

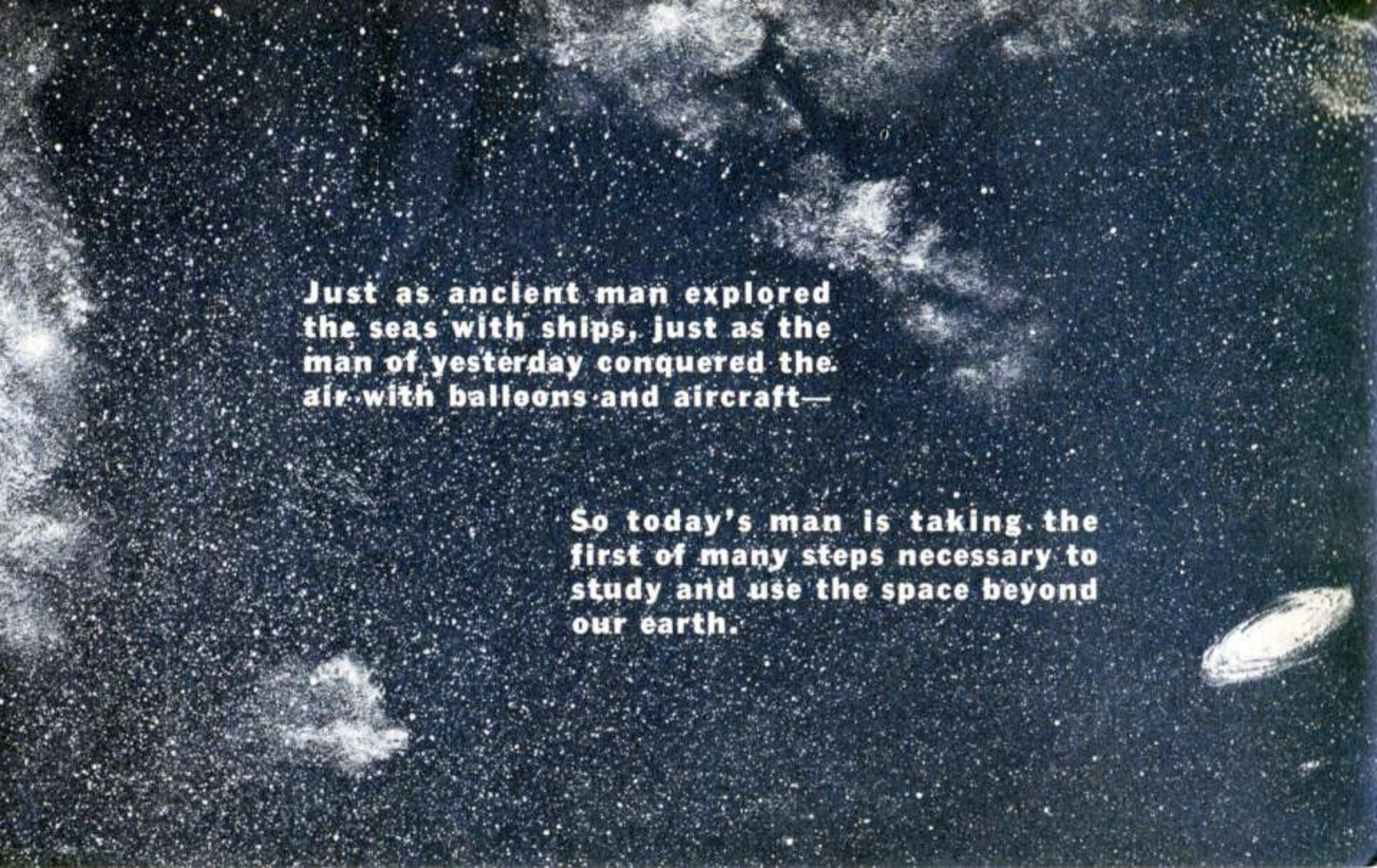
# Exploring Space...

