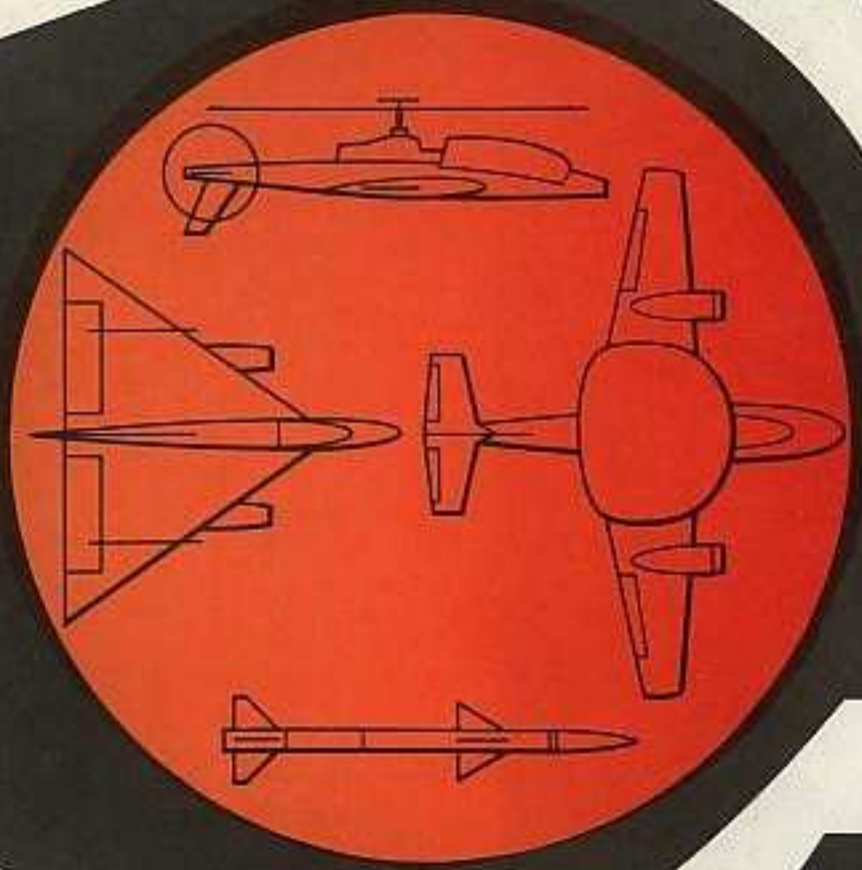
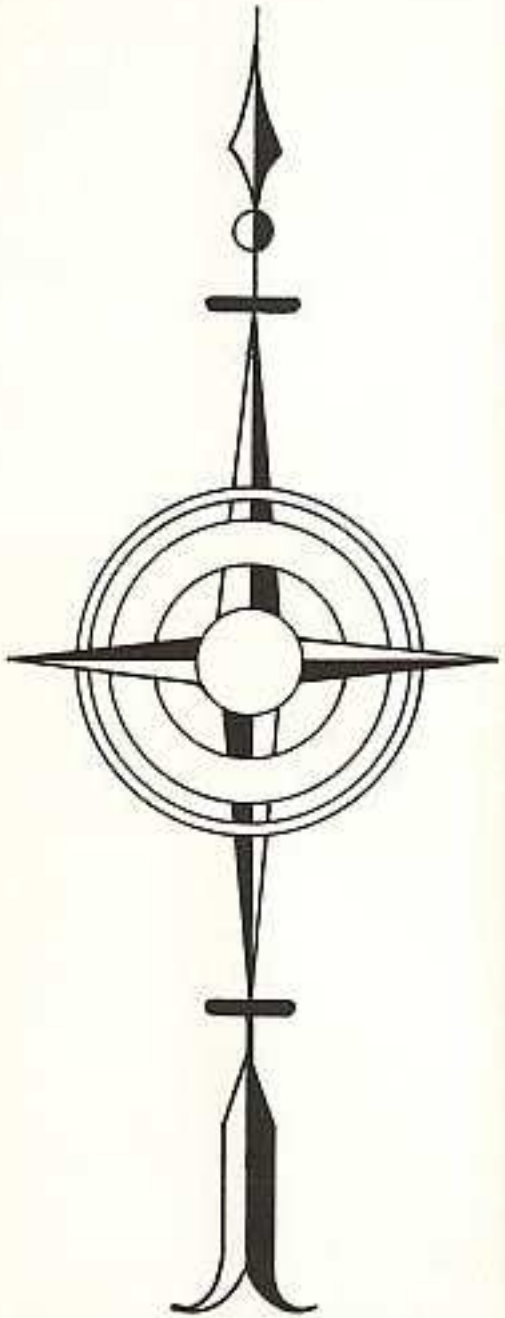
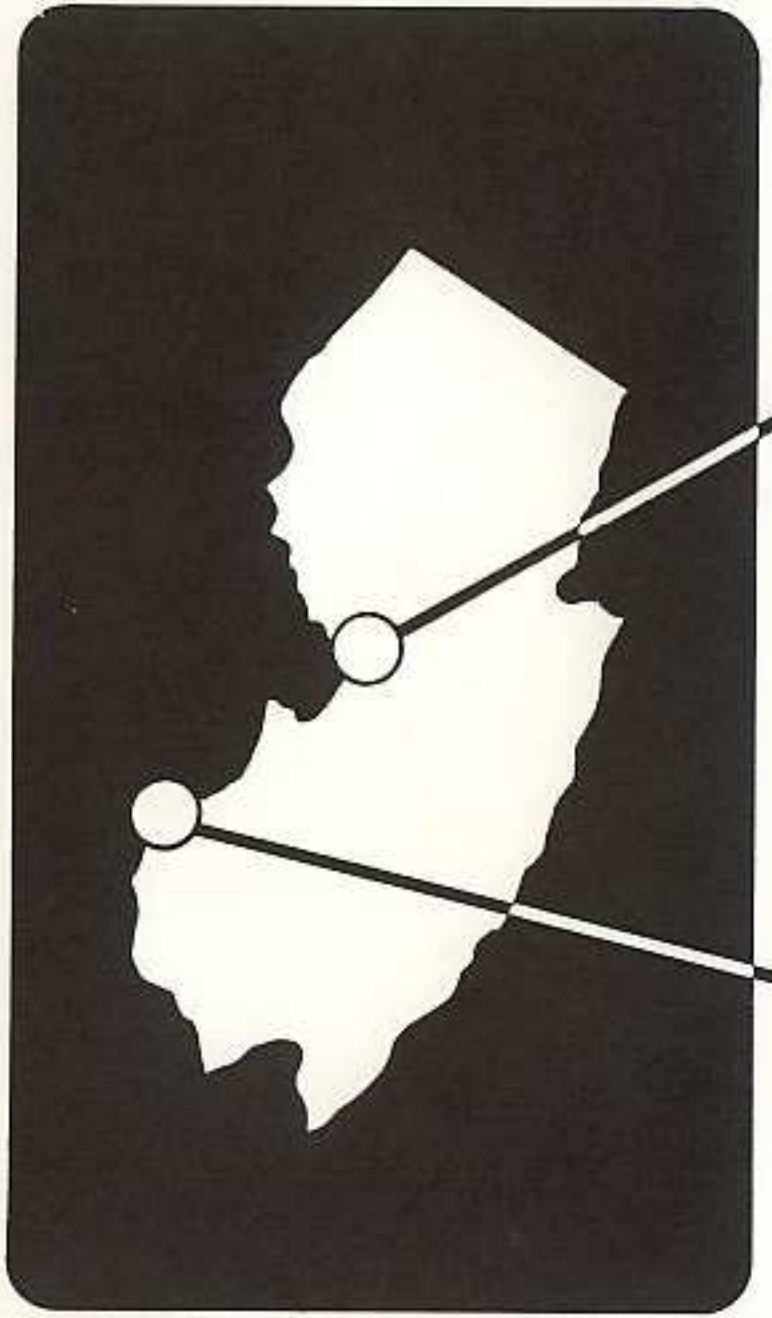


