

# MEMORANDUM OF UNDERSTANDING

for

Technical Collaboration for taking up joint Research, Development  
and Operational Activities

between

Gokaraju Rangaraju  
Institute of Engineering and Technology (GRIET)  
HYDERABAD

and

National Remote Sensing Centre (NRSC)  
Indian Space Research Organization (ISRO)  
Department of Space  
HYDERABAD

Signed on this day 22nd of February 2018

J. Poaven

B. Gopala Krishna

<p><b>Principal</b> Gokaraju Rangaraju Institute of Engineering and Technology Survey No. 288 Nizampet- Bachupally Road, Bachupally, Kukatpally Hyderabad</p>	<p><b>Deputy Director</b> <b>DPPA &amp; WAA</b> National Remote Sensing Centre Indian Space Research Organization Department of Space Government of India Hyderabad</p>
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बी. गोपाला कृष्णा  
B. Gopala Krishna  
उ. नि. (डीपीपीए एवं डब्ल्यूएए)  
Dy. Director (DPPA & WAA)  
एनआरएससी, हैदराबाद/NRSC, Hyderabad.



GOKARAJU RANGARAJU  
INSTITUTE OF ENGINEERING AND TECHNOLOGY

HYDERABAD



NATIONAL REMOTE SENSING CENTER  
INDIAN SPACE RESEARCH ORGANIZATION  
DEPARTMENT OF SPACE

HYDERABAD

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National Remote Sensing Centre (NRSC)  
Indian Space Research Organization (ISRO) Hyderabad

**MEMORANDUM OF UNDERSTANDING**

**1. PREAMBLE**

This Memorandum of Understanding (MoU) is between *National Remote Sensing Centre (NRSC)*, ISRO and *Gokaraju Rangaraju Institute of Engineering and Technology (GRIET)*, with an aim to have partnership for taking up R&D and operational activities in the field of remote sensing applications, mobile apps, DSS using GIS modeling, satellite data processing, image classification, data analytics etc.

**National Remote Sensing Centre** has the prime responsibility of satellite data acquisition, processing, dissemination and developing applications in the field of remote sensing and GIS. NRSC has temporal coverage of various natural resources, the satellite data and wealth of services from these resources. NRSC has acquired large volumes of remote sensing data that may throw new light on how the Earth system works. This throws new challenges in processing, information extraction and mining of this Big data to uncover the hidden patterns on Earth processes. There is a strong need to develop scalable and efficient algorithms for knowledge extraction from these data sets. Specifically due to these reasons we look forward to collaborate in broader research and development areas in image processing, data mining, geospatial applications, software engineering and social media.

**Gokaraju Rangaraju Institute of Engineering and Technology** was established in 1997 in Bachupally. GRIET is a private unaided institution, affiliated to Jawaharlal Nehru Technological University Hyderabad (JNTUH) with recognition as an autonomous institution by UGC. GRIET is accredited by NAAC with A grade and accredited by NBA for all our UG BTech programmes and two PG MTech programmes. It is ranked by Ministry of Human Resources and Development through National Institutional Ranking Framework (NIRF). GRIET, with its state of art infrastructure and support services and qualified faculty, is one of the preferred institutions in the state with the mission "to achieve and impart quality education with an emphasis on practical skills and social relevance". GRIET constantly endeavors to bring in the best practices. The institute has a strong faculty base with a sizeable

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number from the industry. GRIET focuses on domains like Deep Learning, Pattern Recognition, Digital Signal Processing, Digital Image Processing, Power Systems, Power Electronics and Water Resource Engineering. The institute has a strong Mathematics and Statistics faculty with research interests in curve and surface modeling. GRIET strives to collaborate with premier organizations to develop algorithms for applications identified. There is a research unit at GRIET in the Advanced Academic Center (AAC) that initiates first B.Tech. students to work on research ideas. The center has been motivating students to work beyond the curriculum. AAC provides a strong student presence in executing projects at the institute.

