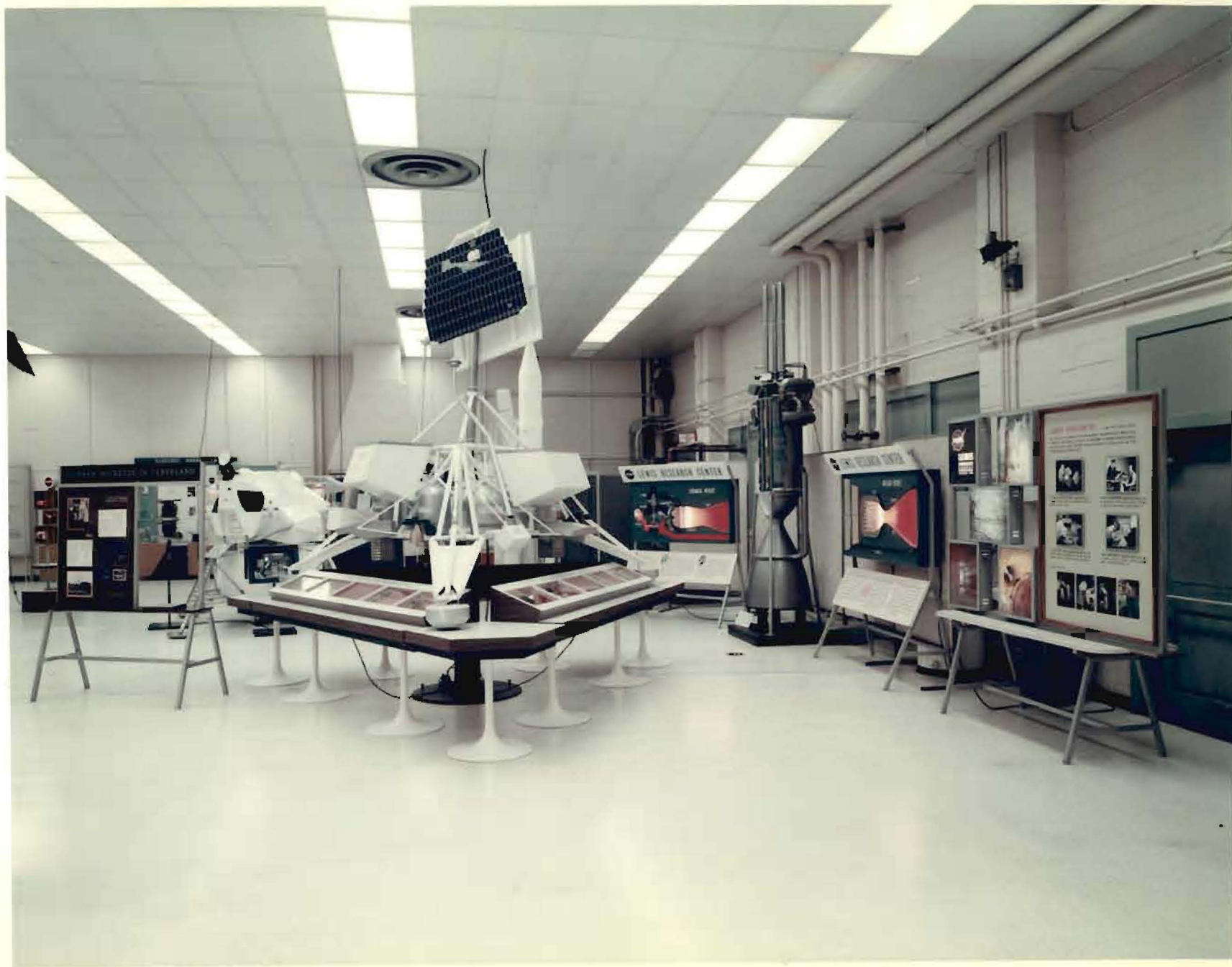




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C-70-2252











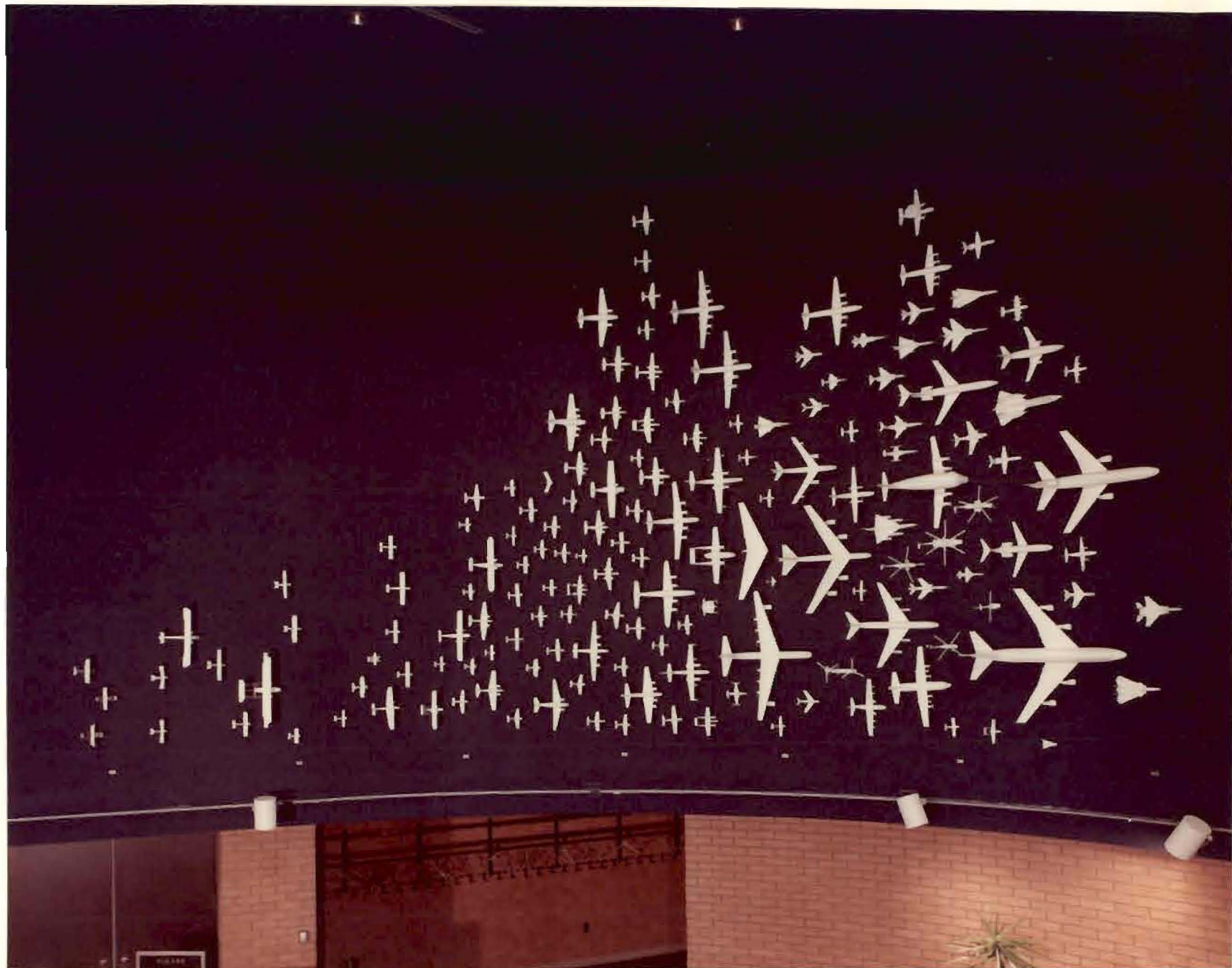




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C-70-2254













NASA

C-75-1984

















WHAT AVIATION MEANS TO YOU



AVIATION PROVIDES

favorable balance of trade



AVIATION PROVIDES

transportation





AND FLIGHT RESEARCH

FLIGHT TEST



ENERGY EFFICIENT AIRCRAFT

KEEPING
AMERICA'S
LEADERSHIP
THROUGH