NAPTC

NAVAL AIR PROPULSION TEST CENTER





NAPTC HEADQUARTERS

ATD
AERONAUTICAL TURBINE DEPARTMENT, TRENTON, N.J.

AED
AERONAUTICAL ENGINE DEPARTMENT, PHILA.,PA.

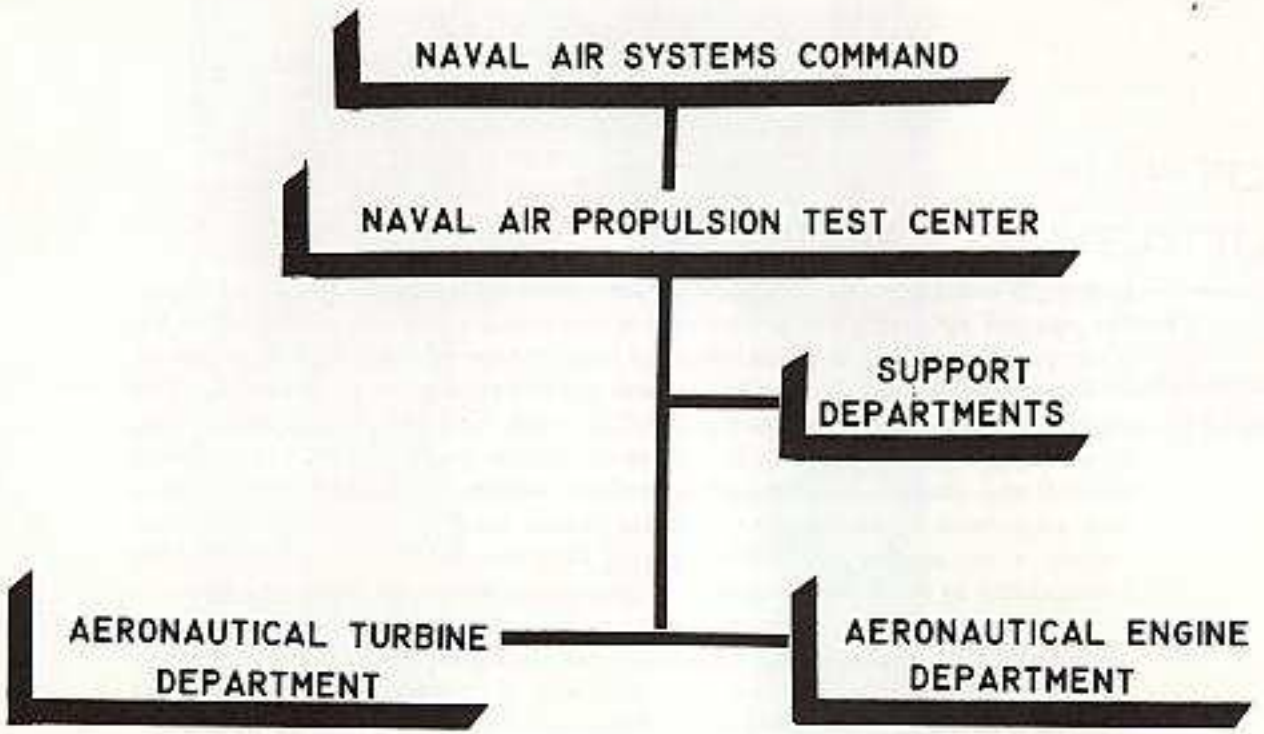
FOREWORD

In today's world of intercontinental ballistic missiles, satellites, and space flight, the manned aircraft is still a vital part of our national security, and will be for many years to come. The availability and performance excellence of our manned Naval aircraft depend upon reliable, high performance propulsion systems. The Naval Air Propulsion Test Center (NAPTC), with facilities located in Trenton, New Jersey, and Philadelphia, Pennsylvania, serves the Navy's requirements for the test and evaluation of aircraft propulsion systems. Simulated engine flight tests performed in these ground facilities reduce the time and expense of flight testing, eliminate the inherent danger of experimental flight, and correct for the inability to accurately measure engine performance in flight.

Today's NAPTC facilities have evolved through two world wars and many eras of development. During this time, the constantly changing requirements of the Navy air weapons systems have always been met. The equipment and specialized experience available at this facility continue to assure the dependability and performance excellence of our manned naval aircraft, and are also available in support of other government departments, agencies, and Department of Defense contractors.

This booklet is a brief description of the facilities, capabilities, and accomplishments of the Naval Air Propulsion Test Center, and how it contributes to our national security and to the advancement of aircraft propulsion systems.

