

# **RESPOND**

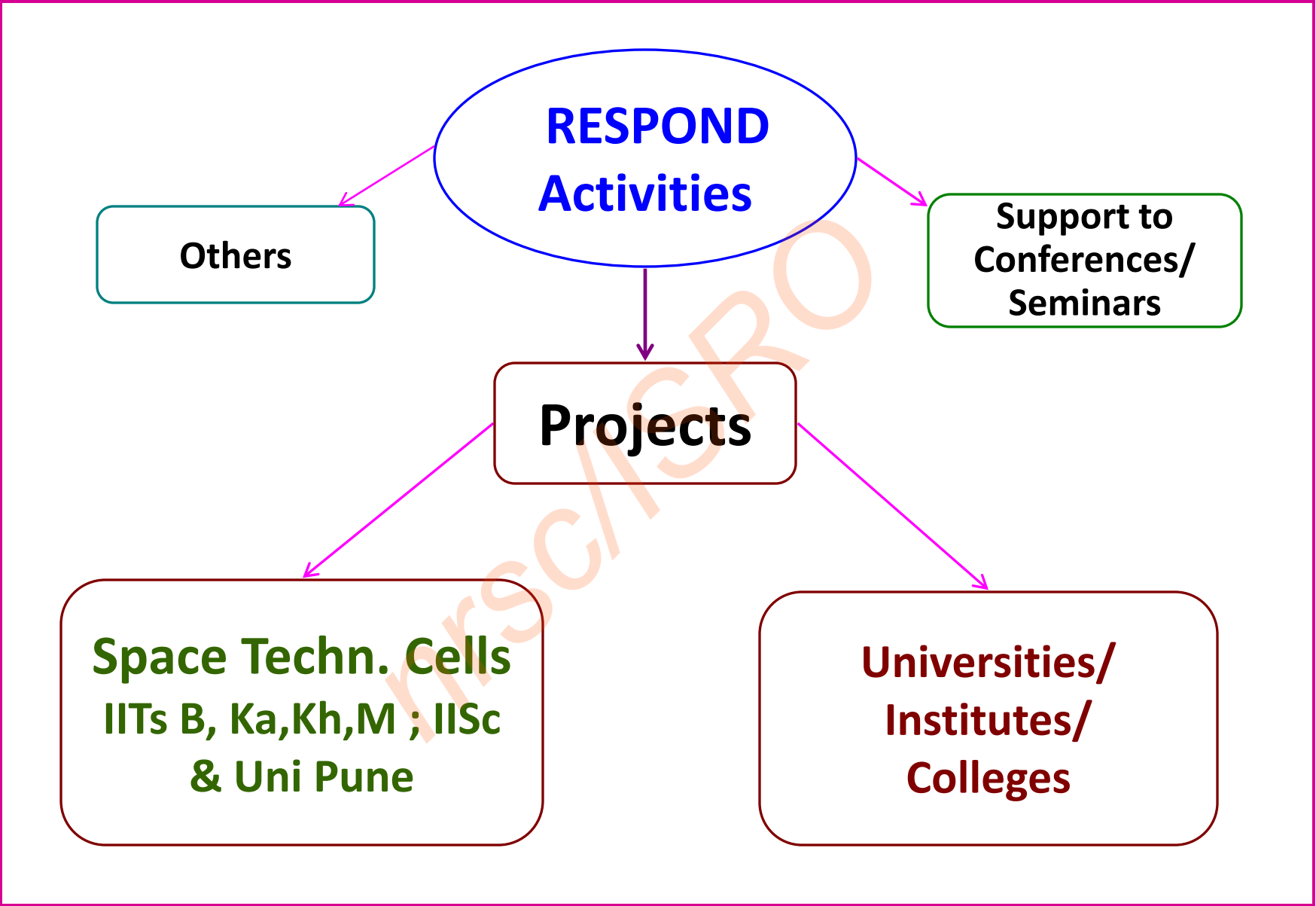
**Sponsored Research Programme of ISRO**



**K. Ganesha Raj**  
**Dy.Dir., RESPOND,**  
**ISRO Hq**  
**Bangalore**

# RESPOND Objectives

- **RESPOND** programme started in the 1970s
- *The main objective is to establish strong links with Universities/Institutions in the country to carry out quality research and developmental projects which are of relevance to space and derive useful outputs of such R&D to support ISRO programmes.*
- **RESPOND** aims to enhance academic base, generate quality human resources and infrastructure at the academia to support the space programme.



**RESPOND  
Activities**

**Others**

**Support to  
Conferences/  
Seminars**

**Projects**

**Space Techn. Cells  
IITs B, Ka, Kh, M ; IISc  
& Uni Pune**

**Universities/  
Institutes/  
Colleges**

# Who can Submit Proposals ?

- **Faculty/Scientists/Engineers affiliated to any recognized university/academic institution/autonomous R&D institutions in India can submit proposals.**
- **The Principal Investigator(s) should be full-time employee (s) of the concerned institution. The Head of the academic institution must forward proposals with application for research grants.**
- **There may also be Co-PI(s) from the same/different institutions working on the project.**
- **Proposals from individuals not affiliated to any recognized institution will not be considered.**

# Broad areas of Research

Document on Research Areas in Space is available in  
ISRO Website '*under sponsored research item at*  
*[www.isro.gov.in](http://www.isro.gov.in)*'

# Launch Vehicle

- **Mission Analysis and Simulation**
- **Aerospace Structures & Materials,**
- **Control Systems, Propulsion**
- **Power Systems, Avionics**
- **Safety Engineering, Gravity Gradiometer**
- **Precision Relative Navigation & Attitude Ref. System**
- **Ultrasonic Motor**
- **Smart PCBs - Stress Strain Sensitive Films**
- **Accelerometer**
- **Vision Aided Inertial Navigation Sys. - Image Processing**
- .....

# Satellite Communication

- **SATCOM Technology & Applications**
- **Mechanical Engineering Systems**
- **Electronics Support Services, Antenna**
- **System Reliability**
- **Mission Development Area**
- **Communication and Power**
- **Integration and Checkout**
- **Mechanical Systems**
- **Controls and Digital Systems**
- **Reliability and Components**
- **Systems Production**
- **VLSI Design, CMOS Process Technology**
- **Development and Educational Communication**
- .....

