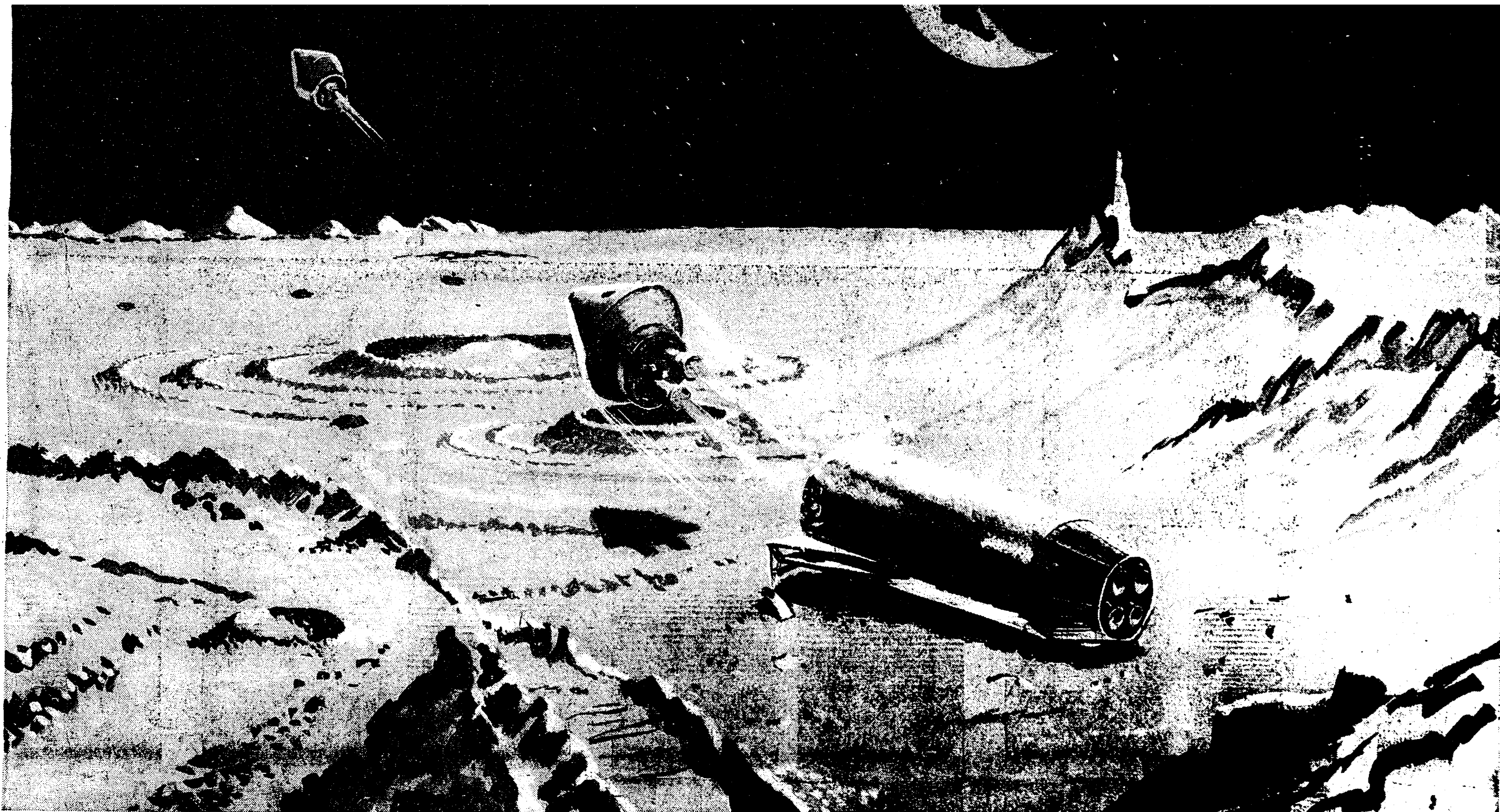


Into Space



FROM THE MOON TO THE EARTH—Astronauts use exhausted earth-to-moon vehicle as launching pad for return stage. Darkness is settling on the Atlantic Seaboard as they take off.