ORGANIZATION

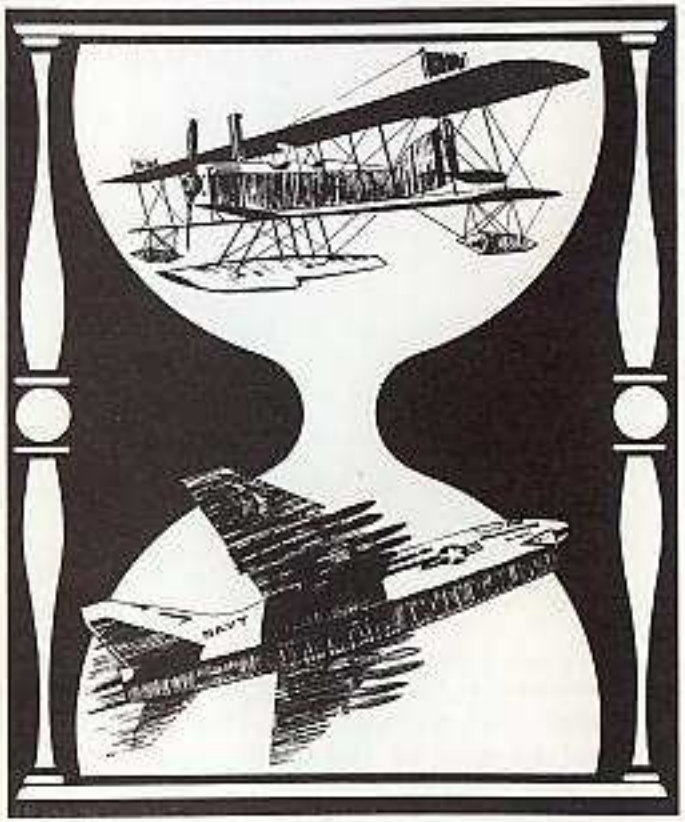


FACILITIES

The Naval Air Propulsion Test Center's combined facilities have a replacement value of over 81 million dollars and are managed, operated, and maintained by a staff of 11 naval officers and over 700 civilians including engineers and skilled technicians.

MISSION

To test and evaluate aircraft propulsion systems and fuels and lubricants; and to perform applied research and development leading to correction of design deficiencies and service problems.



HISTORY

The Naval Air Propulsion Test Center facilities incorporate some of the finest and most modern test and evaluation apparatus available. More than a half-century of experience in this field has helped to establish the Center as a widely recognized authority concerning the design and performance of aircraft power plants.

1915 Aeronautical Engine Laboratory (AEL) is established at Washington Navy Yard for test and experimentation with aircraft power plants.

1924 AEL moves to Philadelphia and becomes a part of the Naval Aircraft Factory.

1941 AEL opens new laboratory. Naval Aircraft Factory becomes Naval Air Material Center in 1943, and Naval Air Engineering Center in 1962.

1946 Trenton, New Jersey, is chosen as the site for the Navy's new aircraft gas turbine test laboratory.

1955 Testing begins at the new Naval Air Turbine Test Station, NATTS, Trenton.

1967 Naval Air Propulsion Test Center is formed by the merger of AEL and NATTS.

AERONAUTICAL ENGINE DEPARTMENT

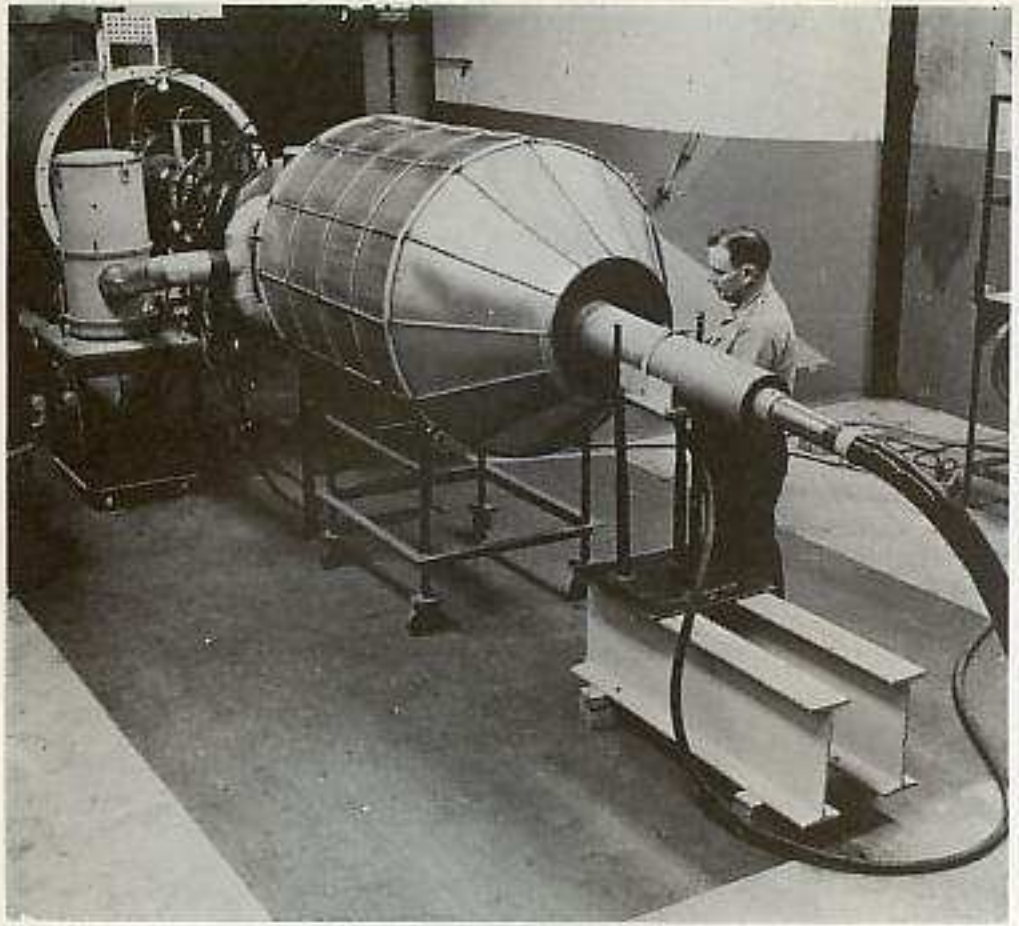
Philadelphia

The AED conducts research, development, test and evaluation of turboprop and turboshaft engines, aircraft engine accessories, and fuels and lubricants. Plant facilities are capable of simulating the severe environmental conditions which Navy aircraft encounter in actual service.

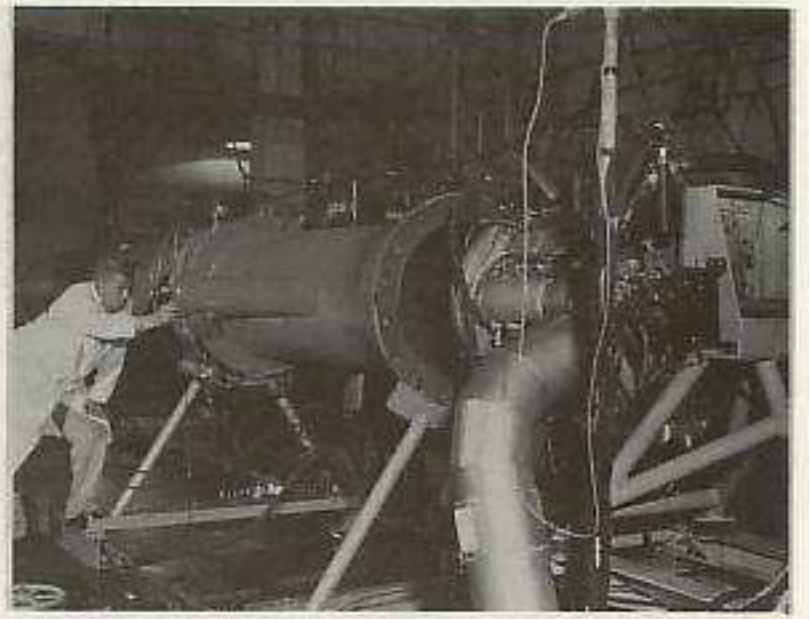
Aircraft propulsion systems and components are subjected to extreme temperature, altitude, salt air, icing and sand and dust environments to determine deficiencies in their operational performance. Applied research, development and engineering work is then performed to improve or correct these deficiencies.