Project Mercury



U.S. NATIONAL AERONAUTICS  
AND SPACE ADMINISTRATION

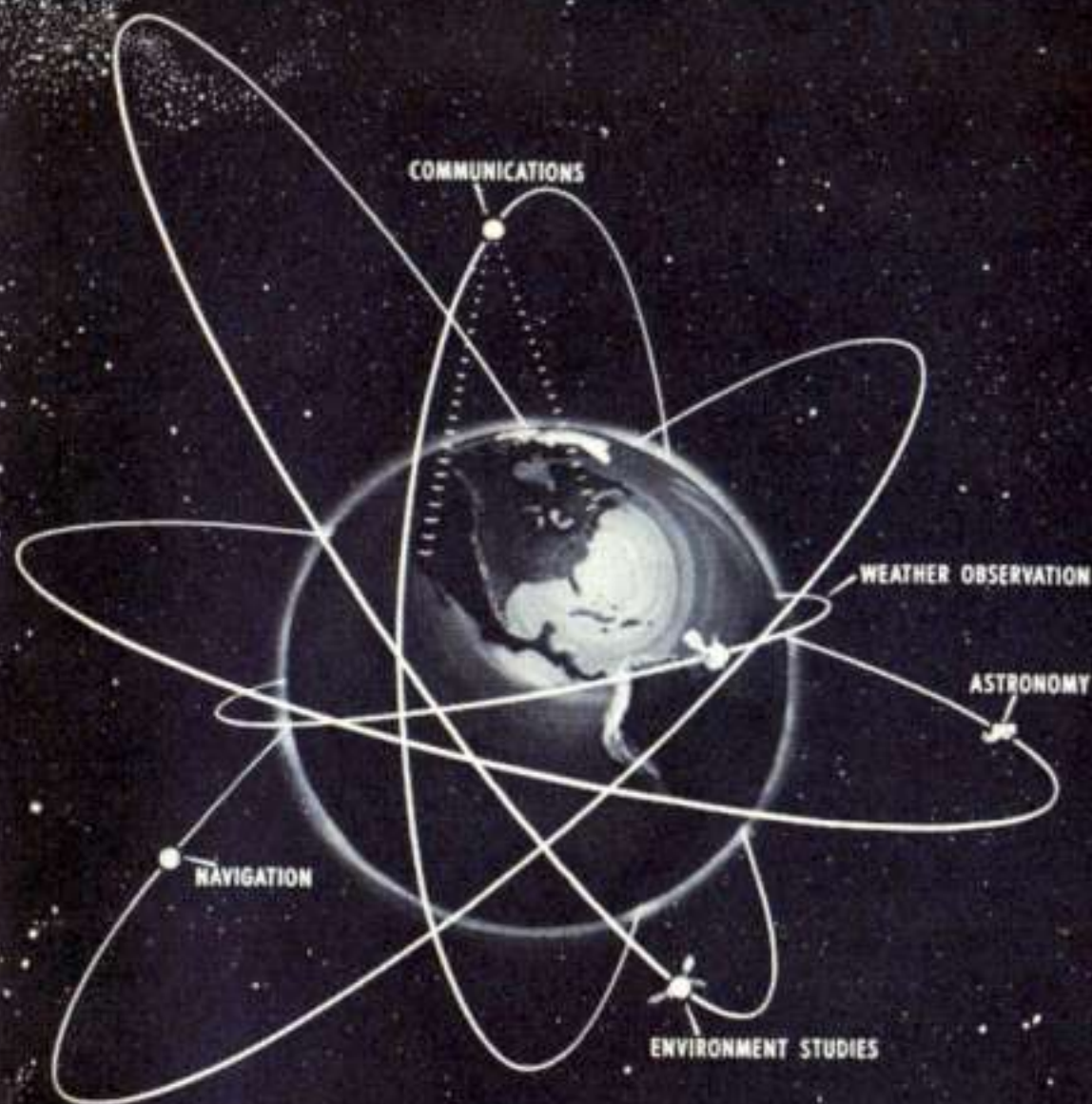




**Just as ancient man explored  
the seas with ships, just as the  
man of yesterday conquered the  
air with balloons and aircraft—**

**So today's man is taking the  
first of many steps necessary to  
study and use the space beyond  
our earth.**





Great practical benefits for mankind have come about as the result of the efforts of the first sailors and aviators. The commerce and communication they made possible have raised the living standards of great sections of the world.

Already we can see that still more benefits for mankind will result from the peaceful exploration of space.

Hundreds of scientific rockets fired safely into the upper air have given us much information about conditions in the atmosphere which control our weather and radio communications.

The 100-foot (30.5 meters) ECHO satellite launched by the United States has shown us that we will be able to use satellites to communicate instantly and cheaply anywhere in the world.

Two TIROS satellites launched by the United States to study the weather have given us a start toward greatly improved weather predictions for all peoples.



**In these and other first steps into space, the United States has cooperated with scientists and technicians in many places:**



**ARGENTINA**

**AUSTRALIA**

**BELGIUM**

**BERMUDA**

**CANADA**

**CHILE**

**ECUADOR**

**FRANCE**

**GERMANY**

**INDIA**

**IRAN**

**ITALY**

**JAPAN**

**MEXICO**

**NETHERLANDS**

**NEW ZEALAND**

**NIGERIA**

**NORWAY**

**PERU**

**SOUTH AFRICA**

**SPAIN**

**SWEDEN**

**SWITZERLAND**

**UNITED KINGDOM**

**EAST AFRICA**



## **BUT THIS IS ONLY THE BEGINNING**

Many more steps will be taken. For example, until now, information on space has been obtained only by scientific instruments. Now, man himself is preparing to venture into space.

## **FIRST STEPS**

Men are climbing higher and higher in balloons and aircraft. Many different methods for sending man himself into space are under study and development. One of these is Project Mercury.

## **WHAT IS PROJECT MERCURY?**

Project Mercury is a program to send a small spacecraft, with a man aboard, into space—

to have this spacecraft circle the earth at a height of about 100 miles (160 kilometers)—

and to bring this man safely back to earth.

Project Mercury will test man's ability to carry out useful activities in a weightless space environment.

