

aerospace

PATENTS

Income for NASA

About two years ago, the National Aeronautics and Space Administration announced that it was prepared to offer exclusive licenses to foreign countries, on a royalty-paying basis, for manufacture of inventions covered by the space agency's foreign patents. This month, NASA granted its first such license.

The license is to the Nippon Electric Co., Ltd., of Tokyo, for exclusive manufacture in Japan of a light-weight, flexible system of interconnections between solar cells, covered by Japanese patent No. 484,436. The company made an initial payment to NASA with the granting of the license, and will continue paying royalties.

The two-year lag between the space agency's announcement and the award of the license was due, NASA officials say, to the time for patents to be obtained.

SATELLITES

Ariel 4 planned for 1971-72

A fourth satellite in the successful Ariel series will be launched for Britain by the U.S. in late 1971 or early 1972.

The Ariel probes are designed for upper atmospheric research. Ariel 1, a joint U.S.-British satellite launched on April 26, 1962, gathered ionospheric, X-ray and cosmic ray data for more than two and a half years. Ariel 2, also cooperatively built, was launched on March 27, 1964, and worked for eight months. Ariel 3, launched May 5, 1967, was the first research satellite ever built entirely by Great Britain. Launched by the National Aeronautics and Space Administration, it is still operating.

The newly added satellite will also be British-built and U.S.-launched. Carrying four British and one U.S. experiments, it will investigate interactions among the charged particle streams and electromagnetic waves in the upper atmosphere.

HIGH-ENERGY PHYSICS

1,000 GeV studies proposed for space

An experimental space module, which would be attached to a manned space station to study extremely high-energy phenomena through cosmic rays, is proposed by researchers at Brookhaven National Laboratory and Grumman Aircraft Engineering Corp.

Called SHEPOS, for Super High Energy Physics On Satellites, the module would probe elementary particle structure and the origins of cosmic rays coming in at energies as high as 1,000 billion electron volts (1,000 GeV). The most powerful ground facility now planned for the U.S. is an expanded, 400 GeV version of the Weston accelerator to be built in Illinois. The Soviet Union is contemplating a 1,000 GeV device (SN: 1/18, p. 63).

Heart of the SHEPOS system would be two new, relatively lightweight and very accurate high-energy particle detectors now under development. One, the transition radiation detector to measure particle velocity, is underway at Brookhaven; a total absorption nuclear cascade

detector for particle energy is being developed at Stanford University.

Experiments planned for SHEPOS include searches for quarks, anti-matter, super-heavy nuclei and the probability of proton-proton interactions.

COMMUNICATIONS

Nuclear comsat seen by Germany

A communications satellite equipped with a nuclear reactor to provide enough power for direct broadcast to homes is being considered by scientists at the German Institute for Research into Air and Space Travel, Brunswick, as well as several German aerospace and nuclear energy firms.

The proposed reactor, says Dr. Wolf Rasch of the institute, uses enriched uranium fuel elements, each 45 cm. long and 5 cm. in diameter, and can provide from 5 to 200 kilowatts of power. Because the reactor would not be activated until the satellite was in orbit, the only shielding necessary would be that to protect the electronic systems from radiation. Including the shielding, the weight of the reactor is expected to be between one and two tons, yielding a total weight of from 1.6 to 3.2 tons.

Such a satellite, with a 20-kilowatt reactor would cost an estimated \$50 million, plus another \$120 million for costs of launching and of the reactor itself.

SOUNDING ROCKETS

Busy year for ESRO at Kiruna

Almost twice as many research sounding rocket launches are scheduled this year from the European Space Research Organization's facility at Kiruna, Sweden, as were conducted in 1968.

At least 40 launchings are planned, of which half are to be sponsored by ESRO, nine by Sweden and the rest by other individual ESRO member nations. Last year there were 23 launches, 14 of them by ESRO. The maximum number at present allowed by the Swedish Government is 50 a year, largely because of the disturbance to the local population, principally Lapps. Officials of ESRO are planning negotiations to try to increase the number.

Most of the research at the Kiruna site is concerned with areas such as the sun's influence on the upper atmosphere and the northern lights. One major project planned for 1968, an 11-rocket study of the interaction between solar proton radiation and earth's ionosphere in the polar regions, had to be postponed when the desired levels of activity did not appear.

ADMINISTRATION

Paine confirmed as NASA head

Dr. Thomas O. Paine passed the next to last step in becoming administrator of the National Aeronautics and Space Administration when, on March 14, the Senate Space Committee unanimously confirmed his March 5 appointment by President Nixon. Dr. Paine had been the space agency's acting administrator since James E. Webb resigned Oct. 7.

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