## 2. PARTIES

### 2.1 Indenting party:

Gokaraju Rangaraju Institute of Engineering and Technology, Survey No. 288, Nizampet-Bachupally Road, Bachupally, Kukatpally, Hyderabad, Telangana 500090, hereinafter called as GRIET.

### 2.2 Executing party:

National Remote Sensing Centre (NRSC), ISRO, Dept of Space, Govt. of India, Hyderabad, hereinafter called as NRSC.

## 3. AUTHORIZED SIGNATORY

Authorized signatory by Principal, Gokaraju Rangaraju Institute of Engineering and Technology, Hyderabad, India (Hereinafter referred to as the First Party)

And

National Remote Sensing Centre (NRSC), ISRO, Department of Space, Government of India, Hyderabad, represented by Deputy Director (DPPA & WAA) One part (Hereinafter referred to as the Second Party).

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#### 4. FUNCTIONARIES AND CONTACT ADDRESSES, PHONE, EMAIL

##### 4.1. Academic Institution:

S.No	Name	Contact Address	Phone / Fax	Email
1	Dr.Ramamurthy Suri	Department of Mathematics GRIET, Bachupally, Kukatpally, Hyderabad	9959065438	viceprincipalsoffice.griet@gmail.com
2	Dr V Aravind	Dept of ECE GRIET, Bachupally, Kukatpally, Hyderabad	9573708408	vainf066@gmail.com
3	V.Vijaya Rama Raju	Dept of EEE GRIET, Bachupally, Kukatpally, Hyderabad	9440821902	vijavram_v@yahoo.com

##### 4.2. National Remote Sensing Centre (NRSC), Hyderabad

S.No	Name	Contact Address	Phone / Fax	Email
1	Dr. M. Naresh Kumar	DPPA&WAA	Tel :040-23884388	nareshkumar_m@nrsc.gov.in
2	K. Seshadari	RSA	040-23884191	seshadri_k@nrsc.gov.in

All correspondence on day to day matters during the course of the project shall be between respective focal points identified in the above table.

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## **5. EFFECTIVE DATE**

### **5.1. Commencement:**

This effective date for the commencement of this MoU will be the date of signing of the MoU by NRSC and GRIET.

### **5.2. Duration:**

This MoU is valid for a period of 5 years from the date of signing of MoU. If further extensions are required, it shall be by mutual consent of the parties in writing.

## **6. SCOPE OF THE WORK**

In light of National Space Meet in New Delhi during September 2016, there is tremendous boost for geo-spatial technology applications in all ministries at Central and State level. NRSC, ISRO has taken up large number of projects in addition to its own programs. Hence, collaboration with academic institutions is envisaged to sustain R&D activities and fulfill operational commitments. The activities proposed to be taken-up under this agreement shall have a separate project proposal, wherever financial aspects are involved. Amount, payment conditions, etc. would be spelt out clearly before starting the activity.

## **7. METHODOLOGY**

The technical specifications and methodology of the projects to be taken up will be addressed separately

## **8. DELIVERABLES AND GUIDELINES ON DATA / MAP SECURITY**

### **8.1. Deliverables:**

As per project specifications

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## **8.2. Data Security:**

Data security as per prevailing Remote Sensing Data Policy would be adhered to. Necessary steps would be taken from both the parties to ensure the data security. In addition, Bhuvan platform would provide necessary infrastructure for ensuring the security of data.

## **8.3. Guidelines on Data / Map Security:**

As per prevailing Remote sensing data policy and any other prevailing policies of Government of India relating to the data and maps.

## **8.4 Working Place:**

As per the satellite data licensing and security guidelines, the project work will be executed predominantly at the campus of GRIET and at NRSC whenever necessary with prior arrangement.

## **9. TECHNICAL SPECIFICATIONS:**

The required specifications will be given in Standard Operating Procedure of the Project proposal separately.