# Earth Observations

- **Mission development and Remote Sensing-Sensor Technology**
- **Remote Sensing Image Processing and Software Development**
- **Earth, Ocean and Atmospheric Sciences Applications**
- **Aerial Remote Sensing**
- **Planetary Sciences**
- **Disaster Management**
- **.....**



# Space Sciences

- **Investigation on Near Earth Environment**
- **Atmospheric dynamics and coupling**
- **Sun and Solar System**
- **Astronomy and Astrophysics**
- **Space Instrumentation**
- **Remote sensing data analysis from Planetary Exploration Missions**
- **Laboratory study of Astromaterials**
- **Study of terrestrial analogues of Moon and Mars**
- **Payloads for upcoming Planetary Missions**
- .....

# Meteorology

- **Weather and Climate**
- **Radiation, Aerosols and Trace gases**
- **Microwave atmospheric studies**
- **Signal and Data processing**
- **Radar and Lidar instrumentation for atmospheric probing**
- **.....**

# How to Select Research Topic?

- **Relevance to ISRO/DOS.**
- **Strength of the faculty/institution.**
- **Interaction with the scientists/experts of ISRO/DOS**
- **Discussion with the seniors in the institution**
- **Avoid duplication in the research topic**
- **Discuss with peers**
- **Identification of the Co-PI /Focal Point from the ISRO/DOS.**

# Preparation of the Proposal

- Read the details about submitting proposals/format ( **sponsored research** at [www.isro.gov.in](http://www.isro.gov.in)) etc
- Prepare preliminary proposal
- The preliminary proposal is then send to the Co-PI/Expert/Focal Point of ISRO or seniors for obtaining views/comments
- Revision or modification of the proposal.
- Submit the revised proposal

# What the Proposal Should Contain

- **Title**
- **Summary**
- **Objectives/scope of the project.**
- **Methodology/Approach.**
- **Data Source /Data base.**
- **Available Institutional Facilities/facilities required**
- **Linkages to ISRO programmes**
- **Expected Results.**
- **Deliverables to ISRO/DOS on successful completion of the project.**
- **Manpower ( Level, No. and qualification with justification) needed**
- **Equipment (with justification) needed and the source (available , to be procured, hired etc ).**
- **Time Schedule.**
- **Detailed Fund/budget Requirement.**
- **Biodata of the PI/Co-PI**

# Proposal Submission

- **Five copies** of the proposal, in the prescribed format should be sent to the **Director**, of **concerned ISRO/DOS Centre**.
- **Two copies** of the proposal must be sent to:  
**Scientific Secretary ISRO**,  
ISRO Hq, Department of Space,  
Antariksh Bhavan, New BEL Road  
Bangalore 560 231  
email : [scientificsecretary@isro.gov.in](mailto:scientificsecretary@isro.gov.in)

# Proposal Submission (Contd.)

Sl.No	Topic	ISRO Centre
1	Space Sciences	<b>Director</b> <b>Physical Research Laboratory</b> Navarangapura Ahmedabad 380 009. email : director@prl.res.in
2	Atmospheric Sciences	<b>Director</b> <b>National Atmospheric Research Laboratory</b> Gadanki, Pakala Mandal Pin-517 112 Andhra Pradesh email: jayaraman@narl.gov.in
3	Propulsion	<b>Director</b> <b>Liquid Propulsion System Centre</b> Valiamala P.O. Thiruvananthapuram 695 547. email: director@lpsc.gov.in

# Proposal Submission (Contd.)

Sl.No	Topic	ISRO Centre
4	Rockets, launch vehicles and space technology including avionics	<b>Director</b> <b>Vikram Sarabai Space Centre</b> ISRO P.O Thiruvananthapuram 695 022. email: <a href="mailto:director@vssc.gov.in">director@vssc.gov.in</a>
5	Space Applications Space communications, Remote sensing & meteorology	<b>Director</b> <b>Space Applications Centre</b> Jodhpur Tekra Ahmedabad 380 015. e-mail : <a href="mailto:director@sac.gov.in">director@sac.gov.in</a>
6	Remote Sensing	<b>Director</b> <b>National Remote Sensing Centre</b> ISRO, Dept. of Space, Balanagar, Hyderabad - 500 625 (A.P.) email : <a href="mailto:director@nrsc.gov.in">director@nrsc.gov.in</a>



# Proposal Submission (Contd.)

S.No	Topic	ISRO Centre
7	Satellite Technology	<b>Director</b> <b>ISRO Satellite Centre</b> P B No. 1795, HAL Airport Road Vimanpura Post, Bangalore 560 017 email : director@isac.gov.in
8	Systems studies related to tracking, telemetry, telecommand and other ground instrumentation for satellites and launch vehicles	<b>Director</b> <b>Satish Dhawan Space Centre, SHAR</b> Sriharikota P.O. 524 124 Nellore District. email : director@shar.gov.in

You may submit the proposals to concerned other ISRO/DOS Centres/Units also

# Review of the Proposal at ISRO

- **Proposals are submitted directly to the ISRO/DOS Centres.**
- **The proposals are then reviewed by the experts of the respective centres/outside.**
- **The proposals are then presented at the RESPOND review meetings of the respective Centres and evaluated by RESPOND Committees**
- **Based on the recommendations of the Centre, the proposals are considered for approval by ISRO Hq**

