NACA LEWIS FLIGHT PROPULSION LABORATORY

WING TIPS

Vol. XVI Cleveland, Ohio, April 10, 1957 No. 8

TRIENNIAL INSPECTION SET FOR OCTOBER

The Triennial Inspection of the Lewis Flight Propulsion Laboratory will be held October 7, 8, 9 and 10th. Identical programs will be given on each of the four days by scientists of the NACA.

Inspections in recent years have been held in the spring but are now being scheduled in the fall. Dr. John F. Victory, Executive Secretary, said the fall timing is believed more convenient for NACA's guests. Invitations will be issued in August to interested persons in the aviation industry, the armed services and other branches of government, and the general public.

NACA LEWIS FLIGHT PROPULSION LABORATORY

WING TIPS

Vol. XVI Cleveland, Ohio, August 14, 1957 No. 17

WILL YOU PLEASE SEND THEM HOME?

This SOS (Send our Silver) has been sent out from the Cafeteria and ERB Room.

"If you have cups, saucers, plates, knives, forks, spoons, water glasses, salt, pepper or sugar shakers belonging to the Cafeteria or ERB Room, please send them back to the Cafeteria, Utilities Building at once."

The Lewis Triennial Inspection will be held in October and the Cafeteria will serve approximately 500 guests and our own employees. Extra china and silverware will be needed - please return all wanderers.

1957 Lewis Inspection
October 7 - 10, 1957

Lewis's Triennial Inspection will be held during the week of October 7-11. During the first four days, about 2000 invited representatives of the aircraft and allied industries, the military services, and scientific institutions will be briefed on the broad trends in flight propulsion research.

On Friday, October 11, Lewis employees will have the opportunity to view the inspection program, and on Sunday, the 13th, Lewis families will have the same opportunity.

The next issue of WING TIPS will cover inspection activities in detail. The following is an outline of the program to be repeated daily.

Introductory remarks at Auditorium: E. J. Manganiello

Participants at Stops

1. High-Energy Aircraft Fuels - at High Energy Fuels Lab. No. 2, Cell 1.

Introduction & Conclusions:	Paul C. Setze or James F. Morris
Body of Text:	Eugene E. Dangle or Leonard K. Tower
Demonstration Assistant:	Harrison Allen or Robert E. Jones
Script by: James F. Morris	Preparations by: Harrison Allen

2. High-Energy Rocket Propellants - at High Energy Propellants Research Facility.

Introduction:	John W. Gibb or Donald C. Guentert
Body of Text:	Adelbert O. Tischler or Harry E. Neumann
Facility Description & tour:	Edward R. Rothenberg or Frank J. Kutina
Demonstration Operator:	Harold W. Schmidt or David A. Bittker
Demonstration Assistant:	Richard DeWitt
Script by: Robert W. Graham;	Preparations by: Harold W. Schmidt

3. Aircraft Noise Reduction - at Flight Hangar.

Talk by: Newell D. Sanders, Edmund E. Callaghan, or Warren J. North
Script by: Newell D. Sanders
Preparations by: E. E. Callaghan and W. J. North

4. Propulsion Research for Hypersonic Flight - at Propulsion Systems Lab. Shop Bldg., 2nd Floor.

Part I: Martin J. Saari or Harold E. Bloomer
Part II: Carl B. Wentworth or Lionel L. Baldwin
Part III: Milan J. Krasnican or Charles E. Shepard
Script by: M. J. Krasnican, W. A. Fleming, M. J. Saari, and C. B. Wentworth
Preparations by: W. A. Fleming and M. J. Saari

1957 Lewis Inspection
October 7 - 10, 1957
Schedule of Stops (continued)

5. High-Temperature Materials - at Materials & Stresses Bldg., Room 4.

Talks by: P. T. Chiarito, P. A. Clarkin, M. H. Hirschberg, R. J. Schafer, and C. A. Stearns.
Script by: S. S. Manson, G. M. Ault, and George Deutsch.
Preparations by: Floyd B. Garrett.

6. Aircraft Nuclear Propulsion - at Materials & Stresses Bldg., Cyclotron.

Part I: Warren H. Lowdermilk, Paul G. Johnson, A. Lietzke
Part II: J. W. Blue, Michael Hacskaylo, R. L. McCollum
Demonstration Assistants: Sam Barile, Charles C. Giamati, M. Hacskaylo.
Cyclotron Tour; Jack Aron
Script by: F. Rom, P. Johnson, J. Blue, W. Lowdermilk
Preparations by: Paul D. Dugan

7. Research Newsreel - at 8-x6-ft. Supersonic Tunnel, Observation Room.

Photography by: Arthur L. Laufman and Richard E. Loomis
Narration by; Professional Talent
Directed by; Willson H. Hunter; Production by: G. Merritt Preston
Script by; Robert O. Hickel, Roger W. Luidens, Edmond E. Bisson, Garrett, Dryer, John Jack, Buller, Baughman.

8. High Mach Number Turbojet - at 10- x 10-ft. Supersonic Tunnel Obs. Room.

Part I: James F. Connors or Leonard H. Obery
Part II: Leonard E. Stitt or David N. Bowditch
Script by: DeMarquis D. Wyatt; Preparations by: Roger W. Weining.

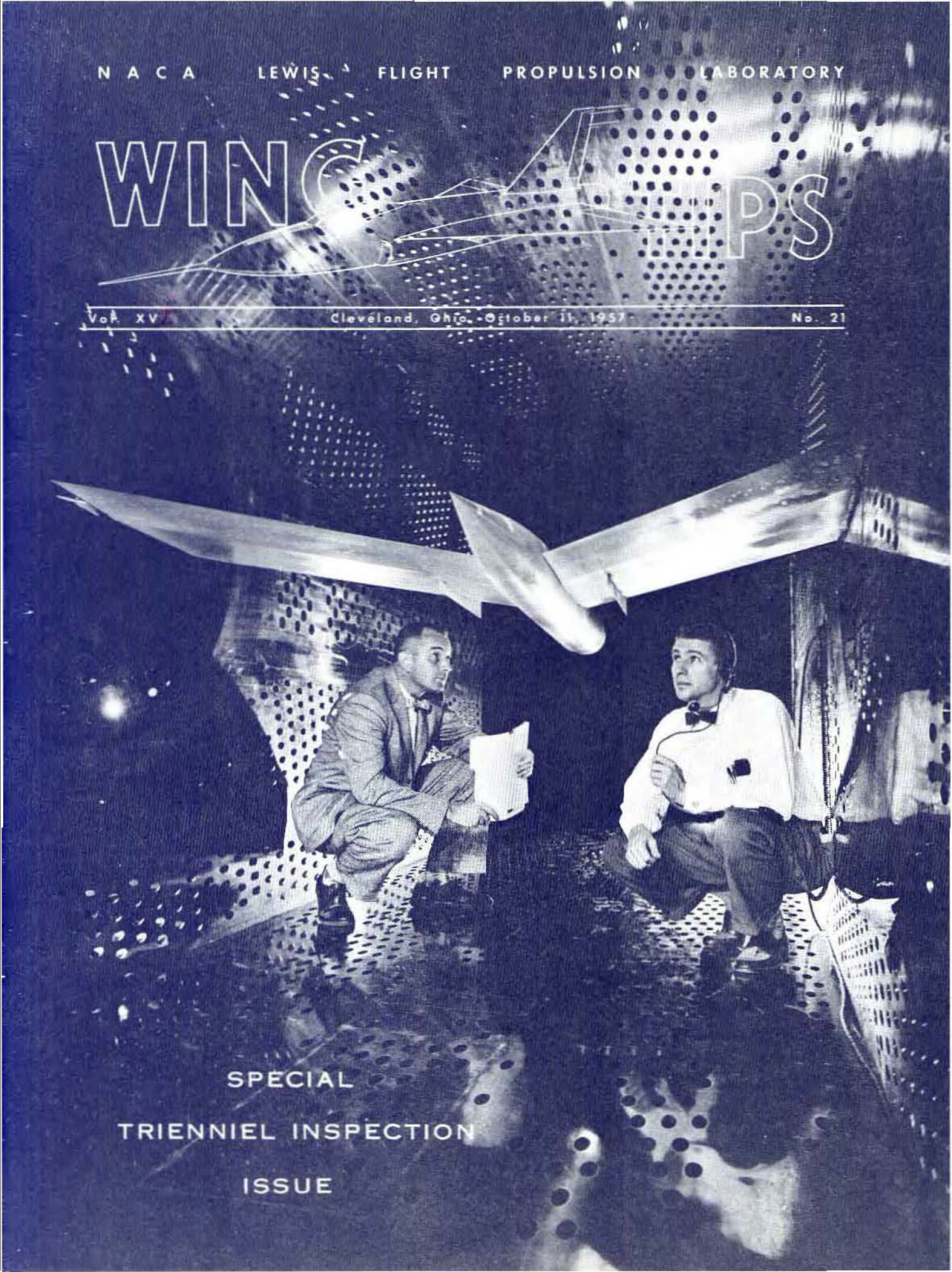
9. Lewis 10- x 10-ft. Supersonic Tunnel - at 10 x 10 Control Rm. Damper Rm, Shop, Test Section, Flex. Wall, 200.

Tunnel: J. Calvin Lovell, Duane A. Rohde, Samuel M. Perrone, and Norman T. Musial.
Room 200: George Moshos or Robert Miller.
Script by: J. Calvin Lovell; Preparations by: Frank Van Hoff.

N A C A LEWIS FLIGHT PROPULSION LABORATORY

WINGTIPS

Vol. XV Cleveland, Ohio, October 11, 1957 No. 21



SPECIAL TRIENNIEL INSPECTION ISSUE

WING TIPS, an official publication of the Lewis Flight Propulsion Laboratory, National Advisory Committee for Aeronautics, Cleveland 11, Ohio, is published bi-weekly in the interest of Lewis employees. Send contributions to the Editor, 258 ERB, telephone 3284. Deadline: Thursday after pay day.
Editor.....Marjorie Hyre Reporters.....NACA Employees

1957 TRIENNIAL INSPECTION
NACA LEWIS FLIGHT PROPULSION LABORATORY

Annually the NACA invites inspection of the facilities of one of its three major laboratories and presents a brief review of current aeronautical research.

These inspections afford the NACA its best opportunity to report directly to the people. They affirm the need for a fully informed public urgently aware that America must maintain air supremacy for survival. The bits and pieces of research facilities and programs that are shown reveal the foundations on which future air supremacy will be built - first in the research laboratory, then in flight.

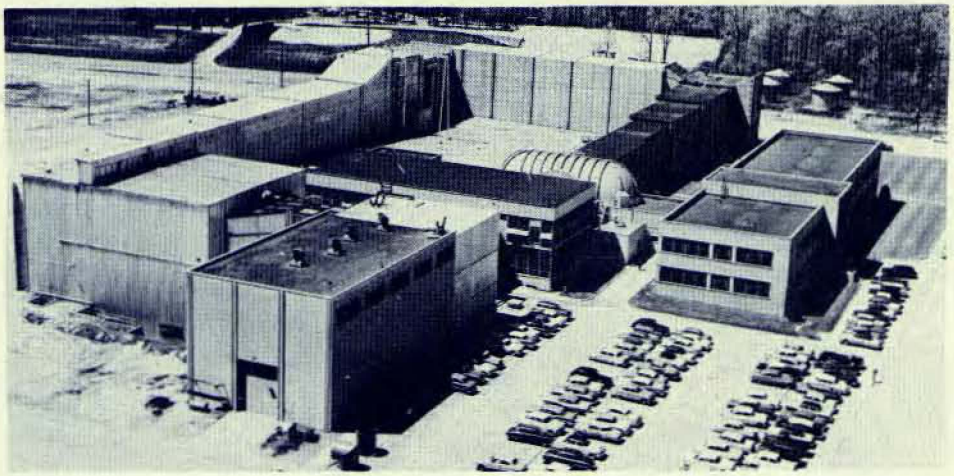
It is fitting that this Inspection is taking place so close to the tenth anniversary of the first supersonic flight in manned aircraft. On October 14, 1947, the rocket-propelled Bell X-1 research airplane was flown faster than sound. In the decade since, both speed and altitude limits of our aircraft have been pushed very far. Today, the demands for greater performance are even more urgent than in 1947.

The following brief descriptions and photographs are but a small part of the Inspection.

SUPERSONIC TURBOJET PROPULSION

During the fifteen years since the turbojet engine was first flown in the United States, significant progress has been made in its development. Its maximum speed capabilities first were predicted at some value below the speed of sound. Then, a Mach number of 1.5 was thought possible; then 2.5. Now a Mach 4 turbojet appears possible.

