

IX. Sounding Rocket Management and Administration

-- Junjiro SHIMOMURA --

1. The IGY and Rocket Sounding

The direct observation of physical phenomena in the upper atmosphere by rocket sounding during the third IGY was an epoch making event. Seven countries had planned to do rocket sounding, and five have realized this goal individually. Japan was the country in the Far East in charge of the northern hemisphere and flew 9 sounding rockets at DOSEN in Akita Prefecture. [See Note] Japan has been in charge of the IGC which was established the year after the completion of the IGY, as part of the work of committees in this country for COSPAR under the ICSU, which was newly established by the Japan Science Council. During this time, the new sounding rocket KAPPA 8 has been added to the KAPPA 6 which was completed during the IGY. The number of rockets which have flown at the Akita Proving Grounds reached 75. Among these are 17 sounding rockets. Around February 1955, when it was decided to participate in the IGY, since we had not even completed the PENCIL rocket, we resolved to participate only as a project, and the fact that we were able to realize one part of our goal was due, I believe, to the frontier spirit of those involved, including the directors and assistants. (Note: 140° 03' 35"E)
39° 34' 12":

In addition to launching rockets from the ground, research on a "Rockoon" was taken over from the Institute for Atomic Research in November 1958, and after several preliminary tests, a proving ground was established in Aomori Prefecture, where flight tests of the SIGMA Rocket are presently in progress.

2. The Resolution of the Geodesic Council of the Ministry of Education and the Materialization of Rocket Sounding

Two resolutions passed in recent years by the Geodesic Council of the Ministry of Education were approved by the Minister of Education, transmitted to the President of our University, and form the basis for embarking on sounding rocket research by this Institute. One of these resolutions, made on February 3, 1955, was an expression of the hope that it would be possible to observe the upper atmosphere during the IGY using the upper atmosphere sounding rockets of the Institute of Industrial Science. The other resolution, made on July 9, 1955, was the hope that this research would be continued after the IGY. Previously, the special committee

(CSAGI) of the ICSU advised and resolved when meeting in October 1954, and July to August, 1958 that every country should cooperate in rocket sounding. This resolution expressed Japan's decision to follow the international trend and organization.

3. The Inter-Ministry Liaison Council and the Akita Prefecture Rocket Sounding Society

At a conference of Vice-Ministers from each Ministry on June 27, 1955, a proposal was made for a "Flight Plan for Sounding Rockets". Each associated administrative agency decided to cooperate in the selection of rocket launching areas, warning systems, maintenance of safety, and recovery of data and an "Inter-Ministry Liaison Council for Sounding Rockets" was established in the Ministry of Education. Representatives from prefectural offices concerned with proving grounds, and central government offices including the Ministry of Education, the Police Agency, the Maritime Safety Agency, the Fisheries Agency, the Civil Aviation Bureau, the Maritime Transportation Bureau, the Radio Regulatory Bureau, the Ministry of International Trade and Industry, and the Autonomy Agency participated in the selection of firing grounds and (on occasion) tests, and discussed problems such as land-sea-air warning systems, notices, fishing regulations, radio, explosives, and other security maintenance procedures.

The Akita Prefecture Rocket Sounding Society first convened in August 1955 at the Akita Prefecture Office with the governor of Akita Prefecture presiding, and later met on the occasion of other experiments. On July 29, 1957 the inaugural meeting and drawing up of the rules was held. The Chairman was the governor of Akita Prefecture, the Vice-Governor was Vice-Chairman and over 50 members were approved and endorsed, including the Chairman of Akita Prefectural Assembly, the president of Akita University, the director of Akita Police Headquarters, head of the Maritime Safety Division in Akita, head of the Akita Local Meteorological Station, director of the Akita Railway Management Bureau, director of the Akita Prefecture Central Hospital, the mayor of Akita City, and the mayor of Iwashiro. Thus a system was established based on local personnel for the Inter-Ministry Liaison Council. The preliminary meeting concerning coastal safety which was held in Akita City for this society, and the DOSEN Council which convenes in the town of Iwashiro form the basic driving forces which have stimulated rocket sounding for almost 6 years.

4. Rocket Sounding Council, Chief Council, SR Managers Council

The Rocket Sounding Council (ROKK) is the primary organization devoted solely to rocket sounding projects. The ROKK originated as the successor to the Special Committee for Rocket Sounding in the Japan Science Council established during the IGY, and was organized to include affiliated members of the Institute, and PI [sic] researchers assigned to this University [Tokyo University] [see note]. Meetings are held ten

times a year. Research plans and budgetary problems are discussed, and in consideration of administrative discussions, representatives from the Ministry of Education, COSPAR and Tokyo University attend. An SR Managers Committee composed of 7 instructors representing each field is organized for the purpose of discussing ordinary management topics within the Institute. Also there is a Chief Council for covering technical problems, but the most recent meeting chiefly are called by test directors during experiments. The SR Research Group is an organization of the ROKK excluding administrative personnel and occupies the same position as ROKK.

