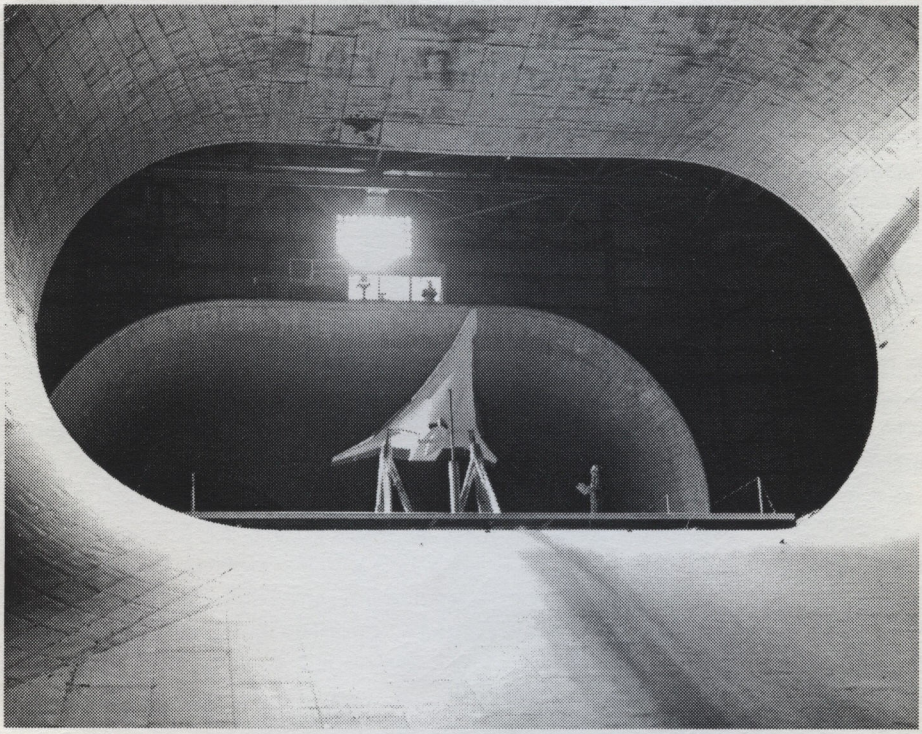


30- By 60-Foot Tunnel Closing Ceremony

October 27, 1995

NASA Langley Research Center
Hampton, Virginia

The NASA Langley 30- by 60-Foot Tunnel, constructed from 1929 to 1931 at a cost of just under $1 million, has been a continuously operational research facility for 64 years. Originally known as the Full Scale Tunnel, the 30- by 60-Foot Tunnel was designed to test large- and full-scale aircraft at actual flight speeds. Almost all World War II fighter aircraft were tested here to find ways of reducing their drag. These studies resulted in substantial improvements in the top speed and range of many aircraft, including the P-51 Mustang and the P-38 Lightning.

Through the years, the 30- by 60-Foot Tunnel's capabilities were expanded to include new testing techniques, particularly for the study of high-angle-of-attack flight characteristics using sub-scale models (angle of attack, or AOA, can be roughly defined as the angle between the airplane centerline and the direction of flight).

Until its closure in 1995, the 30- by 60-Foot Tunnel continued to be used for research on advanced designs, such as the National Aero-Space Plane, High Speed Civil Transport, Advanced Tactical Fighter, and other experimental and advanced high-performance aircraft. The importance of the NASA Langley 30- by 60-Foot Tunnel's contributions to aeronautics technology in the United States was acknowledged in 1985, when it was named a U.S. National Historic Landmark.

FACTS

- Open-jet test section 30 feet high, 60 feet wide, and 56 feet long
- Maximum speed 95 knots (110 m.p.h.), generated by two 4-blade, 35.5-foot diameter fans
- Powered by two 4,000 h.p. electric motors, requiring approximately 3 megawatts during normal operation
- Closed-loop, dual-return-passage design
- Constructed from 1929 to 1931
- Original construction cost approximately $900,000
- Continuously operational from May, 1931 to October, 1995

Cover: Arrow-wing Supersonic Transport Design

TESTING TECHNIQUES

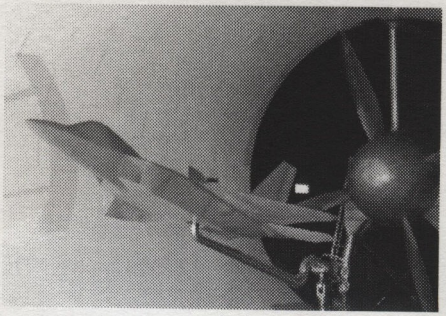
Large- and Full-Scale Tests

Originally designed exclusively for such tests, large-scale transport models and full-scale general aviation aircraft were tested in the facility throughout its lifetime. General areas of interest were high AOA stability and high-lift capability, which are important for aircraft take-off and landing.

Sub-Scale Tests

Many advanced aircraft concepts were tested using small models to obtain a database of performance and stability characteristics over a large AOA range.

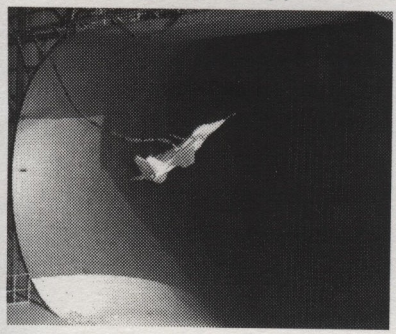
- Models are typically 10% - 20% scale, constructed of fiberglass and wood with aluminum structure; weight is approximately 50-100 lbs
- Designs include military, general aviation, experimental, and transport aircraft



F-22 Advanced Tactical Fighter

Free-Flight Tests

A technique unique to this facility, free-flight testing involved flying a sub-scale model unrestrained in the test section. Free-flight tests allowed dynamic, remotely-piloted evaluations of high-AOA stability and control characteristics to be conducted prior to expensive and potentially dangerous flight testing of prototype aircraft.



- Models are the same as those used for static tests, instrumented with rate gyros, accelerometers, and electro-pneumatic actuators for control surfaces
- Flight weight is approximately 100 lbs
- Thrust is generated by compressed air
- Control is by a combination of pilot and flight control computer inputs

Advanced F-15 Experimental Aircraft

The NASA Langley 30- by 60-Foot Tunnel Complex

Program

Welcome
Director,
Langley Research Center — **Mr. Paul F. Holloway**

Remarks

Congressman
Virginia, First District — **The Honorable Herbert H. Bateman**

Congressman
Virginia, Third District — **The Honorable Robert C. Scott**

Senior Manager
Technology Business Development
McDonnell Douglas Corporation — **Mr. Norbert F. Smith**

Vice President and
Manager of Human Resources,
J. A. Jones Construction Co. — **Mr. J. Edward Capps**

Historian
National Park Service — **Dr. Harry A. Butowsky**
The Full Scale Wind Tunnel - A Retrospective View

Chief
Aeronautics Systems Analysis Division — **Mr. Joseph R. Chambers**
Major Accomplishments

Closing Comments — **Mr. Holloway**

Group Photograph

A Reception will follow the Ceremony