Talk by Dr. Dryden:

On behalf of Mr. Webb, Bob Seamans, myself, and the Headquarters staff I welcome you to this inspection of aeronautical and space research held at the Langley Research Center. Dr. Thompson and his staff plan with some participation from other research centers to give you a broad view of NASA's program of advanced research and technology.

Some of you may recall one of the organizational ancestors of NASA, the National Advisory Committee for Aeronautics, which for years held annual inspections at which representatives of industry, government, universities, and the public obtained timely information on the progress of research. This inspection is a revival, after a lapse of about 5 years, of that valuable method of communication between the producers of research information and the customers. Langley is the oldest NACA, now NASA, research center. Today, as in 1917, it is working at the frontiers of science and engineering in aeronautics and space, foreseeing the problems of future aeronautical and space development, designing and building ingenious research tools, concocting theoretical attacks on research problems, and carrying out related experiments to provide knowledge to replace ignorance.

Langley currently has responsibility for an annual budget of nearly $77 millions, approximately the total operating budget of NACA in its final year. It carries on cooperative programs with 49 universities, and does business with 4500 industrial firms. Langley personnel number 4300 of whom more than 10 percent, 472 persons, are increasing their competence through graduate study. In addition, there are 112 undergraduate students in cooperative

engineering programs who spend part of their time here at Langley and part of their time in classes at 15 universities in 13 states.

Our office of Advanced Research and Technology today has a budget five times greater than that of the old NACA. While a large part of the efforts of this office are concerned with space, its responsibilities for supporting aeronautical development in the nation are the same as those of the old NACA, and you will become acquainted today with some of the important research in aeronautics. NASA capabilities in aeronautics include low speed aircraft technology including helicopters, VTOL, and STOL; supersonic fighter and transport technology; noise alleviation, including the problems of the sonic booms; aircraft materials and structures research; aircraft operating problems, including take-off and landing problems; propulsion aerodynamics; flight tests; simulators; man-machine problems of stability and control.

Langley plays an important role in our striving for better, safer, more versatile aircraft. On the supersonic transport program, for example, NASA's Langley facilities have put in more than 10,000 test hours on supersonic transport concepts. Since 1959, when a supersonic transport plane was first proposed, until the first of this month, our people here at Langley have devoted 2400 eight-hour shifts to working on the supersonic transport.

Similarly, the TFX, or the F-111 as it is now called, is based on configurations developed within the framework of the NACA and NASA - the variable sweep wing which changes the shape of the aircraft to obtain optimum performance throughout the speed range from landing to supersonic speed. To date more than 2000 wind-tunnel test hours - a total of about 720 eight-hour shifts - have been conducted on the TFX or F-111 here at Langley, and the work will continue as required during the development of the airplane.

There are few aircraft, civil or military, which have not benefited from advanced research and testing at Langley. All important aircraft have undergone development testing in Langley and other NASA wind tunnels with the aim of obtaining practical aircraft of superior performance.

NASA has the broad responsibility for advanced research and development in space technology and for the design and construction of space vehicles for the exploration of space and for promoting the applications of space technology to peaceful purposes. In this the NASA in-house government competence is teamed with a much larger effort, about ninefold larger, in industry and the universities for close cooperation in enlarging man's ability to operate, both vicariously and in person, in space.

It is important to remember that NASA is not an operating agency in the sense that the Weather Bureau and the Air Force are. Its only product is research information; and its only development activities, though these are admittedly large and costly, are the development of the tools needed to obtain the research data. This development of rockets and spacecraft is analogous to the development by NACA in former days of wind tunnels, rockets for tests of scale models at Wallops Island, research airplanes, etc. NASA's role is much closer to that of NACA than is generally appreciated, and the research information obtained supports all the operational space programs of the nation as well as the aeronautical programs.

Weather satellites are being developed and flown by NASA, but when they are perfected, they will be operated by the U.S. Weather Bureau.

Similarly, NASA has carried out myriad research and development operations to design and fly a series of experimental communications satellites, in close cooperation with our partners in industry and the nation's universities. Most

of you are familiar with these programs, I feel certain - the Echo balloon satellites, the Telstars, the Relays, and the Syncoms - designed to provide the research basis for the best system of satellite communications. When such a system has been developed to the operational stage, however, it will be the Communications Satellite Corporation, not NASA, which will act as the sponsor of the development of the operational satellite and as the operating agency.

The concepts behind the flight hardware of our aeronautical and space programs are tested in the laboratories here at Langley, and in other NASA research centers across the country. It is here that tomorrow's space capabilities grow from ideas into workable designs. Here we are working on truly advanced concepts, beyond the limits of today's technology.

It is important to note that the studies being undertaken here at Langley are in no sense commitments to flight programs, or hardware. They are, rather, feasibility investigations into areas which appear to hold promise for future space missions. When the decisions are made on the space programs to come after Apollo - the manned exploratory flight to the moon - they will be national decisions, made in the light of conditions then prevailing, and carefully weighing the wide range of choices possible to the nation at that time.

It is within this framework of choice, granted to us by our rapidly expanding capabilities in space, that we are investigating, at Langley, the possibilities of manned orbiting research laboratories, including life support systems, resupply, crew conditioning and orbit keeping; advanced techniques for guidance and control for interplanetary mission trajectories; rendezvous and landing techniques on other planets; hypersonic air-breathing transport craft, traveling at speeds above Mach 5; recoverable boosters capable of being used

repeatedly to put payloads into orbit; and magnetoplasmadynamics and interplanetary propulsion.

Langley capabilities in space include launch vehicle dynamics and model technology; inflatable satellites; micrometeoroid satellites; thermal protection of entry vehicles; high-temperature structures; development of simulators for manned spacecraft operations; and re-entry communications.

In summary, the NASA program is not a drive with the single purpose of landing U.S. astronauts on the moon. As was the case with NACA, our purpose is across-the-board research and development competence to meet any national needs, civilian or defense, that are now apparent or may arise as men and their instrumented devices operate with greater competence in the near and far reaches of space.

You will see some of the results of this research and development work today, and I feel certain you will find it most informative. I, for one, am proud of the progress made, and I hope you will be, too, after your inspection tour. Thank you for being here today.

Remarks by Dr. Hugh L. Dryden, Deputy Administrator, NASA, on the occasion of the Langley Research Center's Inspection of Facilities, Tuesday, May 19, 1964.

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