Unique facilities are available at AED to conduct laboratory experiments and research on special items, such as rotor disks, inflight refueling nozzles, fuel filters and detectors for fuel contaminated with solids or water, and advanced fuels and lubricants.

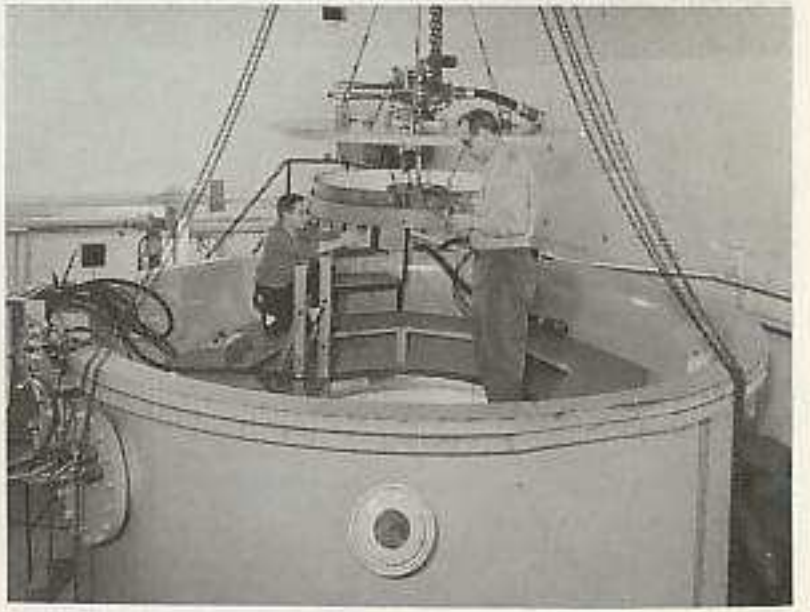
Results of research and experimental work are incorporated into specifications used to procure and evaluate the performance of aircraft systems, their components and accessories and fuels and lubricants.



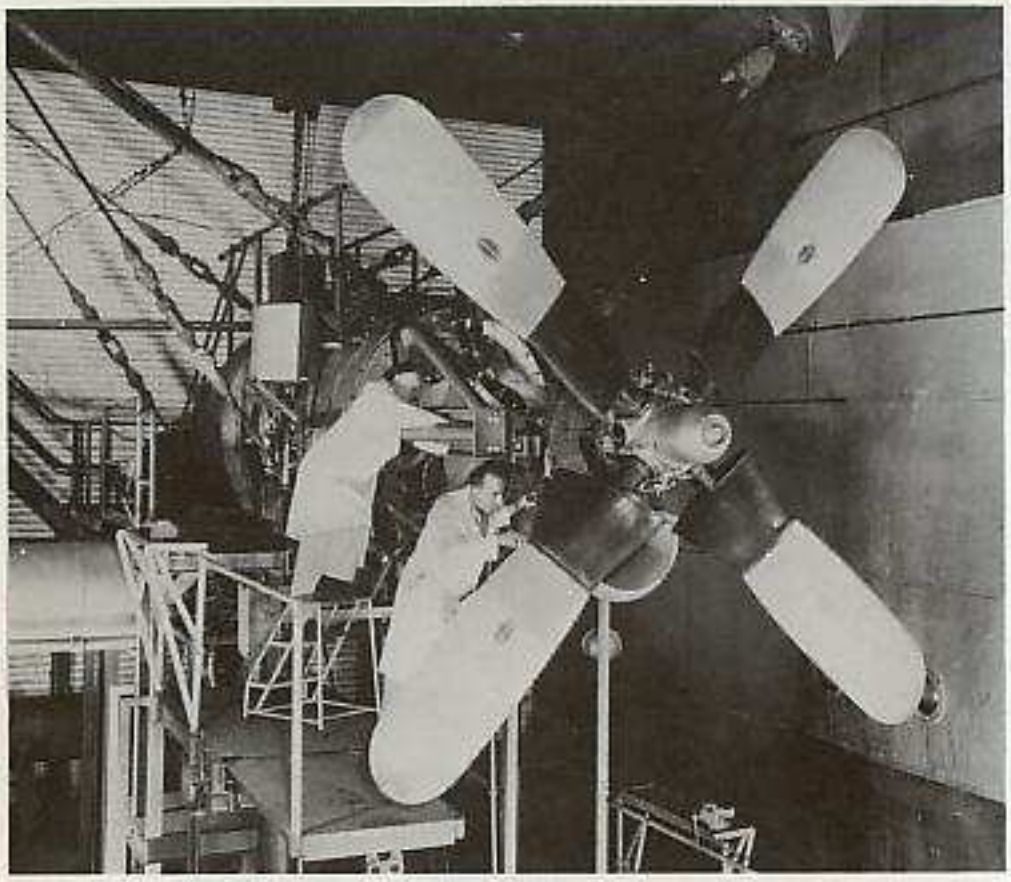
Engines and inlet separators are evaluated in a sand & dust environment.



Engines are evaluated under simulated hazardous icing conditions.

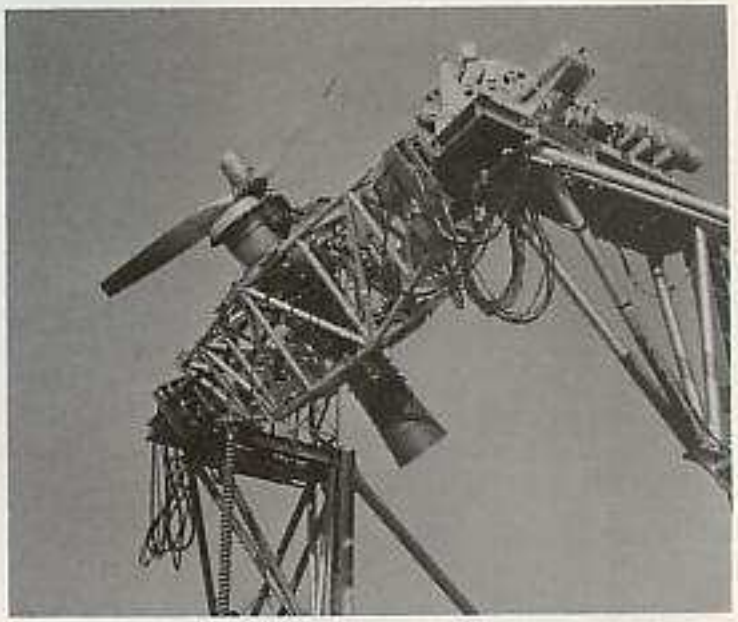


Rotor-disk and blade burst studies are conducted in Free World's largest spin pit facility.

