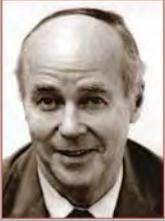


February 2015

# AEROSPACE

A M E R I C A



Remembering  
AIAA's  
Jim Harford/page 4

**SAVE BILLIONS\$ ON YOUR FLEET**  
Stop wasting time and parts on no fault found Page 28

USAF's Otto on  
ISR planes/24



Small sats, big plans/40

## Marking 100 Years of American flight research

# NACA to NASA

Compiled by Edward Goldstein

About a decade after the Wright brothers' flight, Americans were losing aviation ground to British, French and German aeronautical laboratories. The Europeans were leapfrogging the progress of the United States through a mix of government and private funding, and inspiration provided by the Great War, which erupted in 1914. The Smithsonian Institution's regents recommended in February 1915 that Congress establish a National Advisory Committee for Aeronautics, based largely on the similarly named British organization.

On March 3, 1915, Congress acted, setting aside funds in the Naval Appropriations Act for a new organization that would "supervise and direct the scientific study of the problems of flight, with a view to their practical solution, and to determine the problems which should be experimentally attacked, and to discuss their solution and their application to practical questions."

From a modest \$5,000 allocation by Congress, NACA emerged as the pacesetter for practical civil and military aviation research and provided the foundations for the U.S. space program.

This early history is sometimes overshadowed by NASA's space triumphs following its founding in 1958 and absorption of NACA, but in March, NASA will recognize its aeronautical roots and ongoing research

ects, and as a result they basked in the glow of five Collier Trophies. "NACA nuts" was the term bemused neighbors of NACA's first facility, the Langley Memorial Aeronautical Laboratory in Hampton, Virginia, used for the researchers they encountered. NACA would go on to establish the model for productive government-industry partnerships and lay the geographic template for today's NASA. Pioneering wind tunnel research was done at the Langley lab, now NASA's Langley Research Center, and at NACA Ames Aeronautical Lab, now NASA's Ames Research Center. Propulsion and icing studies were done at the NACA Flight Propulsion Research Lab near Cleveland, now

NASA's John H. Glenn Research Center. High-speed aircraft testing was done at the NACA Muroc Flight Test Unit at Edwards Air Force Base, California, now NASA's Neil A. Armstrong Flight Research Center. Research and testing at these sites made passenger flight safer and more efficient and contributed to U.S. air power dominance in World War II.

Today a few surviving members of the NACA team gather occasionally for reunions in the cities that housed the NACA centers.



**1915**  
The first meeting of the National Advisory Committee for Aeronautics.

by celebrating the 100th anniversary of the organization that spawned it.

In its day, NACA attracted some of the nation's brightest thinkers and boldest doers. There was engineer Richard Whitcomb, who helped pioneer supersonic flight; and Maxime Faget, who eventually would conceive development of the one-person spacecraft used in Project Mercury; and there were of course daring test pilots like Neil Armstrong.

NACA encouraged its engineering staff to take on esoteric proj-

**Birth of the black box** — This 1933 memo cleared the way for NACA's V-G — velocity-gravity — recorder to be installed on commercial aircraft. During flight, a stylus would etch a pattern on a small piece of glass that had been coated with soot by holding it over an oil lamp. The pattern showed changes in acceleration and deceleration and the speeds at which they occurred. The recording could span hundreds of hours of flight time. The device was developed as a research tool but also proved useful in some accident investigations. U.S. aviation regulators used V-G recordings to establish the design criterion of 55-feet per second "effective gust velocity," leading to safer airplane designs.

From NACA  
To LMAL

Washington, D. C.,  
April 5, 1933.

Subject:

Research authorization on study of load and load distribution on commercial type airplanes.

Reference:

LMAL letter, March 15, EWM:DD, paragraph 2.

1. Consideration has been given to the question of reference as to the suitability of continuing to charge to Research Authorization No. 287 the work on the study of load factors and gusts on commercial airplanes in actual transport operation by the use of the N.A.C.A. V-G recorder.