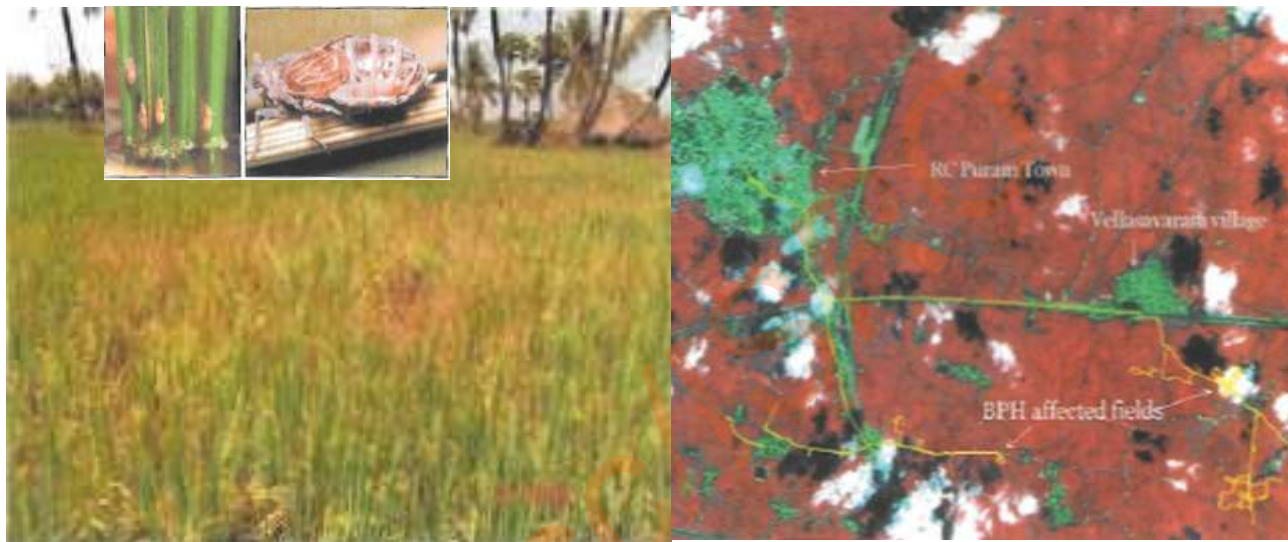
# Research Grants

- ISRO provides financial grants to support fellowship, Equipment, materials, consumables & supplies, internal travel, testing charges, data, contingency etc.
- There is no provision for any kind of payment to the Principal Investigator (or other staff) belonging to the Institution.
- The services of supporting staff like administrative personnel, technical staff, technicians & technical assistants, surveyor, data entry operators etc. has to be provided by the Institute

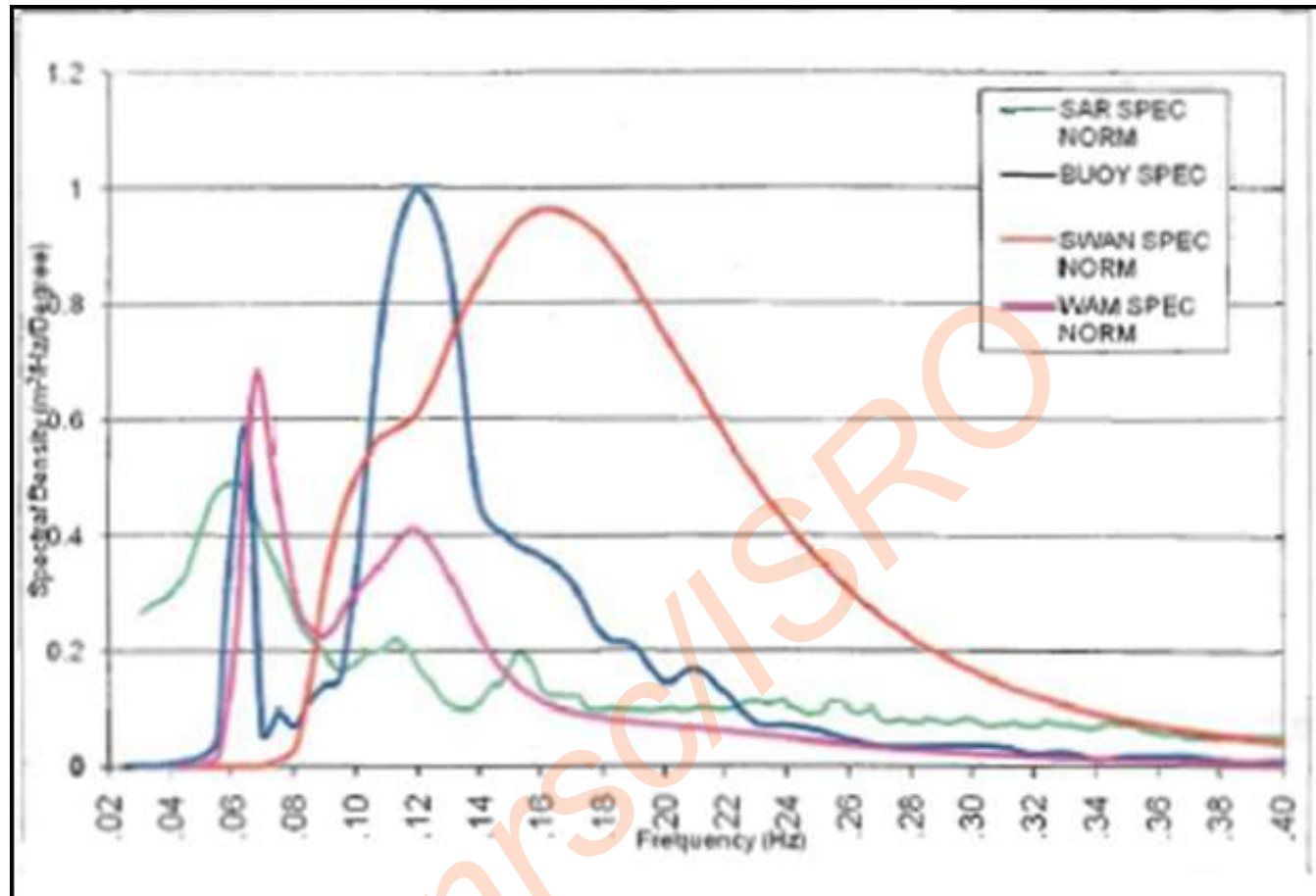
# Thrust Areas

**Planetary Exploration, Navigation Satellite Systems, Climate studies, Human Space Programme, Advanced Communication & Remote Sensing Systems and Applications, Societal Applications, Advanced Launch Vehicles, Astro Chemistry, Astro Biology and Sun-Earth interaction during space weather event etc.**