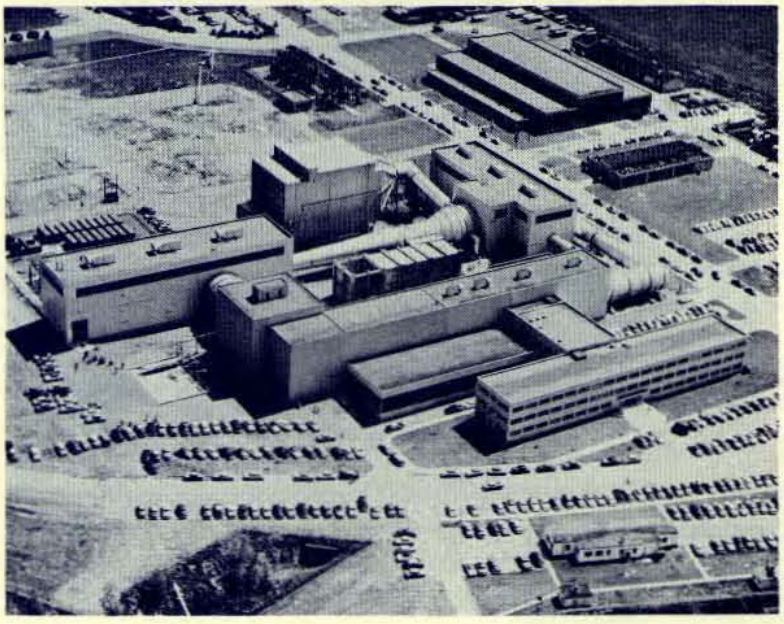
Cover photo: Aeronautical research scientists check a model installed in the test section of the NACA Lewis 8x6-foot Supersonic Wind Tunnel. A recent $2 million modernization program has increased the utility and economy of this engine research facility. The tunnel now produces transonic as well as supersonic air flows in the test section. Research can be conducted either on aerodynamic runs, with the air passing continuously around the tunnel circuit; or on burning engine tests, with the air taken in through the air dryer and exhausted into the atmosphere. Modifications included the boring of 4700 holes in the four sides of the test section, to permit air to "bleed" through the walls. The perforations thus serve to eliminate shocks and pressure disturbances at transonic speeds. Dryed air within the tunnel can be re-used instead of being exhausted directly to the atmosphere.



The erection of a duct which permits reuse of air within the tunnel is the left hand portion of the 8x6 tunnel pictured here. The test section is inside the dome near the center of the photo.

The 10x10-Foot Supersonic Wind Tunnel is operated by NACA in cooperation with industry and the armed forces for development testing of full-scale engines and components for high-performance aircraft.

Research is conducted on aircraft powerplant inlets and outlets, nacelle configurations and shapes, and aerodynamic interference between powerplants and the remainder of the aircraft structure. The year-old tunnel simulates conditions at speeds in a range from 1500 to 2500 mph and altitudes up to 30 miles.

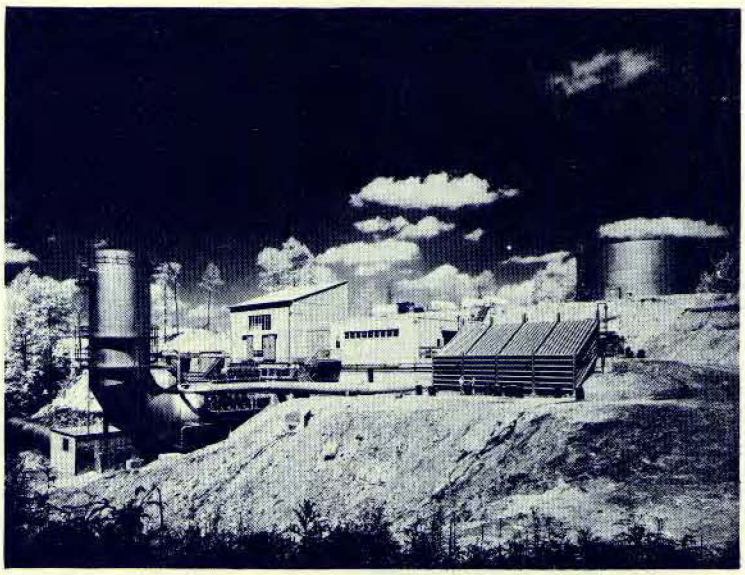


The steel air duct at right leads to the tunnel test section, housed in the long, narrow structure in the center. The building at left and the one at the opposite end of the intervening steel duct house axial flow compressors, which supply the air flow. Seven electric motors totaling 250,000 HP, drive the compressors. Flanking the center ducting are an air dryer (top center) and an acoustic muffler (center). Offices and shops are housed in the building area in the lower part of the photograph.

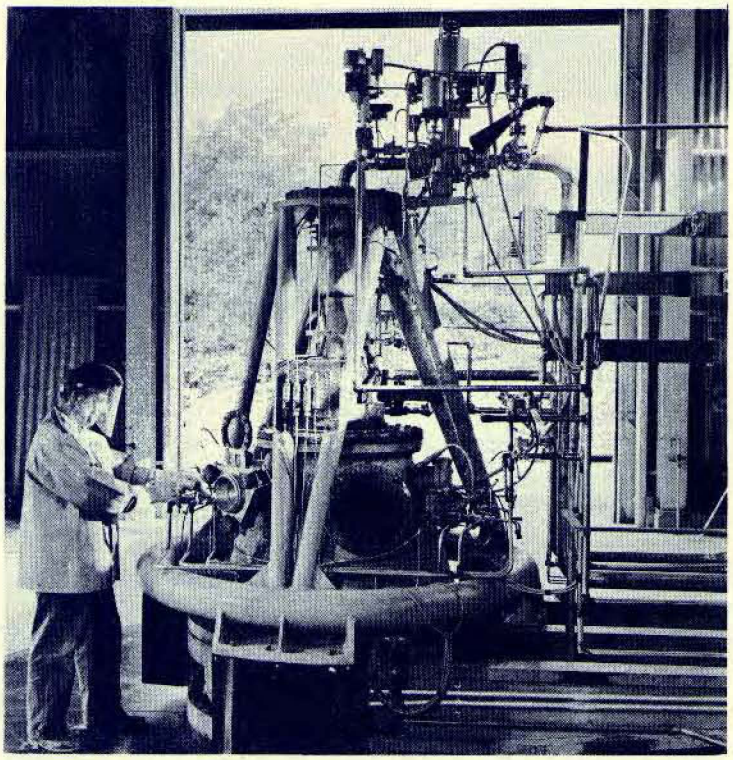
A television camera is focused by technicians on a ramjet engine model through the schlieren optical windows of the 10x10 foot Supersonic Wind Tunnel's test section. Closed-circuit television enables aeronautical research scientists to view the ramjet, used for propelling missiles, while the wind tunnel is operating at speeds from 1500 to 2500 mph.

ROCKET PROPELLANTS

For rocket engines, the heat content or specific impulse of the fuel-oxidant combination is of even greater importance for aircraft or missile range than it is for air-breathing engines. The improvement in rocket performance possible through use of some of the combinations suggested as high-energy propellants is so large that a major portion of the NACA's rocket research effort has been concentrated on this problem.



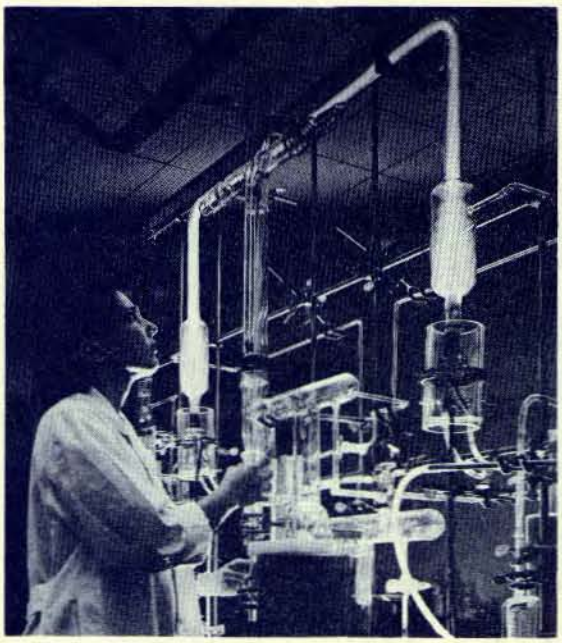
The Rocket Engine Research Facility, completed in August, 1957, is a $2.5-million addition to the aeronautical research equipment available to NACA scientists. Activity here is undertaking to determine, with practical-sized rocket engines, means to utilize new high-energy fuels. This versatile facility permits research and design ideas to be carried through initial investigations with low-cost fuels before using scarce, more expensive fuels. The installation consists of a thrust stand, propellant supply and storage systems, silencing equipment, exhaust gas disposal system, and an operations building which includes an instrument and control room.



A technician adjust the valves on the rocket engine test stand in the new Lewis rocket engine research facility. A research engine is mounted vertically within the tubular frame. The 20,000 pound thrust developed by the rocket, is transmitted through the frame to measuring devices. The rocket jet is directed downward into the treatment duct to which the engine is sealed. Within this duct, or "scrubber," water is sprayed at a rate of 50,000 gallons per minute to remove toxic exhaust products and to silence engine noise.

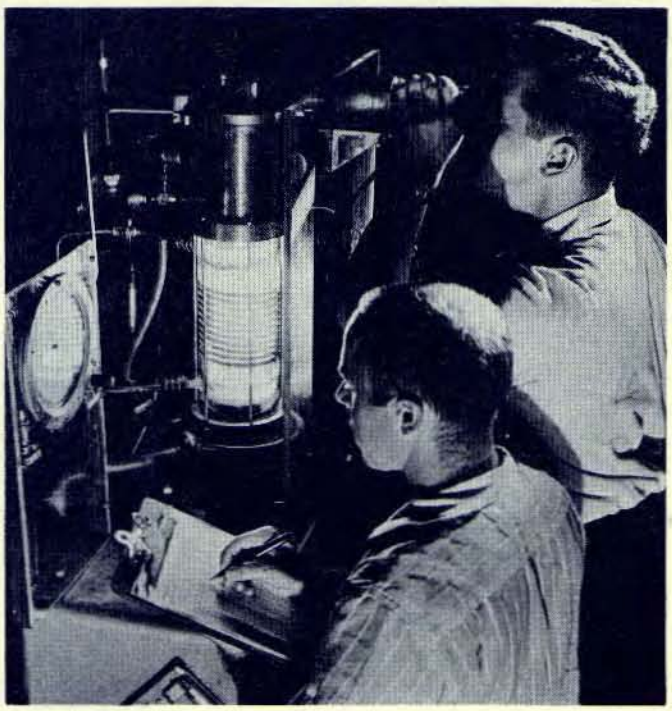
HIGH TEMPERATURE MATERIALS

Advanced materials are required to withstand the very high rates of aerodynamic heating that will be most serious in the nose cones and propulsion systems of advanced aircraft and missiles. Within the next few years it is urgently desired to raise the material temperatures from their present level of about 1650° F in the turbojet engine to over 2000° F and from about 2500° to 3100° F in the ramjet. For the nuclear rocket, material temperatures as high as 5000° F are being considered.



An NACA aeronautical research scientist compares materials under a barrage of atoms to determine which are most resistant to atomic attack and more useful in missile and rocket manufacture. Atoms are produced by passing a gas at low pressures through a high voltage discharge. Fast vacuum pumps make the atoms hit a material test sample. Conditions in this laboratory experiment are similar to those experienced by a missile flying through the upper atmosphere encountering large numbers of chemically active free atoms formed by dissociation of the atmosphere's gas molecules.

An induction furnace is operated as part of a continuing study of the properties of materials suitable for use in design of nuclear powerplants, and in the nose sections of hypersonic missiles that encounter extremely high temperatures in flight through the atmosphere. In applying nuclear energy to aircraft, the high temperature problem is intensified--bringing with it a host of new and difficult problems due to the radiation released by nuclear fission. The induction furnace is capable of reaching 5000°F temperatures.