## **TO CARRY OUT PROJECT MERCURY**

A powerful rocket, the Atlas, will be used to lift the manned spacecraft, or capsule, up into space.

At a height of 100 miles (160 kilometers) above the earth the capsule will begin to circle the earth at a speed of 17,400 miles (28,000 kilometers) per hour.

After circling the earth three times the capsule will be slowed down so it can return toward earth.

As the capsule comes closer to earth it will be slowed down even more until it can be gently brought to a safe landing at sea.

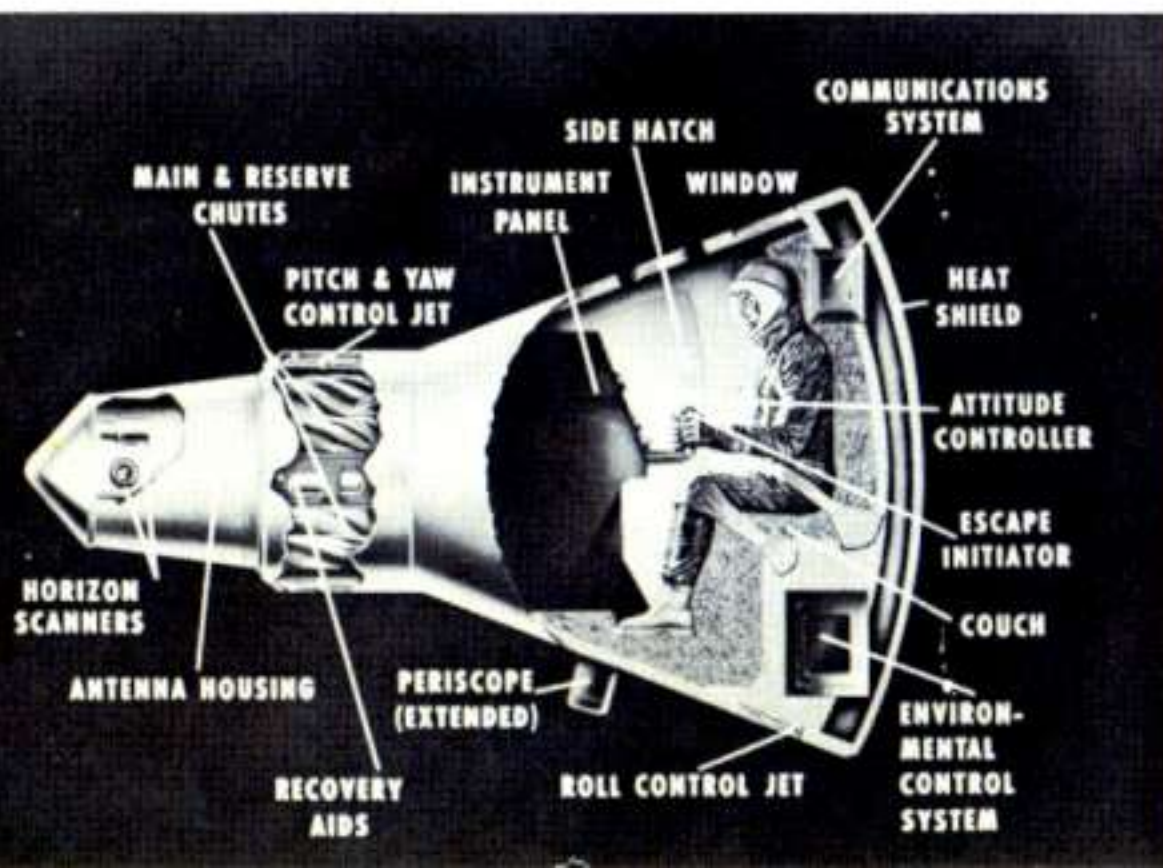
Ships and planes will be waiting to locate and recover the floating capsule and the man inside it.



## THE MERCURY CAPSULE

—is shaped like a bell. Its broad bottom part is about 6 feet (1.8 meters) wide. It stands 10 feet (3 meters) high.

The man who will fly inside this capsule is called an astronaut. He will wear a special space suit, designed to protect him if the capsule develops a leak.



The astronaut will lie on his back at the bottom of the capsule on a special couch designed to fit his body. This couch, like his space suit, will help him to withstand the great pressures of launching and the return toward earth.

As one of many measures designed to insure the safety of the astronaut, the capsule also has a special system so the astronaut can safely escape should something go wrong with the rocket at the very beginning of flight.

This escape system consists of a tower placed on top of the capsule. At the upper end of the tower is a rocket. If something goes wrong with the Atlas during the first moments of the launching, this escape tower will lift the capsule off the big rocket booster some 2,000 feet (600 meters) into the air. The parachutes will then be released and will float the capsule down to the sea where it may be recovered.

The capsule itself is very complicated. There are about 7.5 miles (12 kilometers) of electric wire for all its instruments.



## EMERGENCY ESCAPE SYSTEM



Special equipment will facilitate the astronaut's breathing.

Radio signals, flashing lights, and dyes to color the sea will help ships and airplanes to find the capsule quickly when it lands.

