

DISASTER MANAGEMENT AND SPACE TECHNOLOGY

CAPACITY BUILDING INITIATIVES AND GAPS



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CAPACITY BUILDING COMPONENTS

Capacity-building goes beyond the
Conventional Perception of Training

- Resources
- Motivational
- Performance

RESOURCES

- Strategic and Policy - Map policy/ legislations on spatial Data
- Non-structural and Intellectual - Information and data
- Structural and Material - hardware, software, connectivity
- Systemic and Functional - Institutional mechanism including financial provisions
- Human Resources - Trained Personnel

MOTIVATIONAL AND PERFORMANCE

- Motivational
 - Incentives
 - Facilitation
- Performance
 - Knowledge
 - Skills
 - Attitude

REGULATORY FRAMEWORK FOR HIGH-RESOLUTION MAPPING

Ministry of Defense completely prohibits the use of sensitive information using aerial photography/high resolution satellite imagery by private sector or any non-governmental agencies.

The recent map policy has brought out some relaxation and enabled Survey of India to release two series of maps.

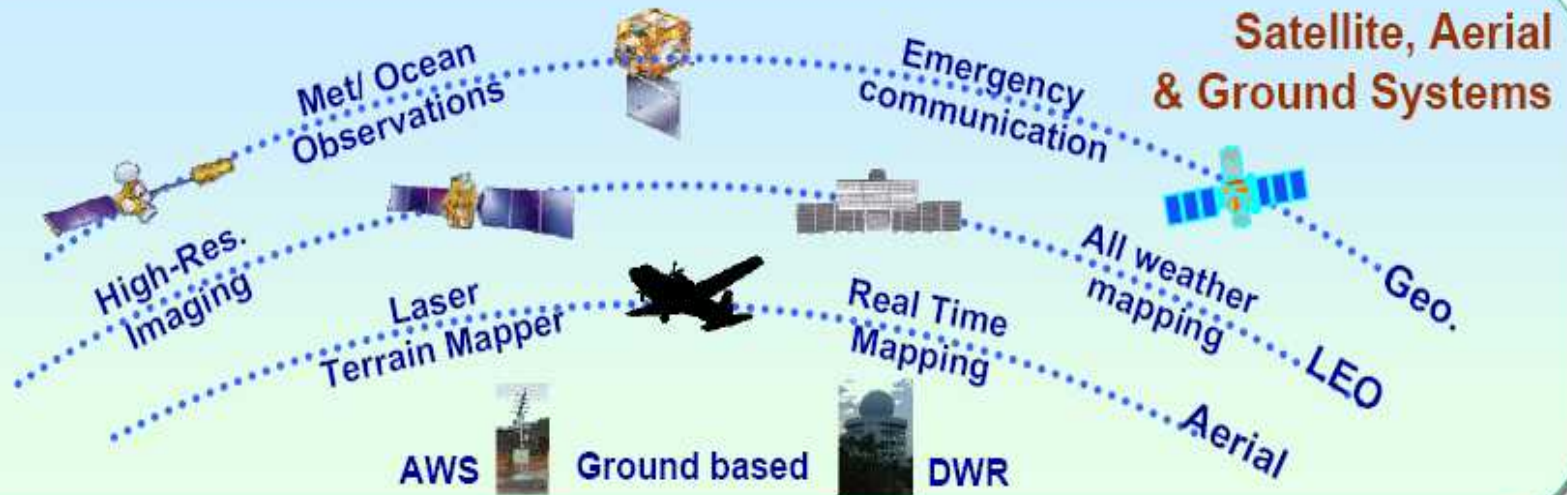
- Defence Series Maps (DSMs): topographic maps (on Everest/WGS-84 datum and polyconic/UTM projection) on various scales (with heights, contours and full content without dilution of accuracy. These classified maps (digital or analogue forms) will serve the purpose of national security.
- Open Series Maps (OSMs): UTM projection on WGS-84 datum will become unrestricted after obtaining a one-time clearance by the Ministry of Defense. Users will be allowed to publish the maps on hard copy and web.