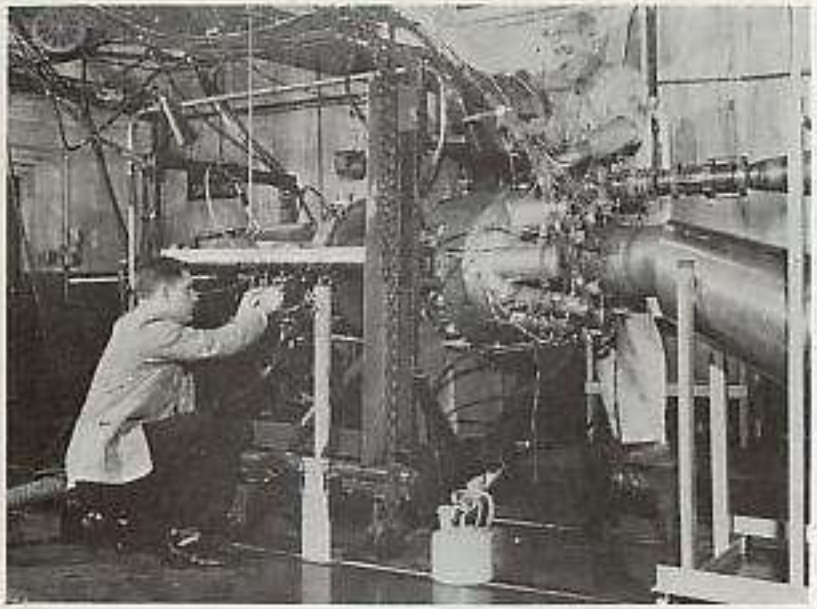


Lubricant qualification procedures at AED include full scale engine tests.

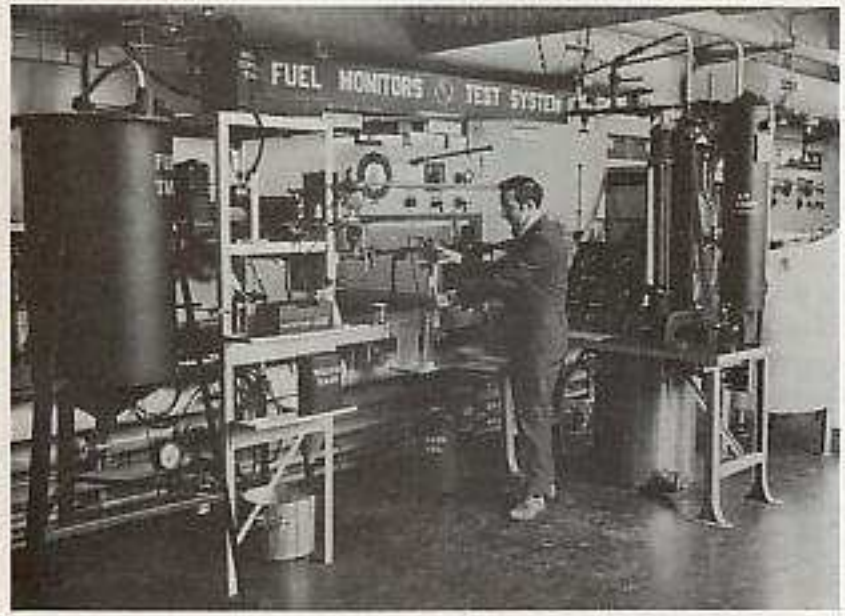
Fuels research is conducted for future supersonic aircraft.



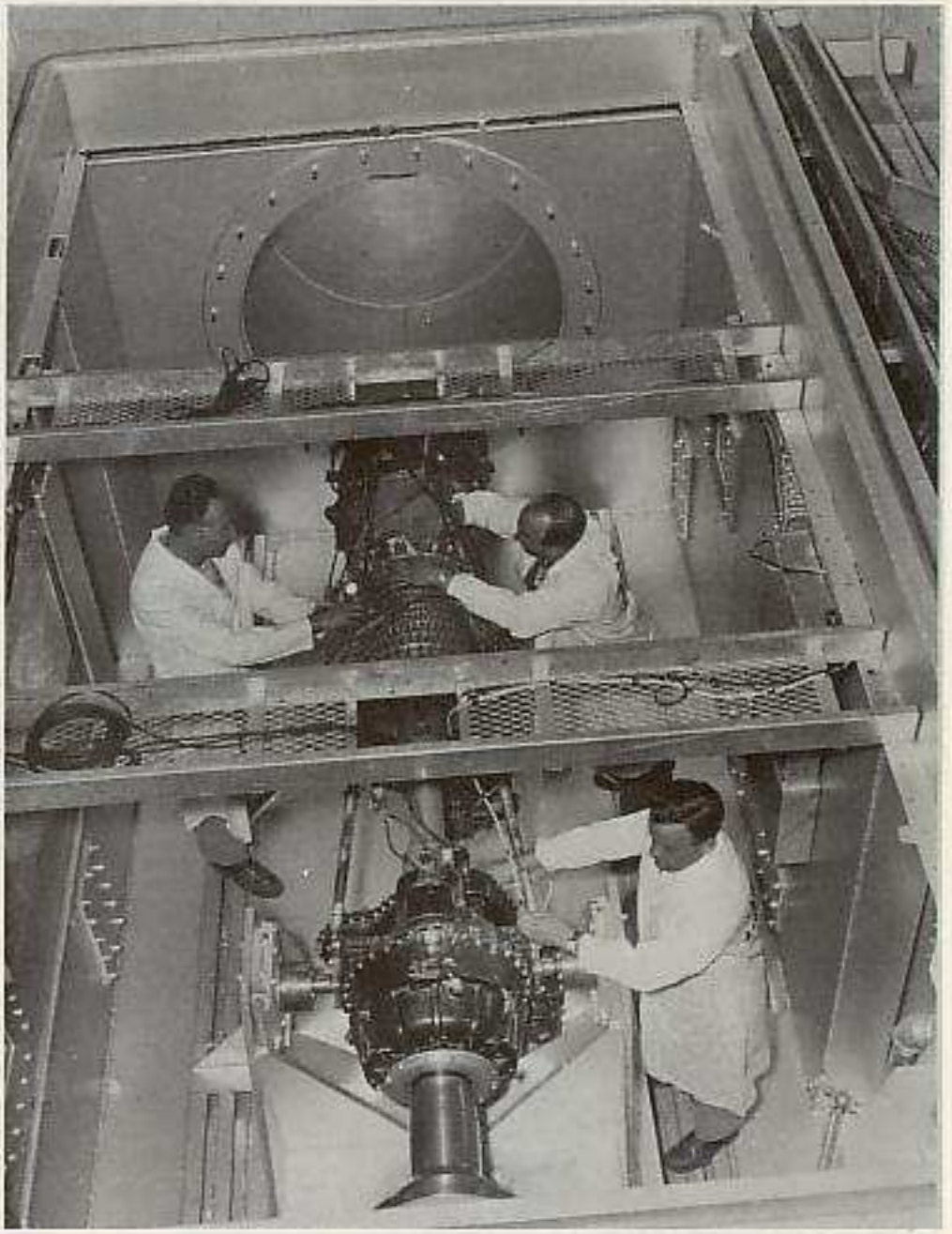
Engines are operated and evaluated on the Variable Attitude Stand.