## **10. APPLICABLE DOCUMENTS**

- A. Remote Sensing Data Policy
- B. Project specific Standard Operating Procedure
- C. Minutes of the meeting, 28<sup>th</sup> Feb 2017, DP Conference Hall, NRSC
- D. Proposals from GRIET, 17<sup>th</sup> August 2017 through email
- E. Minutes of the meeting, 03<sup>rd</sup> November 2017, Bhuvan conference room

## **11. RESPONSIBILITIES OF EACH PARTY**

**11.1. National Remote Sensing Centre (NRSC): NRSC will collaborate with GRIET for project specific requirements on case by case basis. This may include**

- Execution of small modules of the ongoing projects of NRSC through B.Tech/M.Tech students

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*B. Gopala Krishna*

- Organizing workshops and conferences together with the expertise of NRSC scientists related to the above mentioned research domains to train, educate and improve understanding of students and staff.
- Joint guidance of student projects/thesis in Water Resources Engineering, Digital Image Processing & IT based activities
- Collaboration in Research areas of interest to NRSC and GRIET on mutually agreeable terms
- NRSC shall allow technical visits of students as per existing policies to provide them with an exposure to various equipment, instruments, processes etc.
- NRSC shall provide technical knowhow in areas identified for collaborative research.
- NRSC shall allow sharing data for executing projects.

#### **11.2. Gokaraju Rangaraju Institute of Engineering and Technology (GRIET)**

Gokaraju Rangaraju Institute of Engineering and Technology (GRIET) takes the responsibility to fulfill the project needs and goals defined as per the specific projects taken up in collaboration with the National Remote Sensing Centre (NRSC). Within its capabilities, the institute will try to combine the expertise of different disciplines available in the institute in order to come up with outcomes in the research and development areas of interest to NRSC/ISRO. To a great extent, GRIET shall rely on its own resources in executing projects mutually identified by NRSC and GRIET. It shall rely on the expertise of NRSC in areas where GRIET finds itself short of resources in specific areas of study.

#### **12. PROJECT SCHEDULE**

As per specific project proposal

#### **13. SCHEDULE OF INSTALLATION, SUPPLY AND ACCEPTANCE TEST**

As per specific project proposal

#### **14. CONSIDERATION / SCHEDULE OF PRICES**

As per specific project proposal

#### **15. FUNDING & TERMS AND CONDITIONS OF PAYMENT**

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Financial arrangements for each specific collaboration will be decided on a case-to-case basis and brought on record in each case after due approval from heads of both the Institutions.

## **16. TRAINING**

Project specific training will be imparted to GRIET by NRSC if required.

## **17. WARRANTY**

As agreed in the project by GRIET and NRSC.

## **18. PROJECT MONITORING**

The collaborative program between NRSC and Gokaraju Rangaraju Institute of Engineering and Technology (GRIET) shall be coordinated by a coordination committee appointed by Directors / Authorized signatory of both the Institutes.

## **19. CONFIDENTIALITY**

The confidentiality of the data / documents or any other materials shall be maintained by both the parties as per the sensitivity defined to it by any prevailing policies.

## **20. INTELLECTUAL PROPERTY RIGHTS**

- 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 remain with both the parties and either party can commercially exploit the specific IP with permission from the other.
- NRSC and Gokaraju Rangaraju Institute of Engineering and Technology (GRIET) reciprocally guarantee that all technical information and data generated under this MoU shall be treated as confidential and shall not be divulged by either party without prior written consent of the other even after the expiry of this MoU.
- If the outcome of a project related to product development, process technology and design etc. which involves matter of secrecy and concern with security of the State and the Country, the same will not be allowed for publication / printing in any form such as Electronically / verbal, etc. If the outcome of a project results into an intellectual property, for which rights can be secured, it will be

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decided on case to case basis. Similarly, sharing of expenditure in securing such rights and income accrued through royalty etc. by the parties under the law will be decided on case to case basis after mutual consultation.

- Research supervisors from both the Institutes will be the corresponding authors in any publication resulting from the collaborative work. All the efforts put by the student(s) as a part of this MoU will be accounted for by way of reporting the work in thesis and / or paper publication except the part for which IPR needs be claimed.
- Neither of the supervisors shall publish the work carried out under this MoU without knowledge of the other.