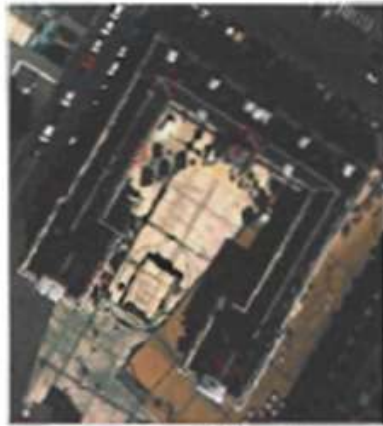
# Highlights of Some studies



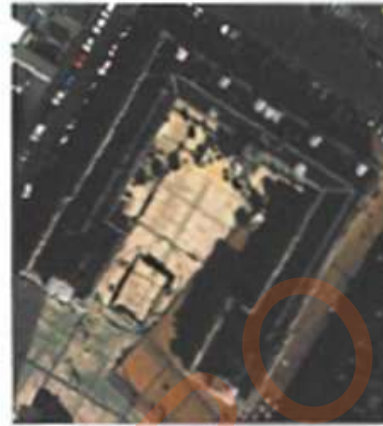
**Brown Plant Hopper damaged Paddy field in West Godavari Dist. and Satellite image, studied under the project 'Detection of pests and diseases for precision crop management using remote sensing techniques'**



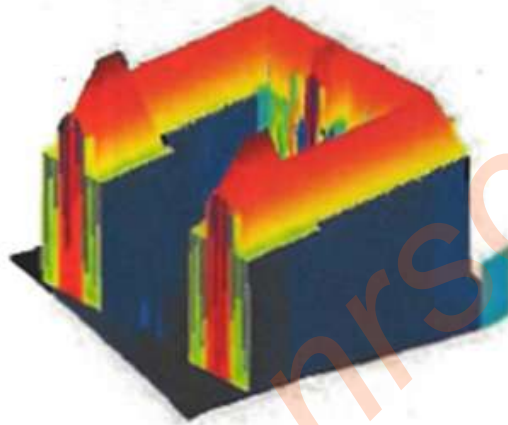
Analysis of **Satellite derived wind and wave parameters** for coastal waters off Karnataka . SAR/Altimeter derived wave parameters were retrieved successfully & validated. The seasonal variability of retrieved wind data and wave data was also studied. ENVISAT ASAR wide swath mode data was used.



(a)



(b)



(c)

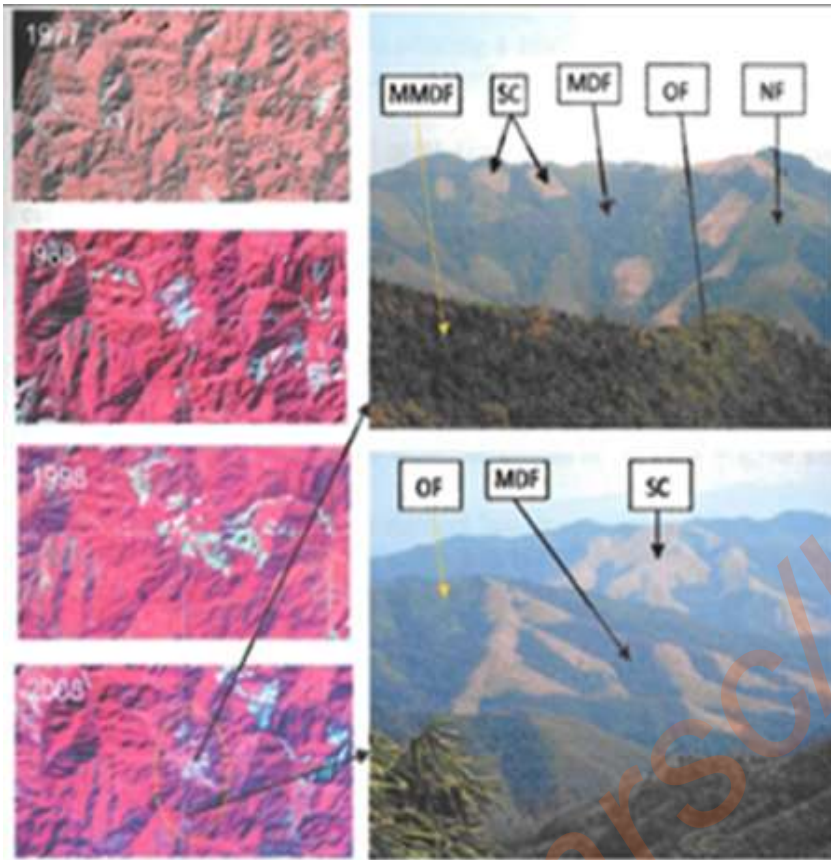


(d)

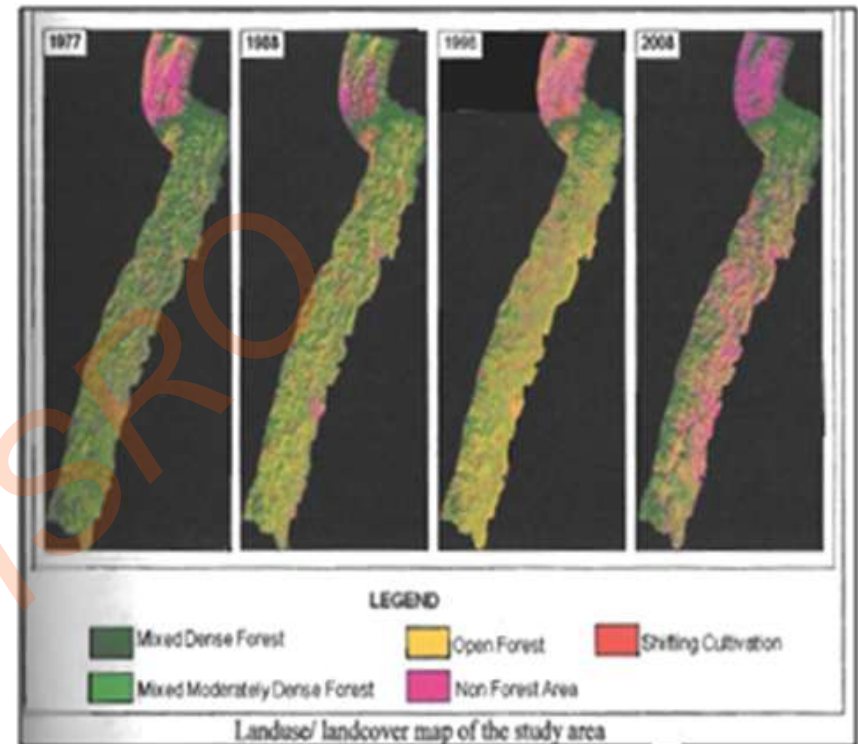
**Reconstruction  
of 3-D objects  
from Stereo  
space imagery  
for  
development  
of city models**

Results for the Building II (a) left image, (b) right image, (c) Ground truth depth (d) obtained result.