Source: Survey of India, Ministry of Science & Technology, Govt of India 2007

INSTITUTIONS -SPACE TECHNOLOGY

- Indian Space Research Organization (ISRO)
- SAC, Ahmedabad
- National Remote Sensing Agency Hyderabad (NRSA)
- Indian Institute of Remote Sensing (IIRS)
- Regional Remote Sensing Application Centres
- State Remote Sensing Centers

ISRO - DMS Infrastructure



Delivery Mechanisms



Technology Development & Research - ASAR, Forecasting/ Simulation Models, ..

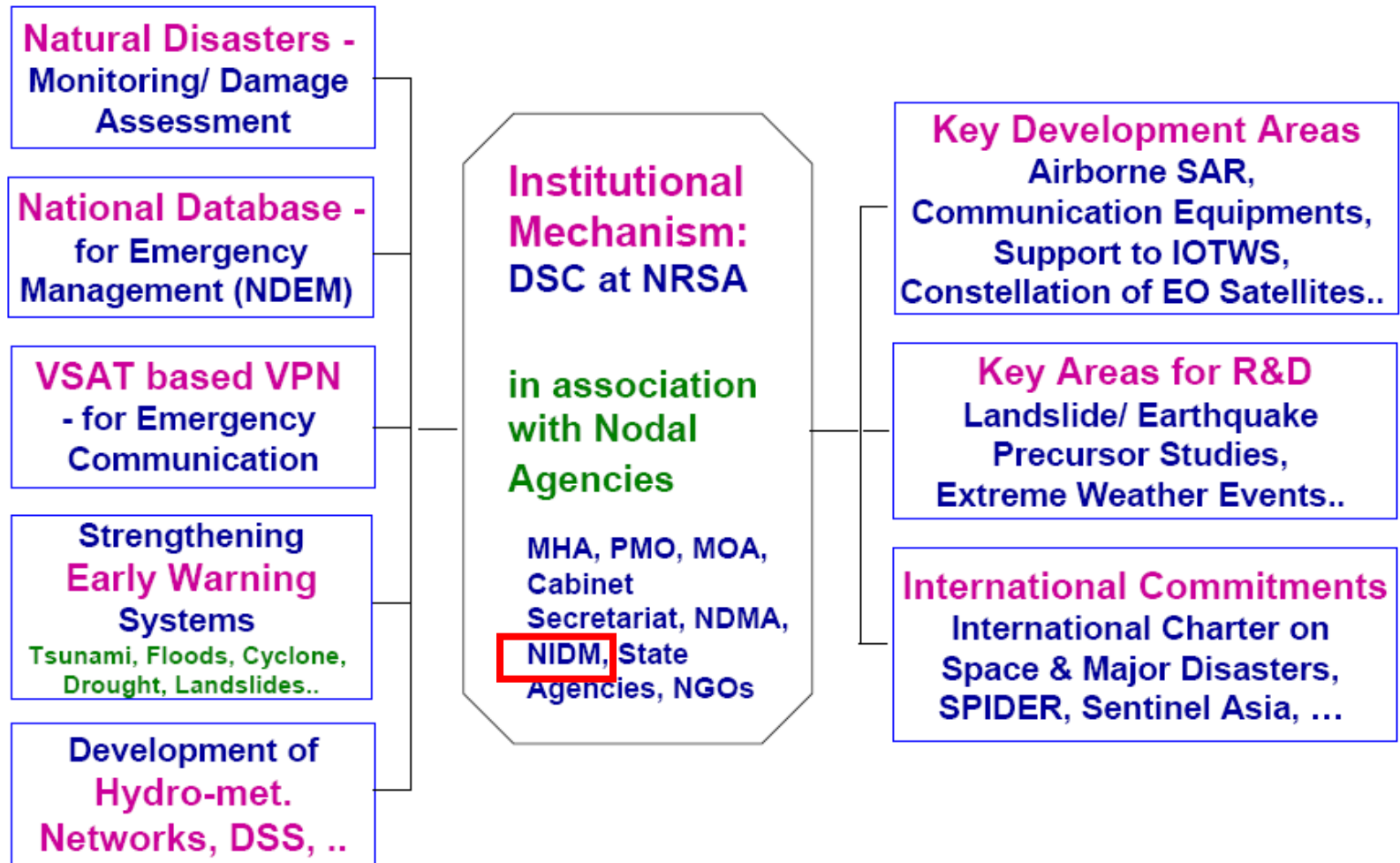
Emergency Communication Network - VPN; Support - MSS Type-D, WLL VSAT, ...