(NOTE: Personnel from the Science Faculty of Tokyo University, Tokyo Astronomical Observatory, the Engineering Faculty of Kyoto University, the Science Faculties of Osaka Municipal University, Nagoya University and Rikkyo University, the Institute of Chemistry, the Radio Laboratory of the Ministry of Postal Services, the Electrical Communications Laboratory of the Nippon Telegraph and Telephone Public Corporation.)

5. Design Conferences, Flight Crew Conferences, Field Operations

Conferences on design are usually held independently after each flight test of a rocket and also are sometimes held for ground tests of engines, antennas and payload instruments. Many research groups from the manufacturing companies participate in the conferences. The significance of conferences on design lies not only in the fact that rockets are now internationally famous, but also in the fact that they help to realize positively evaluations from the experiments.

Conferences by the flight crew are preliminary meetings at which all test personnel are present, and usually takes place one month prior to the date of launching. Of course, there are many items of discussion when tests take place at a new site. For example, the following items have been discussed over the past five years at the Akita Proving Grounds: fixing flight dates, crew organization, preliminary tests, make-up instruments, agenda such as coordination and operation rehearsals, fixing dates for press conferences, enlisting part time help, lodging, and transportation of equipment. To cite an example, below is the organization chart for the September 1960 tests.

ORGANIZATION CHART FOR THE K-8-3

(Date of arrival in Akita in parentheses)

Name of Crew	From the Institute	From Outside	Part time Students
Experiment Director:	Saito(12), Deputy Tomaki(11)		

Table (continued)

Name of Crew	From the Institute	From Outside	Part time Students
Rockets:	Yoshiyama(11), Akiba(14), Hayashi(12), Hirosawa(12), Tamiya(12),	FS Itabashi(10), Kakimi(12), Nakatsuchi(12), Tokisue(13), Shirota(13), Arai(13), Kawatani(13)	
Launcher:	Mori(12), Mitsuishi(12), Nagai(12), Ogura(12), Hasebe(12), Matsuo(12), Makuryu(13)		Y-3~Y 3
Radar:	Hamazaki(12), Kameo(13), Hasebe(9), Kurihara(13)	MD Fukushima(10), Urimoto(10), Motoma(10), Takahashi(10)	
Telemeter:	Nomura(12), Katayama(13), Funatsu(9)	ND Takahashi(15), Nerishi(15) Fukui(15)	
Instruments:	Imazawa(16)	MT Kazunami(16)	
Timer:		IS Nakamura(13)	
Cosmic Rays:	Miyazaki(16), Takeuchi(16)	KS Otsuka(16), Oya(16)	
ID:	Ichinomiya(16) Takayama(16), Ohara(17) Ikegami(17), Miyazaki(16), Akita(16), Hitao(16), Jo(16)	YD Sugiyama(16), Muraoka(16)	
Sounding:	Oshima(14), Tsuda(14), Ito(14)		Y-2~Y 3

Table (continued)

Name of Crew	From the Institute	From Outside	Part time Students		
Camera:	Tanaka(13), Takano(13), Nagano(13), Ito(13), Sakaguchi(13)			Y-2~Y	4
Communications:	Takanaka(12), Suzuki(13), Ichikawa(13)			V-2~Y	5
Recording:	Itogawa(12), Hirosawa(combined with other) Yasuda(12), Tamino(combined)			Y-1~Y	1
General Maintenance:	Shimomura(11), Watari(11), Yoshinaga(10), Ogawa(10), Inoue(11), Horie(10),		Police Receptionist Liaison	Y-2~Y Y-2~Y Y-2Y~Y+1	15 3 1
TOTAL	52	20		35	

In field operations, all necessary steps must be considered for carrying out rocket flight objectives, but I believe that what is most hoped for is smooth operations and advance precautions against mishaps. The principle responsibilities besides technical matters are: liaison with outside cooperating agencies, radio announcements, the Fishery Radio Bureau, ordinary telephones, signal beacons such as flags, sirens, and flares, weather observation, restriction and warning of transportation during special observations, and isolation of noise interference. Incidental responsibilities include press releases and treatment of observers which both carry considerable weight. Also, a considerable amount of attention is paid to printing, power sources, maintenance of transportation, conservation of telephones and interphones, meals and sanitation, simple construction work such as increasing improvements and moving.

Also, measures must be taken for living conditions in winter and for nighters [sic]. Outside people contacted are the Maritime Safety Regional Headquarters, the Police and local inhabitants. As for maritime safety,

in the case of experiments in Akita, emphasis was placed on the fishing vessels along the coast. In addition to assigning patrol craft from the Maritime Safety Agency, helicopters were used for rocket recovery experiments.

