PRESENTATION OF
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at
Closing Ceremony for the Langley
30 x 60-Foot Wind Tunnel
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• Thanks, Paul

• It's a tremendous honor and a pleasure for me to be able to say a few words about the accomplishments of the thousands of dedicated employees who worked in this facility for the past 64 years.

Slide 1- Aerial view of tunnel

• I've had the pleasure of spending 31 years of my career associated with this wind tunnel, first as a researcher, and later as a manager.

• In my early years my historical interest and curiosity led me to read every technical report ever published by the staff of the 30x60 tunnel, and the historical impact of the past work coupled with the excitement of the day-to-day accomplishments and challenges I experienced made my association with the tunnel very special to me.

• Since I can't possibly do justice to the 64 year history of accomplishments in the time we have today, I'd like to use the time to share with you 9 of my favorite photographs that convey the culture and exploits of this facility and are embedded in this nation's aviation history. Each of these pictures portrays a theme that emphasizes the high quality and significant events that happened here.

• One of the most notable characteristics of the 30x60 foot tunnel is the fact that virtually all of the work done here was directed at extremely relevant, real-world applications or problem-solving. The tests were very visual, and the uninformed visitor could quickly grasp the significance of the testing—there was nothing abstract or frivolous about these activities.
The environment here was always a pervasive blue-collar type of spirit with an attitude that always said "Why isn't the tunnel running? Let's get on with the job!"

This is where the rubber hit the road for the NACA and NASA as both agencies strived to comply with their aeronautical mission to (quote)"Supervise and direct the scientific study of the problems of flight, with a view to their practical solution."

Slide 2.- 1934 inspection

This picture captures the theme that living up to customer expectations has always been a major emphasis here.

The slide shows what I consider to have been the most significant gathering of notable American aviation pioneers.

The occasion was the Ninth Annual Engineering Research Conference held at Langley in 1934.

The NACA research was directed by a committee of 15 civil and military leaders, who were appointed without salary by the President to provide national direction to the agency's research efforts.

As part of this management process, a rigorous annual inspection was made of progress on problems identified by the committee.

I have noted a few of the legendary attendees identified in the picture:
- From your left
  - Howard Hughes
  - Charles Lindbergh
  - Orville Wright
  - Joseph Ames-First chairman of the NACA
  - John Victory-The first employee of the NACA
  - Dr. Theodore Theodorsen
  - Major Jimmy Doolittle

Other names in the crowd, which have unfortunately not been identified by face at this time:

- Grumman
- Aeronca
- Fairchild
- Mooney
- Wright
- Martin
- Northrop
- Seversky
- Sperry
- Stearman

- Customers came because they sought two products of the NACA: a high-quality work product in unique national facilities, and the expertise and advice of the staff.

- The staff has been recognized on an international scale throughout the years. As an example, no less than 3 of the original staff of the 30x60 tunnel in the early days later became NACA or NASA Center Directors. Smith DeFrance, the designer of the tunnel, became Director of the NACA Ames Research Center; Abe Silverstein became Director of the NACA Lewis Research Center; and Harry Goett became Director of the NASA-Goddard Spaceflight Center. All 3 were influential and active in the early days of NASA's space program.

- Slide 3.- F4U Corsair

- This photo depicts one of the famous themes of this tunnel and its staff: Problem Solving

- One of the best known examples of problem solving by the staff of the tunnel was the drag clean up work that Dr. Butowsky mentioned earlier.

- Over 30 Army and Navy airplanes (most of them prototypes or early versions) were tested.

- The most notable improvement in performance was obtained for the Bell P-39 Aircobra, which came in with top speed of 340 mph, left with 392 mph. A 52 mph increase!

- This slide shows an early model of the Chance Vought F4U Corsair fighter that played a key role in victory in the Pacific in World War II, flown by aces like Marine Colonel Pappy Boyington and others.

- Drag clean up only one of areas studied for this airplane. When the Navy tried to adapt it to carrier operations, a major problem was encountered during the approach to landing. A vicious, uncontrollable roll-off at stall was caused by the swirling propeller wash produced behind the huge propeller. the staff of 30x60 identified the cause of the problem and found a
modification to the wing leading-edge that cured the problem, permitting badly-needed carrier deployments in the Pacific.

- Wing fold problems were also evaluated and solved.

Slide 4.- P.1127

- The theme for this picture is Keeping Dreams Alive.

- In the early days of the British development of the P.1127 vertical takeoff and landing airplane, the British government became extremely skeptical of the claims of the Hawker-Siddely Company that this revolutionary airplane design could really takeoff vertically like a helicopter, hover, and transition to conventional forward flight.

- In fact, the project was in danger of being canceled when the legendary John Stack of Langley heard about the situation and challenged the staff of Johnny Campbell at the 30x60 to work with the British and prove out the concept using a remotely controlled free flying model.