ADVANCES IN

50%
FUEL SAVINGS

THrust



light composite structures



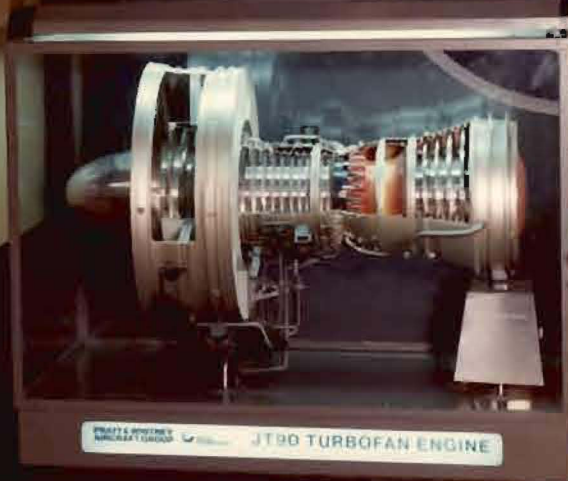
aerodynamics

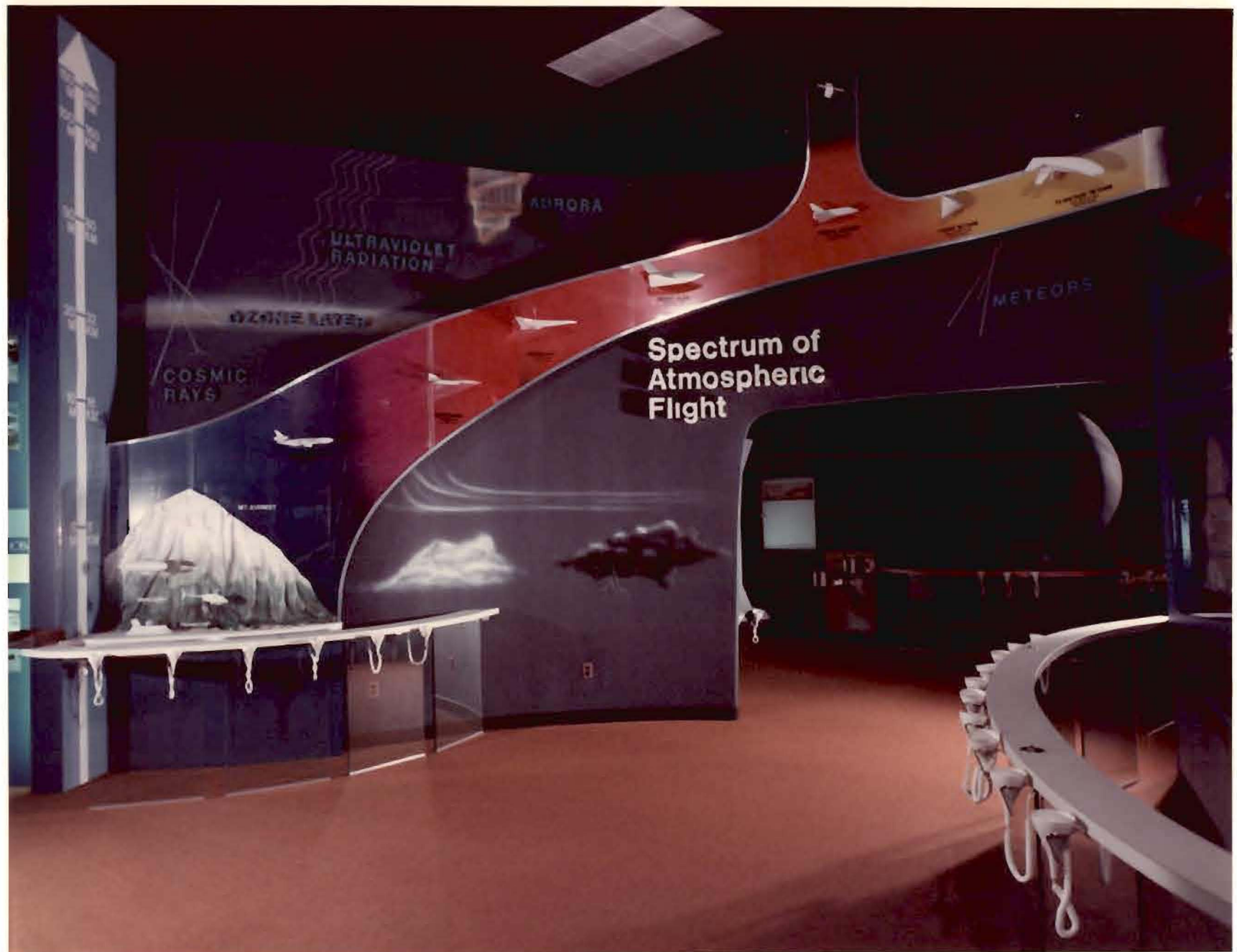


computer assisted active control surfaces



AIR TRANSPORTATION





Energy Conversion Alternatives Study

A DEPARTMENT OF ENERGY-SPONSORED
STUDY MANAGED BY THE LEWIS
RESEARCH CENTER TO RECOMMEND
THE MOST EFFICIENT CONVERSION
OF COAL INTO ELECTRICITY.



COAL FIELDS OF THE UNITED STATES



ENERGY RESOURCES - IDENTIFIED
FUELS IN THE UNITED STATES
REFERENCE: U.S. COAL SURVEY
(1964)

1.3% NATURAL GAS

4.7% PETROLEUM

COAL

PERCENTAGE OF IDENTIFIED RESOURCES



COAL



COAL

COAL



COAL

Conventional Steam Power Plant

EFFICIENCY - 33%
COAL IS BURNED IN A BOILER
TO MAKE STEAM
TO TURN A TURBINE
TO GENERATE ELECTRICITY.



Wind Energy

DEPARTMENT OF ENERGY

NASA JOINT PROJECT



Illustration of a traditional windmill.



Illustration of a lattice tower windmill.



Illustration of a modern three-bladed wind turbine.