2. In view of the fact that the work the Committee is actually doing on this problem at the present time comes within the scope of the purpose of the investigation as stated in the research authorization, it is believed unnecessary to request a new authorization or an extension of No. 287 to cover the very different procedure being followed in conducting the investigation. Since it was not possible at Langley Field with the varying conditions on commercial airplanes under the load factor encountered in actual operation, approval was given by this office, as within the scope of administrative discretion, to the extension of the procedure to airplanes in operation in commercial air transport and the study of accelerometer and V-G recorder records obtained in such operation.

*G. W. Lewis*

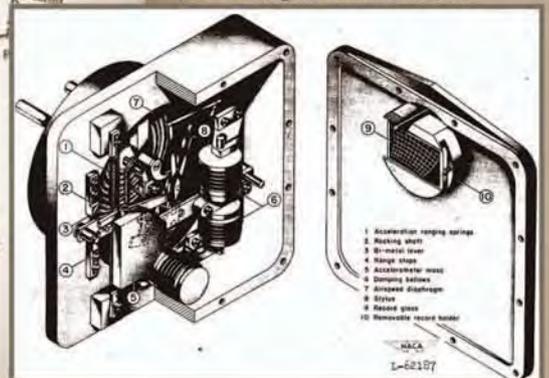
G. W. Lewis,  
Director of  
Aeronautical Research.

CW/NW

- APR 7
- EO
- CG
- Pur
- Stu
- Prp
- Mat
- CTO
- ORR
- CHY
- CA
- ACA
- PH
- AT
- VDT
- PRT
- PST
- OPP
- MR
- Sup
- HP

Langley Memorial Aeronautical Lab in Virginia, now known as NASA's Langley Research Center.

Cutaway drawing of a V-G recorder. The device, which measures 4.5-by-4.5-by-2.75 inches, includes a soot-coated recording glass on the upper part of right-side section.



George W. Lewis wasn't shy about exercising "administrative discretion" to advance technology. Here, he uses it to get an early data recorder onto commercial planes. NASA's Ohio field center carried his name until 1999, when it was renamed the Glenn Research Center at Lewis Field.

## High-level attention

**Visiting NACA facilities** became a way for a succession of U.S. presidents to signal to voters and business leaders that they were determined to keep the country on the cutting edge of aviation development. NACA was founded in 1915 during the administration of President Woodrow Wilson with funds from Congress, and led the country's aviation research until the administration of President Dwight D. Eisenhower. NACA was absorbed into a new agency, the National Aeronautics and Space Administration, in 1958.

1929

On the south lawn of the White House, President Herbert Hoover, at left, presents the 1929 Collier Trophy to NACA Chairman Joseph Ames and members of a team that developed a low-drag streamlined cowling for aircraft engines. The trophy is named for aviator and publisher Robert J. Collier.



1940

President Franklin D. Roosevelt, in the rear seat, visits NACA's Langley Memorial Aeronautical Lab in Virginia. Back when NACA was proposed by the Smithsonian Institute and Congress in 1915, Roosevelt was acting secretary of the Navy. He wrote to the chairman of the House Committee on Naval Affairs to say he "heartily [endorsed] the principle" on which the NACA legislation was based.



1946

The recently victorious Supreme Allied Commander General Dwight D. Eisenhower gives a vigorous thanks to the staff of the Aircraft Engine Research Lab in Cleveland for improving the performance of U.S. military aircraft during World War II. In the background is lab Director Edward Sharp.