Behind all of this special equipment will be the astronaut, and every minute of his flight into space and his return to earth he will be telling us, through his instruments and equipment, what it feels like to fly through space.

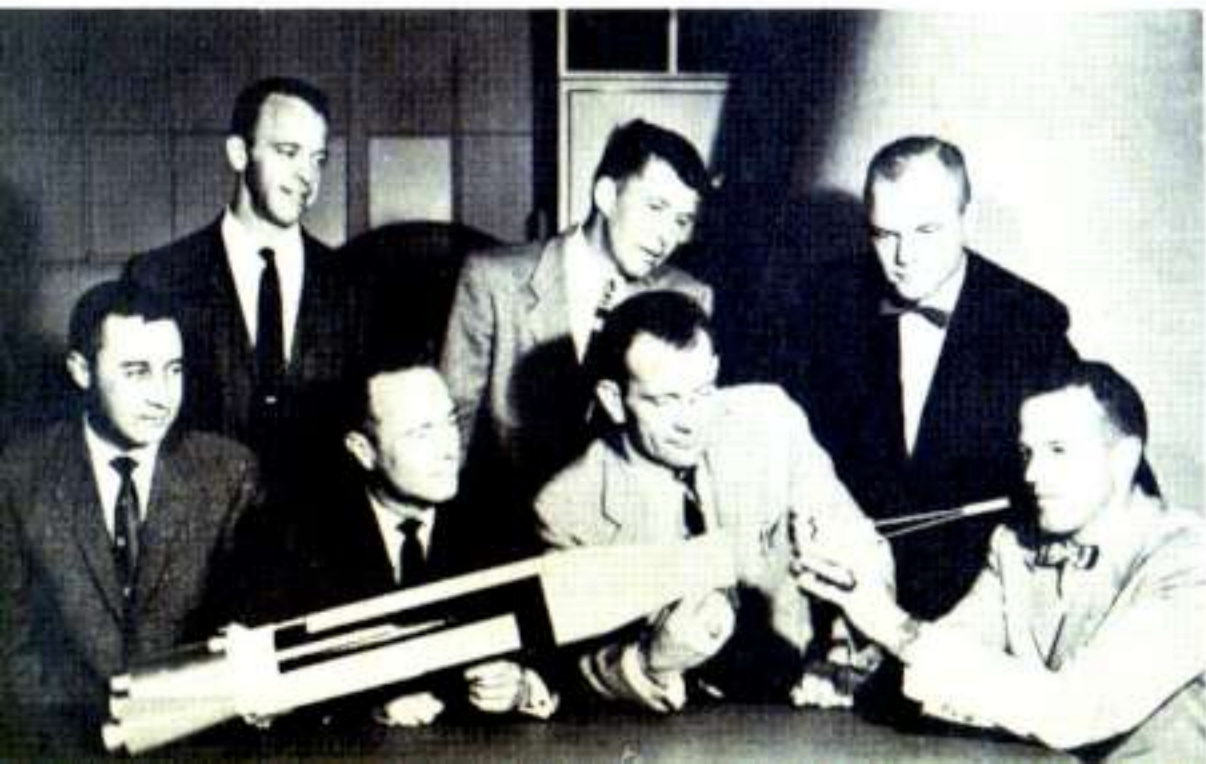




## WHO ARE THE ASTRONAUTS?

Seven volunteers were selected from over a hundred who wished to take part in this great adventure.

Each of the seven volunteers had to be no more than 5 feet 11 inches (1.8 meters) tall or more than 39 years old, and each had to have previous flying experience of 1,500 hours or more. Each had to have a degree in engineering or its equivalent. All seven are married.



The astronauts have undergone a very full training program and education in the basic sciences.

A great many special devices have been used on the ground to give them experience in handling controls like those to be used in the capsule and in growing accustomed to conditions as much as possible like those they can expect to meet in space flight. They have frequently been in conditions of weightlessness which can be created for a few short moments in aircraft flying on a special high looping path. They participated in developing the space capsule in which they are to ride.



