grc.nasa.gov>

Contact

William P. Camperchioli, Facility Manager

NASA Glenn Research Center

Phone: 216-433-8301

Fax: 216-433-8551

E-mail: William.P.Camperchioli@nasa.gov