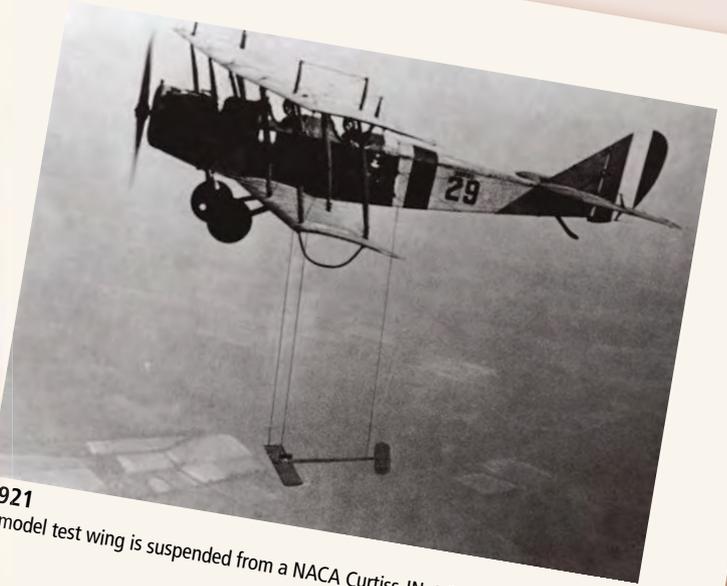


1946

President Harry Truman presented aviation's Collier Trophy to Lewis Rodert, chief of the Flight Research Branch at the Aircraft Engine Research Lab in Cleveland, for his work in thermal de-icing systems for aircraft. The engine lab was eventually renamed the Lewis Flight Propulsion Lab, after NACA's first executive director, George W. Lewis.

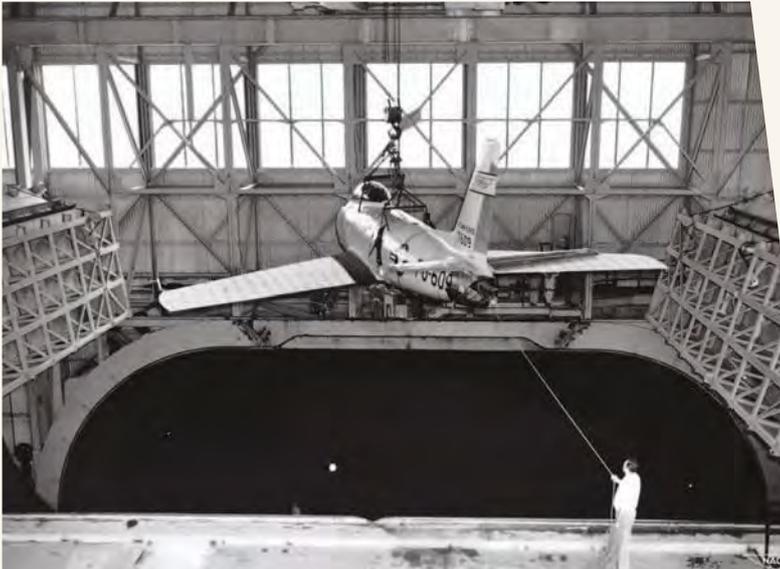


**1949**  
A technician works on the Analog Computing Machine at the Lewis Flight Propulsion Laboratory in Ohio.



**1921**  
A model test wing is suspended from a NACA Curtiss JN-4 "Jenny."

## ***NACA research through the years***



**1954**  
An F-86 aircraft is lowered into the 40x80 Foot Full Scale Wind Tunnel at the NACA Ames Aeronautical Laboratory at Moffett Field, California.



**1927**  
Elton W. Miller, chief of aerodynamics at Langley Memorial Aeronautical Laboratory, stands in the Propeller Research Tunnel during studies on a Sperry M-1 Messenger, the first full-scale plane tested in the tunnel.



**1949**  
A researcher stands by with a fire extinguisher during research on the effect of twin-jet exhausts inclined toward the ground at the Lewis Flight Propulsion Laboratory. The lab was studying how certain engine installations could decrease an aircraft's takeoff distance.



**1922**  
The Variable Density Tunnel, the world's first pressurized wind tunnel, arrives by rail from the Newport News Shipbuilding and Dry Dock Co. for installation at Langley Memorial Aeronautical Laboratory.

NASA photos