In recent years the sea danger area has been limited to the area where the rockets fell, having an angle 12° wide from left to right from the launching point. As a rule, the fishing vessels had freedom of operation and were requested to withdraw from their operating area 30 to 60 minutes before a launching. However, at the height of the sardine season experiments were generally cancelled in consideration of the period of maximum catch. Moreover, flight plans were announced yearly to responsible members of the unions and cooperatives of the coastal fishing enterprises, and their understanding was obtained. There are, however, no provisions in our budget for compensation to fishermen.

Professor Itokawa says that field operations constitute one theme of research in rocket system engineering. The rationality and economy of facilities, organization, negotiations, technical processes, and time schedules should be idealized. Since there is a conflict between the tendency to have routine work and the desire of the scientists to do research, these constitute a problem which must be solved by administration.

6. Selection of Proving Grounds and Facilities

The Akita Proving Grounds are about 12km south of Akita city on the coast of Iwashiro-cho, Waza, Katte, Yuri-gun, but this place is generally known as the shore of DOSEN. It was established in August 1955 and in 1956 it was moved north 700m to its present location, where it is internationally recognized. This spot was selected from two candidate areas, Sado and Ojika, by the Inter-Ministry Liaison Council, and moved slightly after studying Ojika. It was selected with the viewpoint of obtaining cooperation from the local inhabitants and from existing conditions such as air and sea routes, fishing and safety. The land is divided into government property and railway property, the total area of borrowed land is 68,000m². Buildings and facilities presently consist of 14 on the grounds for launching [see note 1], and 7 spots outside of the grounds for tracking [see note 2] four of these latter being bomb proof constructions.

[Note 1: Launching point and guidance route, command room and instrument room, telemeter and radar room, instrument room, rocket assembly room, thermostatic chamber, explosives magazine, horizontal and vertical test stands, central optical observation post, high speed camera observation post, headquarters, police station and warehouse.] [Note 2: Two radar receiving stations, four optical observation posts, and one sound grenade receiver station.]

The KAPPA-8 completed in 1960 was improved four to six times over the K-6 used in the IGY in respect to altitude, horizontal range and payload. The falling point of the main rocket reached the middle of the Japan Sea. In other words, its maximum diameter in the Japan Sea was 600 to 1000km, reaching to the opposite shore. Consequently for future flight tests, a range will have to be set up on the Pacific Ocean side.

This problem has again been presented to the Inter-Ministry Liaison Council.

7. The Yearly Budget and Present Problems

The amount of the National Budget used for rocket sounding since 1955 is as follows. We are receiving large amounts as research funds for the promotion of this type of science. (The amounts listed below include the allotments for all agencies including those outside of the Institute.)

1955	¥57,425,000
1956	¥86,870,000
1957	¥120,000,000
1958	¥175,000,000
1959	¥84,775,000
1960	¥167,461,000
Total Sum	¥691,531,000

We are deeply grateful for the support and understanding of the authorities from the Ministry of Education and the Treasury who allotted this amount to us for rocket sounding from the overall national budget. They have established Japan's international position, and the responsibility of the scientists involved. However, we are still only half way. Space science has just reached its starting point and there are very many problems which must be studied in the future regarding rockets and electronics. The desire of those contributing to this research is to guarantee the required personnel for research and basic research funds. Without basic research there is a drop in potentiality for development, and the basic qualities of scientific investigation are lost. However, those engaged in research cannot help recognizing the need for money and they try to get along as best they can. However, this is rather futile behavior. The problem of acquiring personnel is even more serious. Since the acquiring of young, intelligent minds as good successors is a latent problem it tends to be overlooked. It is most appropriate for the successors to scientific research to be of different generations. Is it impossible to ask the government to provide all funds for the promotion of science? Frankly, I believe that this is not asking too much in view of the situation at the present time.

8. Miscellaneous Thoughts

In the sense of preparing for a public debate, it is necessary to determine beforehand what the purpose of space science is and who is going to study it. However, this cannot be determined beforehand since it is similar to the progress of civilization which, of course, was not carefully planned beforehand to follow a particular course. There is a nuance in the words of the mountain climber when he says "I've got to

climb that mountain, because it's there." The objectives of space science might be considered the same. An important condition is that scholars do what they want to do. If not, there is no development of the scientific sentiment, and no results from research. Also, the answer to the question of who is to conduct research is that those with ability should carry it out. Therefore, no one can solve decisively the problem of who is to solve problems.

The universe is infinitely wide, and contains many mysteries. Solving its problems may not be useful to industry and life directly, but will serve to answer the long unanswered questions of mankind. Perhaps by solving these mysteries we will discover what is useful and what is not. It is sometimes asked that a philosophy having the consent of everyone be formed in regard to this kind of problem, but this is very difficult.

(December 8, 1960)