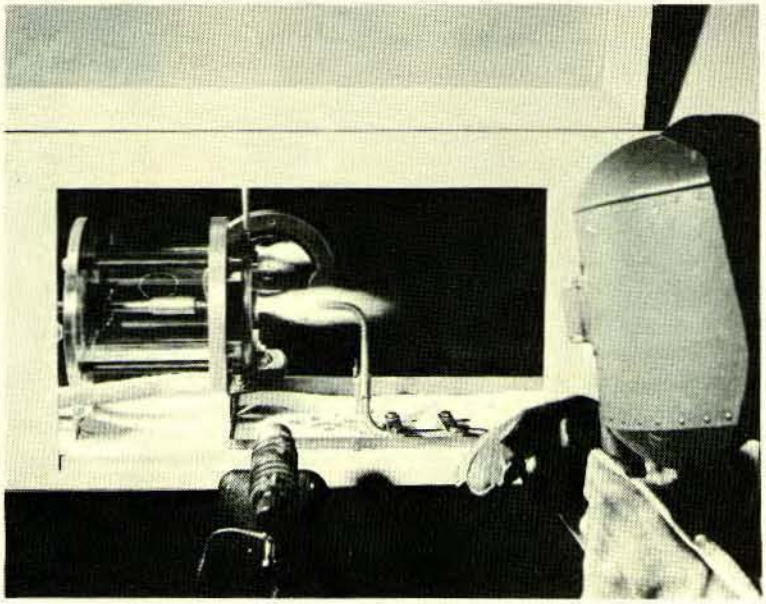
PROPULSION RESEARCH FOR HYPERSONIC FLIGHT

Hypersonic flight speeds are generally assumed to be more than a Mach number of 5, or 3300 miles per hour. The only air-breathing engines that might now be considered for the lower end of this speed range is the ramjet. Lacking both compressor and turbine, and utilizing booster arrangements for takeoff and climb, this engine type is inherently simple in its design and working principles.

The main problems requiring solution before the ramjet or any alternate propulsion system will be satisfactory for hypersonic flight are those of high temperature. For example, at Mach 5 air temperatures reach values of about 2000° F on the engine surfaces; at Mach 7 the air temperatures are about 4000° F. Extensive cooling can be accomplished with minimum losses, however, if fuel can be used as the coolant in the same manner as in the liquid-fuel rocket engine. Much research now is directed towards evaluating various methods.

A miniature laboratory ion-propulsion model, operating at near vacuum conditions, produces thrust which is detected by the small wheel behind the jet. An ion jet is produced when charged particles are formed in an electric discharge between two electrodes, and are accelerated by a magnetic field. An ion-propulsion unit serving as a low thrust engine may be useful in flight at extreme altitudes. However, many problems must be solved before it will be practical.

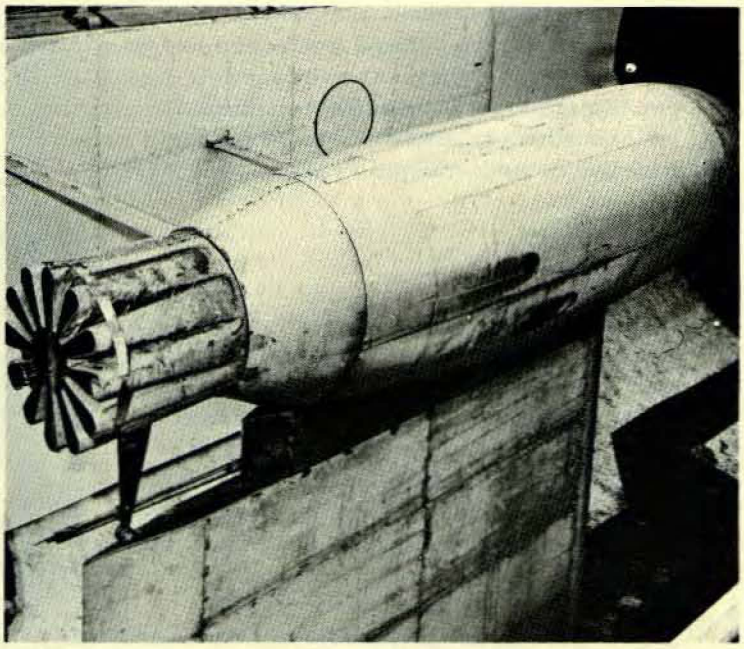
A plasma jet of ionized air, hotter than the surface of the sun, disintegrates a small aircraft model. This laboratory device is useful in the study of aerodynamic heating problems. The jet is produced in an arc chamber by arcing a high electric current between a tungston cathode rod and a graphite anode nozzle. By injecting a working fluid and passing it through the nozzle, the high temperature jet is formed.



AIRCRAFT NOISE REDUCTION

Within the next year or so, jet airliners will be put into operation in the United States. Because turbojet engines today are substantially noisier than piston engines, commercial use of the jet transports may result in difficulties unless ways are found to reduce the noise produced by their engines. Everyone concerned with air transport is anxious that all practical measures be taken to minimize this problem, and the NACA has been participating in this work.

An experimental turbojet noise suppressor nozzle is mounted on an engine in the Altitude Wind Tunnel during investigations of means for reducing jet aircraft noise. Jet exhaust and the air do not mix smoothly; hot gas and air roll up into irregular swirls and eddies producing fluctuating pressures which are radiated as sound waves. Research has been conducted on various nozzle shapes, some of which will lessen the noise substantially by reducing the peak sound levels at certain frequencies. Difficulties are encountered in the design of such nozzles, to keep drag, weight, and engine performance penalties at a minimum while at the same time accomplishing the desired noise reduction.



A tape recorder mounted in the nose of an F-94 Starfire gathers data on the character of aerodynamic sound at high speed and altitude. The study is part of the Lewis Laboratory program of research into the high-speed aircraft noise problem. With this apparatus, boundary layer sound is recorded from a flush-mounted condenser microphone and from a signal obtained by using a hot-wire technique. The position of the hot-wire probe relative to the surface is controlled from the cockpit and recorded on tape. A series of boundary layer pressures are recorded as an aid in evaluating the data.

AIRCRAFT NUCLEAR PROPULSION

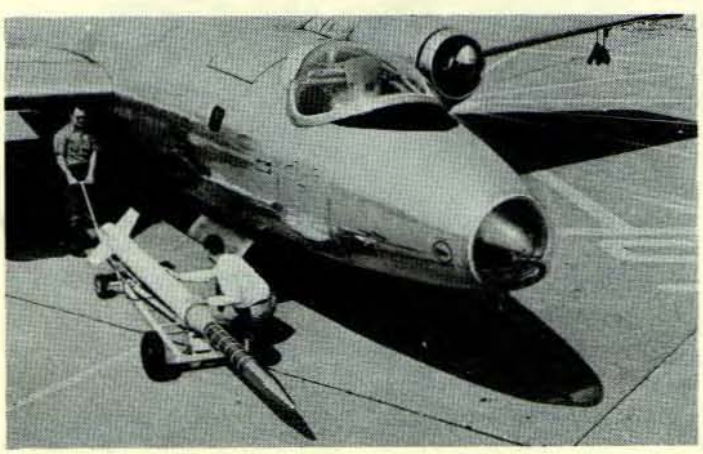
Two characteristics make nuclear energy attractive for flight propulsion. They are the tremendous energies available per pound of fuel and the very high temperatures that can theoretically be obtained from nuclear fission. Several disadvantages accompany these desirable characteristics. First, shielding must be provided to protect the crew from radiation. Since the shielding is made in part from heavy elements such as lead, considerable weight is involved. Second, radiation has an adverse effect on many of the materials used in an airplane. The presence of a strong radiation field often will induce additional radioactivity in areas far removed from the reactor. This factor further complicates the shielding problem.

Theoretically, there are a number of ways to harness nuclear energy. All depend on the transfer of the heat produced in a reactor to a working fluid, which in turn is expanded through a nozzle to produce thrust. In air-breathing engines, such as the turbojet and ramjet, air is the working fluid or medium. In rockets, the working fluid is carried in tanks in the vehicle.

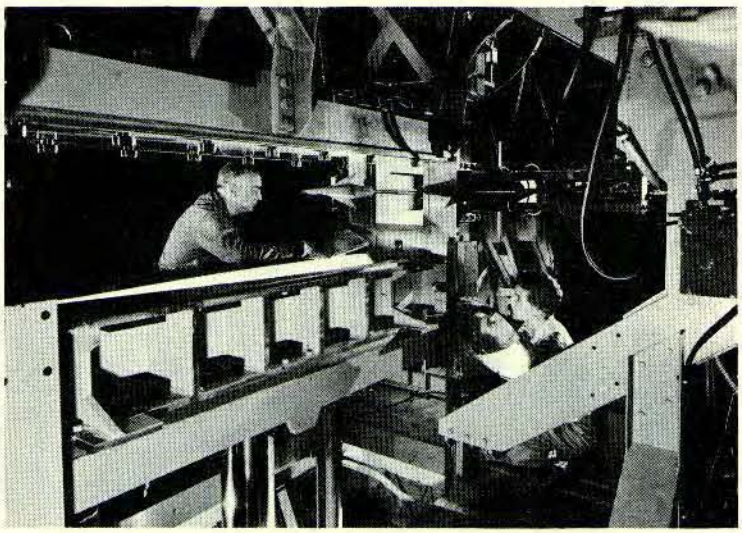
A cloud chamber is used by Lewis scientists to obtain information aimed at minimizing undesirable effects of radiation on nuclear-powered aircraft components. Here, alpha particles from a polonium source emit in a flower-like pattern at the cloud chamber's center. The particles are made visible by means of alcohol vapor diffusing from an area at room temperature to an area at minus-78° Centigrade.

RESEARCH NEWSREEL

The Research Newsreel brings to you the action of a crash fire, the block tunnel in operation, the launching of a high-speed missile and other fields of NACA research which would be difficult to present as well as can be done through the eye of the camera.



A two-stage hypersonic rocket is prepared for flight test by launching from a B-57A bomber in the propulsion research program of the Lewis Laboratory. NACA pilots fly these research models to altitudes as high as 50,000 feet. This 15-foot, 440-lb. rocket is carried by the airplane above 45,000 feet, then launched with its nose headed slightly downward. Top velocity at the end of burnout of the second stage is Mach No. 10.5 (about 7000 miles an hour) at 40,000 feet.



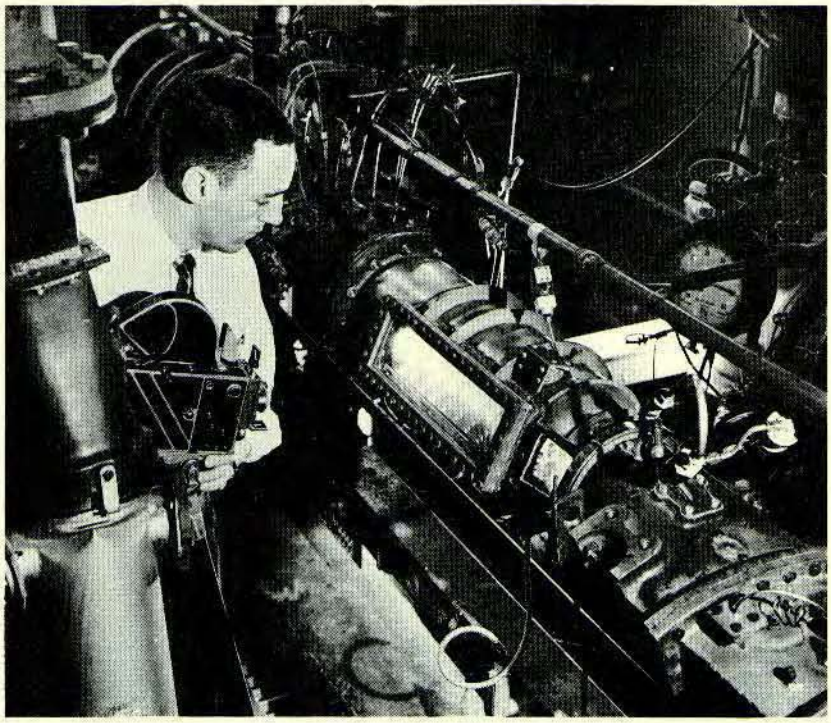
A small supersonic wind tunnel at Lewis is prepared for operation at speeds up to three-and-a-half times the speed of sound. Prior to tests in the tunnel, the nozzle block, located below the technician at left, is hydraulically raised into position. The mirrors at right are part of the schlieren optical system which will make shock waves visible within the tunnel. The tunnel is used in preliminary studies of aircraft and engine configurations.

HIGH-ENERGY AIRCRAFT FUELS

Petroleum fuels burned in jet aircraft are relatively cheap, plentiful, and safe. The energy content of these hydrocarbon compounds is however limited to about 18,500 Btu per pound. This figure is too low to satisfy the maximum range requirements of the military services for high-speed missiles and airplanes.