AMERICA'S ROLE IN SPACE TODAY

Head of United States Space Agency Gives Five Reasons Why This Country Must Move to Master Space Flight

“NOTHING is stronger than an idea whose time has come.” This characterization was applied to space exploration by Robert H. Goddard, father of American rocketry nearly two decades ago. Dr. Goddard foresaw and pioneered the dynamic new force that is one of today's most significant realities, but even he did not envision its magnitude.

Four short years after the first man-made satellite went into orbit, space is becoming the focal area for the major scientific and technological disciplines. At the same time, highly important lines of development in economics, education, and international affairs are converging on space exploration and its supporting activities.

I am convinced that most Americans realize that we could not be bystanders to any key phase of this tremendously challenging adventure, with all its implications for the future of mankind. We know that space time has come for us. There are, however, lingering questions as to the extent and timing of the effort the United States must make.

Some highly intelligent, public-spirited business and professional men have asked me if it actually is necessary for the President and Congress to commit the nation to a greatly accelerated program—costing billions of dollars—for sending a United States astronaut team to the moon and back before 1970. They wonder if the need for manned exploration of a huge, dead sphere of rock, 240,000 miles distant in space, is all that urgent.

Urgent and Vital

The program the President calls for is not only urgent, it is vital to the security and well-being of the United States.

Here, briefly, are five principal reasons for the national commitment to sustained and resolute action in space on a large scale, a crucial element of which is the augmented drive to land Americans on the moon during this decade.

1—The United States cannot risk continuing (and discounting) the lag of past years in the space competition with the Soviet Union. We must master spaceflight in both its

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unmanned and manned aspects. This is insurance against finding ourselves at some stage with an over-all technology inferior to that the Russians will develop as they design and build advanced spacecraft and work out supporting techniques for manned voyages to the moon.

If we permitted the Russians to surpass us, eventually we would almost certainly find ourselves on the receiving end of their advanced space technology, employed for military and economic aggression.

2—Space research is a vigorously expanding field, whose growth is comparable to the development of nuclear physics after World War II. It is a field which cuts across the established areas of astronomy and physics and the earth sciences, and draws together scientists of varied backgrounds. The close interaction and exchange of ideas among scientists from many different fields have proven to be highly stimulating.

N. A. S. A. Program

The National Aeronautics and Space Administration scientific program involves both manned and unmanned lunar exploration. From the scientific standpoint, exploration of the moon is of great importance. The moon may hold the answers to some of the key questions in science. How was the solar system created? How did it develop and change? Where did life originate? The moon is devoid of atmosphere in the terrestrial sense. Having neither winds nor rains, its surface is almost changeless. Thus, the moon offers scientists a chance to study the very early matter of the solar system in practically the form in which it existed billions of years ago.

3—For the sake of this country's prestige, it is essential that other nations believe that we have the capability and determination to carry out whatever we declare seriously that we intend to do. Space achievements have become today's symbols of tomorrow's scientific and technical supremacy in the minds of millions of the world's people. The manner in

which knowledge emerging from space science and technology is put to use will become more and more persuasive in the battle for men's minds. The United States is sharing the knowledge from its space experiments with the world scientific community. We are co-operating with a growing number of nations in many projects to increase knowledge of the earth's environment and of the universe.

In today's interlinked world, the policy of sharing knowledge must eventually prove as sound practically as it is morally. In its very essence, science is international. The United States stands to gain valuable contributions from gifted minds in scores of countries through mutual-aid space programs and interchange of ideas with scientists and scientific organizations of other nations.

4—The country needs the stimulus, the knowledge and the products that will evolve from the program to land Americans on the moon. In marshalling and developing the scientific and technical resources required for manned lunar exploration, we shall be creating a technology that is certain to radiate great and diversified benefits to almost every area of material and intellectual activity.

Already the national investment in space exploration has produced new materials, metals, alloys, fabrics and compounds which have gone into commercial production. From work in space vacuum and extreme temperatures have come new durable, unbreakable plastics and new types of glass that will have a wide variety of uses.