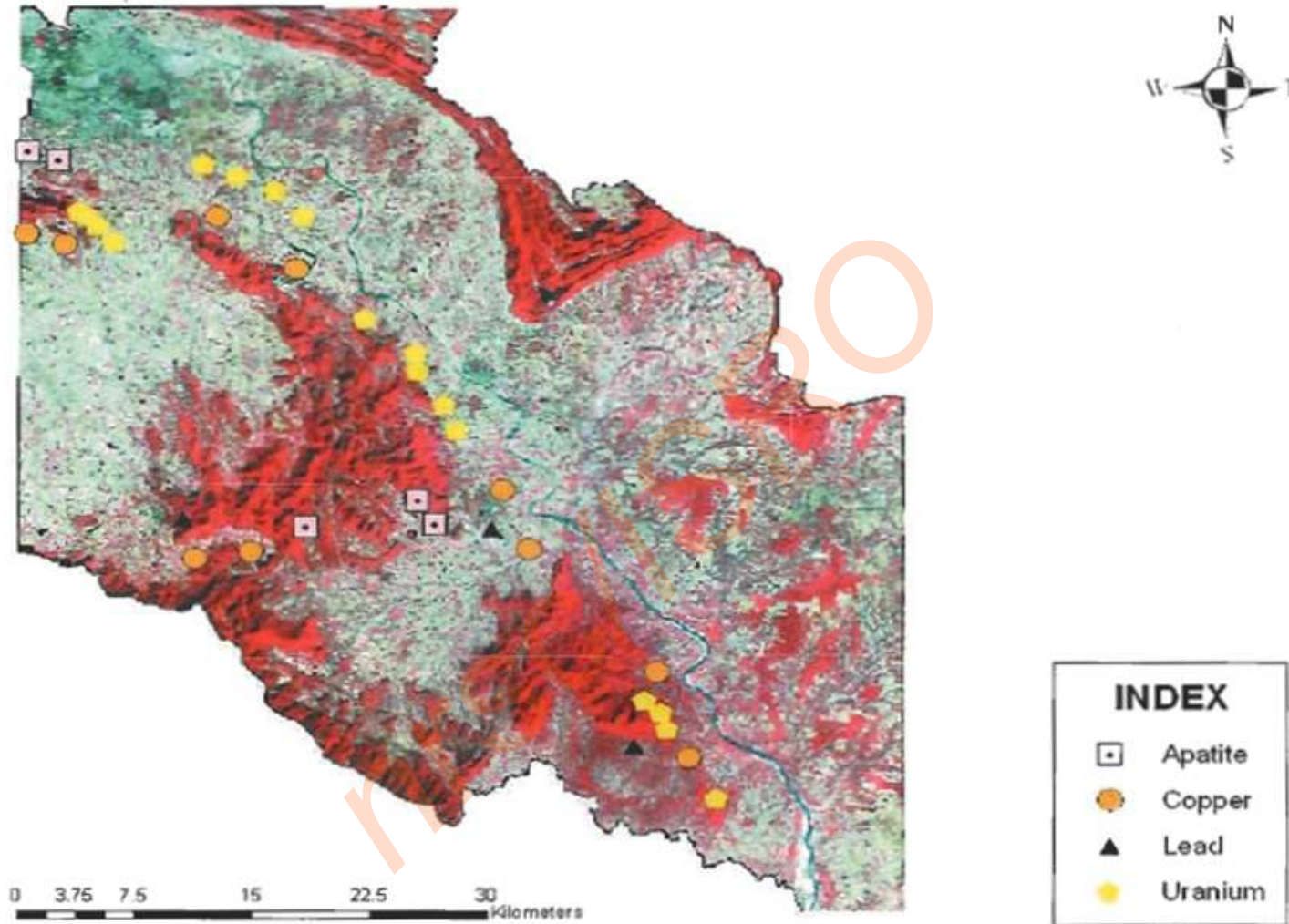
Field Validation Sites near Leibi Village (94.225° E & 24.392° N).  
 Yellow circle indicates the selected site