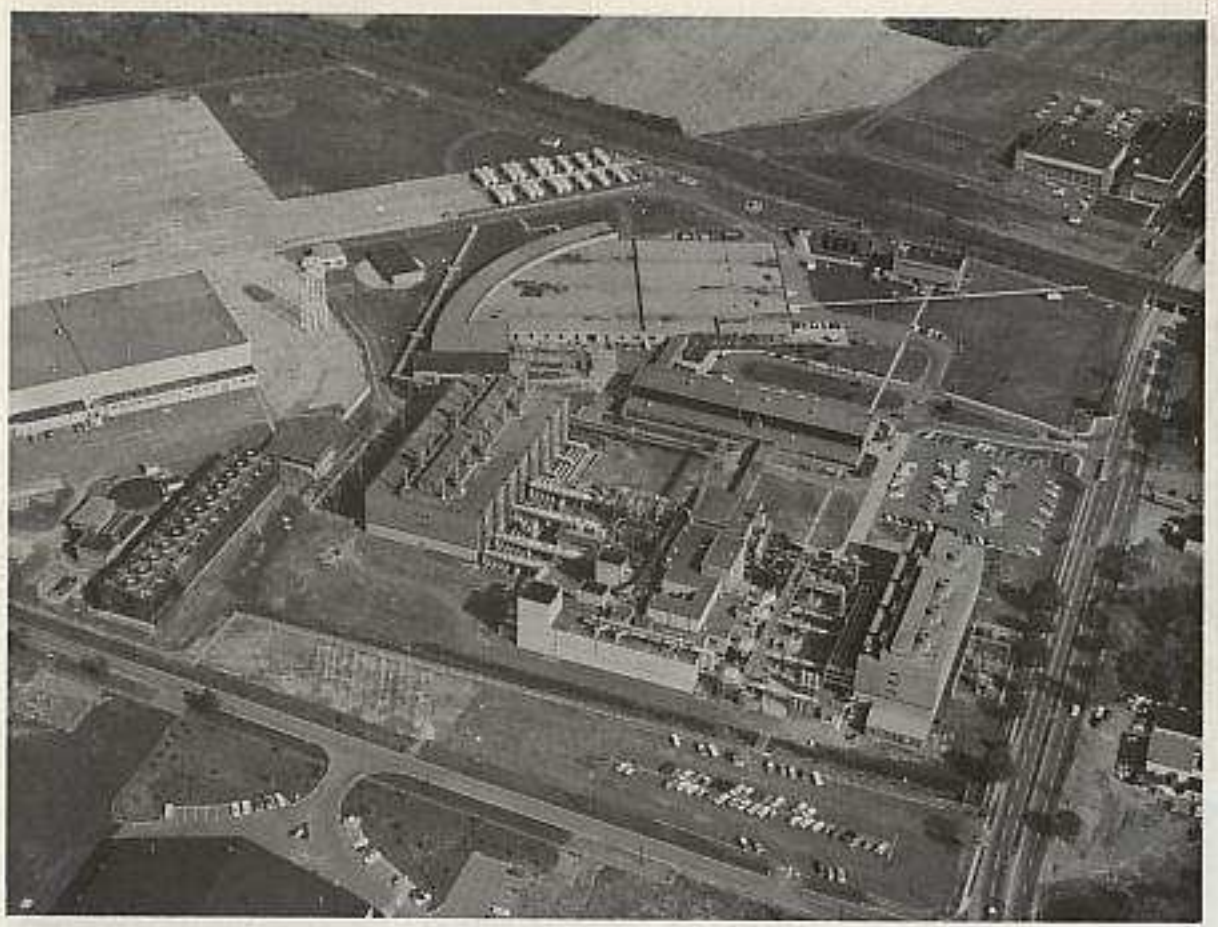
Auxiliary power units, ground support equipment and accessories are evaluated under extreme environmental conditions.



Fuel cleanliness system components are evaluated with a contaminated fuel supply.



Engines installed in environmental chamber undergo extreme temperature and simulated altitude tests.