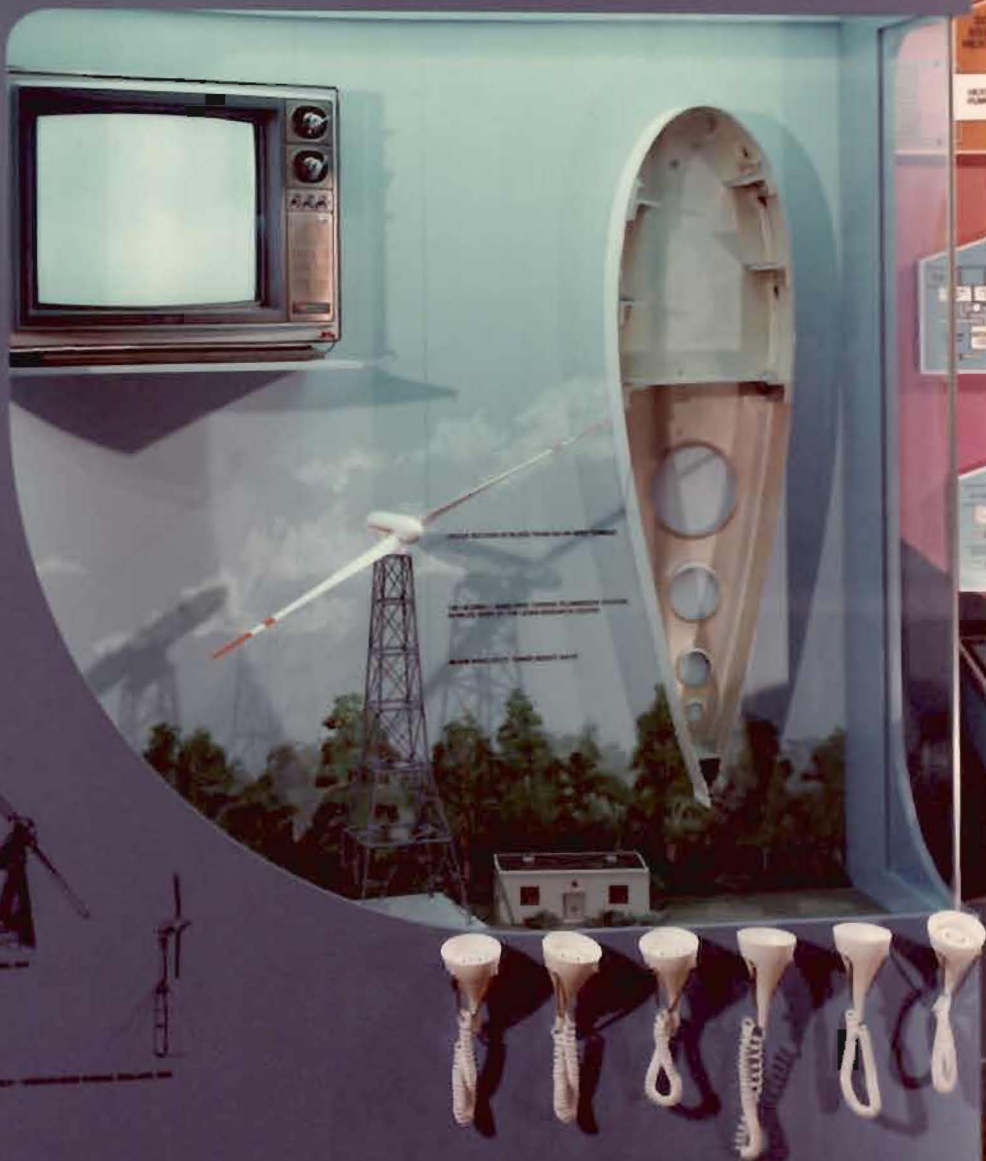
Illustration of a wind turbine with a large circular nacelle.



Illustration of a wind turbine with a large circular nacelle and a lattice tower.



Illustration of a small wind turbine.



Solar Energy

Heating & Cooling of Buildings

DEPARTMENT OF ENERGY -
NASA JOINT PROJECT

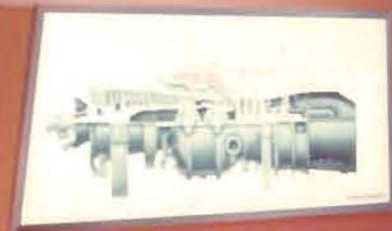


Figure 1. Solar collector and heat exchanger.