## TRACKING THE ASTRONAUT

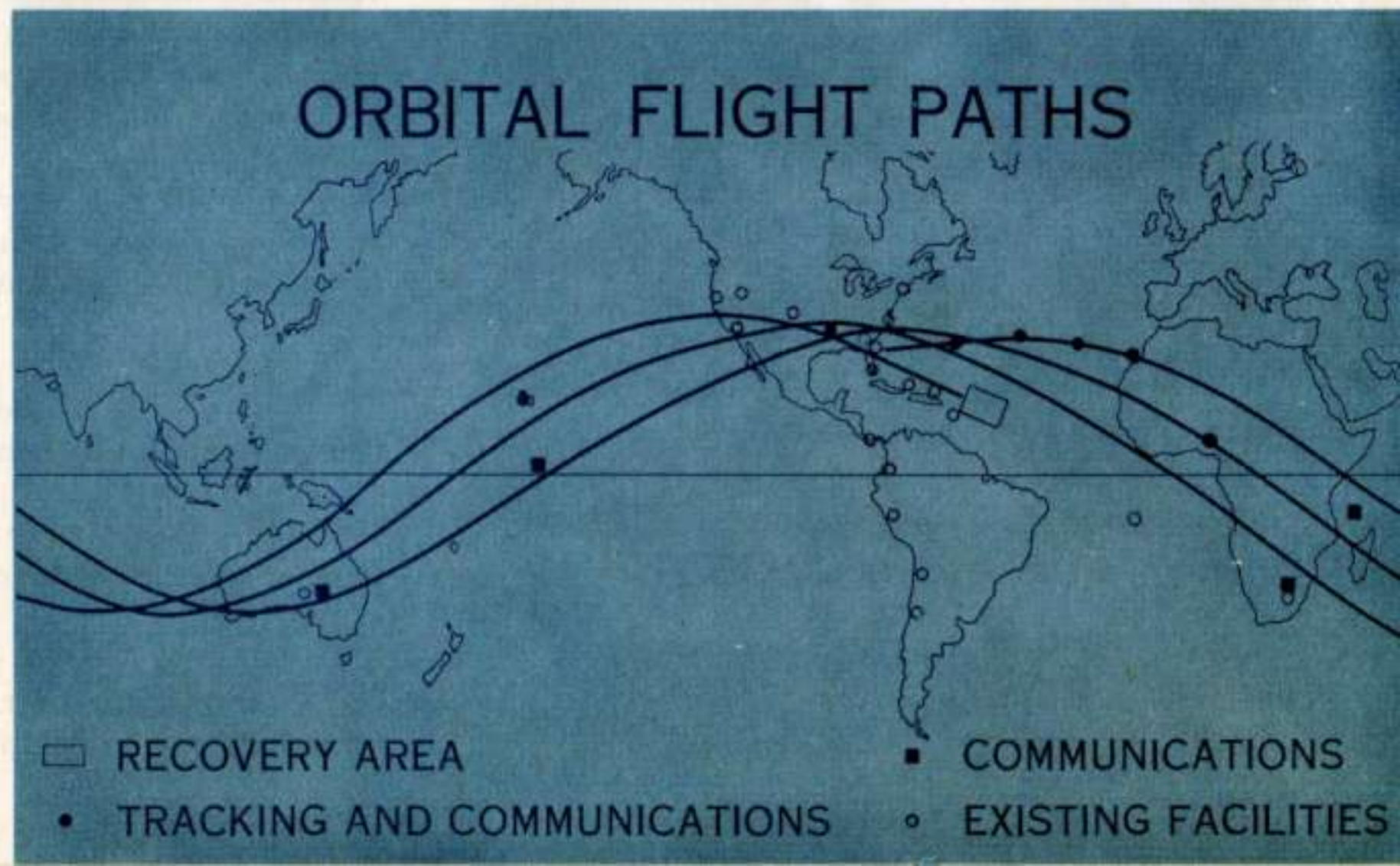
— requires communications with all the stations throughout the world set up for this project.

Many people are cooperating directly in project Mercury, with tracking and communications stations set up in their lands:

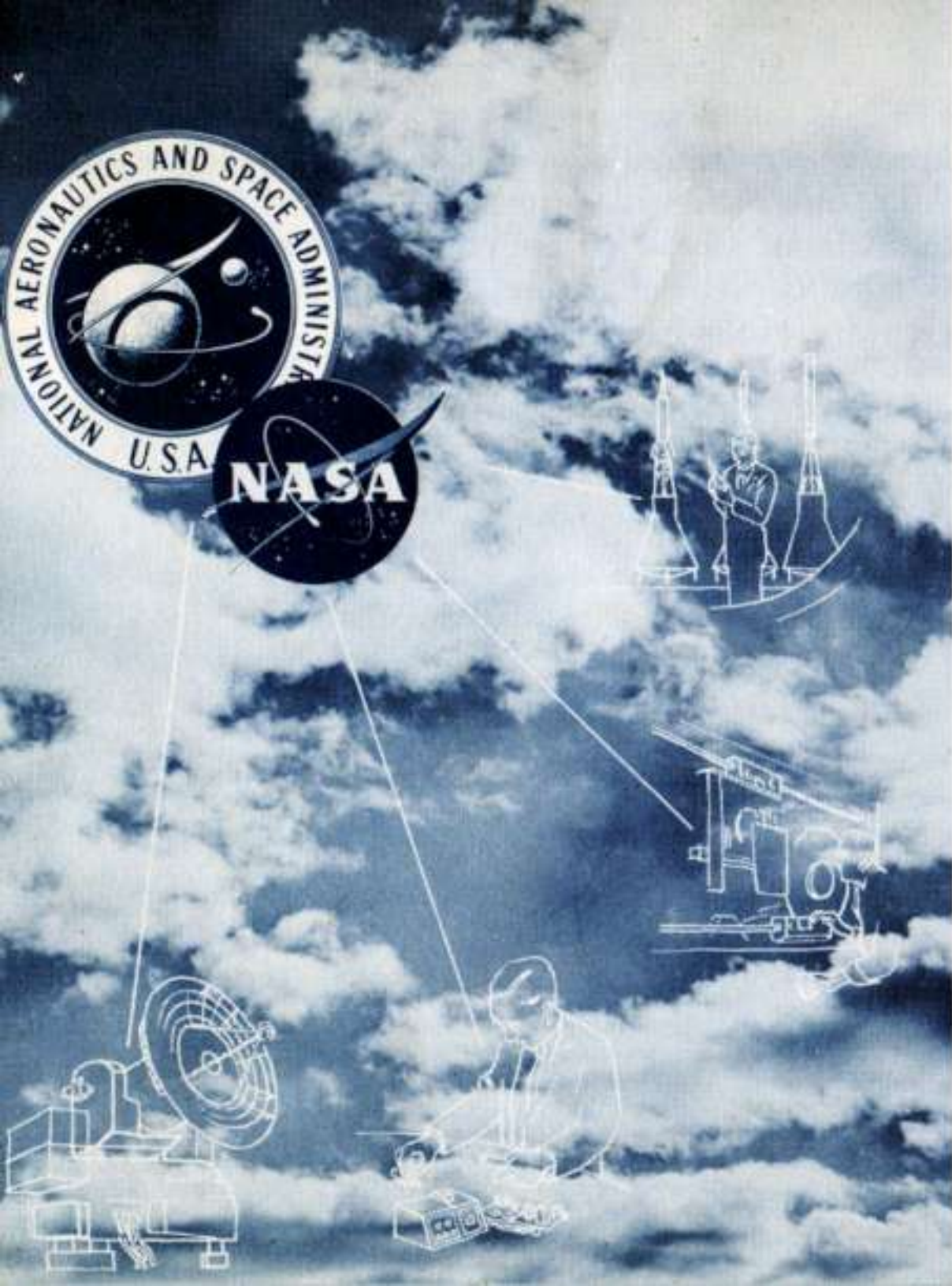
Australia  
Mexico  
Nigeria  
Spain  
United Kingdom  
United States  
East Africa

