

LETTER FROM TOKYO



Japan asks for help

**Ambitious space goals
will need cooperation
from the U.S., which
Japan is now seeking**

by Stuart Griffin

Japanese space engineers were pleased in February (SN: 2/28, p. 232) when the country became the world's fourth to orbit a satellite. It was particularly pleasing to have done so before neighboring Red China (SN: 5/2, p. 427), and on a much smaller budget. It was a point of pride that the rocketry and satellite were designed and built in Japan.

But Japan has ambitious plans in space. "We aim," says Muroo Murakami of the Space Development Agency, "to make a national effort to secure a place for Japan in the international space development race." To do that, the Government is planning to put up a large number of satellites in the 1970's.

Japan's efforts seem bound to grow rapidly. During the past 15 years the country has spent about \$95 million in space rocketry development but in fiscal 1970-71 alone (begun this past April 1), the rocketry portion of the budget will soar to about \$68.6 million.

The rest of the decade will match the pace. Says Prof. Sumio Sasahara of the Japan Rocket Industry Association: "Japan's total national demands for space development equipment and services to be generated during the six-year period from fiscal 1968 to fiscal 1973-74 can be figured at roughly \$583 million, and those during the following four years, from fiscal 1974 through fiscal 1977-78, at approximately \$741 million—a grand total of about \$1,333 million."

To carry out such a program in a hurry will require more rocketry than Japanese engineers have been able to develop on their own. While space designers at the University of Tokyo were developing the simple rocket that finally flew the country's first satellite, others at the Science and Technology Agency were designing more ambitious projects, aimed at incorporating hardware and rocket engineering advances made in the United States.

Development of good rockets, including the proposed Q-rocket for orbiting an ionospheric observation satellite, is the prime target of intensifying industrial activity.

The Government has decided to let industry introduce United States technology into development of this rocket, and Mitsubishi TRW is now working on a systems-designing phase of the job, with help from TRW Inc. in the United States.

Nippon Electric has unofficially been selected for development of a rocket

guidance system, with similar assistance from Honeywell, Inc.

As for the Q-rocket itself, the Government has virtually decided to let Nissan Motor, Japan's second biggest vehicle-making concern, develop solid fuel for the first and second stages; Mitsubishi Heavy Industries will develop liquid fuel for the third stage and solid fuel for the fourth stage, and Ishikawajima-Harima will have responsibility for attitude control side jets.

Mitsubishi Heavy Industries has already been named to coordinate all the jobs.

The satellite itself is being developed by Mitsubishi Electric with help from Toshiba (Tokyo Shibaura Electric), Hitachi, Nippon Electric and Fujitsu, Ltd. Mitsubishi is prime contractor for the job ordered by the Radio Wave Research Laboratory of the Ministry of Posts and Telecommunications. The American firms approached, besides TRW, include McDonnell Douglas, General Electric, Aerojet-General and Martin Marietta, and help will further be sought from Hughes Aircraft and Lockheed Aircraft.

Competition is said to be mounting in the industry for development of more rocket and satellite production technologies since the Tokyo Government has also decided to develop its followup N-type rocket through American technological cooperation.

Tokyo Shibaura and Ishikawajima-Harima, joined by the integrated import-export firm Mitsui and Co., are intending to go with Martin Marietta, if possible, for launching a joint rocket systems design venture in Japan.

General Electric and Aerojet-General of the United States will probably join the venture. Toshiba is also planning to introduce GE's satellite-building technologies, taking full advantage of technical relationships extending back over six decades.

Three other firms, Nissan Motor, Hitachi and Fuji Heavy Industries are reportedly getting together to develop Japan's own domestic technologies.

Kawasaki Heavy Industries, which has been slow to build up its own space development line, is also trying to gain the cooperation of Lockheed Missiles and Space Co.

And the Mitsubishi Group, including Mitsubishi TRW, is, meanwhile, trying to establish itself as the industry's acknowledged leader. It has approached McDonnell Douglas Aircraft for its Thor-Delta rocketry in an effort to consolidate its position.