TECHNOLOGY

# Venus Probe Lightened

➤ THE AGENA ROCKET has been made lighter so it can launch the first U. S. probe to the planet Venus this summer.

The Agena, workhorse second stage that has shot many satellites into space, was chosen to launch the Mariner I Venus probe because the hydrogen-fueled Centaur program originally scheduled for the job has run into a snag.

The Venus space probe could not wait since the "window" from the earth—the time when the planet is in the most favorable position—occurs only every 19 months.

Last time the favorable path to Venus was available, the Russians shot their Venus probe at the planet, only to lose radio contact. The Russian probe was launched Feb. 12, 1961. The U. S. wants to take advantage of the Venus "window" this summer. Otherwise another 19 months will elapse before another try.

The U. S. Air Force Space Systems Division in Inglewood, a part of Los Angeles, made about 15 improvements on the Agena to cut down its weight, Lt. Arthur W. Vogan of the Air Force told Science Service. The group had six weeks to figure out how to do it.

The most important improvements were:

1. Miniaturization of the power supply from five black boxes to three.

2. Since the Mariner I is not designed to impact Venus but pass by 16,000 miles, no sterilization was necessary such as has been used on the Ranger probes expected to crash into the moon. Therefore the membrane encapsulating the Mariner inside the Agena was eliminated.

3. A lightweight telemetry system for sending signals back to earth was adopted. The same capacity was achieved with about half the weight.

4. A new retro- or brake-method for launching the Mariner from the Agena was decided on. The retro-rocket used on the Agena for the Ranger is a solid fuel rocket which was more than needed for the Mariner. Instead, the gas left in a tank will be discharged through a nozzle giving an impulse opposite the line of flight.

5. A lighter heat shield of titanium was designed for the Agena engine.

The Air Force has built two Agena stages in five months and both are scheduled to go to Venus carrying Mariner probes within 50 days of each other.

Both will stand ready when the first one is launched in a few weeks. Both will have the same mission and will arrive near Venus at about the same time, between Dec. 10 and 16, plus or minus two days, because the path to Venus will be shorter at the later launch date. The Mariners will study the mystery planet, always shrouded in clouds, its atmosphere, radiation, electrically charged particles and the magnetic fields between earth and Venus.

The Air Force has increased its spare parts for space launches by 50%. Two guidance systems are kept ready and checked out for a space vehicle instead of one. The second Agena standing ready with its Mariner can also be used as a spare. A spare "nose," the cone-shaped end of the Agena in which the Mariner is housed, will also be ready if needed.

When the Atlas-Agena carrying the Mariner I is launched, a team of experts will immediately receive information if anything in the space vehicle malfunctions and will be able to correct it for the second Mariner shot. As the rocket lifts off into space the information is sent back to a ship in the area. An airplane will receive the information while flying over the ship and take it back to land.

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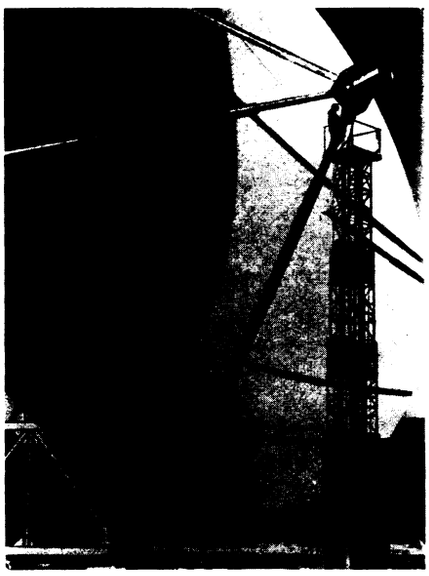

*MOST ACCURATE EAR—Surface variations have been reduced to less than one millimeter on this 85-foot radio telescope built by Philco Corporation for the University of California's Radio Astronomy Laboratory at Hat Creek.*

TECHNOLOGY

## Machine Reads Written Numbers for Computers

➤ HANDWRITING is often difficult to read but now a machine can recognize numbers written in many individual styles. Moreover, the machine (demonstrated at Tufts University recently) reads and feeds the numbers directly into a computer without passing through human hands or brains.

Still experimental and not ready for marketing, this creation of the International Business Machines Corporation is used by Tufts University Institute for Psychological Research, where in tests 150 people have written 100,000 numbers on cards.

The machine made a score of 98.5% accuracy. Most of the ones missed were pencilled by the same 10% of the persons in the test.

The way the machine operates is to scan the numerals optically and when a numeral is matched, a card is punched which can be processed by conventional computers or accounting machines.

Most people write well enough to suit the machine, but a few must be retrained to make minor changes in forming their numerals.

For some three decades, attempts have been made to read automatically records in print and handwriting. Optical scanning of printed characters was developed over a decade ago. Magnetic ink is used to print identification on bank checks for sorting. Another method applicable to handwritten records is detecting the conductivity of the handwritten graphite pencil marks.

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MEDICINE

## AMA Issues Revised First Aid Manual

➤ SINCE the beginning of World War II, when first aid became for a time a classroom subject in many schools, the art of doing what is right at the time of an injury has evolved in step with medicine itself.

Consequently, what used to be considered good practice when dad was a boy is often no longer recommended by medical authorities. Some of the old-style first aid procedures, in fact, have been found to be more injurious than the injury itself.

An up-to-date list of do's and don'ts for handling the more common variety of emergencies has been issued by the American Medical Association in a 48-page pocket-size first aid manual. Subject matter ranges from cuts to childbirth and from scorpion stings to mental disturbances.

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GENERAL SCIENCE

## Hydrogen Bomb Fired 200 Miles Above Pacific

➤ THE UNITED STATES set off a hydrogen bomb 200 miles above the Pacific Ocean on July 9, one in a test series known as Operation Dominic.

The megaton explosion was the most powerful ever conducted at such an altitude, which is in the upper layer of the ionosphere. Light from the blast turned night into day in Hawaii, some 700 miles northeast of the Johnston Island test site.

At Auckland, New Zealand, 3,000 miles to the southwest, an artificial aurora was seen on the northern horizon. Radio communications across the Pacific were disrupted only temporarily by the detonation. The Van Allen radiation belt was not affected, as far as is known.

The explosion also set off political reverberations, with Moscow radio branding it a "crime" by American atom-maniacs.

The following day the U. S. set off the 26th nuclear bomb in the Pacific test series, dropping the device from an airplane near Christmas Island.

• Science News Letter, 82:46 July 21, 1962