Combined Cycle Gas Turbine and Steam

POTENTIAL EFFICIENCY 45 - 50%

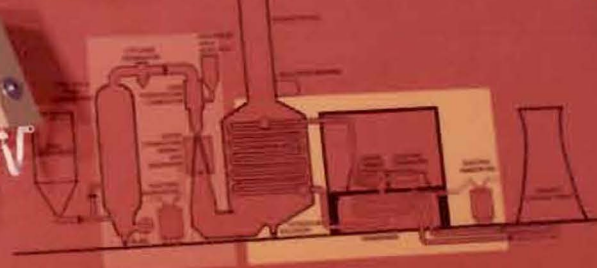
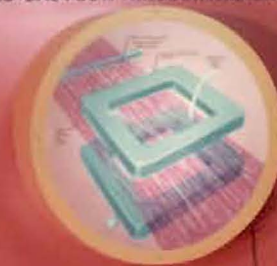
GENERATING ELECTRICITY BY COMBINING GAS TURBINE & STEAM POWER PLANTS.



Combined Cycle MHD and Steam

POTENTIAL EFFICIENCY 50 - 60%

MAGNETO - HYDRO - DYNAMICS, GENERATING ELECTRICITY FROM
HIGH-SPEED GAS FLOW THROUGH A MAGNETIC FIELD.



Fuel Conserving Engines

REDUCED POLLUTION
DEPARTMENT OF

Gas Turbine

THE ERDA-CHRYSLER
AUTOMOTIVE GAS TURBINE



Technological Goals

COMBUSTION

STEADY, UNIFORM TEMPERATURE GAS
PRODUCTION, MINIMUM HEAT LOSS
AND POLLUTION

MATERIALS

HIGH STRENGTH PROPERTIES AT
HIGH TEMPERATURE

HEAT TRANSFER

MAXIMUM RECOVERY AND
UTILIZATION OF HEAT GENERATED

BEARINGS AND SEALS

LUBRICATION OF HOT BEARINGS
AT HIGH ROTATIONAL SPEEDS
SEALING OF LUBRICATING
FLUIDS

POWER TRANSMISSION

VARIABLE SPEED DRIVE FOR A
RANGE OF SPEEDS AND LOADS

Stirling Engine

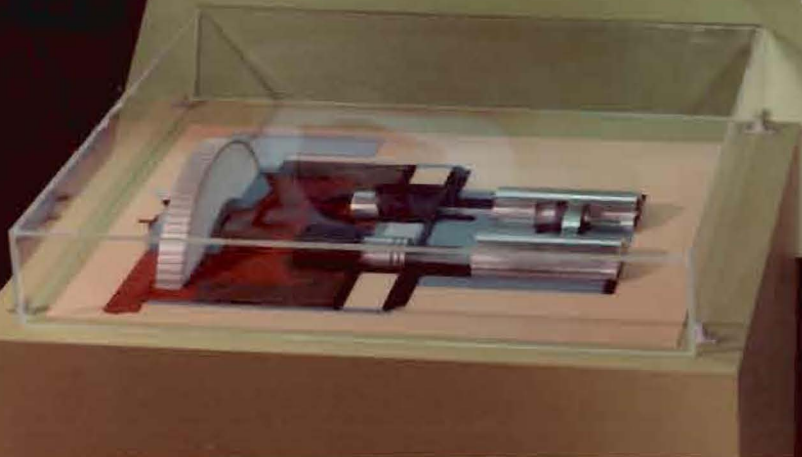
EXTERNAL
COMBUSTION ENGINES
WITH REGENERATING
HIGH COMPRESSION
AND POWER STROKES