Since the end of World War II, at least eleven organizations in this country, with increasingly strong encouragement from the armed forces, have been searching for new fuels that would have higher energy contents. The work by the Lewis laboratory over this period has included predicting theoretical fuel performance, compounding new fuels and determining their properties and those of fuels suggested by others, and studying the use of the potential new fuels in engines.

Research to find new fuels that would have higher energy content has been a major effort of the laboratory for more than 10 years. Here a Lewis engineer operates a combustion test apparatus on a high-energy chemical fuel study. The fuels program has included predictions of theoretical fuel performance, study of new compounds and determination of their properties, and investigations of new chemical in engine operations. By increasing the energy content of fuels, scientists seek to improve the range and performance of propulsion systems in aircraft and missiles.



NACA LEWIS FLIGHT PROPULSION LABORATORY

WING TIPS

Vol. XVI Cleveland, Ohio, October 23, 1957 No. 22

NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS
1512 H STREET NORTHWEST
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October 24, 1957

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MOFFETT FIELD, CALIF.
LEWIS FLIGHT PROPULSION LABORATORY
21000 BROOKPARK ROAD, CLEVELAND 11, OHIO

Dr. E. R. Sharp, Director,
NACA Lewis Flight Propulsion Laboratory,
21000 Brookpark Rd.,
Cleveland 11, Ohio.

Dear Ray:

This letter I am directed to write by the full membership of the Committee. It is one I would have written on my own, if such action had not been taken.

My happy task is to express in warm and unqualified terms, to you personally and to every member of the Lewis Flight Propulsion Laboratory staff, appreciation for the splendid presentation which was the 1957 triennial inspection.

This is no easy job, not if I am going to convey the real feelings of your "board of directors". Merely to write that the presentations were outstanding is not enough. It is necessary I add, we caught the enthusiasm of the young engineers who made the talks and we noted the talented fashion with which the visual presentations were composed.

In order to have a top-notch inspection, it is necessary first to have something important to report about research progress. This was self evident to all who were privileged to attend the inspection the week of October 10th.

I shall be grateful if you will pass this message to every member of your organization.

Congratulations! Well done!

Sincerely yours,

J. H. Doolittle
Chairman

Lobby Lines BY MARY LOUISE GOSNEY

A total of 6,761 persons came through the lobby of the Administration Building during the fiscal year from July 1, 1957 to June 30, 1958, according to a recent analysis. This total does not include routine visits of sales or service representatives, applicants for employment, or other casual callers.

A few of the categories included in this figure are:

	No. of persons
Aircraft & related industries	1,333
Military Services	248
Educational institutions	92
Foreign countries	76
NACA Subcommittees	211
NACA research conferences	384
Tours (of which 1,410 were from educational institutions	2,531
NACA Triennial Inspection, October 1957	1,562

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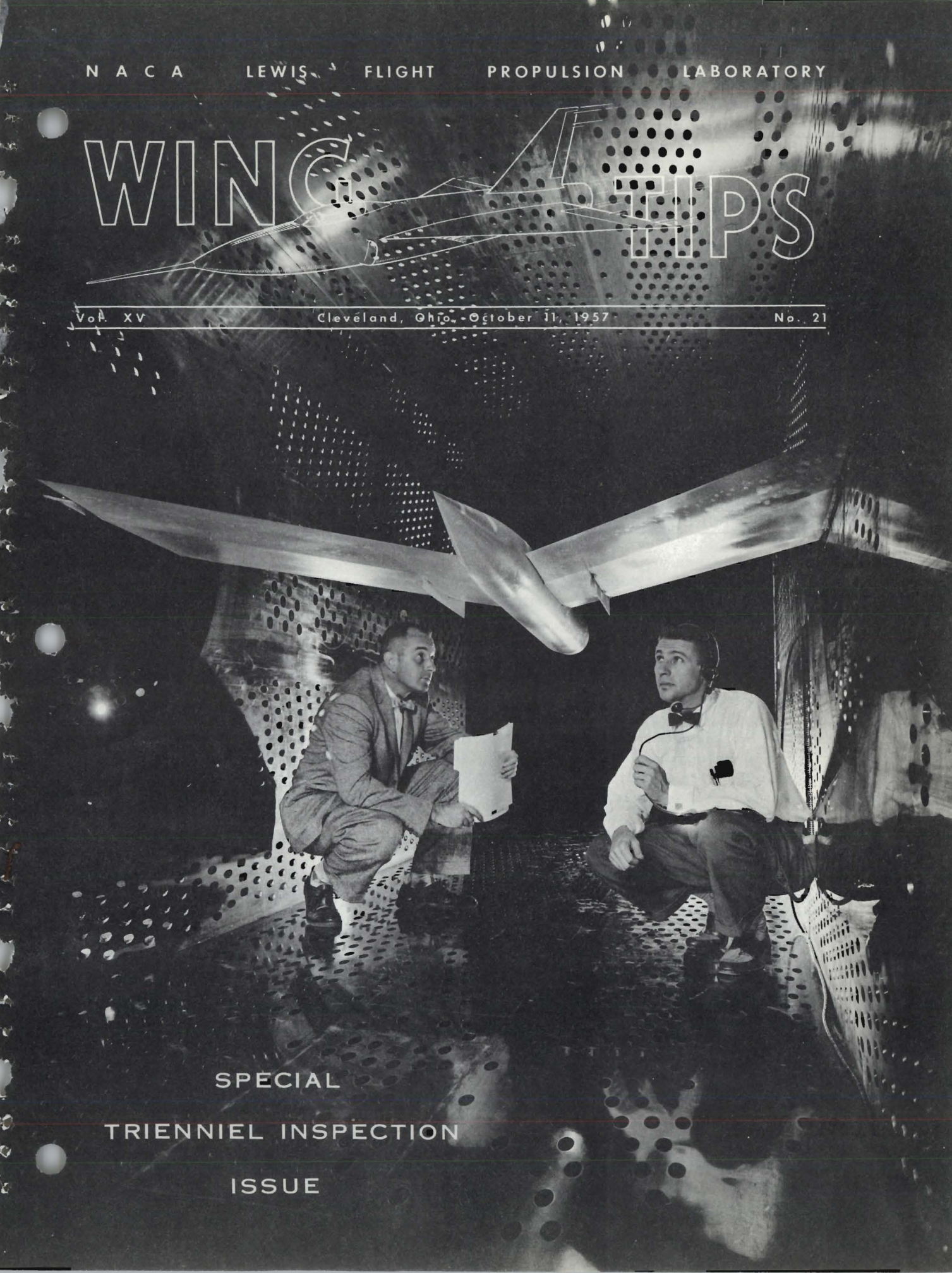

SPECIAL

TRIENNIEL INSPECTION

ISSUE

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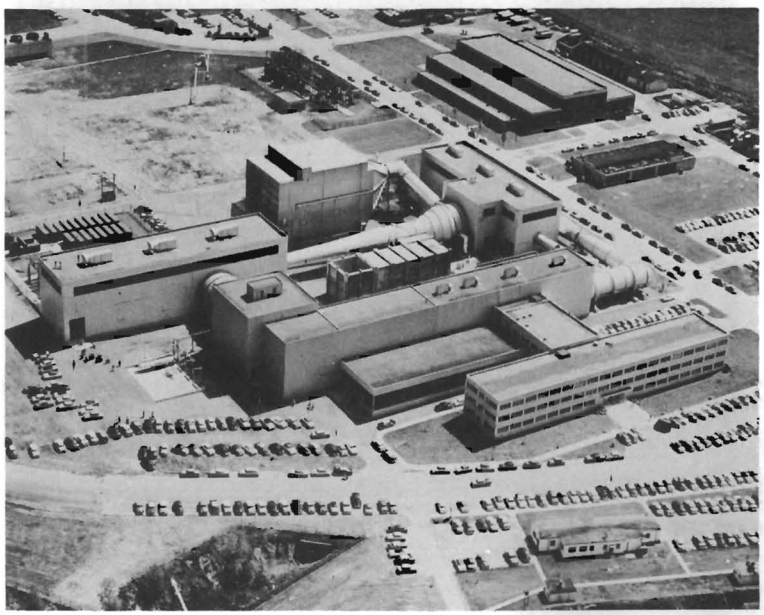
The 10x10-Foot Supersonic Wind Tunnel is operated by NACA in cooperation with industry and the armed forces for development testing of full-scale engines and components for high-performance aircraft.

Research is conducted on aircraft powerplant inlets and outlets, nacelle configurations and shapes, and aerodynamic interference between powerplants and the remainder of the aircraft structure. The year-old tunnel simulates conditions at speeds in a range from 1500 to 2500 mph and altitudes up to 30 miles.

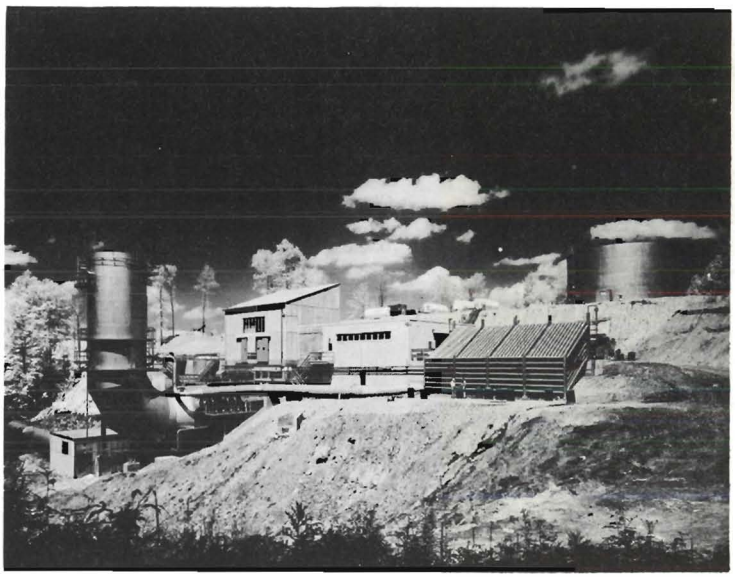


The steel air duct at right leads to the tunnel test section, housed in the long, narrow structure in the center. The building at left and the one at the opposite end of the intervening steel duct house axial flow compressors, which supply the air flow. Seven electric motors totaling 250,000 HP, drive the compressors. Flanking the center ducting are an air dryer (top center) and an acoustic muffler (center). Offices and shops are housed in the building area in the lower part of the photograph.

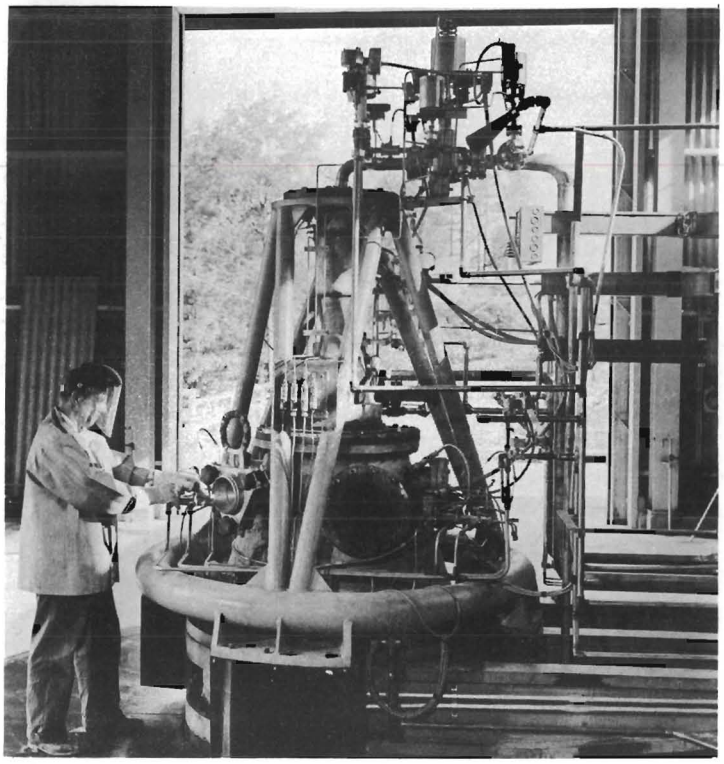
A television camera is focused by technicians on a ramjet engine model through the schlieren optical windows of the 10x10 foot Supersonic Wind Tunnel's test section. Closed-circuit television enables aeronautical research scientists to view the ramjet, used for propelling missiles, while the wind tunnel is operating at speeds from 1500 to 2500 mph.

ROCKET PROPELLANTS

For rocket engines, the heat content or specific impulse of the fuel-oxidant combination is of even greater importance for aircraft or missile range than it is for air-breathing engines. The improvement in rocket performance possible through use of some of the combinations suggested as high-energy propellants is so large that a major portion of the NACA's rocket research effort has been concentrated on this problem.