Satellite Network

INSAT system has nine operational satellites in the geostationary orbit - INSAT-2E, INSAT-3A, INSAT-3B, INSAT-3C, INSAT-3E, KALPANA-1, GSAT-2, EDUSAT, and INSAT-4A

7 operational IRS satellites in orbit making it as one of the largest constellation of remote sensing satellites for civilian applications

ISRO DMS PROGRAMME



DMS PROGRAMME

- Creation of digital database for facilitating hazard zonation, damage assessment, etc.
- Monitoring of major natural disasters using satellite and aerial data and development of appropriate techniques/tools.
- Acquisition of close contour data, for hazard prone areas using Air-borne Laser Terrain Mapper.
- Strengthening the communication backbone for timely dissemination of information and emergency support.
- Development of Air-borne Synthetic Aperture Radar (ASAR) towards all-weather monitoring capability.
- Establishment of a Decision Support Centre (DSC) at NRSA as a single-window service provider
- Support the International Charter on Space and Major Disasters, as a signatory.

CAPACITY BUILDING INITIATIVES- ISRO

- Dedicated network/satellite for Education (EDUSAT network)
- Network for healthcare (ISRO Tele-medicine network)
- Network for community empowerments (Training and Development Communication (TDCC))
- Jhabua Development Communication Programme (JDCP), Village resource Centre (VRC) network,
- Dedicated secure virtual private network (VPN) for emergency communication towards DM
- Network of Cyclone Warning and Dissemination System (CWDS).
- Financial Support for conducting research and development activities related to Space Science, Space Technology and Space Application in Unversities and academic Institutions



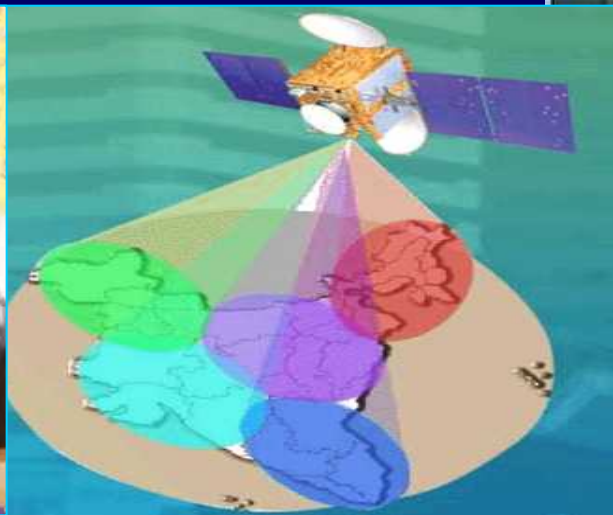
Receive Only Class

Utilization Status

- 44 Networks
- 9 on National; 35 on Regional
- 15952 Classrooms;
- 2125 Interactive Classrooms,
- 13827 Receive Only Classrooms

Under Implementation

Maharashtra, Chattisgarh, Orissa, MP, Delhi, Meghalaya, Andman & Nikobar, VTU and WBTU



Satellite Coverage

Benefits

- Teacher's' Training
- Primary/Secondary School Education
- Technical/Professional Education
- Distance Education
- Adult Education
- Healthcare Programmes
- Vocational Training
- **More than 20 lakh schools-children being benefited**



Interactive Class

States/UT

- J&K
- Punjab
- Haryana
- Rajasthan
- Gujrat
- Jharkhand
- West Bengal
- Tripura
- Nagaland
- Mizoram
- Karnataka
- Tamilnadu
- Kerala
- Andhra Pradesh
- Lakshadweep
- MP, UP, Bihar, Uttaranchal under School net Network