REDUCED POLLUTION BENEFIT DEPARTMENT OF ENERGY - NASA JOINT PROJECT

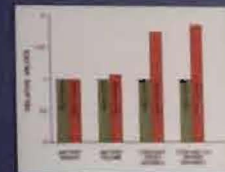
Stirling Engine

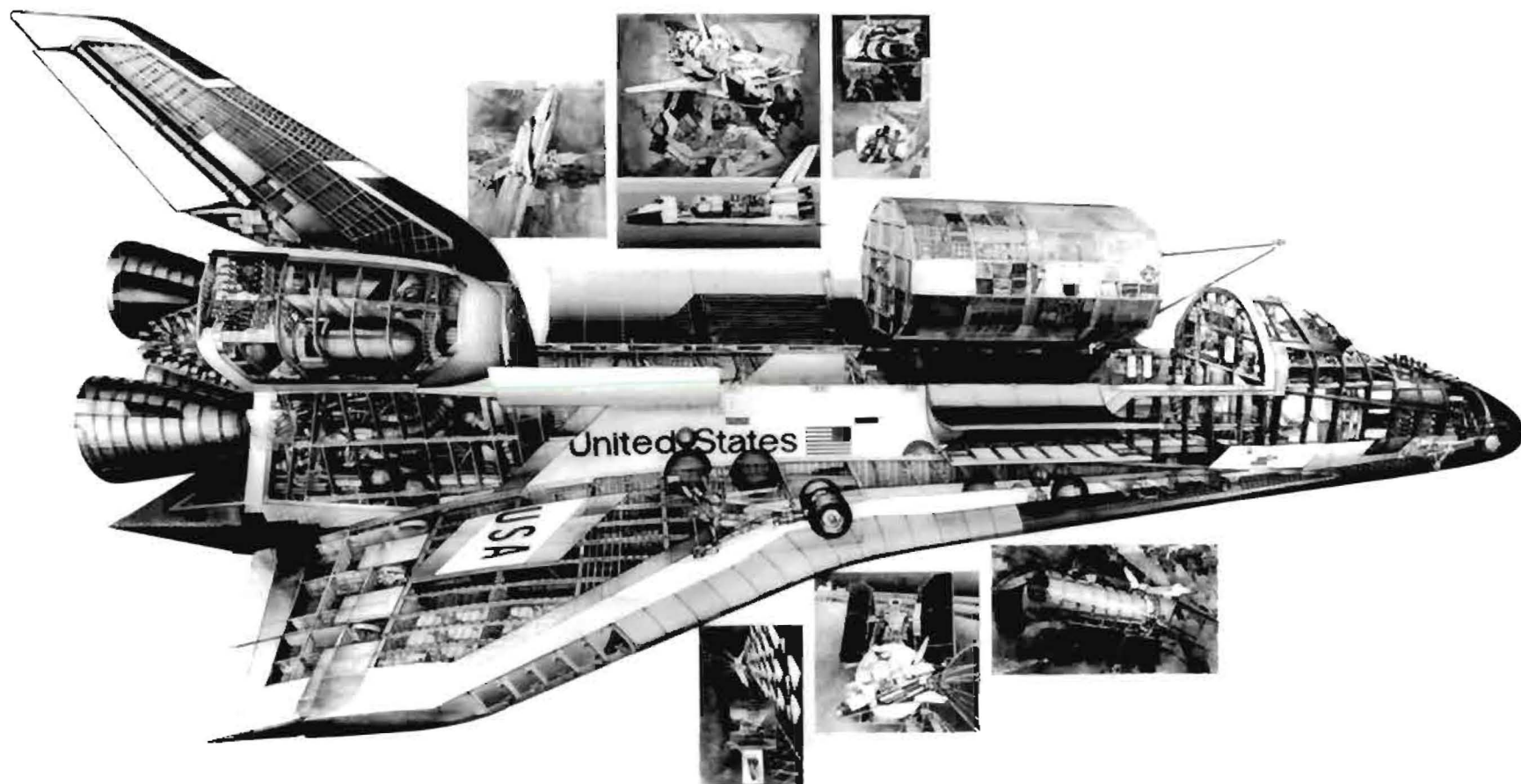
AN EXTERNAL
COMBUSTION ENGINE
WITH SEPARATE PISTONS
FOR COMPRESSION
AND POWER STROKES

