SPACE

Radiation Belts Sought

➤ THE DISCOVERER of the earth's radiation belts, Dr. James Van Allen, is now on the track of radiation zones circling close above the polar region.

Dr. Van Allen, head of the physics department, State University of Iowa, Iowa City, told SCIENCE SERVICE that satellite experiments now underway could show if the dumping of trapped particles in the aurora zones, causing the spectacular northern lights, come from separate radiation belts or originate from the radiation belts already discovered.

He said measurements have already been made by the Injun satellite sent aloft June 29 with the navigational satellite Transit IV-A. Experiments have also been carried in the Explorer XII satellite for measuring these particles and soon a new Injun satellite will be launched with more advanced equipment to continue the studies.

Dr. Van Allen told newsmen at the American Rocket Society meeting in New York that many space scientists lack basic competence. He suggested that the Government support basic research in universities in the form of facilities and fellowships to offset this shortcoming. He said $2,000 and tuition fees should be the bare minimum for fellowships and added that $100,000,000 a year would be a generous appropriation for university space research. As of now, no appropriations for such purposes have been made by the United States Congress.

He recommended that undergraduate students intending to go into space science should have thorough training in basic sciences such as mathematics, physics and classical mechanics. On the graduate level, Government-sponsored programs in space research could give future space scientists a solid foundation for work in the field. He said there are now not more than 25 "real pros" in space sciences, whereas in the field of physics, there are at least a thousand. Most of the scientists in the space field are "transplants" from other fields.

Dr. Van Allen says he hopes work done in the next few years will bring knowledge of the influence of radiation belts on weather, on magnetic storms that interfere with communication, and show whether the planets are surrounded by radiation belts similar to those circling the earth.

The radiation from the Van Allen belts is considered dangerous to space travelers. However, Dr. Van Allen said the greatest danger to man in space is radiation from the sun during solar storms, which cannot be predicted at this time.

He said the Explorer VII satellite showed 21 solar events occurred in 17 months, but out of these, only one, from Nov. 12-16, would have been fatal to man outside the earth's shielding atmosphere. He added, a man in space at that time would have needed more than one inch of aluminum shielding, or one ton per person, to withstand the lethal effects.

The shielding problem is difficult at this time because of the present limited lifting capacity of space boosters. Man will have to take his chances if he goes into space now or wait until enough shielding can be provided, he said.

Dr. Van Allen, who received the Rocket Society's first annual research award of $2,500, feels that on the whole the U. S. is ahead of USSR in scientific space achievement despite a few spectacular Russian achievements.

• Science News Letter, 80:287 October 28, 1961

SPACE

Saturn Shot Scheduled

See Front Cover

➤ THE WORLD'S largest known rocket, the U.S. Saturn, will zoom 90 miles into space soon.

This is the first of ten scheduled test firings of the 162-foot Saturn C-1 rocket. The tests are expected to lead to operational Saturn C-1 rockets in 1964 and more advanced models shortly thereafter, the National Aeronautics and Space Administration reported in Washington, D.C.

The C-1 Saturn model is scheduled to send three men on a whirl around the earth in the Apollo capsule. The advanced Saturn is designed to take a three-man crew around the moon and return them to earth. The trip will be a test for later lunar landings of manned spaceships.

The main purpose of the first Saturn shot, to be known as the SA-1, is to test the propulsion system and the booster, also called the first stage. It is also hoped the flight will prove the design of the whole vehicle in flight and the launching equipment.

Only the first stage of the first Saturn rocket will be "live," carrying fuel. The two upper stages will be ballasted with water to give them the weight they would ordinarily have when carrying propellants. The probable path traveled by the rocket from launch to finish is about 225 miles. The flight is expected to take around eight minutes with speeds up to 3,700 miles per hour.

The development of the Saturn has presented a multitude of problems because of the rocket's size. The general field of rocket technology has received a great boost from the work carried out on it.

The Saturn program is under the technical direction of the NASA Marshall Space Flight Center, Huntsville, Ala., whose scientists are optimistic about the outcome of the project, although setbacks are anticipated along with successes. Five successful launches are expected from the ten scheduled test launchings.

At lift-off, the first Saturn will weigh about 925,000 pounds and will be fired by eight H-1 engines. Each engine will have a thrust of 165,000 pounds, giving the first stage a total of 1,300,000 pounds of thrust.

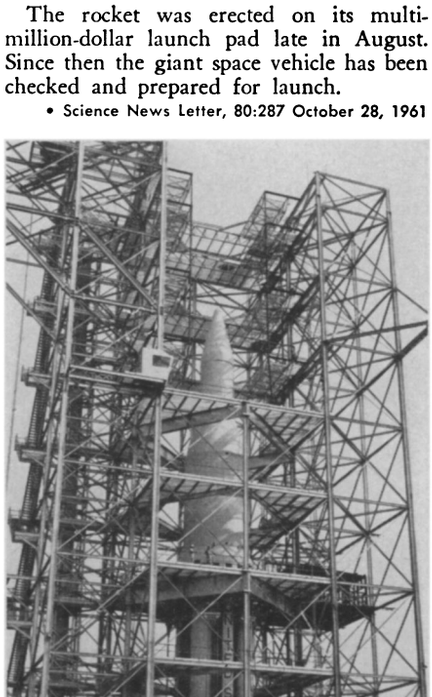
The booster, seen on the front cover, will carry 600,000 pounds of propellant, which is 150,000 pounds less than its maximum carrying capacity. The second stage weighs 25,000 pounds and will carry 90,000 pounds (almost 11,000 gallons) of water as ballast. The upper stage weighs 3,000 pounds and will carry 100,000 pounds (12,000 gallons) of water.

The dummy payload, a nose section of a Jupiter missile, weighs slightly more than a ton. This payload will in operational flight be substituted by the Apollo capsule carrying astronauts into an earth orbit and, later, to the moon.

The two first stages were made at the Marshall Center. General Dynamics/Astronautics provided the third stage. The "live" second stage to be used in later Saturn rockets is being developed by Douglas Aircraft Co. All stages were transported by water from Huntsville to Cape Canaveral, Fla.

The rocket was erected on its multi-million-dollar launch pad late in August. Since then the giant space vehicle has been checked and prepared for launch.

• Science News Letter, 80:287 October 28, 1961



***LARGEST KNOWN ROCKET—** The first Saturn C-1 during vibration tests at NASA's Marshall Space Flight Center, Huntsville, Ala.*