No. 11089

INDIA
and
UNION OF SOVIET SOCIALIST REPUBLICS

Memorandum of understanding on collaboration in the organisation of rocket sounding of the atmosphere by Soviet meteorological rockets at Thumba Equatorial Rocket Launching Station (India). Signed at Moscow on 14 May 1970

Authentic texts: Russian and English.

Registered by India and the Union of Soviet Socialist Republics on 17 May 1971.

INDE
et
UNION DES RÉPUBLIQUES SOCIALISTES SOVIÉTIQUES

Protocole d'accord relatif à l'organisation de sondages de l'atmosphère à l'aide de fusées météorologiques soviétiques à la base internationale de Thumba (Inde). Signé à Moscou le 14 mai 1970

Textes authentiques: russe et anglais.

Enregistré par l'Inde et l'Union des Républiques socialistes soviétiques le 17 mai 1971.

MEMORANDUM OF UNDERSTANDING [1] BETWEEN THE DEPARTMENT OF ATOMIC ENERGY, GOVERNMENT OF INDIA, AND THE USSR HYDROMETEOROLOGICAL SERVICE ON COLLABORATION IN THE ORGANISATION OF ROCKET SOUNDING OF THE ATMOSPHERE BY SOVIET METEOROLOGICAL ROCKETS AT THUMBA EQUATORIAL ROCKET LAUNCHING STATION (INDIA)

1. The Hydrometeorological Service (HMS) of the USSR and the Department of Atomic Energy (DAE) of the Government of India express their desire to collaborate in conducting systematic investigations of the upper atmosphere from the International Thumba Equatorial Rocket Launching Station (TERLS) using Soviet meteorological rockets.

2. The scientific objectives of the meteorological rocket investigations are to study the properties and processes which characterize the physical state of the stratosphere and mesosphere.

As a first step, the study of the thermodynamical parameters and winds will be undertaken. In order to carry out these investigations, about 50-70 meteorological rockets will be launched annually from Thumba during the initial period of 1971-72.

The sounding rocket programme will be continued further and it will include experiments for the study of ion composition, the influence of the corpuscular solar radiation and low energy particles of the atmosphere, the distribution of atomic oxygen and water vapour and some other questions. The programme will be reviewed annually taking into account how the Indian side could take progressively more responsibilities such as payload construction and instrumentation. The agreement provides that Indian scientists would be able to put in their own meteorological payloads of the Soviet rockets to be launched from Thumba.

3. The results of the collaborative experiments would be made freely available to the world scientific community, in the standard form, through the World Data Centres A (USA) and B (USSR). However, detailed results of these investigations will belong to the participating scientists of the two countries.

[1] Came into force on 14 May 1970 by signature, in accordance with the third subparagraph of paragraph 12.

In order to preserve the priority of the participating countries the results of the investigations will be published only by mutual consent of Indian and Soviet Scientists.

The Soviet side will as soon as possible make available to the Indian participants data collected from other Soviet stations on the meridional cross section for the purpose of fuller appreciation of the processes which characterise the state of the stratosphere and mesosphere over the Indian region, and effective use in weather forecasting.

4. The shipment of the equipment to Thumba will be carried out in the second half of 1970 so that at the end of this year or at the beginning of the next year it would be possible to start the regular operations.

5. For implementing the joint programme at TERLS by means of Soviet meteorological rockets, HMS and DAE agree to the following, division of responsibilities between the two agencies:

HMS will use its best efforts to make available the following:

(*a*) rockets type M-100, with solid fuel charges and pyrotechnics;

(*b*) rocket-borne scientific instrumentations (payload) and radio-technical devices, including complete telemetry, tracking systems and power supplies;

(*c*) launcher for M-100 rockets;

(*d*) trailer for transportation and charging of rockets;

(*e*) special installations for calibrating, testing and controlling, designed for preparation and launching of rockets;

(*f*) radar stations;

(*g*) telemetry stations;

(*h*) equipment for initial processing of sounding rocket data;

(*i*) transportation of all items of equipment to be supplied by the HMS, from USSR to the Indian port of Cochin.

DAE will use its best efforts to make available the following:

(*a*) launching pad;

(*b*) block house;

(*c*) accommodation for the following:

(i) building space for storage of propellant charges, pyrotechnics and rocket motor hardware,

(ii) building space for charging, assembling rocket motors,

(iii) building space for payload assembly, testing and calibration,

(iv) building space for telemetry station,

(v) pad for radar station [1];

(*d*) necessary internal communication lines;

(*e*) computer facility (Minsk II);

(*f*) existing radar station (Cotal LV) for tracking chaff cloud;

(*g*) existing transport facilities;

(*h*) power supply;

(*i*) necessary auxiliary equipment and instruments;

(*j*) necessary meteorological and aerological data;

(*k*) clearance of frequencies;

(*l*) unloading, clearance and transportation of the USSR equipment from the port of Cochin to TERLS.

6. For assembling and commissioning the equipment for rocket launching from TERLS, the Soviet side will send the necessary number of specialists to India for this initial work.

The technical staff for the installation of rocket facilities, launching rockets, and processing measurement results, will be provided by the Indian side.

7. The Indian side will ensure the range safety measures during rocket launching and in the places of storing rockets and charges to them.

8. In the process of systematic work of the range at TERLS, scientists of both sides will be present there for general scientific collaboration.

9. For implementing the collaborative programme from TERLS, Soviet specialists will visit Thumba and Indian scientists will participate in meridional section observations from the Soviet ships and other stations.

10. Each side will provide the necessary finance for the work it has to do to implement the programme, and pay all the necessary living expenses and travel costs of its specialists. No exchange of funds is envisaged.

[1] In the authentic Russian text this line constitutes sub-paragraph *d*, the remaining sub-paragraphs bearing letters *e* to *m*. Furthermore, the four items constituting sub-paragraph *c* in the authentic Russian text are not identified by Roman numbers as is the case in the English authentic text.

11. Each side will nominate a project manager end a scientific co-ordinator for mutual consultations and the follow up actions required for the successful completion of the programme. The Indian Project Manager will be responsible for the conduct of the campaign at TERLS according to the plan of operation. Copies of all correspondence and reports generated by the Project Managers and the Scientific Co-ordinators will be furnished to the Indian Space Research Organisation (ISRO) of the DAE and to the HMS of the USSR.

12. The HMS of the USSR and the DAE agree that the equipment (such as, radar and telemetry station) to be supplied by the HMS of the USSR will be made available when it is possible to other countries, if required for sounding rocket experiments in exploration of the upper atmosphere for peaceful purposes.

The Memorandum is done in two languages: Russian and English. Both language versions are equally authentic and valid.

The Memorandum of understanding shall enter into force on the date of signature.

DONE at Moscow on 14th day of May 1970.

[*Signed — Signé*] [1]

Chairman of the Atomic Energy Commission of India and Secretary to the Government of India

[*Signed — Signé*] [2]

Chief of the Hydrometeorological Service of the USSR

[1] Signed by Vikram A. Sarabhai — Signé par Vikram A. Sarabhai.
[2] Signed by E. K. Fedorov — Signé par E. K. Fedorov.