## **21. CHANGE IN SCOPE OF WORK**

Any change in scope of work would be with mutual consent of both the parties.

## **22. MODIFICATIONS**

Any further modifications to this MOU, if required, would be through amendments with mutual consent in writing.

## **23. FORCE MAJEURE**

Neither party shall be held responsible for non-fulfillment of their respective obligation under the agreement due to exigency of one or more of the unforeseen events such as but not limited to Acts of God, war, flood, earthquake, cyclones, strikes, lockouts, epidemics, riots, civil commotion etc. provided on the occurrence and cessation of such events, they effected thereby shall give 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**

Partner Institute shall exercise reasonable skill, care and diligence in the performance of the agreement and indemnify and keep indemnified NRSC in respect of any loss, damage or claim howsoever arising out of or related to breach of contract, statutory duty or negligence by Partner Institute or its employees, agents or sub-contractors in relation to the performance or otherwise of the services to be provided under this agreement.

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Partner Institute will indemnify and keep indemnified NRSC in respect of any loss, damage or claim whatsoever arising out of the use of data hosted by them through the Bhuvan Node server.

## 26. ARBITRATION

- (i) In the event of any dispute or difference between the parties hereto, such disputes or differences shall be resolved amicably by mutual consultation. If such resolution is not possible, then unresolved dispute or differences shall be referred to arbitration of one of the arbitrators to be appointed by Director, NRSC, Hyderabad. The venue of such arbitration shall be at Hyderabad. The language of arbitration proceedings shall be English. The arbitrator shall make a reasoned award (the "Award") which shall be final and binding on the parties. The cost of the arbitration shall be shared equally by the parties to the MoU. However, expenses incurred by each party in connection with preparation, presentation should be borne by the parties itself.
- (ii) 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 Contract without prejudice to a final adjustment in accordance with such award.

## 27. JURISDICTION

Place where any dispute arising out by MoU or its terms shall be subject to Hyderabad only.

## 28. TERMINATION

During the tenure of the agreement, either Party may terminate and nullify this Agreement/MOU by providing prior written notice of 30 days to the other party for any of the reasons - Cause/convenience/Force Majeure

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**28.1. Termination for Convenience:** For convenience without assigning any reason

**28.2. Termination for Cause:** For the breach of 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.

**28.3. Termination for Force Majeure:** in the event of "Force Majeure" as defined in this MOU.

**28.4. 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,

- (a) 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.
- (b) The agreement arrived at between the parties hereto for the utilization of the intellectual property (defined in clause #20) shall survive the termination of the agreement.
- (c) Termination shall not affect the projects/ assignments agreed to be undertaken by both the parties before such termination and both the parties should complete such projects/ assignments as if this MoU is in operation.
- (d) On termination, the Partner Institute shall handover the data and disk which were used for processing to the NRSC.

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IN WITNESS WHEREOF, the Parties hereto have caused this MoU to be signed in their respective names on this 22nd day of February, 2018

J. Baveen

B. Gopala Krishna

<p><b>Principal</b> Gokaraju Rangaraju Institute of Engineering and Technology Survey No. 288 Nizampet-Bachupally Road Bachupally, Kukatpally Hyderabad</p>	<p><b>Deputy Director (DPPA&amp;WAA)</b>  National Remote Sensing Centre Indian Space Research Organization Department of Space Government of India Hyderabad</p>
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बी. गोपाला कृष्णा  
B. Gopala Krishna  
उ. नि. (डीपीपीए एवं डब्ल्यूएए)  
Dy. Director (DPPA & WAA)  
एनआरएससी, हैदराबाद/NRSC, Hyderabad.  
(Seal)

Witness: [Signature]  
Name: P. S. RAJU

Witness: [Signature]  
Name: Dr. M. NARESH KUMAR

Address: GRIET, Hyderabad

Address: NRSC, Hyderabad

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