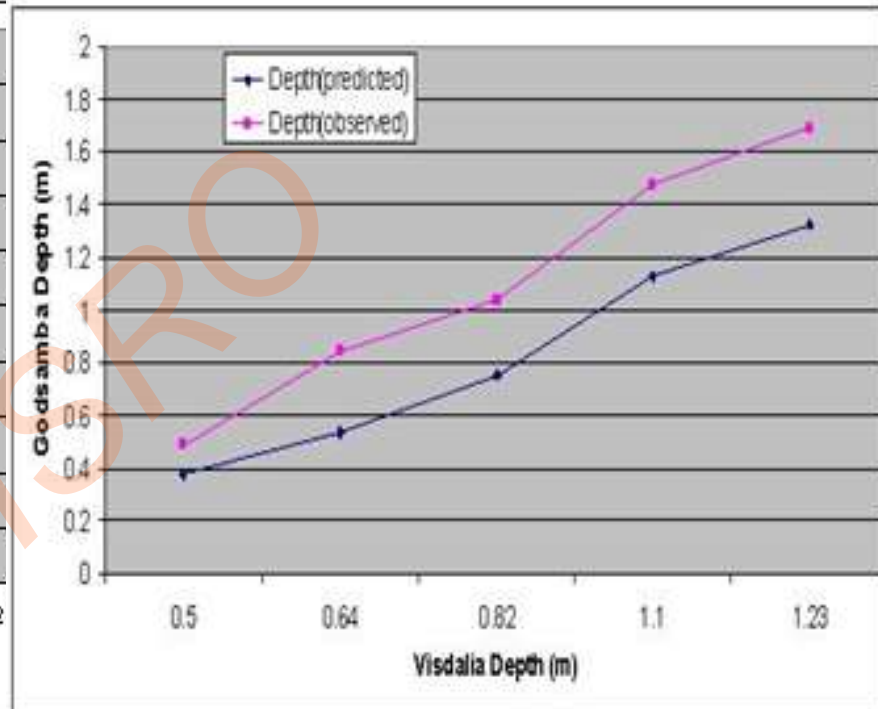
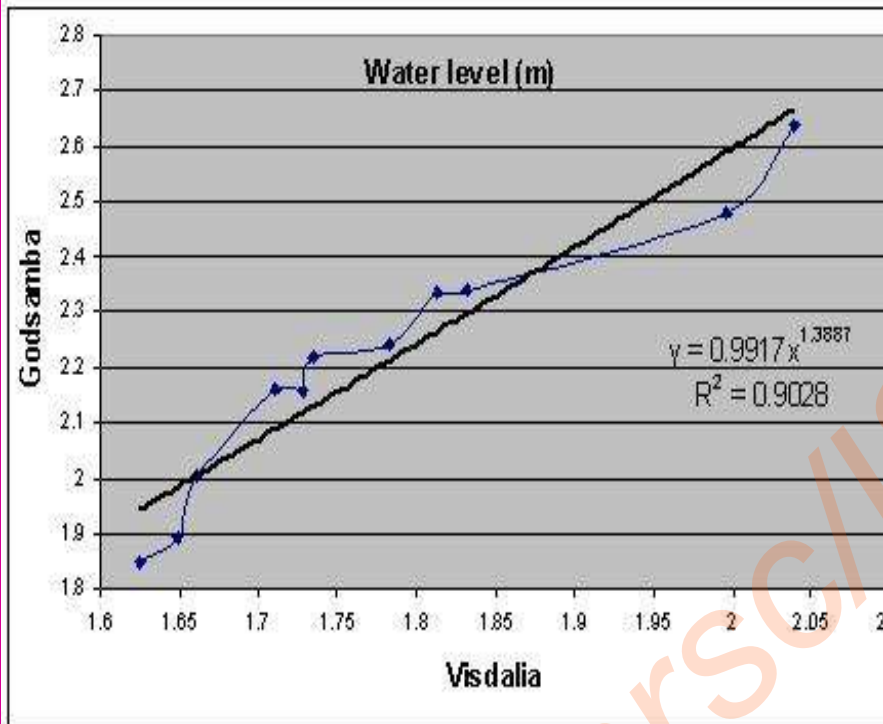
## Application of remote sensing techniques in assessment of landscape dynamics along the Indo-Myanmar Ranges



