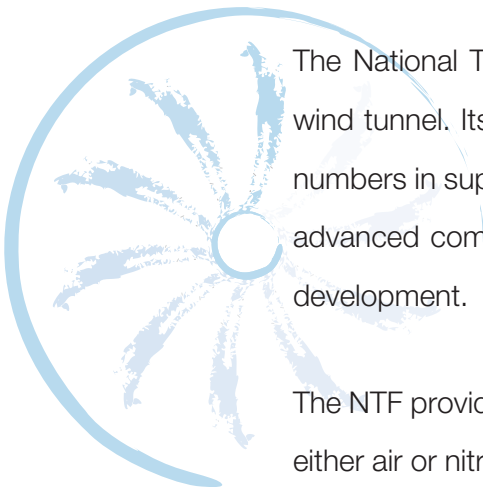
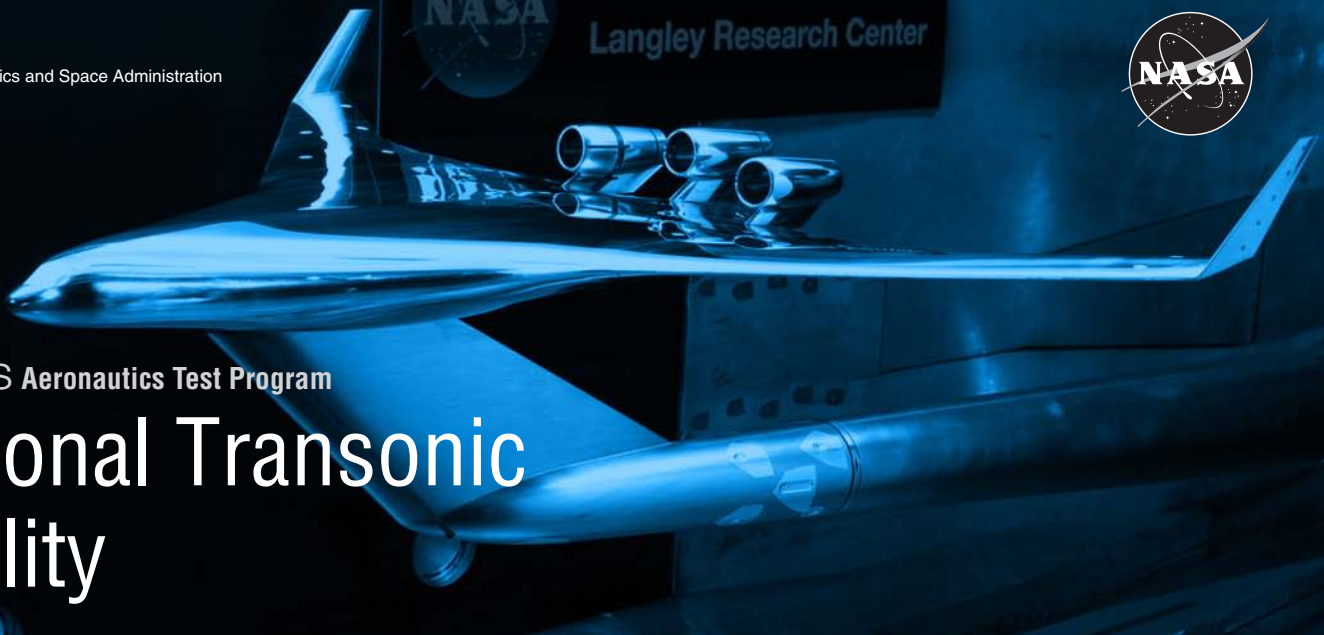




NASA's Aeronautics Test Program

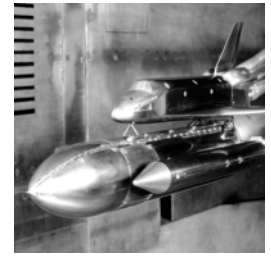
# National Transonic Facility



The National Transonic Facility, or NTF, is the world's largest pressurized cryogenic wind tunnel. Its unique capabilities enable testing of scaled models at flight Reynolds numbers in support of advanced aerodynamic concept development and assessment, advanced computational fluid dynamics tool validation, and risk reduction for vehicle development.

The NTF provides the largest range of Reynolds number testing in the world. It can use either air or nitrogen gas at ambient temperatures matching conditions of conventional wind tunnels. At cryogenic temperatures, nitrogen gas is used to achieve the highest Reynolds number testing in the world. Support is provided for both full-span and semispan testing with a wide range of instrumentation and measurement techniques.





## Facility Benefits

- Provides the highest Reynolds number testing capability in the world
- Matches and selectively isolates Mach number, Reynolds number, and aeroelastic effects to accurately determine and understand vehicle performance while in the cryogenic mode
- Provides testing and configuration aerodynamics validation for both full- and half-span models for existing and new vehicle concepts
- Adjustable airflow to match model size
- Design tool verification at flight conditions
- Preflight risk reduction at flight conditions

## Characteristics

Test section dimensions	8.2 ft high by 8.2 ft wide by 25 ft long
Area	66.8 ft <sup>2</sup>
Speed	Mach 0.1 to 1.2
Reynolds number	4 to 145×10 <sup>6</sup> per ft
Temperature	-250 to 150 °F
Pressure	15 to 130 psi
Test gas	Nitrogen and ambient atmosphere
Circuit length	497 ft
Drive power	135 000 hp
Contraction area ratio	14.95:1

## Instrumentation

Strain gauge balances	Six-component internal
Available corrections	Interactions, temperature effects, attitude tares, axes orientation, pressure tares, and momentum (flow) tares
Angle-of-attack (AOA) accelerometers	Thermal conditioning systems available and accelerometers for cryogenic operation
Electronically scanned pressure (ESP) system	Rates up to 500 samples per second
Modules are available in differential pressures of 2.5, 5, 15, 30, and 45 psi.	

## Facility Applications

- Vehicle testing such as the Boeing 777 and 787, the space shuttle and booster, as well as transport, fighter, and business jets
- Blended-wing-body design testing such as the B-2 bomber
- Launch vehicle testing such as the Delta II

## Data Acquisition and Processing

Inputs	Analog, digital, and frequency and pulse train
Controller	UNIX
Capacity/channels	Analog/256, Digital/32, Frequency/1
Dynamic data acquisition	64 channels
Customer computers	Yes
Classified capability	Yes

## Contact Information

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