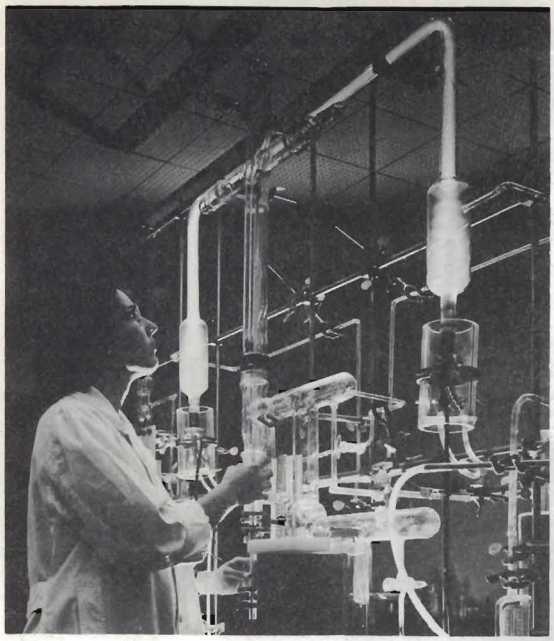
The Rocket Engine Research Facility, completed in August, 1957, is a $2.5-million addition to the aeronautical research equipment available to NACA scientists. Activity here is undertaking to determine, with practical-sized rocket engines, means to utilize new high-energy fuels. This versatile facility permits research and design ideas to be carried through initial investigations with low-cost fuels before using scarce, more expensive fuels. The installation consists of a thrust stand, propellant supply and storage systems, silencing equipment, exhaust gas disposal system, and an operations building which includes an instrument and control room.



A technician adjust the valves on the rocket engine test stand in the new Lewis rocket engine research facility. A research engine is mounted vertically within the tubular frame. The 20,000 pound thrust developed by the rocket, is transmitted through the frame to measuring devices. The rocket jet is directed downward into the treatment duct to which the engine is sealed. Within this duct, or "scrubber," water is sprayed at a rate of 50,000 gallons per minute to remove toxic exhaust products and to silence engine noise.

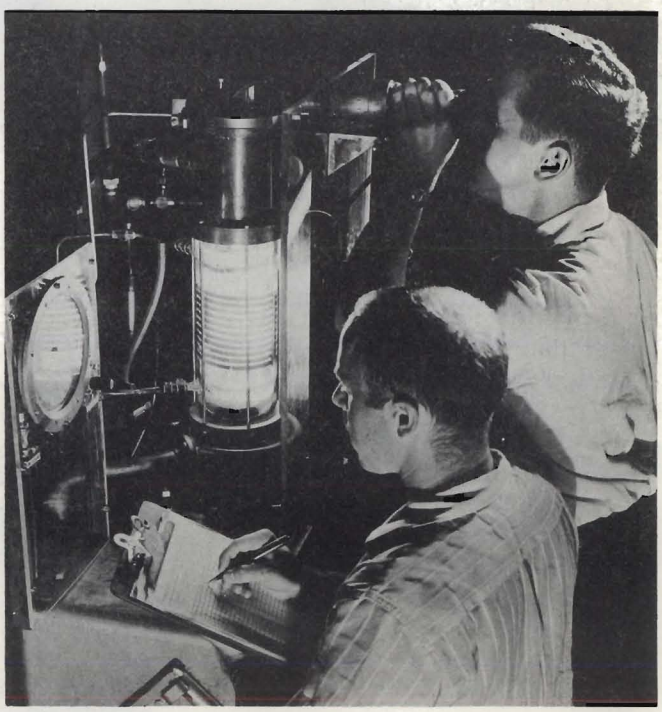
HIGH TEMPERATURE MATERIALS

Advanced materials are required to withstand the very high rates of aerodynamic heating that will be most serious in the nose cones and propulsion systems of advanced aircraft and missiles. Within the next few years it is urgently desired to raise the material temperatures from their present level of about 1650° F in the turbojet engine to over 2000° F and from about 2500° to 3100° F in the ramjet. For the nuclear rocket, material temperatures as high as 5000° F are being considered.



An NACA aeronautical research scientist compares materials under a barrage of atoms to determine which are most resistant to atomic attack and more useful in missile and rocket manufacture. Atoms are produced by passing a gas at low pressures through a high voltage discharge. Fast vacuum pumps make the atoms hit a material test sample. Conditions in this laboratory experiment are similar to those experienced by a missile flying through the upper atmosphere encountering large numbers of chemically active free atoms formed by dissociation of the atmosphere's gas molecules.

An induction furnace is operated as part of a continuing study of the properties of materials suitable for use in design of nuclear powerplants, and in the nose sections of hypersonic missiles that encounter extremely high temperatures in flight through the atmosphere. In applying nuclear energy to aircraft, the high temperature problem is intensified--bringing with it a host of new and difficult problems due to the radiation released by nuclear fission. The induction furnace is capable of reaching 5000°F temperatures.



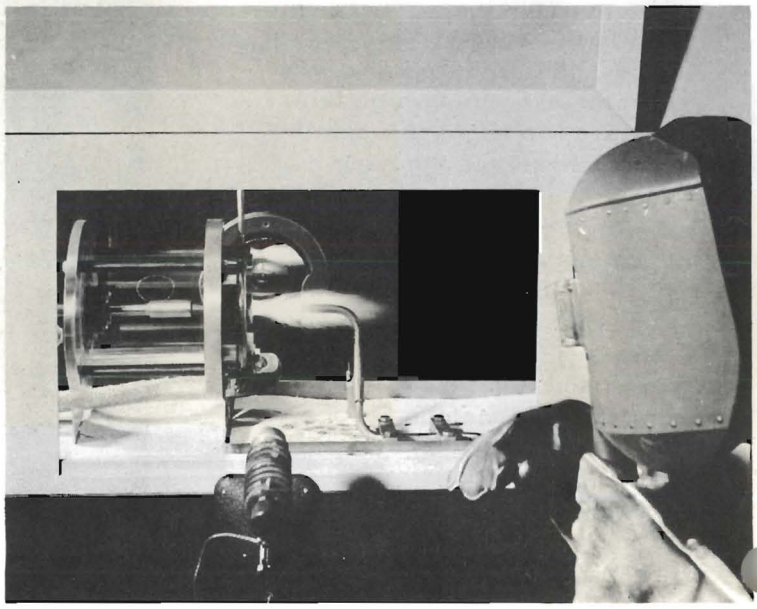
PROPULSION RESEARCH FOR HYPERSONIC FLIGHT

Hypersonic flight speeds are generally assumed to be more than a Mach number of 5, or 3300 miles per hour. The only air-breathing engines that might now be considered for the lower end of this speed range is the ramjet. Lacking both compressor and turbine, and utilizing booster arrangements for takeoff and climb, this engine type is inherently simple in its design and working principles.

The main problems requiring solution before the ramjet or any alternate propulsion system will be satisfactory for hypersonic flight are those of high temperature. For example, at Mach 5 air temperatures reach values of about 2000° F on the engine surfaces; at Mach 7 the air temperatures are about 4000° F. Extensive cooling can be accomplished with minimum losses, however, if fuel can be used as the coolant in the same manner as in the liquid-fuel rocket engine. Much research now is directed towards evaluating various methods.

A miniature laboratory ion-propulsion model, operating at near vacuum conditions, produces thrust which is detected by the small wheel behind the jet. An ion jet is produced when charged particles are formed in an electric discharge between two electrodes, and are accelerated by a magnetic field. An ion-propulsion unit serving as a low thrust engine may be useful in flight at extreme altitudes. However, many problems must be solved before it will be practical.

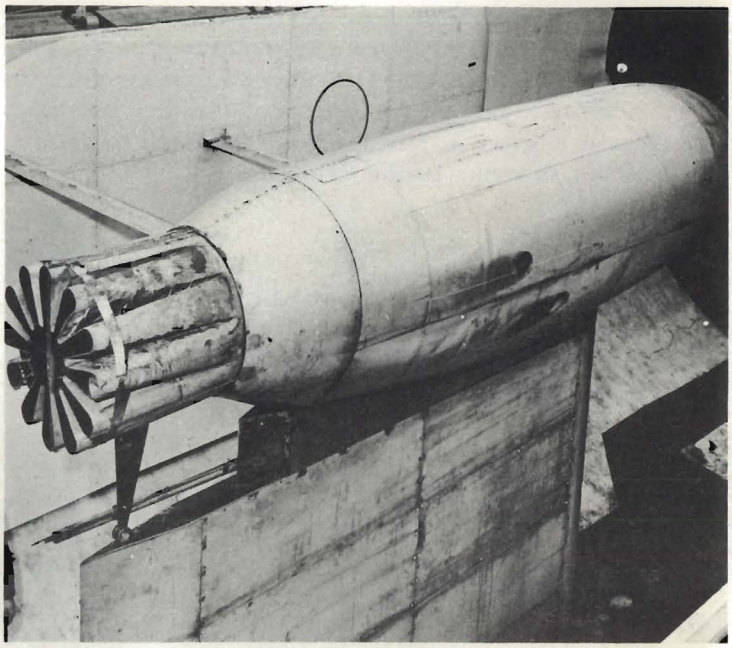
A plasma jet of ionized air, hotter than the surface of the sun, disintegrates a small aircraft model. This laboratory device is useful in the study of aerodynamic heating problems. The jet is produced in an arc chamber by arcing a high electric current between a tungston cathode rod and a graphite anode nozzle. By injecting a working fluid and passing it through the nozzle, the high temperature jet is formed.



AIRCRAFT NOISE REDUCTION

Within the next year or so, jet airliners will be put into operation in the United States. Because turbojet engines today are substantially noisier than piston engines, commercial use of the jet transports may result in difficulties unless ways are found to reduce the noise produced by their engines. Everyone concerned with air transport is anxious that all practical measures be taken to minimize this problem, and the NACA has been participating in this work.

An experimental turbojet noise suppressor nozzle is mounted on an engine in the Altitude Wind Tunnel during investigations of means for reducing jet aircraft noise. Jet exhaust and the air do not mix smoothly; hot gas and air roll up into irregular swirls and eddies producing fluctuating pressures which are radiated as sound waves. Research has been conducted on various nozzle shapes, some of which will lessen the noise substantially by reducing the peak sound levels at certain frequencies. Difficulties are encountered in the design of such nozzles, to keep drag, weight, and engine performance penalties at a minimum while at the same time accomplishing the desired noise reduction.



A tape recorder mounted in the nose of an F-94 Starfire gathers data on the character of aerodynamic sound at high speed and altitude. The study is part of the Lewis Laboratory program of research into the high-speed aircraft noise problem. With this apparatus, boundary layer sound is recorded from a flush-mounted condenser microphone and from a signal obtained by using a hot-wire technique. The position of the hot-wire probe relative to the surface is controlled from the cockpit and recorded on tape. A series of boundary layer pressures are recorded as an aid in evaluating the data.

AIRCRAFT NUCLEAR PROPULSION

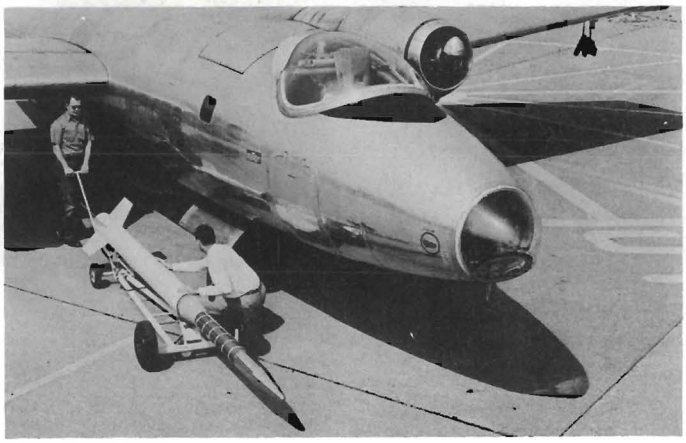
Two characteristics make nuclear energy attractive for flight propulsion. They are the tremendous energies available per pound of fuel and the very high temperatures that can theoretically be obtained from nuclear fission. Several disadvantages accompany these desirable characteristics. First, shielding must be provided to protect the crew from radiation. Since the shielding is made in part from heavy elements such as lead, considerable weight is involved. Second, radiation has an adverse effect on many of the materials used in an airplane. The presence of a strong radiation field often will induce additional radioactivity in areas far removed from the reactor. This factor further complicates the shielding problem.