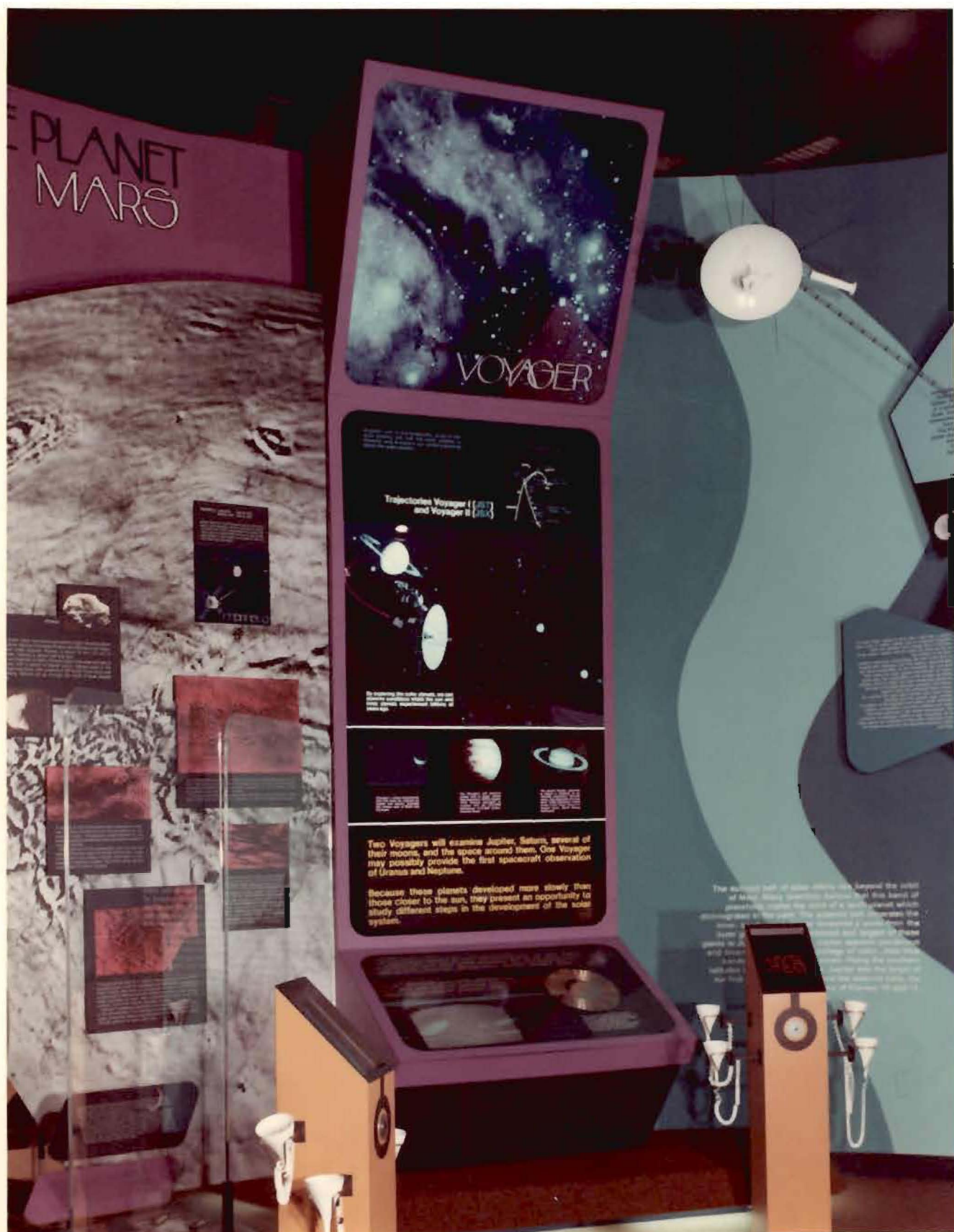


Electric Vehicles

BATTERY TECHNOLOGY
PROPULSION SYSTEM
TECHNOLOGY



