

for the rocket and the space vehicle is still in the study stage. The next step: the planets.

Space research is pursued by scientists not for control of earth or space, or even for defense. Man has always been breaking new frontiers, always tried to overcome his environment and conquer the unknown, or pioneered out of curiosity "to see what he could see."

One of the earliest records left today that express man's desire to fly and leave the earth is the story from Greek mythology of Daedalus, an ingenious Athenian artist who made wings with feathers and wax for himself and his son Icarus to escape from Crete where he was held prisoner.

Man has always wanted to fly and often in tale and poetry envied the flight of the bird that has become symbolic for freedom. Many attempts at flying were made in man's early history, and in the 15th century Leonardo da Vinci, the Renaissance genius, even designed flying models and invented the propeller.

The first man-carrying free balloon ascen-

sion took place in 1783. This was followed by the first successful parachute jump in 1797. In 1810 came the first successful man-carrying glider. Steam-powered experimental planes and airships with internal combustion engine power, glider flights and analysis of the principles of flight were made during the rest of the 19th century.

Between 1898 and 1910 Alberto Santos Dumont built successful airships and airplanes which he flew himself. On Dec. 17, 1903, the famous flight was made by the Wright brothers, Wilbur and Orville, in their internal combustion engine biplane. This flight is generally accepted as the first successful flight of a powered aircraft.

Now, less than six decades later, two men within a month of each other have flown into outer space. On April 12, the Russian Yuri Gagarin circled the earth in 89.1 minutes, the USSR reported. On May 5, the first U.S. astronaut flew 115 miles into space on a down-range trip from Cape Canaveral to a spot near the Great Bahama Island.

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SPACE

Russians' Space Schedule

► RUSSIA'S SPACE SCHEDULE in 1961 calls for at least two more manned space flights—one to circle the earth, the other, perhaps, to the moon.

In 1962, the Soviets are planning to set up on the moon one or two automatic stations that will send back information on temperature, landing and other conditions. If both the manned observation flight and the instrumented station landings are successful, the USSR will then try to place a man on the moon.

The predictions come from Dr. Grigori Aleksandrovich Tokaty, former chief scientist and deputy head of the USSR Long Range Rocket Group, who was responsible for much of the early Soviet rocket development before leaving the USSR in 1949 for ideological reasons.

Dr. Tokaty has been in this country for the past month as visiting lecturer in engineering at the University of California, Los Angeles, and consultant on American space problems. He is now a British citizen and heads the department of aero space engineering at Northampton College of Advanced Technology, London.

The current space race between the Soviet Union and the United States is only a warm-up for the real competition, which will start in five to seven years when both countries will try to place permanent space stations in orbit, Dr. Tokaty predicts.

Soviet engineers and scientists have been working intensively on this project for the last few years. Their plans, Dr. Tokaty reports, call for the orbiting of a 10- to 12-ton instrumented satellite, which will be joined by a second, manned vehicle. Rockets will send up additional instruments and materials, allowing the 10- to 15-man crew to construct an elaborate and practically permanent space station.

Dr. Tokaty attributes the success of the Soviets' space effort to complete centralization of all programs under one ministry, thorough theoretical proof for all projects before any experiments are started, and Russia's traditional excellence in mathematics and long history of rocket studies.

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SPACE

USSR Sent Cloud Pictures From U. S. Tiros Satellite

► CLOUD PICTURES over the Soviet Union taken by the United States weather satellite Tiros have been sent to the Russians by the National Aeronautics and Space Administration. A polite note of thanks was received in return.

Future U. S. space efforts will include an ionosphere satellite launched jointly with the United Kingdom and an extensive program of scientific sounding rockets with more than a dozen Western allies.

The sounding rockets explore an area from 20 to 100 miles above the earth. NASA scientists have found for the first time evidence that heavy nuclei occur in the nitrogen region high in the earth's atmosphere. These heavy nuclei are believed to be released by the sun.

Another recent probe showed a distribution of energy in the Van Allen belts different than had been expected. The significance of this discovery is tied to the origin of the Van Allen belts.

NASA scientists at Greenbelt, Md., hope to extend the sounding rocket program to a global scale. But officials would not say whether they expect USSR participation in this program in the near future.

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