Theoretically, there are a number of ways to harness nuclear energy. All depend on the transfer of the heat produced in a reactor to a working fluid, which in turn is expanded through a nozzle to produce thrust. In air-breathing engines, such as the turbojet and ramjet, air is the working fluid or medium. In rockets, the working fluid is carried in tanks in the vehicle.

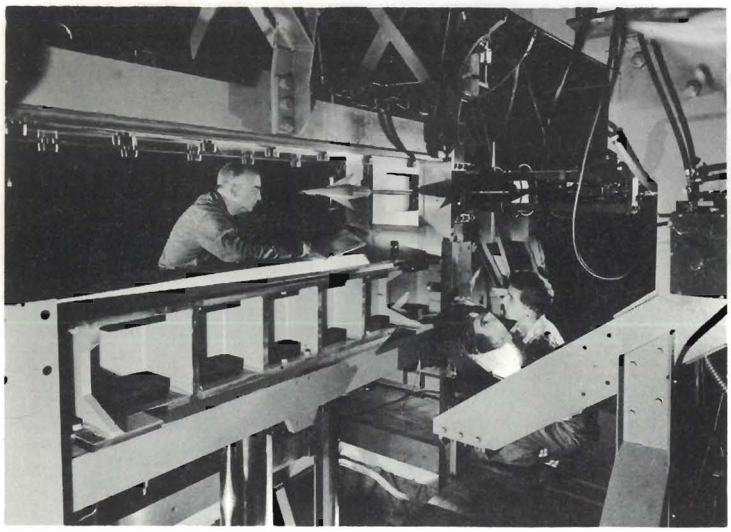
A cloud chamber is used by Lewis scientists to obtain information aimed at minimizing undesirable effects of radiation on nuclear-powered aircraft components. Here, alpha particles from a polonium source emit in a flower-like pattern at the cloud chamber's center. The particles are made visible by means of alcohol vapor diffusing from an area at room temperature to an area at minus-78^{o} Centigrade.

RESEARCH NEWSREEL

The Research Newsreel brings to you the action of a crash fire, the block tunnel in operation, the launching of a high-speed missile and other fields of NACA research which would be difficult to present as well as can be done through the eye of the camera.



A two-stage hypersonic rocket is prepared for flight test by launching from a B-57A bomber in the propulsion research program of the Lewis Laboratory. NACA pilots fly these research models to altitudes as high as 50,000 feet. This 15-foot, 440-lb. rocket is carried by the airplane above 45,000 feet, then launched with its nose headed slightly downward. Top velocity at the end of burnout of the second stage is Mach No. 10.5 (about 7000 miles an hour) at 40,000 feet.



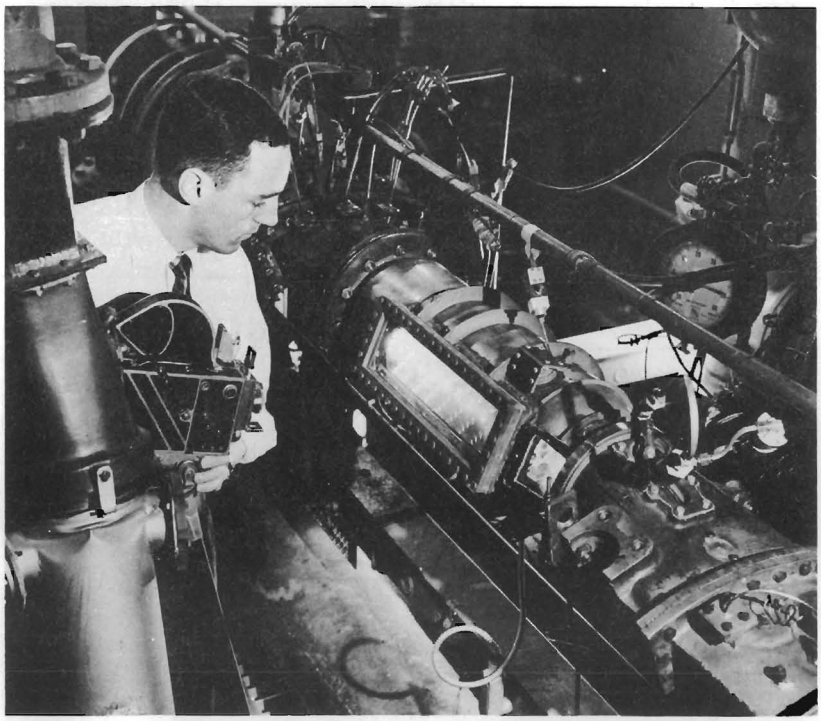
A small supersonic wind tunnel at Lewis is prepared for operation at speeds up to three-and-a-half times the speed of sound. Prior to tests in the tunnel, the nozzle block, located below the technician at left, is hydraulically raised into position. The mirrors at right are part of the schlieren optical system which will make shock waves visible within the tunnel. The tunnel is used in preliminary studies of aircraft and engine configurations.

HIGH-ENERGY AIRCRAFT FUELS

Petroleum fuels burned in jet aircraft are relatively cheap, plentiful, and safe. The energy content of these hydrocarbon compounds is however limited to about 18,500 Btu per pound. This figure is too low to satisfy the maximum range requirements of the military services for high-speed missiles and airplanes.

Since the end of World War II, at least eleven organizations in this country, with increasingly strong encouragement from the armed forces, have been searching for new fuels that would have higher energy contents. The work by the Lewis laboratory over this period has included predicting theoretical fuel performance, compounding new fuels and determining their properties and those of fuels suggested by others, and studying the use of the potential new fuels in engines.

Research to find new fuels that would have higher energy content has been a major effort of the laboratory for more than 10 years. Here a Lewis engineer operates a combustion test apparatus on a high-energy chemical fuel study. The fuels program has included predictions of theoretical fuel performance, study of new compounds and determination of their properties, and investigations of new chemical in engine operations. By increasing the energy content of fuels, scientists seek to improve the range and performance of propulsion systems in aircraft and missiles.



BLOODMOBILE ON SPLIT DATES

Due to the urgent need of whole blood in the Cleveland area, NACA will change its next scheduled Bloodmobile dates, going into a "split-shift".

PLEASE NOTE THESE DATES: Friday, October 18 - Monday, October 28.

Each recruiter will have double his usual amount of work unless donor gives him a definite appointment request for either the 18th or 28th. Those not in contact with a regular recruiter, please call Thelma Allyn, 4131 for an appointment.

Blood donations all over the city have, within the past six months, fallen far short of the need. NACA's participation has been better than some, but poorer than ever before. We ask for the cooperation of each of you - for yours and your family's protection.

LEWIS SCIENTIST PRESENTS PAPERS AT LONDON AND TORONTO CONFERENCES

Edmond E. Bisson presented technical papers at the International Conference on Lubrication and Wear in London, England, on October 1, and at a similar conference in Toronto, Canada, on October 7. The London meeting was sponsored by the Institution of Mechanical Engineers, and the Toronto meeting by the American Society of Lubrication Engineers and the American Society of Mechanical Engineers.

Bisson, assistant chief of Fluid Systems Division, discussed "Friction and Lubrication with Solid Lubricants at Temperatures to 1000° F with Particular Reference to Graphite", and "Friction, Wear and Surface Damage to Metals as Affected by Solid Surface Films - A Review of NACA Research". Co-authors of these papers with Bisson are R. L. Johnson and W. J. Anderson on the former, and R. L. Johnson and M. A. Swikert on the latter.

COMING EVENTS

China Seas, with Jean Harlow, Clark Gable & Wallace Beery will be the Film Classic Club's excellent presentation on Friday October 18th. SPECIAL NOTE: The following Friday, October 25th, is the date of the next movie, A Tree Grows In Brooklyn. Keep these dates in mind.

WGA Toy Party - The Women's Golf Association will hold a gala toy party in the auditorium at 7:30 p.m. Tuesday, October 29th. Staff members and families are invited. Do your Christmas toy shopping this easy and inexpensive way. See Rita Roach for gate passes.

Go Spookooroo! NicNACA's Masquerade or Hardtimes Dance is all set to go on Saturday, October 26th from 9 p.m. to 1 a.m. in the auditorium. There will be 8 prizes for best costumes, and the Rhythmaires will provide their usual good music. Sales will be limited, tickets are $1.50/person. See your NicNACA building representatives for tickets.

The Bay Players will present DESK SET on October 18, 19, 25, 26. The cast in this superb comedy includes lovers Marion and Pat Chiarito (no lines, but plenty of action). Having great fun in the technical staff of the production are: Gen Miller, Jean Chapman, Jo Schwedler, Bill Stevens, Bob Forrette (Set Construction); Eileen Heinmiller (Make-up), JoAnn Daus (Costumes), Marion Chiarito (Stage Properties), Jim Daus (Scenic Art, Mel Hartmann (Stage Manager and Lighting) and Bill Mickelsen (Production Manager).

COMMITTEE MEMBER RECEIVES HIGH HONOR

Frederick C. Crawford, chairman of the board of directors of Thompson Products, Inc., and a member of the NACA from 1954, received the Elder Statesman of Aviation award of the National Aeronautical Association, one of the highest awards in this field.

Dr. John F. Victory, Executive Secretary of the NACA, made the presentation to Mr. Crawford at a dinner in the Thompson Museum last night, Thursday, October 10th. Dr. Victory pointed out that Mr. Crawford "is not only a just and competent business man, but has been in the forefront of aeronautical pioneering."

MAKE THE FIRST TEAM

Many things can be done by an individual - like golf, reading, sewing or playing solitaire.

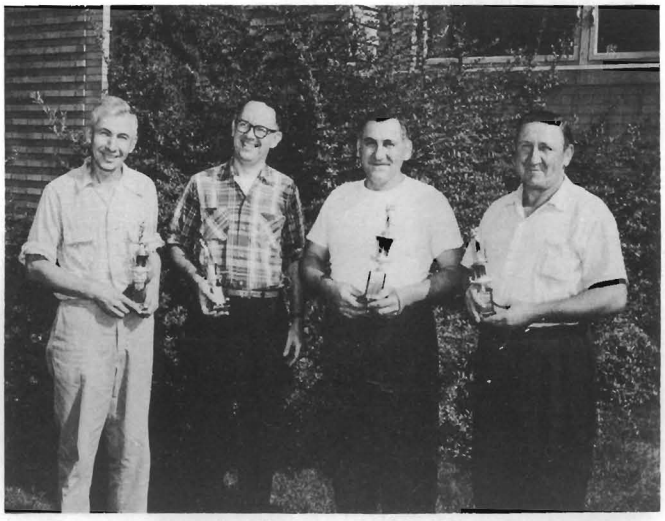
Other things can be done by two individuals - like, hmmm, let's see - tennis, double solitaire and uh - - - - - - yes, many more things.

Then there are those things that can best be done by a group of individuals - a team. One of the biggest of teams is your own Community Chest.

I am sure that every thinking adult knows of this organization and its vital assistance to the 124 "red-feather" agencies in Greater Cleveland. Once a year we are all asked to donate to our Community Chest - to be a part of the team. The chest drive at Lewis Laboratory will open on Monday, October 14th and close Thursday, October 24th.

THE SAMMY SNEADS OF LEWIS

The coming of fall brings the end of the golf season and awarding of trophies to the top-notch swingers. Both the NACA Men's Golf Association and the Fabrication Division League ended hotly-contested seasons last week.



These are the champions - the smiling recipients of trophies and the congratulations of their fellow golfers. L to r: NACA Men's Golf Ass'n: Don Groesbeck, Class C; John Kruper, Class A; Art Yurek, Class AA; Harold Schneider, Class B. Fabrication Division League, l to r: John Scerba, runner-up, Class B; Harold Copas, winner, Class B; John Kruper, winner, Class A; George Krynak, runner-up, Class A.

FOR SALE

1956 Olds 4-door Holiday 88, power steering and brakes, hydromatic, r & h, extras, 13,000 miles $2295. Al Lukas, BE 4-4623.

Brand new boys 16'' bike, never used $20; doll with wardrobe $15. Lloyd Backston, TU 5-1274.

No. 1 Kodak folding camera 120 with f 6.3 lens, cable release. Barney Glassner, LA 1-2012.

Man's 16 lb. bowling ball $5. Lou Miller, SP 7-1891.

1956 Pontiac 2-door hardtop, standard shift, r & h, good cond., $1600. Bonnie McBride, CL 1-2964.

Racoon coat, women's size 13, full length, perfect cond., cleaned & glazed; man's 16 lb. & women's 14 lb. Brunswick bowling ball & bags; Westinghouse electric roaster with Pyrex bake dishes, rack, grill & cabinet. Jean Stulic, OR 1-6127.