These countries can participate because, as it circles the earth, the capsule will pass over them. It was important to locate stations at these places to

keep in constant communication with the astronaut. Also, this path will permit the capsule to land in the Atlantic Ocean off the coast of Florida where it is most convenient to prepare for safe and quick recovery of the capsule.







## WHO IS CONDUCTING PROJECT MERCURY?

Project Mercury is a program entirely under the direction of the National Aeronautics and Space Administration, a civilian agency in the United States responsible for space research and exploration for peaceful purposes to benefit all mankind.

The program is a very difficult and expensive one requiring assistance from many different laboratories, private companies, and other Government agencies.

The construction of the capsules, for example, has been carried out by a private company.

Private companies have constructed and, for the most part, are operating the communications and tracking stations overseas.

Naval vessels and aircraft of the United States and other countries will help to recover the capsule at sea.





1. Atlas rockets boost manned space capsule from launching pad.



2. Escape tower is jettisoned; speed increases to 18,000 mph.



3. Capsule is released from the Atlas.



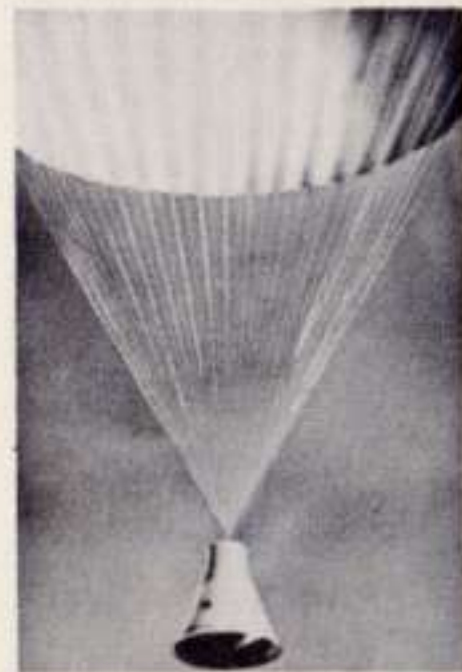
4. Blunt end forward, space capsule attains orbit path.



5. Retrograde rockets are fired to decrease speed for reentry.



6. Small drag parachute stabilizes space capsule in descent.



7. Main parachute opens to allow gentle descent of capsule.



8. Helicopter recovery party picks up astronaut after space trip.





## WHAT WILL AN ACTUAL PROJECT MERCURY FLIGHT BE LIKE?

On the day of the flight, the astronauts, the capsule, the Atlas rocket, and all the tracking and communications stations around the world will be ready.

The Atlas will stand upon its launching pad at Cape Canaveral in the United States.

The astronaut will put on his special space suit in a building nearby. Then he will be taken to an air-conditioned van near the Atlas launching pad.

Two hours before launching he will enter the capsule which will already be in place on the nose of the Atlas rocket.

As in an airplane, he will secure himself in his seat or couch and will make final checks on his oxygen and control systems. The attendants will carefully close the capsule door. Then the astronaut will be left alone while the preparations for launching the Atlas continue.

