



Memorandum of Understanding

Monitoring & Investigations on lightning phenomena and its associated processes using lightning detection systems (LDS) at Collaborating Institutes

Between

National Remote Sensing Centre
ISRO, Department of Space, Govt. Of India
Balanagar, Hyderabad-500037

And

Department of Physics
Punjabi University,
Patiala-147 002, Punjab

Signed on : 08 Sep 2023

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Monitoring & Investigations on lightning phenomena and its associated processes using lightning detection systems (LDS) at Collaborating Institutes

This Memorandum of Understanding (hereinafter called the "MoU") is made on the 06 day of July 2023, between the National Remote Sensing Centre (NRSC), Indian Space Research Organisation (ISRO), Department of Space, Government of India (hereinafter called the 'NRSC') as the 1st party and Department of Physics, Punjabi University, Patiala-147 002, Punjab as the 2nd party.

NOW THEREFORE, the parties hereto hereby agree as follows:

1 Preamble

(i) National Remote Sensing Centre (NRSC)

National Remote Sensing Centre (NRSC) is one of the primary centers of Indian Space Research Organization (ISRO), Department of Space (DOS), Govt. of India. NRSC has the mandate for establishment of ground stations for receiving satellite data, generation of data products, dissemination to the users, development of techniques for remote sensing applications including disaster management support, geospatial services for good governance and capacity building for professionals, faculty and students.

(ii) Introduction : (Second Party) – Department of Physics, Punjabi University, Patiala

Punjabi University, Patiala was established on April 30, 1962 in the erstwhile princely state of Patiala under the Punjab Act No. 35 of 1961 with the main objective of furthering the cause of Punjabi language, art and literature. Punjabi University has since evolved into the largest University in the state. This is the second University in the world to be named after a language, the first being Hebrew University of Israel. The University started working from its present lush green and pollution free 316 acres campus since 1965.

Now the University caters to the educational needs of nine districts of Punjab. Over the time since its inception, the University has evolved into a multi-faceted and multi-faculty educational institution for the promotion of higher education and research in Humanities, Arts, Languages, Sciences, Engineering Technology and many more. University is imparting instruction and guidance to nearly 14,000+ students in a multi-faceted, multi-pronged and

multi-faculty environment comprising 70+ Teaching and Research Departments/Chairs on its Campus, 27 Regional Centre/Neighbourhood Campuses/Constituent Colleges and 274 Colleges affiliated to it.

The department of Physics was established in 1963, being one of the first departments to get functional in the University. The first batch of postgraduate students passed out in 1965. The aim of the department throughout its existence for six decades has been to provide up to date instruction to students to meet the requirement of trained manpower in Physics for teaching, research, engineering and other vocations. It has established itself as a centre of excellence with well-qualified faculty and modern teaching, computer and research laboratories. All teachers have been actively involved in emerging R & D activities and many of them have been trained abroad. The department also has well-established programs for research leading to Ph.D. degrees in specialization with Material Science, Radiation Physics, Theoretical Physics, Astrophysics, etc. It has been recognized as a department for special assistance (DRS and DSA-I, DSA-II, DSA-III and now under CAS-II) since 1986 by the UGC under SAP and COSIST programs and DST under FIST program for strengthening of infrastructure. Material Science, Radiation Physics and Theoretical Physics form major thrust areas of research in the department, and grants have also been received by individual faculty members for several research projects from different funding agencies such as DST, UGC, CSIR, ISRO, IUAC, IAEA, DAE and state Government.

(i) **Reference to Earlier MOU, if any**

NIL

(ii) **Purpose/Need for MOU**

To expand LDS network with the active support from Punjabi University, Patiala in terms of installations of LDS system at, collection of data, maintenance of the LDS system, dissemination of the data to NRSC and utilization of the lightning data for scientific use.

(iii) **Parties involved in MOU**

First party (NRSC)

National Remote Sensing Centre,
ISRO, Dept. of Space, Govt. of India

Balanagar, Hyderabad-500037

Second Party

Department of Physics

Punjabi University

Patiala-147 002, Punjab, India

2 Authorised signatories

First Party

Deputy Director

Earth & Climate Sciences Area (ECSA)

National Remote Sensing Centre (NRSC)

Balanagar, Hyderabad 500 037

Second Party

Registrar

Punjabi University

Patiala-147 002, Punjab

Phones : (Office) 0175 5136030

3 Functionaries and Contact Details

First Party : NRSC

S. No	Name	Contact address	Telephone / Fax	e-mail
1	Dr.AlokTaori	Earth & Climate Sciences Area, NRSC, Hyderabad-500037	7382685983	alok_taori@nrsc.gov.in
2	Mr. Venkatesh Degala	Earth & Climate Sciences Area, NRSC, Hyderabad-500037	8547760424	Venkatesh_d@nrsc.gov.in

Second Party : Punjabi University, Patiala

S. No	Name	Contact address	Telephone / Fax	e-mail
1.	Dr. Karamjit Singh	Assistant Professor Department of Physics Punjabi University, Patiala-147 002, Punjab	+91 9464077434	dhaliwalkaramjit@gmail.com

4 Date of Signing, Effective Date and Duration of MOU






Date of signing: The date of signing in MOU shall be the date on when both parties sign the document.