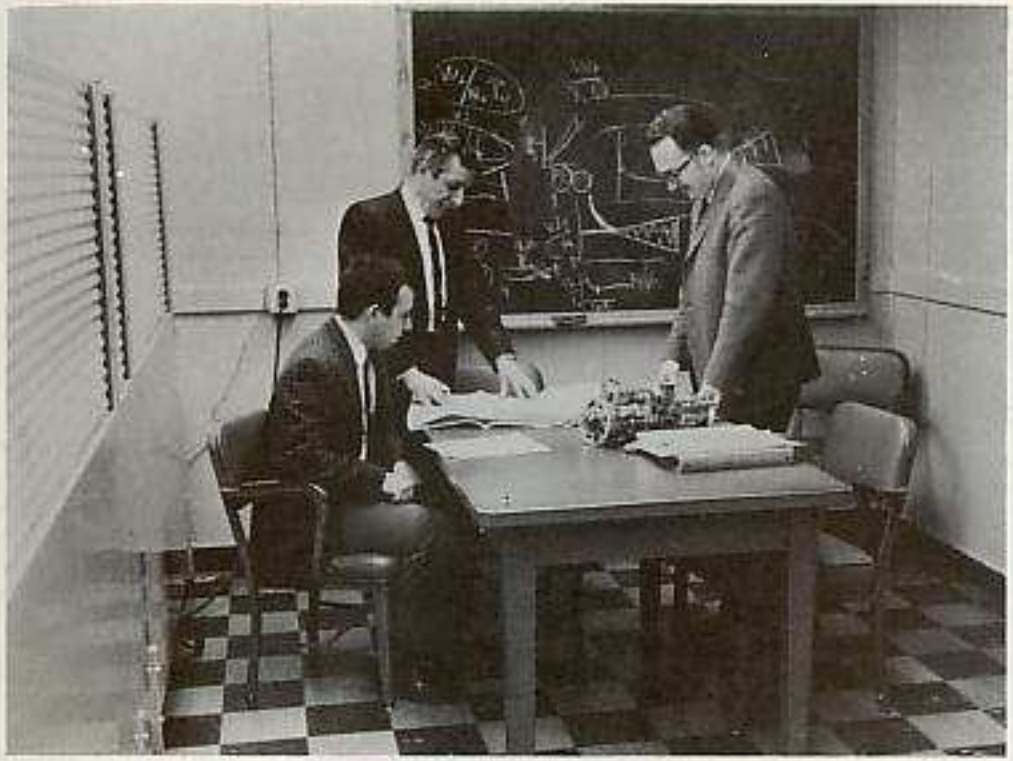
AERONAUTICAL TURBINE DEPARTMENT

Trenton

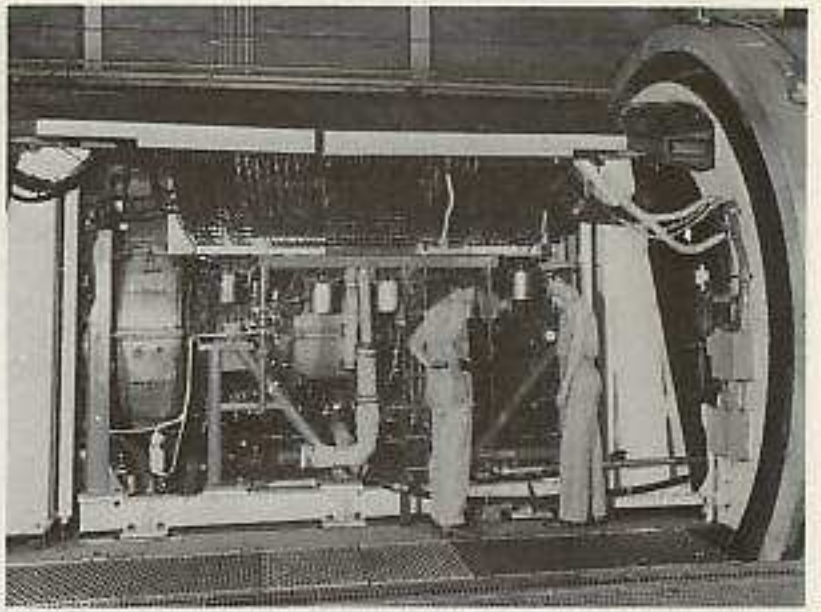
The primary mission of the ATD is the testing and evaluation of large development/production turbojet and turbofan engines. ATD has facilities capable of providing flight regime simulation over a wide range of Mach numbers and altitudes. Engine steady state and transient testing can be conducted in areas such as water ingestion, icing, missile exhaust gas ingestion, and inlet distortion.

The ATD has evaluated the engines for the Navy's A-4, A-6, A-7, and F-4 aircraft. Test and evaluation efforts will continue for all advanced engines programmed for use by the Navy to insure proper performance and operational suitability of these engines.

Other areas of prime interest to the aircraft industry and to other military departments include ATD's studies and reports on the state-of-the-art for compressors, turbines, infrared suppression, thrust augmentation systems, and engine monitoring instrumentation.

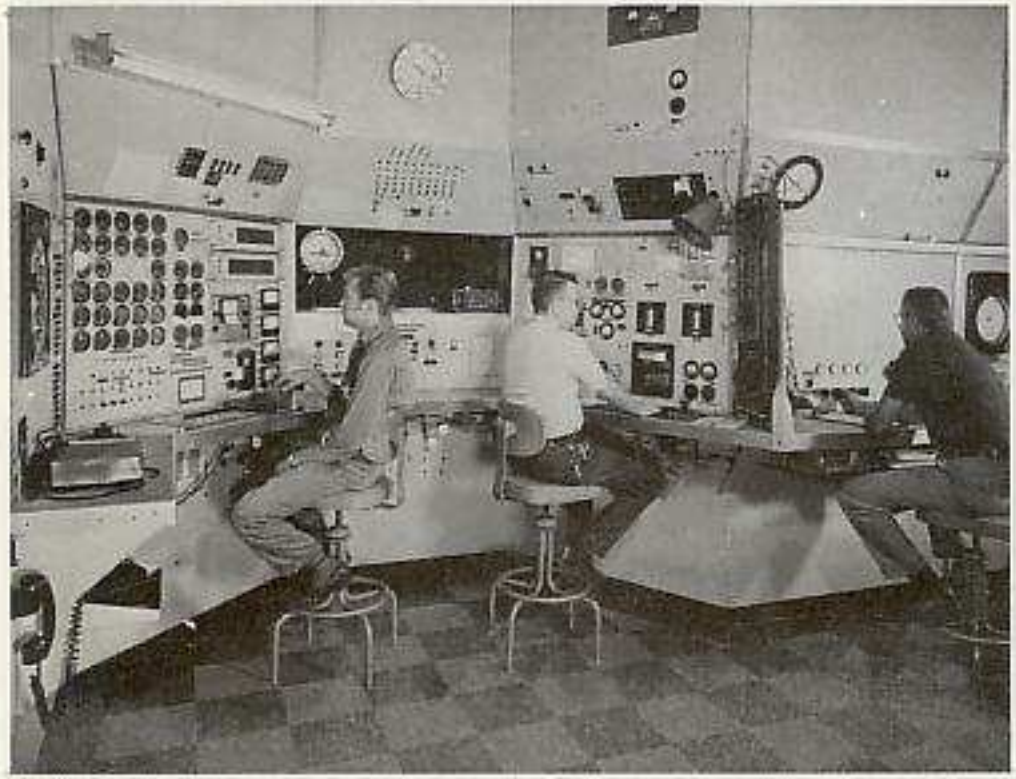


Extensive detailed project engineering is required prior to and during tests.



ATD's high altitude test cells can accommodate the Navy's largest jet engines.