- Tests conducted under Marion McKinney here proved conclusively that the concept would work, and when the British visitors returned with motion pictures showing the amazing capabilities of the flying model, the airplane development proceeded through the current day McDonnell-Douglas AV-8 Harrier operated by our Marine Corps.

Slide 5.- Mercury capsule

- The theme of this picture is Adaptation and Versatility.

- Only 29 years after testing fabric-covered biplanes, activities turned to tests in support of NASA's embryonic space program.

- Slide shows a technician inspecting a model of the Mercury capsule during test to determine aerodynamics and stability characteristics.

- The Mercury Astronauts actually trained in this building. Their mission simulator was located right over there where our model preparation area is now located. I had the thrill during my first week of work here in early 1962 of meeting John Glenn and Wally Schirra before the Space Task Group was transferred to Houston.
- Low-speed stability studies of lifting bodies that paved the way for the Space Shuttle concept were also conducted.

- The tunnel has been adapted for tests of many unusual concepts, including submarines, paragliders, antennas, crop dusters (with water sprayed to evaluate spray pattern modifications), and my own personal favorite, an inflatable airplane that was designed to be used by troops who would inflate the single-engine airplane and use it for reconnaissance. Unfortunately, during evaluations here it literally tore apart, but in a safe and controlled manner.

Slide 6.-Externally Blown Flap

- Here is an illustration of the trademark of research conducted here- Innovation and Creativity.

- Johnny Campbell, Marion McKinney, and Joe Johnson led the development of concepts to permit short takeoff and landings for large transport airplanes.

- They personally conceived a research program that explored the potential of using strategically-placed location of engines to augment the aerodynamic lift of the wings. One concept, called over-the-wing blowing, placed the engines in a plane above the leading edge of the wings and the engine exhaust washed over the upper wing surface, thereby increasing lift and lowering the required runway lengths. A second concept used the principle of tilting the engines nose-down to permit the exhaust to impinge directly on the trailing-edge flaps, dramatically increasing the lift.

- When industry was briefed on this work, Boeing used on the upper-wing blowing concept on the YC-14 and McDonnell-Douglas used the externally-blown flap on the YC-15.

- Today, McDonnell-Douglas uses the externally-blown flap concept on the Air Force's C-17 transport.

Slide 7- SST

- This picture signifies Breaking the Barriers. Not all barriers in aviation are associated with high speeds. Many advanced vehicle designs never reach their potential because of problems
and barriers in low-speed flight, especially during takeoffs and landings.

- The picture shows a model of an advanced Supersonic Transport designed to cruise at Mach 3.0.

- Major problems with high-speed vehicles usually occurred at low speeds.

- The nation has spent more tunnel time trying to solve these problems low-speed problems than high-speed testing.

- Tests here provided the fundamental solutions now used in the current NASA program on the next generation SST.

Slide 8.- F-18 Model in Flight at high Angle of Attack

- This depicts the Continuing Tradition of problem solving in the nation's interest.

- Major national problem in 1960's caused by inadvertent stall/spin accidents encountered with high-performance fighters during strenuous maneuvers.

- Tunnel was established as producing results in good agreement with flight and became the national workhorse.

- Virtually all fighters are tested here- problems are identified and solved

- New concepts identified, such as thrust vectoring, permitted carefree maneuvering into areas where certain loss of control previously existed.

Slide 9.- F-22

- When the Air Force's latest fighter, the Lockheed-Martin F-22 takes to the skies later this century, it will employ the research and technology that was carried out here by NASA researchers and their industry partners.

LIGHTS

- In closing, I'd like to salute the thousands who worked here. It was through their dedication and hard work that the missions of the NACA and NASA were completed in a superior manner. It was through their brilliance and innovation that dramatic new aeronautical concepts were born, evaluated, and proven to the point of application.
• To all who have worked here, and especially the alumni who are here today, let us reflect with special pride on having been fortunate enough to have participated in such important events in aeronautical history.

• And finally, I'd like to like to honor this historic old facility.

• It ran continuously for 46 years before taking a brief pause when it underwent a major rehabilitation in 1976; When it started up a year later, a 3-year backlog of work was already waiting, and the tunnel soldiered on without missing a beat.

• There's another important legacy to be recorded about the history of this remarkable facility. And that is the ingenuity and technical leadership of the Langley researchers who adapted the tunnel for unique new testing techniques and the evaluation of advanced aero-space vehicles that the early NACA planners could never have envisioned back in 1931.

• It has survived for 64 operational years through hurricanes, floods, snow storms and everything else mother nature could throw its way. It has really became the Cal Ripken of the wind-tunnel world, and it will be a long time before it's operational record is broken. The record will be broken in about 10 years when 3 tunnels at Langley will be of age. These are the Low Turbulence Pressure Tunnel, the Spin Tunnel, and the 16-Foot Transonic Tunnel.

• Let us preserve for generations to come the accomplishments and culture of this great old wind-tunnel which had such a profound and everlasting impact on the development of civil and military aviation.