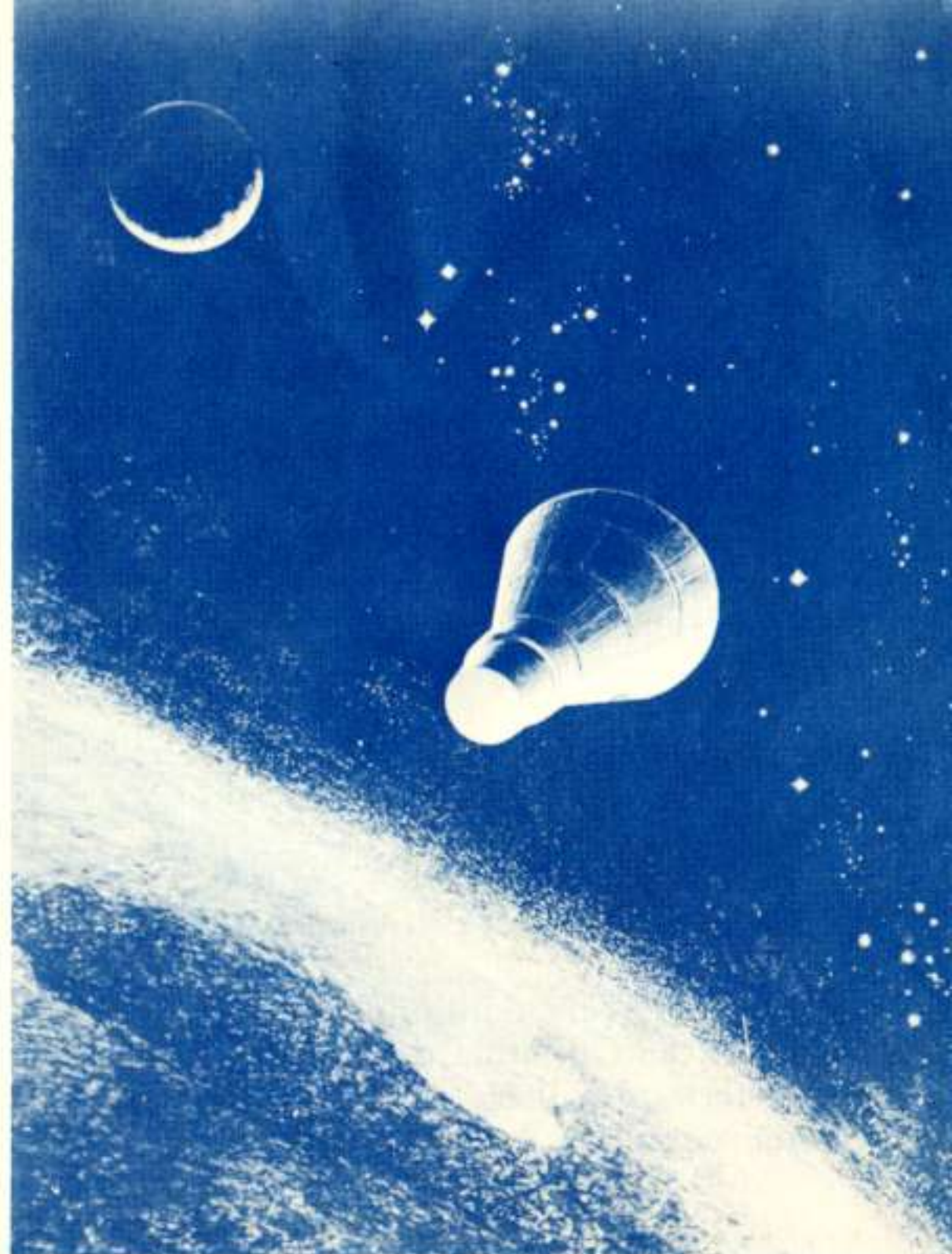
When all is ready, the Atlas will be fired.



It will rise slowly at first, then faster and faster. If the escape tower is not needed, it will be discarded. Within 5 minutes the Atlas will burn out, the capsule will be separated, and now it will be in an orbit around the earth, moving at a speed of about 17,400 miles (28,000 kilometers) per hour.



Small jets will be used to turn the capsule around so that the broad end, equipped with a special heat shield to withstand the friction of high-speed travel, is now facing forward. The capsule will now be without weight. The force of the earth's gravity will be exactly balanced by the energy given to the capsule.





The astronaut will concentrate on reporting his position, using his periscope, maps, tables of figures, and stop watches. In his right hand will be a control to keep the capsule in the correct attitude.

He will try to eat and drink to see whether this can be done under such conditions.