Response Gauged

Medical scientists in the space effort have devised minute sensors to gauge an astronaut's physical responses and to measure his heart-beat, brain waves, blood pressure, and breathing rate. These same devices could be attached to hospital patients so that their conditions could be recorded continuously and automatically at the desk of a head nurse.

More than 3,200 space-related products have been developed in the United States. They come from the 5,000 companies and research outfits now engaged in missile and space work. From this new indus-

try are coming new opportunities and new jobs that will help take up the slack of unemployment.

5—Direct, practical applications of earth-satellite technology promise to return very large, early dividends in improved communications and weather-forecasting services.

N. A. S. A.'s Echo I passive communications satellite, launched in 1960, has been seen by people in many countries. The huge, aluminum-plastic sphere proved that it is possible to communicate between distant areas on the earth by reflecting radio signals from a satellite.

Private companies have shown interest both in the Echo concept, and in “repeater” satellites that can receive messages at one point over the earth's surface and retransmit them to ground receiving stations thousands of miles apart. Satellite communications will make worldwide telephone and television services realities, and will accommodate growth of global communications. This enhanced communication could well be a bond drawing peoples of the world closer together.

N. A. S. A.'s Tiros series of satellites has demonstrated the possibilities of vastly more accurate and longer-range weather forecasting. Tiros I transmitted nearly 23,000

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Head of Space Agency Reviews Progress

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television pictures of the earth's cloud patterns. Tiros II, launched last November, has transmitted more than 40,000 pictures and has reported important information about the atmosphere and the radiation of solar heat back into space from the earth. Tiros III pictures of Storm Eliza in the Pacific and Hurricanes Anna, Betsy, and Carla on the Atlantic and Gulf Coasts were valuable aids to the Weather Bureau in tracking these cyclonic winds and issuing warnings ahead of them.

N. A. S. A. also used Tiros III for weather support of Astronaut Virgil Grissom's July 21 Mercury suborbital flight. Twice a day as the satellite passed over the Caribbean, one of its two TV cameras was triggered to report weather conditions in the area of the flight. In addition, when Grissom was briefed just before his flight, he was shown TV pictures obtained from Tiros for visual comparison during the actual flight.

The Savings

According to the House Committee on Science and Astronautics, "An improvement of only 10 per cent in accuracy (of weather forecasting) could result in savings totaling hundreds of millions of dollars annually to farmers, builders, airlines, shipping, the tourist trade, and many other enterprises."

The foregoing list of reasons for the national space program and for accelerating it could be extended for many pages.

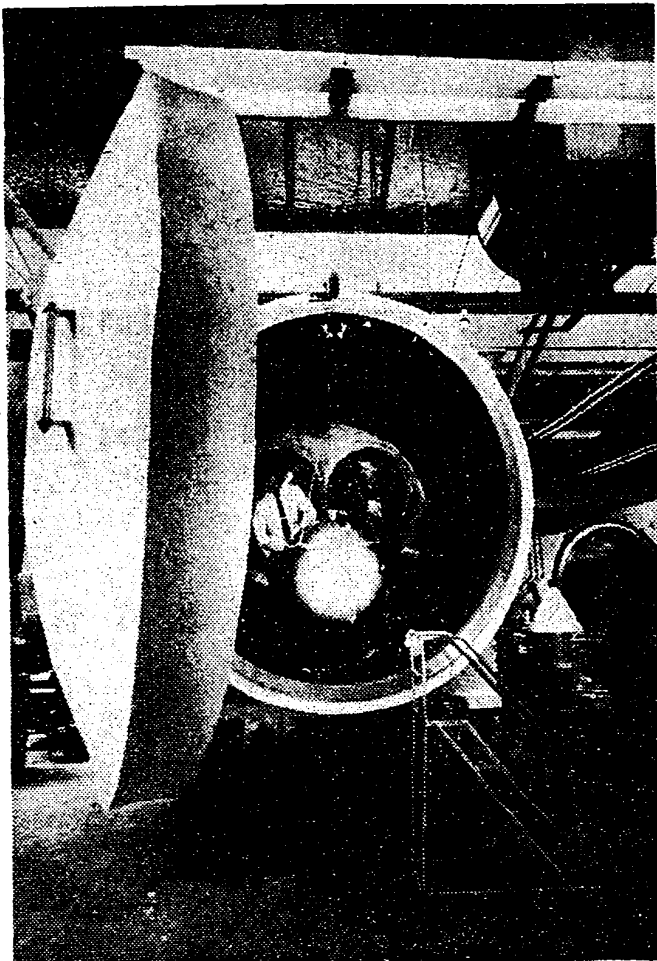
Since Jan. 31, 1958, this country has successfully launched fifty-one earth satellites, two solar satellites, and two deep space probes. For example, a recent scientific satellite, Explorer XII, is making simultaneous measurements of many aspects of the space environment between altitudes of about 200 and 50,000 miles.