Effective date: The effective date of MOU is the date of signing the MoU or from the date the funds are transferred to the Punjabi University, Patiala, whichever is later.

Duration of MoU: MOU is valid for 5 Years. MOU shall be extended further with mutual agreement.

5 Scope of Work

The scope of overall project is to study the atmospheric lightning and its associated phenomena. However, the scope of present MOU is for collaboration for data collection, analysis and raw data dissemination to NRSC from the LDS instrumentation installed at Department of Physics, Punjabi University, Patiala's location

6 Methodology

- Operationalization of LDS with automated data recording.
- Transfer of data to NRSC using the static IP for the LDS computer system.
- Archiving and analysis of diurnal, seasonal and inter seasonal cycles of lightning data

7 Deliverables & Specifications

Second party will deliver the following to First Party

- Maintain the installed LDS in functional condition.
- Data base of lightning occurrences with their classifications.
- Data transfer to NRSC.

8 Data Holding

- NRSC will receive and hold the data.
- The 2nd party acquires and carries out near real time data analysis.
- The 2nd party transfers real time data and products to the first party.

9 Applicable documents

Project Proposal / Standard Operating Procedure (SOP)

10 Guidelines on data / Map security



- Approval of competent authority of NRSC is required for sharing data with 3rd party

11 Responsibilities

First party : NRSC

- NRSC will ensure the LDS system supplied are technically suitable.
- Developing technique for now-casting of lightning occurrences.

Second party : Punjabi University, Patiala

- Regular monitoring on the functioning of LDS unit and report to the first party on any short coming.
- Maintenance of the LDS and power supply with UPS for the above project work.
- Providing a static IP for the LDS system operational computer.
- Extend logistics to NRSC scientists during the maintenance, inter-sensor calibrations etc.
- Submit half yearly utilization certificate (April to September and October to March) for funds provided by NRSC with justifications

12 Activity Schedule

- LDS installation & Configuration of LDS units
- Data collection, storage/ archival & transfer of data
- Regular monitoring of the LDS unit
- Reporting the short comings, if any
- Participation in capacity building and outreach activities..

13 Consideration and Schedule of prices

A lump sum of Rs.1.0 Lakh /Year shall be funded by NRSC to the Punjabi University, Patiala.

14 Funding Terms and Conditions of Payment

On signing of MOU, lump sum of Rs.1.0 Lakh /Year shall be funded by NRSC to the **Punjabi University**, Patiala subjected to the allocation and availability of funds for this research activity at NRSC /ISRO.

15 Training

Suitable training towards the equipment maintenance, operation will be provided to the identified persons of the 2nd party by the 1st party

16 Warranty

17 **Project Monitoring**

Monthly monitoring of the project activities will be carried out internal project monitoring mechanism at NRSC and also at **Punjabi University, Patiala**.

18 **Confidentiality**

"All information and documents to be exchanged pursuant to the Memorandum of Understanding will be kept confidential by the Parties and will be used subject to such terms as each Party may specify. The Parties will not use the information for purposes other than that specified, without the prior written consent of the other Party.

All the parties will maintain utmost confidentiality in data sharing. Both partners undertake, during the tenure of the MOU and thereafter, on their behalf and on behalf of their employees/representatives/associates to maintain strict confidentiality and prevent disclosure thereof all the Information and data exchange/ generated pertaining to work, under this agreement/MOU. However the data can be published and shared jointly for scientific publication with mutual written consent of both the parties

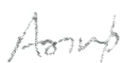
All Confidential Information shall remain the exclusive property of the disclosing Party. The Parties agree that this MoU and the disclosure of the confidential information do not grant or imply any license or interest or right to the Recipient in respect to any intellectual property right of the other Party.

Unpublished information, whether oral, in writing or otherwise, discovered or conceived by the scientists or technicians and exchanged under the provisions of this MoU will not be transmitted to a third party, unless otherwise agreed by the Parties in writing.

19 **Intellectual Property Rights**

The original information, the methodology adopted, original data, derived data, the originals of any reports and documents or materials prepared or inventions or information produced as a result of the services and all intellectual property rights therein, unless otherwise specifically stated in the MoU, shall be and shall remain property of the parties in agreement.