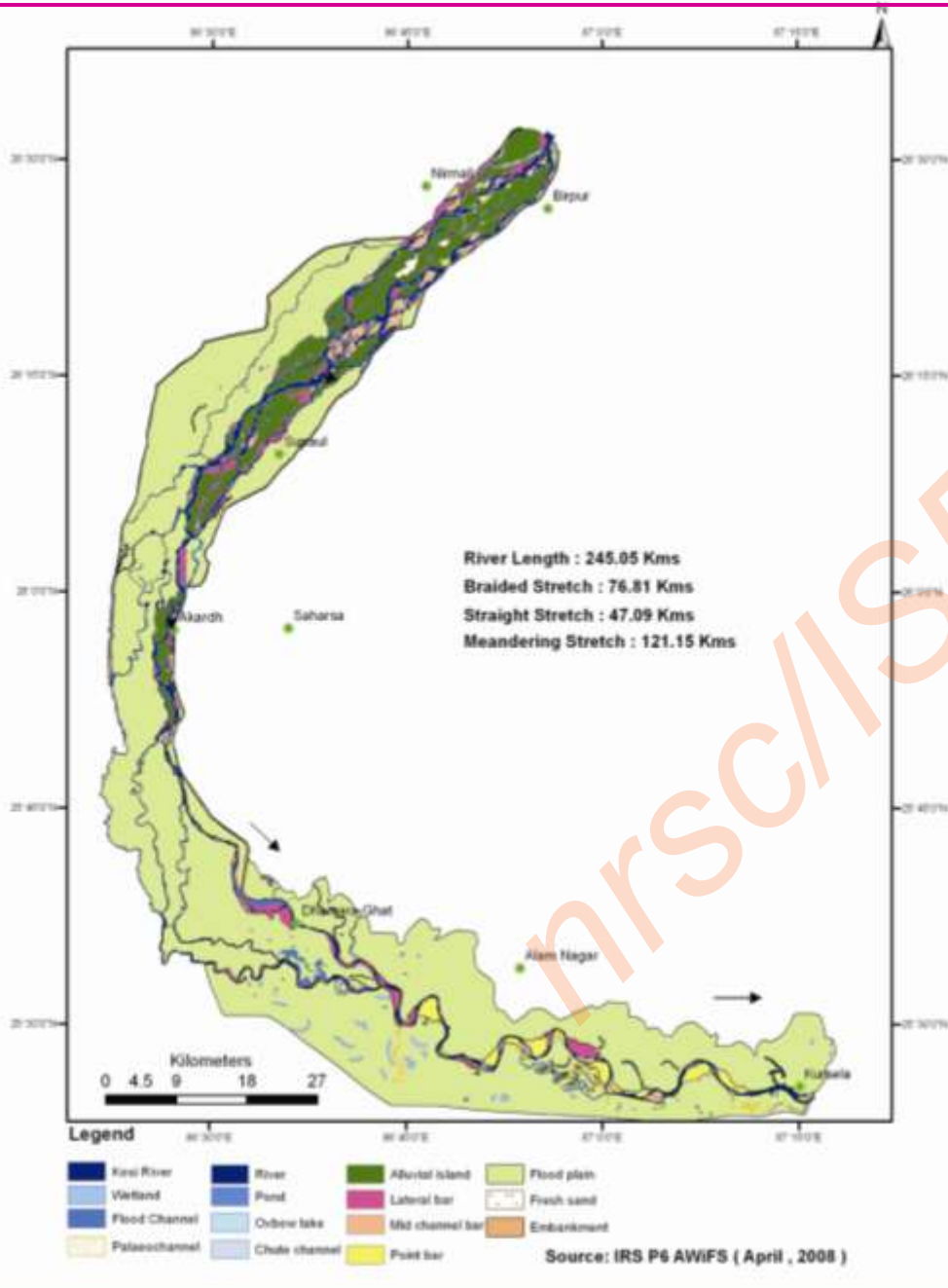
## PROGNOSTIC MINERAL AVAILABILITY LOCATION MAP



**Geospatial Technology for mineral exploration program in Singbhum Shear Zone**

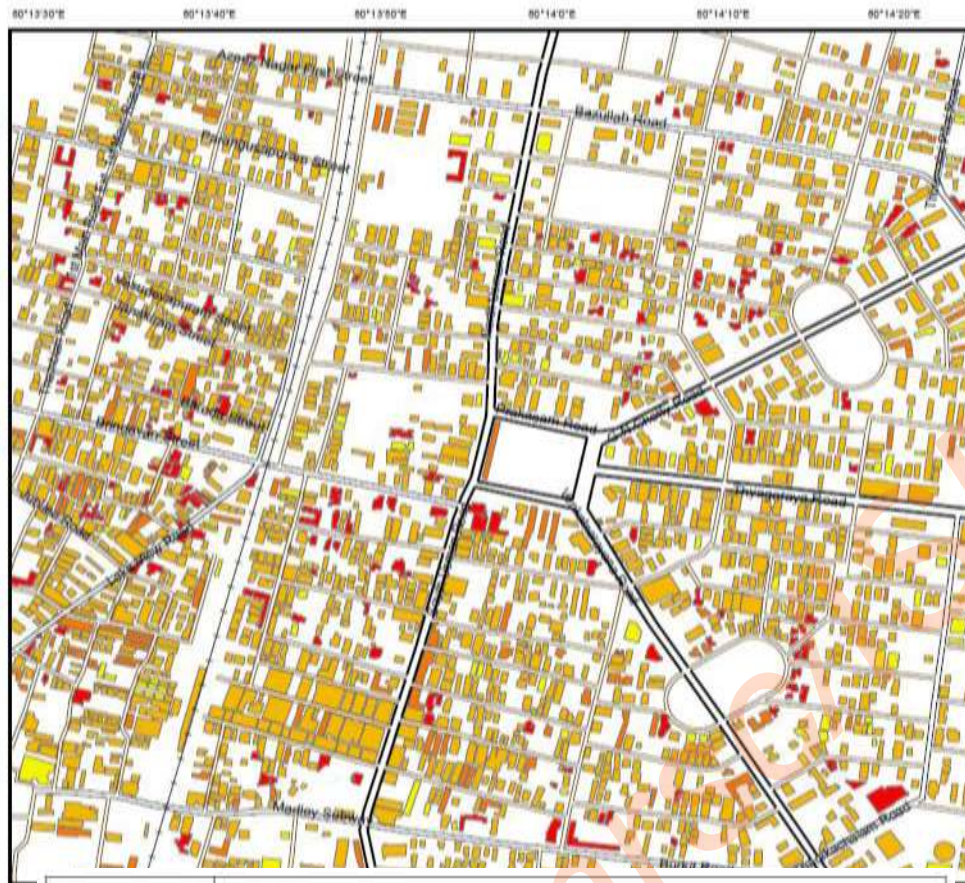


**Development of a remote sensing and GIS based approach for flood forecasting and warning for Lower Tapi basin using FFW model (Flood Forecasting Work Model)**



## Morpho-tectonic evaluation of the Kosi river basin, Bihar using remote sensing data





## Damage Potential to buildings in the Study area (part of Chennai )

### Legend

#### Study Area Roads

- Major Road
- Main Road
- Street
- Railway Line

#### RVS Zone III

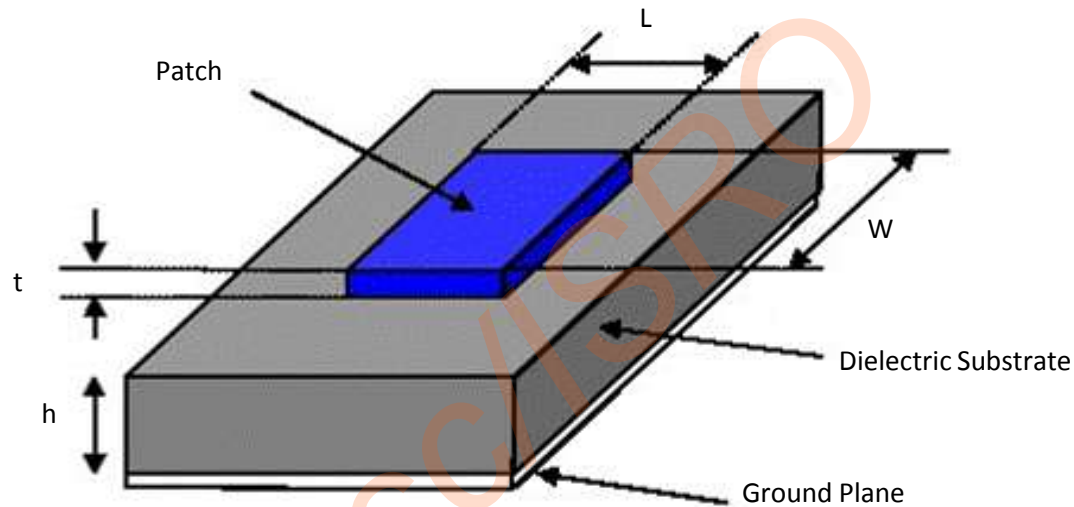
##### Damage Probability Score

- Red: -0.300000 - 0.299999
- Orange: 0.300000 - 0.699999
- Light Orange: 0.700000 - 1.999999
- Yellow-Orange: 2.000000 - 2.999999
- Yellow: 3.000000 - 4.000000