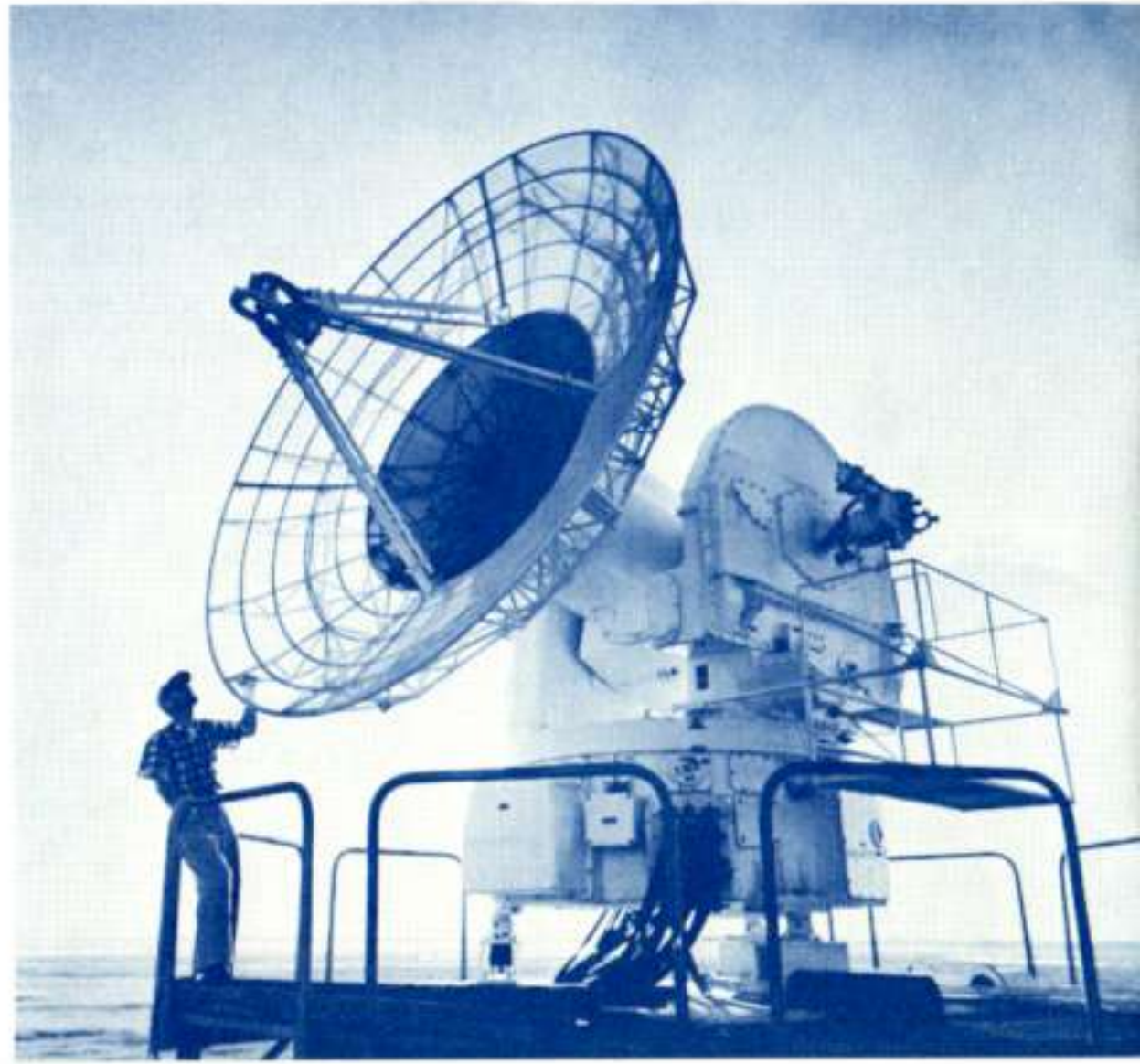
Far below him in the communications and tracking stations, ground controllers will receive signals from the capsule and will watch them carefully to see how the flight is going and whether the astronaut is in good condition.

Each ground station should be able to talk with the astronaut as he passes overhead.

The capsule will orbit, or circle, the earth three times. Each orbit will take about 90 minutes.

Near the end of the third orbit, when the capsule is very near the California coast, three small rockets facing forward will be fired. This will cause the capsule to begin its descent to earth.

The shield at the blunt end of the capsule will protect the astronaut from the very great heat that will occur when the capsule meets the heavier air of our own atmosphere.





At about 20,000 feet ( 6,000 meters) a small parachute will be released to help slow down the capsule and to keep it from swinging. At about 10,000 feet (3,000 meters) a large parachute, about 60 feet (18 meters) in diameter, will be released. This will slow the capsule down to a safe landing speed in the sea.

An impact bag will be extended about 4 feet (1 meter) below the capsule to help take up the shock of the landing in the sea.

Ships and planes waiting in the Atlantic will receive information from control stations about the position of the capsule. Then they will pick up signals directly from it. They will rush to the landing spot.

The capsule will be opened and the astronaut will emerge from his flight.



### **WHEN WILL THE FIRST PROJECT MERCURY MANNED FLIGHT TAKE PLACE?**

Test flights, short of a complete orbit of the earth, have been scheduled during 1961. The first flight of

a Mercury astronaut completely around the earth may take place in the same year or soon thereafter.





**Project Mercury will be only one of many steps in sending a man into space. It will be an international effort carried out with the cooperation and efforts of many peoples.**

**The plans, the details, and the results of Project Mercury are open to all. Peoples everywhere can share freely in the excitement and adventure of this peaceful research and exploration into space.**