NRSA

- An autonomous institution supported by Department of Space.
- Responsible for acquisition, processing and supply of data from remote sensing satellites.
- Satellite earth-station at Shadnagar, Hyderabad, for reception of data from Indian remote sensing satellites, US Landsat and NOAA, French SPOT and microwave data from the European remote sensing satellite ERS.
- Undertakes remote sensing application projects in collaboration with the users e.g. NDEM, NADAMS etc.
- Incharge of generation and implementation of action plans under Integrated Mission for Sustainable Development in 174 districts of India and NDEM for 241 districts.
- Indian Institute of Remote Sensing at Dehra Dun.
- supplying data from IRS-1B, IRS-1C, IRS-1D, IRS-P3 and IRS-P4 to the users.

NRSA - DSC PRODUCTS AND SERVICES

Floods



Flood Inundation Maps
Damage Assessment
Hazard Zonation
Bank Erosion Studies

Earthquakes



Damage Assessment

Cyclone



Inundation Maps
Recession Maps
Damage Assessment

Landslides



Damage Assessment
Hazard zonation

Drought



Monthly Agricultural
Drought Report

End-of-the-season
Agrl. Drought Report

Forest Fires



Active Fire Detection
Damage Assessment

applications.

Table 1. Remote sensing & GIS products & services for disaster management

| Disaster Theme | Remote sensing & GIS based Deliverables | | |
|----------------|---|---|---|
| | Pre-Disaster | During-Disaster | Post-Disaster |
| Flood | Chronic flood prone areas/ flood-plain zoning | Flood inundation map, flood damage assessment | Detailed damage assessment, flood control works, river bank erosion and damages |
| Drought | Integrated land and water management plans (long term plan) | Drought assessment in spatial format, damage assessment | Drought mitigation measures |
| Landslide | Landslide Hazard Zonation (LHZ) mapping, risk assessment | Mapping of affected area | Suggesting management practices |
| Cyclone | Satellite based Monitoring input to forecast models | Impact assessment | Detailed damage assessment |
| Earthquake | Seismic zonation | Impact assessment | Sites for rehabilitation |
| Forest Fire | Delineation of forest fire-prone areas | Monitoring of spread and direction of fire | Damage assessment |

CAPACITY BUILDING INITIATIVES - NRSA

National Remote Sensing Centre (NRSC) at NRSA organises courses for scientists working at implementation level

- 12 week Regular Course on Remote Sensing & GIS - Technology and Applications
- 4 week Regular Course on Introduction to GIS and its Applications
- Customized / Special courses are also organised for a period of 1 to 2 weeks upon request by user organisations.
- One week training on applications of Geoinformatics in Disaster Management for State Govt Officials (MHA sponsored)

TRAINING AND AWARENESS GENERATION INITIATIVES by IIRS

- EDUSAT Based Training on "Remote Sensing, GIS & GPS" for university students 25 Aug - Nov 2008
- International workshop on Risk Assessment of multi hazards along Indian Coasts in collaboration with Asian Institute of Technology, Bangkok during 9,12 July 2007 at IIRS, Dehradun.
- Asian Program for Regional Capacity Enhancement for Landslide Impact Mitigation (RECLAIM)
- 'Capacity Building in Asia using Information Technology Applications' (CASITA) funded by European Union
- Awareness course on "Geo-Hazards"
 - Training on Landslide Management with ITC Netherlands, Jan 2008
 - Awareness Course in Geoinformatics Applications in Geohazards, IIRS-NIDM, MHA in July 2006

National Natural Resources Management System (NNRMS)

- A national level inter-agency system for integrated natural resources management in the country.
- established in 1983 and is supported by Planning Commission, Government of India. Department of Space (DOS)

National Natural Resources Management System (NNRMS)

- Establishing and maintaining a National Natural Resources Repository
- Establishing Village Resource Centres to outreach to grass-root level
- Enabling information services for governance, citizens and commerce
- Supporting systems of Ocean Information Service, improved Weather Forecasting and Disaster Management
- Developing a better understanding of earth system environment and its processes
- Positioning a viable Spatial Information business sector

TRAINING AND AWARENESS GENERATION INITIATIVES by IIRS

Certificate Courses (4 months)

Diploma Course(10 months)

M.Tech.