The procedural formalities for securing and maintaining the intellectual property rights (patents/trademarks/copyright) if any, shall be the responsibilities of Punjabi University, Patiala and NRSC and the expenditure incurred thereof shall be borne by each party equally, consistent with laws, rules and regulations of India. The question of whether or not the intellectual property rights should be secured and the territory where these shall be secured will be decided by the Director, NRSC and Head of the Institute of **Punjabi**



under the agreement due to the exigency of one or more of the unforeseen events such as but not limited to Acts of God, war, flood, earthquake, strike, lockouts, epidemics, riots, civil commotion etc. provided on the occurrence and cessation of any such events, the party affected thereby shall give a notice in writing to other party within one month of such occurrence or cessation. If the force-majeure conditions continue beyond six months, the parties shall then mutually decide about the future course of action.

25 Indemnity

Either Party ("Indemnifying Party") shall indemnify and keep indemnified the other Party ("Indemnified Party") against any and all claims, direct losses, injuries, liabilities, reasonable costs and expenses, direct damages, actions or proceedings which may be made or taken against the Indemnified Party by any person arising out of any breach, action or inaction of the Indemnifying Party under this agreement. In no event whatsoever, the Indemnifying Party shall be liable to the Indemnified Party for any loss of revenue, loss of profits, rights or services, incidental, indirect or consequential damages arising from or related to this agreement.

26 Dispute Settlement Mechanism

In case of any dispute or difference of opinion or interpretation of the MOU arising out of the activities performed under the provisions of this contract or related document not amicably resolved completely by mutual discussion or consultation between the parties within thirty days (30), the entire matter shall be referred to the Administrative Mechanism for Resolution of CPSEs Disputes (AMRCD) for settlement of any such commercial disputes and the procedure mentioned in the Office Memorandum Dated 22nd May, 2018 and others OM subsequently issued by Department of Public Enterprises, Ministry of Heavy Industries & Public Enterprises shall apply in consonance with applicable Indian laws and public policy.

Notwithstanding anything contained in above para, in case of any dispute or difference of opinion falling under the exception to the ambit of Administrative Mechanism for Resolution of CPSEs Disputes (AMRCD) the party to this contract/agreement/MOU with mutual consent may take recourse of any alternative dispute settlement mechanism including arbitration for settlement of such disputes as per applicable law and procedure.

Pending the submission of and / or decision on a dispute, difference or claim or until the arbitral award is published; the parties shall continue to perform all of their obligations under this MOU without prejudice to a final adjustment in accordance with such award



27 **Jurisdiction**

Any dispute arising out of the implementation or interpretation of any provisions of this MOU shall be subject to the jurisdiction of Patiala (Punjab) court.

28 **Termination: (for Cause, Convenience, and Force Majeure)**



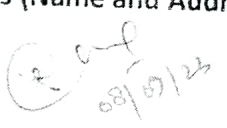



On completion of MOU duration, as stated in the clause No. 4, the MOU ceases to exist. During the tenure of the agreement, either Party may terminate and nullify this Agreement/MOU by providing prior written notice of 30days to the other party for any of the reasons – Cause/convenience/Force Majeure.

- Termination for Convenience: For convenience without assigning any reason.
- Termination for Cause: For the breach of any obligations/responsibilities/conditions of this agreement by the other party, with an opportunity to cure/rectify such a situation within thirty (30) days to the defaulting party and no remedial action is taken to the satisfaction of the aggrieved party.
- Termination for Force Majeure: in the event of "Force Majeure"
- Obligations upon Termination

Following termination or expiration of this Agreement, in addition to any other obligations existing hereunder or otherwise at law or in equity:

- The rights and obligations of the parties thereto shall be settled by mutual discussion; the financial settlement if any shall take into consideration not only the expenditure incurred but also the expenditure committed by the parties hereto.
- The agreement arrived at between the parties hereto for the utilization of the intellectual property (defined in clause #19.0) shall survive the termination of the agreement.

IN WITNESS WHEREOF, the Parties hereto have caused this Mou to be signed in their respective names on this 08 day of SEP, 2023 on which day it comes into force, copy of the same shall be made in two originals, one retained by each party.

First Party	Second Party
For and on behalf of	For and on behalf of
Deputy Director Earth and Climate Sciences Area (ECSA) NRSC, Hyderabad	Registrar Punjabi University, Patiala-147 002 Tel-Ph: (Office) 0175 5136030
Signature  8/9/23	Signature  31-8-23
Seal डॉ. राजश्री वि. बोथले / Dr. Rajashree V Bothale अधीक्षक, आसमन / Deputy Director, ECSA पृथ्वी एवं जलवायु विज्ञान क्षेत्र (हिमालय) Earth & Climate Sciences Area (ECSA)	Seal Registrar, Punjabi University, Patiala.
Witness (Name and Address)	Witness (Name and Address)
1.  (SYED SHADAB) WS&ISD - ECSA	1. Dr. Anup Thakur  Head Department of Physics Punjabi University Patiala-147 002, Punjab
2.  3/9/2023 (Mallikarjun)	2. Dr. Karamjit Singh  Assistant Professor Department of Physics Punjabi University Patiala-147 002, Punjab
Date:	Date: 31/08/2023