Dutch oven gas range 39'', fair cond., reasonable. F. Williamson, BE 4-9513.

17'' Admiral TV console, 1950, excellent cabinet, needs some repairs, good tube $30. S. Heimel, SK 1-7598.

Williams box wrench 1-5/8 - 1-7/16'' $3. John Klyop, Elyria EM 67-521.

Gun-type oil burner & controls $25. Henneberry, TR 1-5836.

35 mm Golde 300 slide projector with case $25; foam rubber mattress with matching box spring, full size, never used $60; full size double bed $10. R. Reich, RE 4-0819.

1947 Cadillac convertible, '52 engine, power steering. R. Kranz, SU 1-0226.

Wool rug, 4-1/4x7-1/2, blue background, $7; 2 pr. lined drapes, brown background, $10; 2-drawer sewing cabinet, mahogany, $8. Pesman, CEnter 8-6083.

Service - rototilling, lawn rolling, roto mowing, Fred Buscher, AD 5-2573.

w/w tubeless 6.70x15 tire, less than 500 miles $18. L. Rabb, EV 2-6759.

Drafting table, 48x32'' top, like new, $35; Edwards FM tuner in good cond., $17. B. Billings, BE 4-5330.

Drill press, portable radio, 3 pr. long drapes, 2 pr. short drapes, floral pattern, black ballet slippers, size 3-1/2, used twice. Drescher, LA 1-3860.

WANTED

Used three speed record play in good cond. Call Wing Tips Office, 3284.

Free fill dirt at 27075 Sprague Rd. (between Usher & Jaquay). E. Zirnfus, AT 1-0260.

Would like one or two other girls to join me in a 6 to 8 weeks tour of Europe next spring (preferably) or next fall. Evelyn Anagnostou, CL 2-0747.

Girls 20'' bike. Bill Maple, TR 1-5880.

RIDE WANTED

From NACA to Case for Tues - Thurs 4:45 class (no return needed). Martin Hersch, 2263.

From Fairview bowling alleys Thurs. after bowling to W. 156 St. south of Furitas. Shirley Shonkwiler, 2227.

Join or form combo from Rts. 42 & 303 (Wolf Development). G. Vasek, 4244.

From Depot St., Berea (til January). Lois Morrow, 2146.

From West Blvd. & Clifton. Ruth Erickson, 2146.

From vicinity of Brookpark & Broadview (Broadview Apts). Sally Funk, 6117.

From vicinity of Lorain & W. 220th. Herbert Bernhardt, 3255.

From NACA to Case on Rapid Transit Mondays at 2 p.m. Dudley McConnell, 4234.

HOUSING

For rent - efficiency apt., completely furnished, utilities, garage, washer & dryer, private entrance, 5 min. from lab, available Nov. 1st, $120/month. Ray Snodgrass, WI 1-5392, 4968 Rocky River Drive.

For rent - 1/2 duplex, 3 bedrooms, newly decorated, modern kitchen & bath, gas heat, garage, adults preferred, $125/month. E. Wirth, 1526 Wagar Ave., Lkwd., LA 1-5581.

House for sale - 1-1/2 story, 2 bedrooms, 90x260 ft. lot, 4728 Grayton Rd., Mrs. Cora Baum, WI 1-8464.

Want to share west side apt. with fellow engineer. Herbert Bernhardt, RE 4-2015.

For rent - 4-1/2 room bungalow, W. 130th, refrigerator, stove, carpet, $110/month. Geo. Porvasnik, OR 1-5667 after 5 p.m..

Wanted - 1 or 2 men to share furnished house 10 min. from lab. J. Campbell or Weber. WI 1-1223.

NACA LEWIS FLIGHT PROPULSION LABORATORY

WING TIPS

Vol. XV Cleveland, Ohio, October 23, 1957 No. 22

NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS
1512 H STREET NORTHWEST
WASHINGTON 25, D. C.

TELEPHONE: LIBERTY 5-6700

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October 24, 1957

LANGLEY AERONAUTICAL LABORATORY
LANGLEY FIELD, VA.

AMES AERONAUTICAL LABORATORY
MOFFETT FIELD, CALIF.

LEWIS FLIGHT PROPULSION LABORATORY
21000 BROOKPARK ROAD, CLEVELAND 11, OHIO

Dr. E. R. Sharp, Director,
NACA Lewis Flight Propulsion Laboratory,
21000 Brookpark Rd.,
Cleveland 11, Ohio.

Dear Ray:

This letter I am directed to write by the full membership of the Committee. It is one I would have written on my own, if such action had not been taken.

My happy task is to express in warm and unqualified terms, to you personally and to every member of the Lewis Flight Propulsion Laboratory staff, appreciation for the splendid presentation which was the 1957 triennial inspection.

This is no easy job, not if I am going to convey the real feelings of your "board of directors". Merely to write that the presentations were outstanding is not enough. It is necessary I add, we caught the enthusiasm of the young engineers who made the talks and we noted the talented fashion with which the visual presentations were composed.

In order to have a top-notch inspection, it is necessary first to have something important to report about research progress. This was self evident to all who were privileged to attend the inspection the week of October 10th.

I shall be grateful if you will pass this message to every member of your organization.

Congratulations! Well done!

Sincerely yours,

J. H. Doolittle
Chairman

WING TIPS, an official publication of the Lewis Flight Propulsion Laboratory, National Advisory Committee for Aeronautics, Cleveland 11, Ohio, is published bi-weekly in the interest of Lewis employees. Send contributions to the Editor, 258 ERB, telephone 3284. Deadline: Thursday after pay day.

Editor.....Marjorie Hyre Reporters.....NACA Employees

TWO LANGLEY SCIENTISTS WIN EXCEPTIONAL SERVICE MEDALS

Dr. Hugh L. Dryden of Washington, director of the National Advisory Committee for Aeronautics, presented the NACA Exceptional Service Medal to two research scientists of the Langley Aeronautical Laboratory in a special ceremony on October 4th at the Peninsula research center.

Receiving the NACA's second highest honor were John B. Parkinson of Hampton, chief of the Hydrodynamics Research Division, and Anshal I. Neihouse of Newport News, head of the Spin Tunnel. The two long-time staff members at Langley were cited for research that has contributed significantly to the advancement of aviation in the United States.

Parkinson, recently presented the first Water-Based Aviation Award of the Institute of the Aeronautical Sciences, is recognized for his analysis and experimental verification of the principle that high length-beam ratios improve hydrodynamic and aerodynamic characteristics of seaplane hulls--making it possible to design seaplanes with speed and performance capabilities equivalent to landplanes.

Neihouse, head of Langley's Spin Tunnel for the past 13 years, received the award for his outstanding leadership in the development of spin research technique and the art of predicting spin and recovery characteristics of airplanes--resulting in great savings of life and property. The spin and recovery characteristics of virtually every United States military airplane since 1941 have been studied in the Langley Spin Tunnel.

ESCAPES SERIOUS INJURY

"Nothing will happen - why bother putting on a safety faceshield!"

How many of us are apt to sluff off using a safety device because of such a thought? Perhaps nothing does happen 99% of the time, which makes this type of thinking seem reasonable.

Phil Ross (Research Installation Branch) knew better than to take even a small chance, his wisdom paying big dividends. While transferring a 15% solution of alumina trimethyl fuel from one large container to another, the safety bleed line stopped up. To clear this line it is necessary to loosen the coupling. But the coupling came apart and Phil was sprayed with the powerful solution that can burn even in this dilute state. The photo of Phil's protective faceshield and the surrounding area tell the story. Serious damage could have been done to Phil's eyes had he "not bothered" with the faceshield.

SINCE OUR LAST LOST-TIME ACCIDENT

449 DAYS 6,120,565 MAN-HOURS

LOST-TIME ACCIDENTS IN 1956.....1
LOST-TIME ACCIDENTS IN 1957.....0

OCT. 18, 1957

SCENES OF THE TRIENNIAL INSPECTION

Over 1700 invited guests attended the Lewis Laboratory's 1957 Triennial Inspection from October 7th through the 10th. Among these were leaders of the aeronautical industry, the military, colleges and universities, the press and local industries.

The purpose of the Inspection was to acquaint the public with the functions of the NACA -- what we are doing, what our advancements have been, what our facilities are, and what possibilities are under consideration in future research.

It is equally important that the staff of the laboratory -- you and I -- know these things. Because of the highly specialized nature of our jobs here, it is not always possible to view the over-all operation of the laboratory. That all are interested was verified by the number of you who accepted Dr. Sharp's invitation to visit the Inspection stops on Friday, October 12th. This was further proved by nearly 7500 employees and their families that visited the laboratory on Family Day, Sunday, October 13th.

Among the visitors on Thursday, October 10th were fifteen of the seventeen Members of the Committee. Appointed by the President of the United States, these men serve as advisors for the nation's leading aeronautical research agency, the NACA.

Committee Confers - Members of the Committee and directors of the NACA are shown in the photo above. Around the table from left to right they are: Captain E. V. Rickenbacker, Chairman of the Board, Eastern Air Lines, Inc.; Honorable James T. Pyle, Vice Chairman, Civil Aeronautics Board; Mr. Charles J. McCarthy, Chairman of the Board, Chance Vought Aircraft, Inc.; Honorable Louis S. Rothschild, Under Secretary of Commerce for Transportation; Dr. Frederick C. Crawford, Chairman of the Board, Thompson Products, Inc.; Honorable Paul Darwin Foote, Assistant Secretary of Defense, (Research and Engineering); Rear Admiral Wellington T. Hines, USN, Assistant Chief of Procurement, Bureau of Aeronautics; Lt. General Donald L. Putt, USAF, Deputy Chief of Staff, Development USAF; John W. Crowley, Jr., Associate Director for Research, NACA; Dr. Hugh L. Dryden, Director, NACA; Dr. H.J.E. Reid, Director, Langley Aeronautical Laboratory; Mr. Preston R. Bassett, former Vice President, Sperry Rand Corporation; Dr. Leonard Carmichael, Vice Chairman, Secretary, Smithsonian Institution; Dr. Detlev W. Bronk, National Academy of Sciences, President, Rockefeller Institute for Medical Research; Dr. James H. Doolittle, Chairman NACA, Vice President, Shell Oil Company; Dr. John F. Victory, Executive Secretary, NACA; Dr. Allen V. Astin, Director, National Bureau of Standards; Dr. Jerome C. Hunsaker, Massachusetts Institute of Technology, former Chairman, NACA; Vice Admiral William V. Davis, Jr., USN, Deputy Chief of Naval Operations (Air). Unable to attend the Inspection were Committee Members General Thomas D. White, USAF, Chief of Staff; Dr. Francis W. Reichelderfer, Chief, U.S. Weather Bureau.

COMING EVENTS

A Tree Grows In Brooklyn, an Academy Award picture starring Dorothy McGuire, James Dunn & Joan Blondell will be the Film Classic Club's presentation this Friday, Oct. 25th. The next film date will be November 15th.

The Toy & Gift Party sponsored by the Women's Golf Association will be held Tuesday, October 29th at 8:00 p.m. in the auditorium. Toys will be priced from $.39 to $6.98. For gate passes see Rita Roach or Alma Diedrich.

Like To Square Dance? There are openings in the North Olmsted Square Dance Club. Call Steve Calmer, SP 7-0390 or Jack Esgar, SP 7-2172 for further information.

NACA Skiers, See "The Great White World" This is the title of John Jay's personally narrated tilm taken at famous ski spots about the world. The film will be shown at the WHK auditorium 5000 Euclid Avenue on November 7 at 8:30 p.m. Tickets are $1.50/person and can be obtained from Dick Schleicher.

NACA

For 15 Years Meritorious Service

KATHLEEN S. HOVANEC

IRMA M. HOLZWORTH

HELMUT F. BUTZE

LADIMER LASHUTKA

IVAN B. ROSSEY

JOSEPH SIKOSKY

ANTHONY B. PETTI

ERNEST F. DREHS

HENRY B. WILMS

Don't Forget the Christian Fellowship Club meeting on Friday, October 25th, 12:30 noon at the Ad Bldg. Foyer.

GRABBING GOLFING - GREATS

It was a close race all the way as the Engineering Services Division Golfing League ended its season with a flurry of lost balls and tempers. Even though Emil Napholz and Ed Grochocki received trophies as visible proof of their superior golfing skills under pressure, not a man in the group will deny that he's the best golfer - just ask any one of them. Next year it will be a different story, so they all say, as they eye the trophies with envy. Left to right they are: Top row: Al Percival; Ed Satmary; Joe Richvalsky, Treasurer. Front row: Andy Terpay; Emil Napholz, champ; Marty Kisel, president, Ed Grochocki, runner-up; Sebastian Codespoti. Absent: Andy Balbin and Larry Raynak, secretary.