Among our most successful experiments to date has been the Pioneer series of space probes. Pioneer V, launched into solar orbit on March 11 of last year, was tracked into space to a distance of 22.5 million miles, still the greatest distance any man-made object has been tracked. The satellite sent back scientific data on conditions in space until communication contact was lost on June 26, 1960.

Pioneer Probes

Advanced launch vehicles are becoming available for both scientific missions and for operational systems. They will have greatly improved load-carrying capability for unmanned space experiments such as Ranger, which will land instruments on the moon, and Surveyor, a spacecraft that will be able to make a so-called "soft landing" on the moon with more delicate scientific instruments. Also under development are spacecraft that will fly close to Venus and Mars.

The historic flights of United



The New York Times

ING—Scientists at the Goddard Space Flight Center, Greenbelt, Md., place a satellite in thermal vacuum chamber to subject it to temperatures and vacuum it will meet when it flies into space.

States Astronauts Alan Shepard and Grissom on May 5 and July 21, respectively, were important steps in Project Mercury, the first phase in the United States program for manned spaceflight. The flights were made to test the men and the Mercury spacecraft, and to determine the quality of the vehicle and its systems, and man's ability to handle them in space, as preliminary steps to putting an astronaut in orbit around the earth.

Project Apollo

The second phase of our manned spaceflight program is Project Apollo whose ultimate goal is a manned lunar landing. The Apollo spacecraft will be large enough for living and working quarters to accommodate three men who will be able to operate in a "shirt-sleeve" environment.

Apollo will first be placed into an earth orbit by the Saturn launch vehicle which has an eight-cluster first stage with a thrust of 1,500,000 pounds, compared to the Atlas with 360,000 pounds, and the Redstone with 78,000. The Redstone was used for the Shepard and Grissom flights. The Atlas was the booster for the unmanned Mercury orbital flight of September 13 and will be used for forthcoming manned orbits.

After the Apollo spacecraft is used as a manned earth-satellite laboratory, it will be sent on voyages deeper into space. These will include a three-man expedition around the moon, and finally an actual moon landing and return late in this decade. The Saturn launch vehicle which is now under development will not be powerful enough for circumlunar flight and lunar landing. N. A. S. A. is developing much larger launch vehicles, such as the Nova which will be able to

deliver multi - million - pound thrusts.

Implementation of the lunar program will result in the investment of large sums of research, development, and capital equipment. For the fiscal year 1962, the National Aeronautics and Space Administration has a budget of \$1,671,750,000. This includes \$245,000,000 for construction of new and supporting facilities and \$1,220,000,000 for research and development. Eighty per cent of the N. A. S. A. research and development budget goes to industry and to private organizations to pay for work performed.

The 1962 program is approximately double that for 1961. Funding requirements will increase still further in 1963 if we are to meet the goals recommended by President Kennedy. N. A. S. A. other Government agencies, universities, and industry all have important responsibilities in the conduct of this rapidly expanding effort.

Space exploration in general, and the manned lunar program in particular, offer the United States the chance for unparalleled material progress, and for maintaining our position in the world. In the words of President Kennedy, when discussing the preservation of the role of the United States as a leader:

"National Effort"

"It is to meet that great responsibility that I have suggested a great national effort in the field of space for the American people. We are dedicated to the accomplishment of this objective and are determined that this nation will continue to be a pioneer in the new frontier of space . . .

"We go into space because whatever mankind must undertake, free men must fully share."