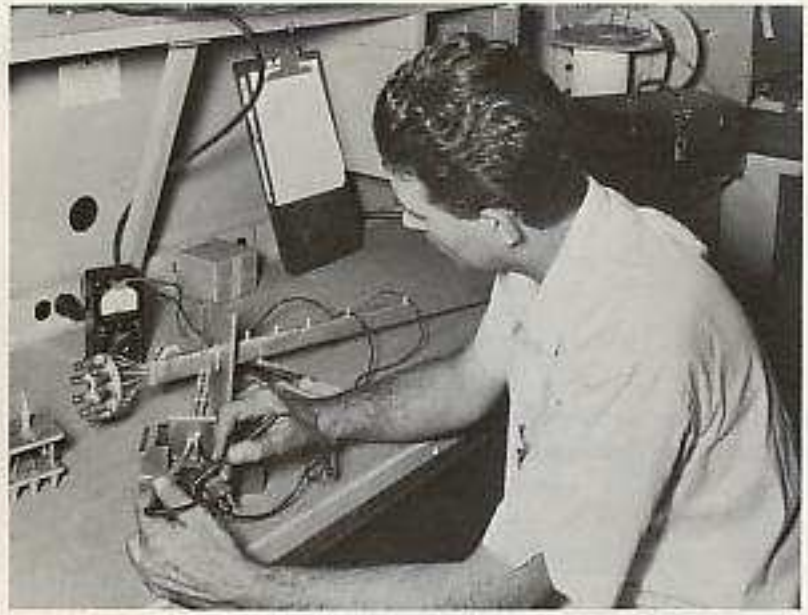
Standardized test cell instrumentation hookups simplify engine installations.



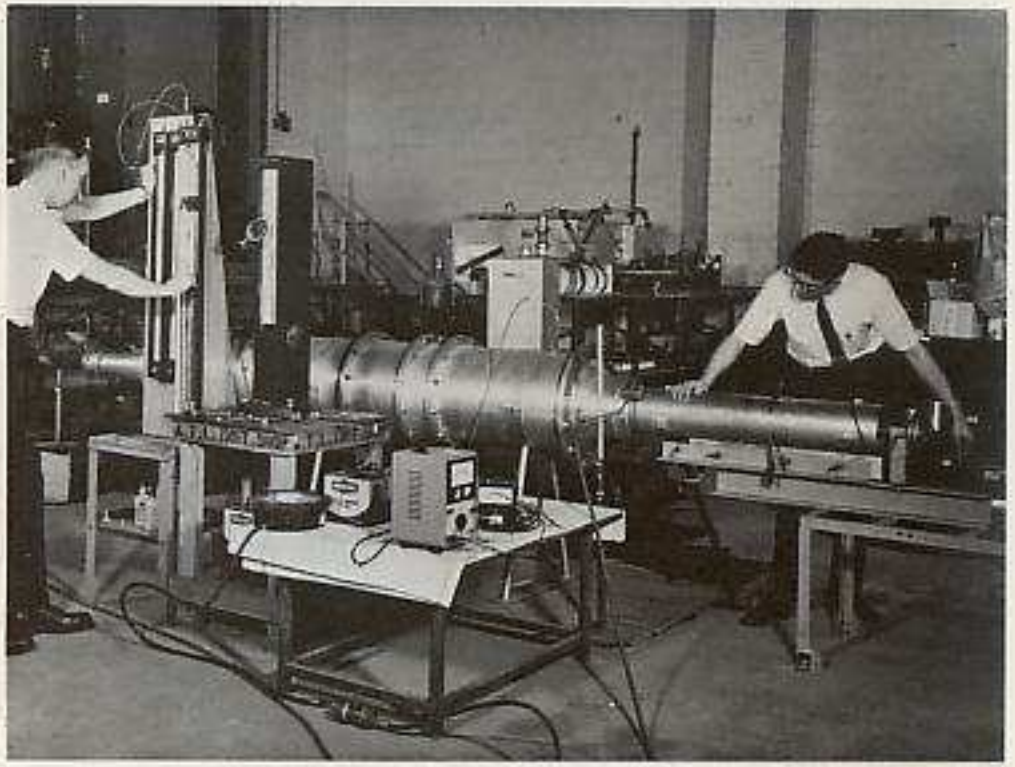
The test cell control rooms contain complete instrumentation to monitor all phases of engine performance.

Modern, high-speed data acquisition equipment support the test facilities.

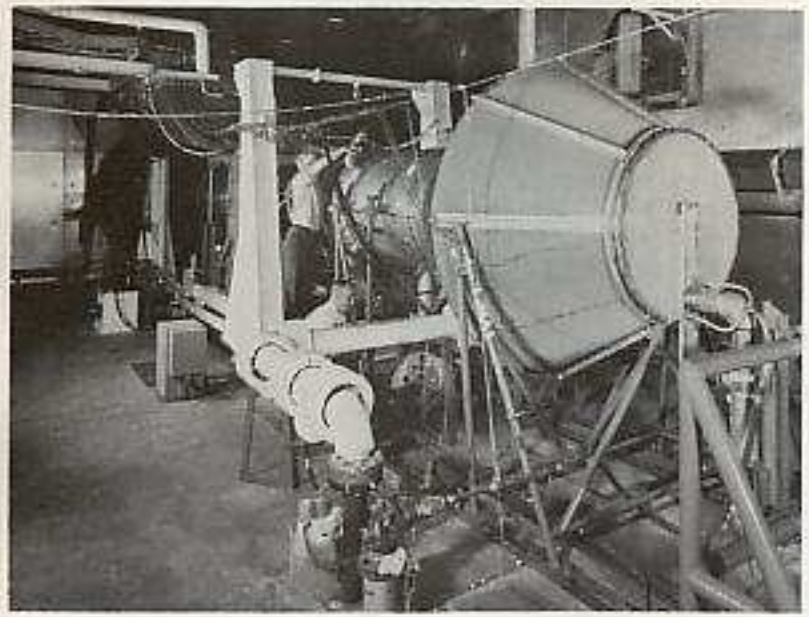
Accurate, responsive, transient recording equipment is an essential test engineering tool.



Highly specialized instrumentation components are fabricated in ATD shops.



Independent Exploratory Development projects are encouraged.



Steam ingestion tests are an integral part of turbofan engine testing.

SIGNIFICANT ACCOMPLISHMENTS

Performed the first full-scale reciprocating engine calibration under simulated altitude conditions and developed test procedures and methods of presenting data subsequently used throughout the aircraft industry.

Performed the first simulated altitude test in the U.S. on a turbojet engine.

Performed environmental and special tests on all Navy gas turbine engines.

Developed specification for lubricating oil now used in U.S. gas turbine aircraft engines.

Developed water and fuel contamination detectors used in service throughout the world to detect free water and solid contamination in aircraft fuel.

Performed a controlled test and study of a commercial jet engine fire under simulated flight conditions.

Performed the first test of the effects of ingestion of missile exhaust type products on the performance of a turbojet engine.

for additional information contact:

CIVILIAN PERSONNEL DEPARTMENT,

NAVAL AIR PROPULSION TEST CENTER,

TRENTON, NEW JERSEY 08628

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