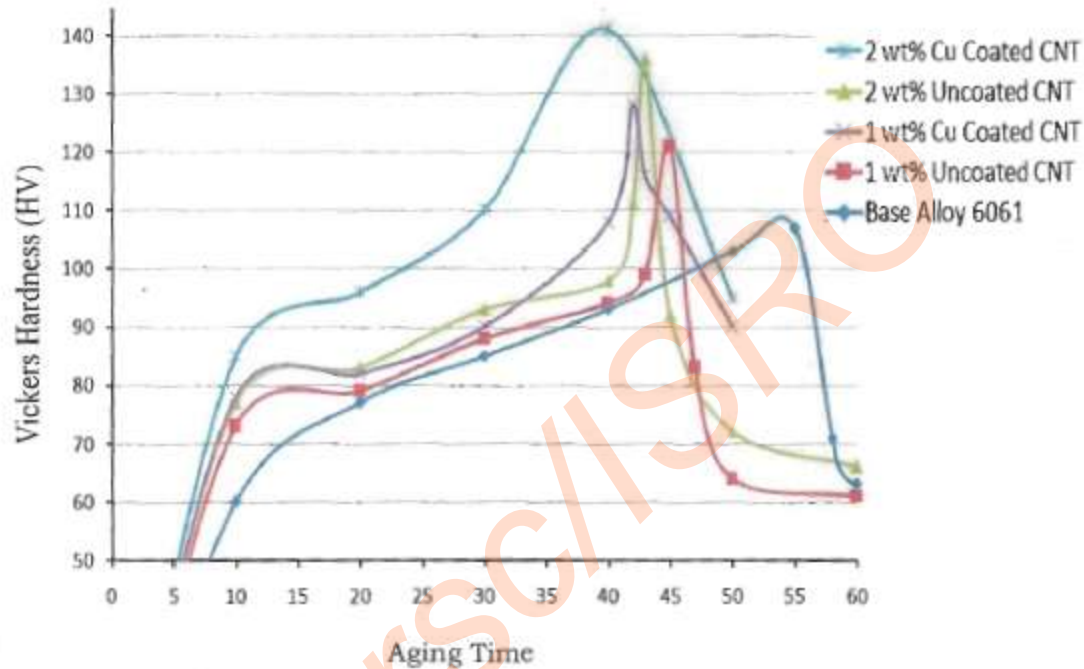
0 0.1 0.2 0.3 Km

RVS Score	Damage Potential
$S < 0.3$	High probability of Grade 5 damage; Very high probability of Grade 4 damage
$0.3 < S < 0.7$	High probability of Grade 4 damage; Very high probability of Grade 3 damage
$0.7 < S < 2.0$	High probability of Grade 3 damage; Very high probability of Grade 2 damage
$2.0 < S < 3.0$	High probability of Grade 2 damage; Very high probability of Grade 1 damage
$S > 3.0$	Probability of Grade 1 damage

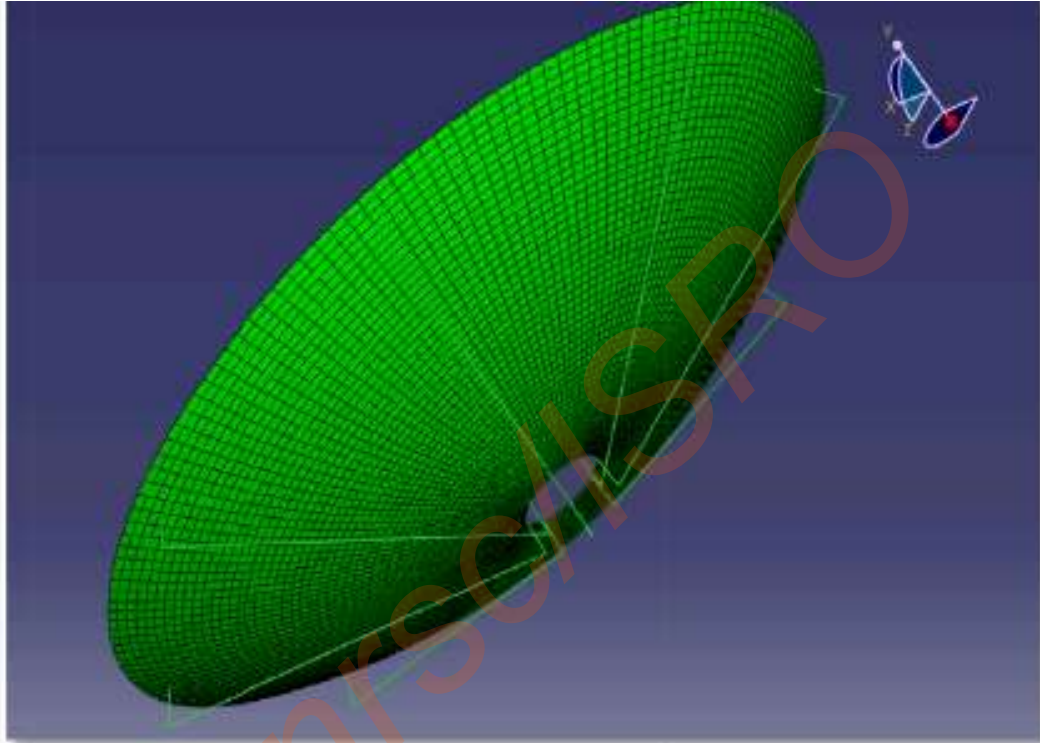
**Earthquake Damage Scenario Analysis for Chennai city using Remote sensing & GIS techniques**



**Structure of the Micro strip patch antenna  
under the project 'Design feasibility study  
and realization of a single directional antenna  
for L and S bands relevant to space  
communication'**



**Graph showing aging curves for base alloy, uncoated and coated composites under the Project ‘Strengthening of Aluminum Alloy 6061 Carbon Nanotubes composites ‘**



***ABAQUS Model of the Reflector using S4R Shell with 8064 elements developed under the project 'Control of flexible and reconfigurable Parabolic Antenna'***

**Thank You**

nrsc/CSRO