

## ASTRONAUTICS

# Plan Space Telescope

The Congress of the International Astronautical Federation in Amsterdam was told of plans to put a telescope on an earth satellite and to reduce interplanetary travel time.

► ASTRONOMERS wish to put a telescope on an earth satellite in order to observe the stars from outside the masking of the earth's atmosphere, and the Congress of the International Astronautical Federation in Amsterdam was told that it can be done.

Dr. Fred L. Whipple, director of the Smithsonian Astrophysical Observatory and Harvard University astronomy professor, said the telescope would focus radiation from celestial objects so that an electronic scanning device can provide an image of an area of the sky at a monitoring station on the ground. The space telescope would be operated by remote control and there would be power in the satellite to keep it from rotating and spoiling the view and focus.

A wealth of new material would be obtained by the orbiting telescope in the far ultraviolet regions of the spectrum and this, Dr. Whipple said, would increase our understanding of the universe.

Such a telescope could be launched in a relatively short time if facilities are made available, because no major technological developments are required. It could be constructed, launched, and operated by reasonably simple modifications of present instrumentation.

For rocket propulsion, designers are turning to exploring the use of free radicals or dissociated molecules as high energy propellants, Dr. G. C. Szego of the General

Electric Company's flight propulsion laboratory at Cincinnati, Ohio, told the Congress.

Conventional chemical propellant systems are not able to yield an effective operating impulse of more than 400 "seconds," he explained.

A special branch of mathematics, the calculus of variations, although discovered 200 years ago, has found today "a most powerful application in the study of the flight paths of rockets and missiles," Dr. Angelo Miele of Purdue University's school of aeronautical engineering, told the Congress.

Devices for telling space travelers and watchers from earth the location of satellites and space rockets in relation to the earth were described by Edward J. Madden of the U. S. Army Engineer Research and Development Laboratories, Fort Belvoir, Va. The information needed should be a translation of machine language and should be presented simply as a picture of the earth over which the object moves, he said.

A nuclear energy powered rocket that can achieve exhaust velocities ten times as speedy as any chemical rocket was visualized by Dr. F. Winterberg of Hamburg, Germany, in a paper before the Congress. Hydrogen would be heated in a nuclear reactor up to several thousand degrees and then expanded in a nozzle. Higher exhaust velocities would be obtained by heating the hydrogen during its initial expansion.

## Interplanetary Time Cut

► TRAVEL TIME from earth to Mars or Venus and back can be reduced a year or more by starting out with velocities slightly higher than the lowest needed to make the trip.

Dr. W. E. Moeckel of the Lewis Flight Propulsion Laboratory of the National Advisory Committee for Aeronautics, has reported that the round-trip time to Venus can be cut 360 days by increasing the initial velocity one and a half miles per second.

Round-trip time to Mars, Dr. Moeckel told the Congress, can be reduced from 973 days to 400 days by starting out at about 15 miles per second instead of about seven miles per second.

A large part of interplanetary travel time, he pointed out, would be spent at the destination planet waiting for the earth and the planet to move into the proper relative position so that the returning spaceship and earth will arrive at the same point at about the same time. Because of this problem, simple reductions in transit time do not necessarily produce reductions in total round-trip time.

Dr. Moeckel tackled the problem of reducing the total trip time as much as possible and at the same time using the least possible excess energy and, therefore, fuel.

To have a common basis for comparing the paths, Dr. Moeckel considered trips starting from a circular orbit around earth and ending in a circular orbit around the planet. The reduced times apply only if the spaceship spends a very short time at the destination planet.

Sizable increases in starting velocity are required to provide adequate exploration time, Dr. Moeckel concluded.

## Probe Corona Mysteries

► A BOLD PLAN to investigate the sun with a special rocket in order to solve some of the solar mysteries was discussed by Dr. R. P. Haviland of General Electric's missile and ordnance systems department, Philadelphia, at the Congress.

With the present state of the rocket art the distance of closest approach to the sun would be the orbit of the planet Mercury. But with available components scientists could make a solar probe vehicle that would reach within 5,000,000 miles of the solar surface.

"The earth is immersed in the solar atmosphere," Dr. Haviland explained. In the vicinity of the earth this atmosphere consists largely of ionized hydrogen with a density of about 400 particles per cubic centimeter. During an eclipse the excited atmosphere of the sun may be observed as the corona, which extends to a distance of 24 radii from the sun with a temperature of about 1,500,000 degrees Kelvin.

Parts of a solar probe already available would withstand temperatures that would allow a relatively close approach to the sun.

Dr. Haviland suggested a solar probe should be attempted during the extension of the International Geophysical Year.

Science News Letter, September 6, 1958



*MODERN HOME—The Unesco House that, from the standpoint of design, construction and purpose, is the most international building in Paris, will be officially opened to the public on Nov. 3, 1958.*