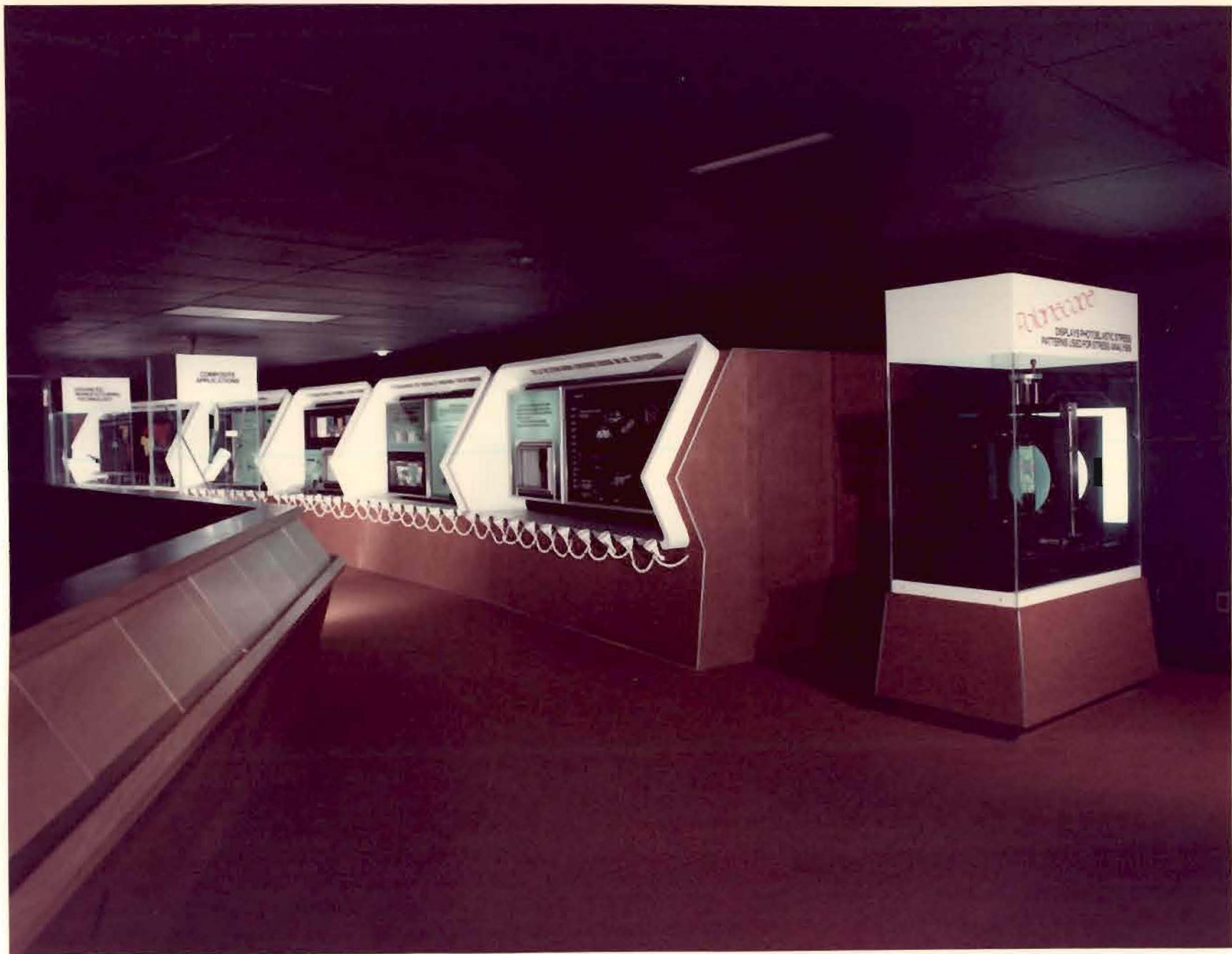


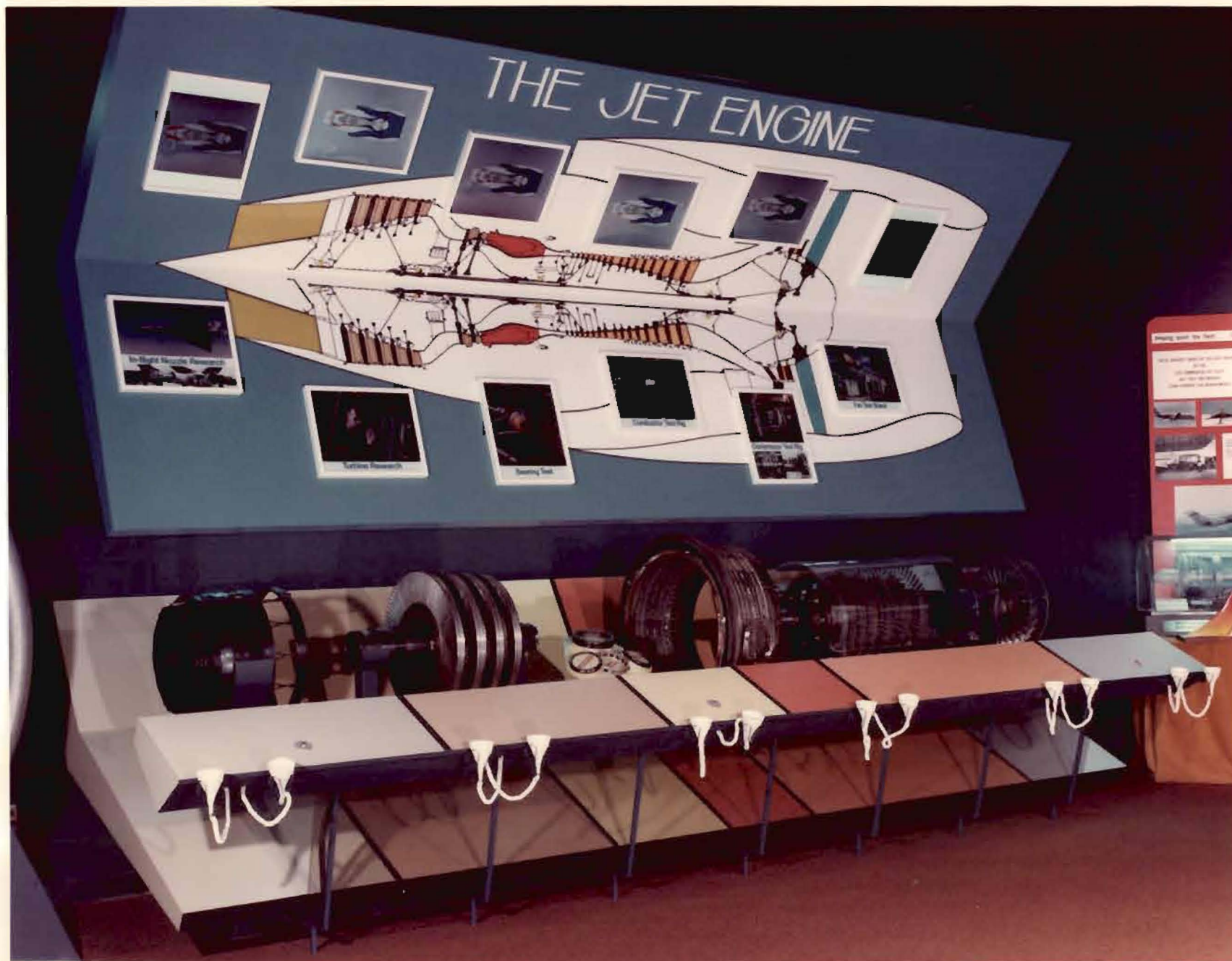














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