M.Sc.

Orientation Course

Awareness Course

NNRMS - ISRO Sponsored courses : for

University Faculty only

International Programmes

GEOINFORMATICS-GEO-HAZARDS PROGRAM

- Geo-informatics in Geo-Hazards -18 Months M.SC. with ITC, Netherlands
- Geo-informatics in Geo-Hazards
- 10 Months Post Graduate Diploma of IIRS Geo-informatics in Geo-Hazards
- 4 Months Certificate Course Geo-informatics in Geo-Hazards
- 1 weeks awareness generation course

CENTRE FOR SPACE SCIENCE AND TECHNOLOGY EDUCATION IN THE ASIA PACIFIC REGION (CSSTE-AP)

The Centre is conducting Post Graduate Courses

- Remote Sensing and Geographic Information System,
- Satellite Communication
- Courses in Satellite Meteorology and Global Climate
- Space Science.

The Centre has also conducted 21 Short Term Courses/ Workshops and Awareness Programmes (Till Aug 2008).

REGIONAL REMOTE SENSING SERVICE CENTRES

RRSSCs organizes training courses for user community as well as for the university / school faculties.

- Basics of Remote Sensing
- Digital Image Processing
- Geographic Information System
- Application specific training courses

PROJECTS HANDLED BY RRSSCs

- Integrated Mission for Sustainable Development (IMSD)
- National (Natural) Resources Information System (NRIS)
- Crop Acreage and Production Estimation (CAPE)
- Landuse / Landcover Mapping
- Wasteland Mapping
- Biodiversity Characterization at Landscape Level
- Rajiv Gandhi National Drinking Water Mission
- Watershed related studies
- Agro-Climatic Planning and Information Bank (APIB)
- Disaster Management System
- Survey of Potential and Actual Area under sericulture through Remote Sensing (SPAARS)

TRAINING PROGRAMMES OF GSI

- Conducts ISRO (Department of Space) sponsored training courses on Remote Sensing (NNRMS) and Geo-informatics for Disaster Management
- high resolution satellite data for Landslide Zonation and Hazard Risk Management in collaboration with ITC under a joint agreement between GSI, ITC & NRSA.
- Training courses have also been designed for technical and administrative officials.

ABOUT NIDM

- MoA sets up NCDM in IIPA in 1995
- NCDM upgraded to NIDM in Oct 2003 (under MHA)
- NIDM as a Statutory Body -DM Act 2005
- 4 Departments
- Mandate
 - Capacity Building through training, education and information/knowledge dissemination
 - Research
 - Documentation & Publication
 - Inputs for Guidelines, Planning, Policy and Advocacy for Disaster Management

VISION & MISSION

Vision

- To be the leading center of excellence in the field of disaster risk mitigation and management in India and the region

Mission

- To work as a think tank for the government by providing policy advice and facilitating capacity building services including strategic learning, research, training, system development and expertise promotion for effective disaster preparedness and mitigation.

DIVISION OF HYMET & GEOINFORMATICS

- Flood
- Drought
- Cyclone
- Climate Change
- Coastal Erosion/ Bank Erosion
- Tsunami
- Heat / Cold Wave
- Geoinformation in Disaster Risk Reduction and Management

GEOHAZARD RISK MANAGEMENT DIVISION

- Earthquakes
- Landslides / Mudslides
- Mining Hazards
- LLOF/Dam Burst
- Hill Area Development & Safety
- Urban Risk Management

GEOINFORMATION TRAINING PROGRAMMES

- Three days Programme for Administrators - First Programme in May 2005
- One week hands on training programme for technical professionals (State RSAC and NIC) and TOT Programmes (ATIs)- Since Jan 2007
- Training Programmes at DM Cells of ATIS with the technical support of State RSAC, RRSSC .
- Add on module to ongoing training programmes (e.g. Landslides, floods, drought, cyclones, industrial and chemical disasters etc)
- Launching 2 weeks Programme in collaboration with ITC in Jan 2009.
- Specialised online programme with WBI