IT HAS BEEN SAID . . . .

The following are excerpts from just a few of the numerous letter received by Dr. Sharp from visitors to the Inspection.

". . must add my own personal word of congratulations to you and your capable associates for the wonderful show you put on." Hon. James T. Pyle, Administrator, Civil Aeronautics Board.

". . I came away feeling that our tax dollars are being spent efficiently to keep our industry and nation as leaders in transportation and defense." Warren H. Chase, Vice President, Ohio Bell Telephone Co.

". . The Lewis Inspection was its usual wonderful affair." Charles Tilgner, Jr., Chief Aeronautical Engineer, Grumman Aircraft Engineering Corporation.

". . to tell you what a whale of a job you and your boys did at the Inspection. Every member of the board spoke of it." F. C. Crawford, Chairman of the Board, Thompson Products, Inc.

". . I think the job you did was most remarkable - providing great interest as well as instruction." T. P. Wright, Vice President Research, Cornell University.

". . a rare opportunity to see the truly great research program being carried out there." Warner Seely, Public Relations Vice President, Warner & Swasey Co.

". . I was amazed at the progress that has been made in the fields of aircraft propulsion and rockets, and after seeing your fine presentation and listening to your research scientists, I feel much more secure in my own mind about the position of our Country in the guided missile race." E.C. Asman, Captain, USN, Commanding USN Air Station, Akron.

". . extend my congratulations to you and your boys for the very fine show. . all the comments I heard were extremely favorable." S. Paul Johnston, Director, Institute of Aeronautical Sciences.

Lobby Lines BY MARY LOUISE GOSNEY

Comparative quiet reigns in the lobby after the procession of 1700 visitors who came through our portals to attend the Lewis Triennial Inspection . . . comparative, that is, for tour groups and research visitors, subcommittee and other meetings, continue to bring us back to normal . . . Never a dull moment.

From England this week came Mr. J. C. Hamilton of the Royal Aircraft Establishment; and from Turin, Italy, Dr. A. Zazzaroni and Felice Forte of the Fiat Company.

Start dreaming right now of that European Tour (see kick-off information this issue Wing Tips). And if you need to generate enthusiasm, talk to some of the Lewis employees who went on the tour last year. They are loud in their praises of the arrangements and claim the trip was wonderful in anticipation, in realization, and now in retrospect. In fact, yours truly and roommate, Virginia Brightwell, are signing up again this year - we can't miss it! Just ask us.

NACA MACH TWAIN CLUB EUROPEAN TOUR - 1958

The Mach Twain Club is again sponsoring a European Tour this coming spring (May-June 1958). In this connection, we would like an indication of the NACA employees who would be interested.

It is felt that those persons who have already made trips to Europe might be interested in a tour of the Scandinavian countries and the British Isles.

The plane to Europe will transport those who wish to travel on their own in addition to those who might be interested in either the European or Scandinavian tours. A minimum group of 30 persons would be needed to conduct either of the tours.

The chartering of an airplane and arrangements with the foreign representatives handling the tours abroad must be made well in advance to assure priority of accomodations. Therefore, if you are interested, we would appreciate your completing the form below and returning it to Mary Lou Gosney, Coordinator, Lewis Lab, Lobby, Ad Bldg., PX-2228.

Additional information and forms for definite reservations will be sent to the laboratories soon.

- -

TO Mary Lou Gosney, Lobby, Ad Bldg.

I am interested in the

☐ European Tour - 30 days (England, France, Holland, Germany, Italy, Belgium, Monaco, and Switzerland)

☐ Scandinavian Countries and British Isles

☐ Flight only

Comments or suggestions:

MEDICAL SERVICES RUSH PREDICTED

No, there is no epidemic of Asiatic Flu expected! There is a new arrival though - Miss Marilyn Kurtz, R.N., assistant to our head nurse and friend, Mrs. Ruth Elder.

Miss Kurtz, a west side Clevelander from Fairview Park, graduated from St. Lukes School of Nursing two years ago this January. She worked at Crile Hospital for 1-1/2 years and at Camp Nicolet in Wisconsin before joining our Lewis staff. This attractive and conscientious young lady of 22 teaches home nursing once a week for the Red Cross and does volunteer work at Merrick House and the west side "Y" ("We could use more help," says she). Her favorite hobbies are music and sports, especially sailing and water skiing.

FELLOWSHIP NAMED FOR LATE AIRCRAFT DESIGNER

An annual graduate fellowship has been established by Bell Foundations, Inc., in memory of Robert J. Woods, aircraft designer.

Mr. Woods was director of engineering and sales of Bell Aircraft Corporation's aircraft division when death ended his career in 1956. Many friendships grew between members of the NACA and Mr. Woods through their close association in aeronautical research. He designed some of the world's most famous airplanes including the first supersonic aircraft, the Bell X-1, and the P-39 Airacobra of World War II fame.

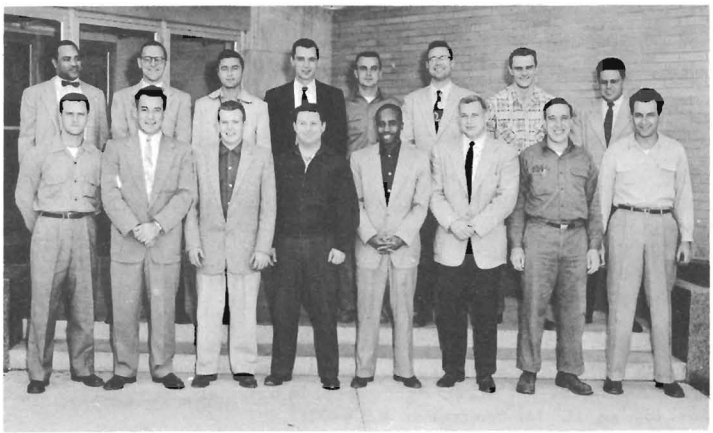
The fellowship, granted to the University of Michigan's Department of Aeronautical Engineering, will be awarded to a graduate student studying for either a Master's or doctorate degree in the department. Mr. Woods was a 1928 graduate of the University.

ROCKETS BLAST OPPOSITION

The Rockets successfully defended their NACA softball championship by downing the Superbloops 13 to 1 and the Jets 11 to 5 in the second half playoffs. The Rockets had previously won the first half playoffs, thus gaining the undisputed title.

During the season, timely slugging by Dick Glaser, Don Turner, Gordon Steiner, Dick Bath, Marty Kisel and Leo Theobald generally gave pitchers Del Tischler, Bob Richmond and George Kinney plenty of room to work.

Nine teams were in the league this year. Five of the Jets, Superbloops, Engineering Services, Falcons and Rockets participated in the playoffs at the end of each .lf.



No Satellites These! Here are the Rockets, leaders of the softball league. Front row, l to r: Gordon Steiner, Marty Kisel, Bill Goette, Hal Price, Bert Antoine, Bob Walter, Frank Deblasi, Salvatore Codespoti. Back row, l to r: Harold Lucien, Bill Tomazic, Wally Herrlich, Don Turner, Leo Theobald, George Kinney, Dick Glaser, Del Tischler. Absent: Dick Bath, Bill Funk, Al Glueck, Nick Saracco, Bob Richmond and Lyn Dunseith.

NO ADS ACCEPTED WITHOUT NAME AND HOME PHONE NUMBER

FOR SALE

Gas range, like new, reasonable; refrigerator, in perfect condition, $25. L. Kozar, WA 1-4794.

22 Qts. SAE 40 Wolf's Head motor oil. B. Heintz, 5121.

Black 1 yr. old male French poodle, sub-standard, papers available, reasonable. Golladay, WI 1-5677.

2 Inch wide adhesive tape & 3 inch sterile gauze bandage. Gagat, ED 1-7899.

Croquet set of 6 brand new $6 girls' Cleveland rink roller skates with toe tips, size 3, used 4 months, $10. Harold Uthe, WI 1-9880.

Lot 100x250 ft. in N. Royalton, restricted area; dining room set, table & 6 chairs $25. Bissler, BE 2-1113.

1956 Olds 4-door Holiday 88, power steering and brakes, hydromatic r & h, extras, 13,000 miles, $2095. Al Lukas, BE 4-4623.

1948 Chevrolet 4 door, 1 owner, 62,000 miles, good cond., $150. Sloop, ED 1-8499.

12-1/2 Ft. plywood boat, 1 yr. old, like new, $175. Tom Mayher, SH 1-6229.

Degan vibraharp. Geo. Ford, WY 1-4216.

Girls' 16 inch bike, brand new, training wheels & accessories. Lloyd Baxton, TU 5-1274.

Ronson electric shaver. Sather, TR 1-7643.

Coil springs & mattress for double bed $20; box springs, ex. cond. $20. L. Carter, BE 4-4835.

Sunset Memorial Park - 2 adjoining double lots, $75 per lot. Mrs. Albert Zay, OR 1-9416.

Baby buggy, like new, $8; baby jumper & car bed $4; drafting table, good buy. Bart Billings, BE 4-5330.

Universal gas range, divided top, separate broiler, window in oven door, perfect working cond. $75. Carl Wentworth, ED 1-0845.

New Pickering cartridge diamond stylus $9. W. Remagen, LA 1-5413.

1949 Ford convertible $100; 30 gal. electric hot water tank, used 1 year $20. Proskine, TR 1-0316.

Coroaire 85,000 BTU gas heater with fan, thermostat and controls $45; plastic tile, 360 sq. ft. black marbelized, 150 sq. ft. light grey, 90 sq. ft. light green, in original cartons, 10¢/sq. ft. M. Bazemore, RE 4-0217.

WANTED

Blonde spinnet piano. Sather, TR 1-7643.

Boys' 20'' bike. Beckman, SP 7-1209.

Male bowler for Fairview League, Thursdays at 6 p.m. Geo. Roberts, 5282.

LOST 'N FOUND

Lost - silver filagree bracelet of heart-shaped links on Family Day. Evelyn Anagnostou, 5279.

Found - man's alligator gaberdine top coat in the Key Punch room, 104 ERB (left 4-5 wks. ago). Call Olive Mogge, 6296.

Found - cigarette lighter. Call Chris Truax, 3263.

RIDE WANTED

From Royalton Rd. (Rt. 82) between Broadview & State. S. Dore, 2293.

Two girls need ride from W. 53rd & Clark. Pat Carrier, 3257.

From Parma Gardens, Brookpark & Stumph. Richard Knoll, 6217.

From W. 96th & Biddulph. Eileen La Salvia, 4231.

From West Blvd. & Clifton. Ruth Erickson, 2146.

From Brookpark & Broadview (Broadview Apts.). Sally Funk, 6117.

HOUSING

For sale - beautiful 2 bedroom ranch-type home in Brecksville. Mrs. Harry Oberst, JA 6-8414.

Sleeping room for rent, kitchen privileges, 27476 Detroit Rd., Westlake, TR 1-8288.

Wish to share apt. with fellow engineer. Herbert Bernhardt, RE 4-2015.

For sale - 2 yr. old house, 4-1/2 rooms plus utility room, new garage, concrete drive, Thornhope Rd. just south of Puritas. $12,900. F. McNeeley, WI 1-3580.

The Marty Eiband's (Fluid Systems Div) third child, Doan Edward, arrived to join his brother and sister on October 7th. . . . Jeannette (formerly Propulsion Systems) and Don Groesbeck (Propulsion Systems) welcomed their first child, a daughter, on October 15th. . . . Marion and Abe Silverstein announce the arrival of their new son, David, born Friday, October 18th. . . . Cathy (formerly Physics Div) and Jim Enos (Facil Oper) were happily surprised by the early arrival of their daughter, Marilyn Donna, born October 20th . . . . Paul, Jr., is the name of the new son of Ginger (formerly Sec B Computing) and Paul Laisure's (Facil Oper), born on Friday the 18th . . . .

The lovely flowers that decorated the various buildings during the Triennial Inspection were brought in by Tony Petti of Plant Services. Many of the flowers were donated by Tony's fellow members of the Cleveland Horticultural Society. In all there were six dozen dahlias, eight dozen roses, three dozen mums, two dozen snapdragons, thirty-two potted plants (mostly begonias) and twenty vases. Tony, our thanks to you and your friend for the beautiful flowers and thoughtfulness. . . .

Air Force Captain William F. Montgomery, the nephew of Christine Truax (Section B Computing) visited the laboratory last week. The Captain is recently returned from 3 years of duty in Italy.