ACHIEVEMENT

- Organized >400 training programmes and trained (both trainers and direct stakeholders)
- Organized South Asia Policy Dialogue in August 2006
- Organized the First IDMC in Nov. 2006
- Technical Coordination of 2nd AMCDRR in Nov. 2007
- Partnership with >50 institutions in various fields of cooperation
- Central Sector Scheme and 30 DMC in States
- ICS and FEMA/EMI Trainings
- 38 Training Designs developed
- WBI online training Programmes

GAPS

RESOURCES

- Strategic and Policy - Map policy in India still not permit the use of high resolution data and data of coastal/ international borders
- Non-structural and Intellectual - Information and data not available to right personnel in right time
- Structural and Material - hardware, software, connectivity problems below district level. EOC/DC/RC offices are not having geospatial data/products.
- Systemic and Functional - NIC/State RSAC/RC/offices work with out coordination
- Human Resources - Trained Personnel at district and sub-district levels

GAPS

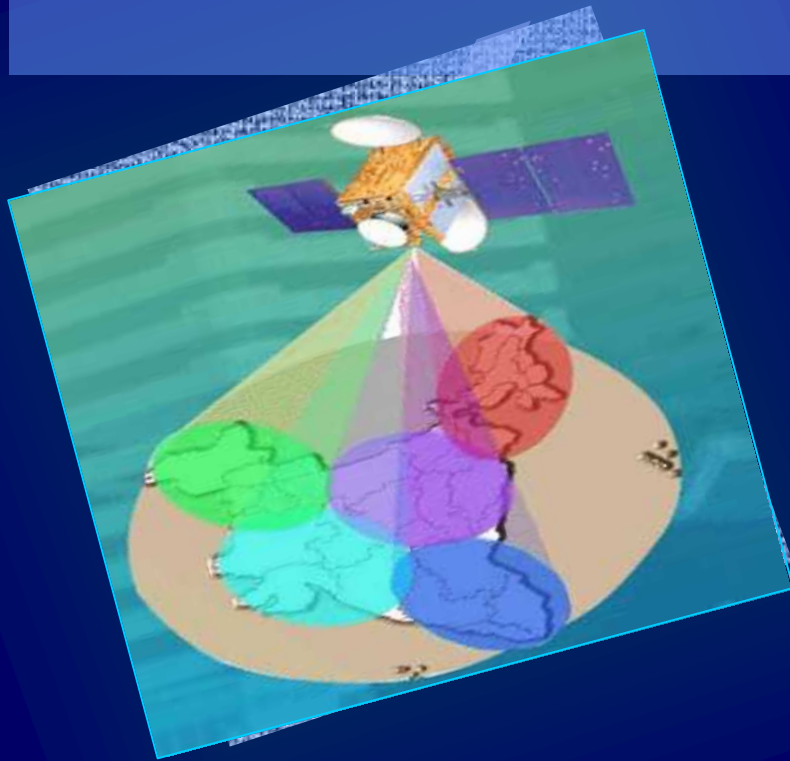
MOTIVATIONAL AND PERFORMANCE

- Most of the training programmes by IIRS /ITC/IITS / BIT etc are opted by researchers and not DM professional.
- Training needs of DM community on application of Geospatial data needs to be carried out.
- No incentives /trainings to promote the use of Geospatial data/Non availability of data
- Technophobia
- Not convinced with the advantage of technology over conventional methods

STRATEGIES

- Capacity and Needs Assessment
- Development and implementation of user friendly web based tools and customized applications targeting DM professionals (not familiar with GIS Programmes).
- Collaboration with State level institutions in conducting training programmes. Awareness generation on the potential of Geo-information technologies. Specific online training programmes through e-learning centers.
- Promoting Geo-information Information/datasets through IT Kiosks, VRCs etc.
- Data sharing with decision makers (timely) through emails or VPN. Processed information and DSS for decision making
- Promoting data sharing through Knowledge Network Portals.

THANK YOU



www.nidm.gov.in
www.isro.gov.in
www.nrsa.gov.in
www.ndmindia.nic.in