

National Database for Emergency Management (NDEM)

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**UN/India Workshop on the Use of EO Data for Disaster Management and
Risk Reduction: Asia Experience
8-10 March, 2016, Hyderabad**

Disasters

NATURAL DISASTER

1. Floods (CWC)
2. Cyclones (IMD)
3. Forest fires (MoEF)
4. Landslides (GSI)
5. Drought (MoA)
6. Spread of epidemics (MoH)
7. Earthquakes (IMD)
8. Tsunami (MEoS)
9. Severe windstorms (IMD)
10. Snow or ice storms (IMD)
11. Severe extremes in (IMD)
temperature (cold or hot) etc

Early Warning available (3)

Type of Emergency

Evacuation, Rescue & Relief
Medical,
Contingency Operations

TECHNOLOGICAL DISASTER / MAN-MADE

1. Fire (State Govt)
2. Explosion ((State Govt, MHA)
3. Building collapse (State Govt)
4. Train/ vehicle accidents (IR, State Govt)
5. Failure of dams (CWC)
6. Major structural failure (State Govt)
7. Spills of flammable liquids (MoEF)
8. Accidental release of toxic substances (MoEF)
9. Deliberate release of hazardous biological
agents, or toxic chemicals (MoEF)
10. Terrorist activities (MHA, State Govt)
11. Riots (MHA, State Govt)
12. Mining accidents (MoM)
13. Loss of electrical power (State Govt)
14. Loss of water supply (State Govt)
15. Loss of communications (State Govt, DoT)
16. Nuclear / Radiological disaster (Nuclear attack,
accidents in nuclear facilities (DoE)

Disaster/Emergency Management Concept

Event
Reporting

Real-time
Field Info

Situation
Assessment

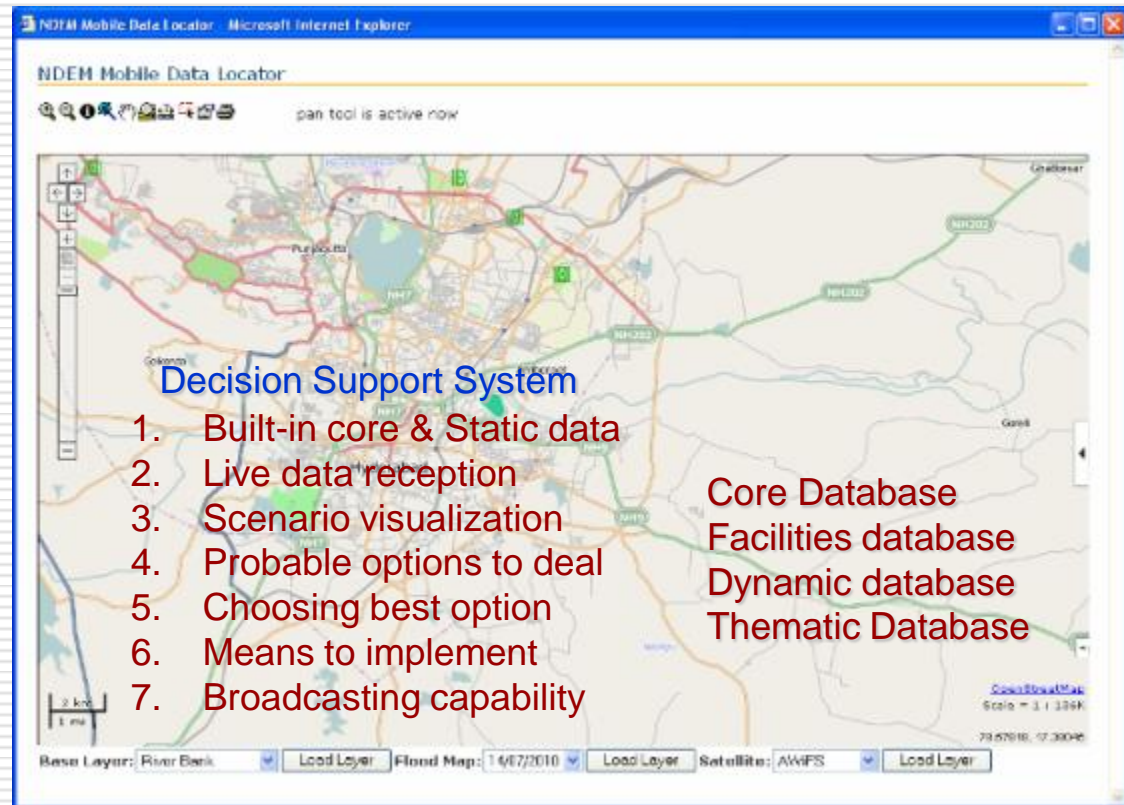
Resource
Identification

Mobilization

Nodal Depts
+

Commn
Channels
+

Database integration, Visualization
Decision Making, Actions

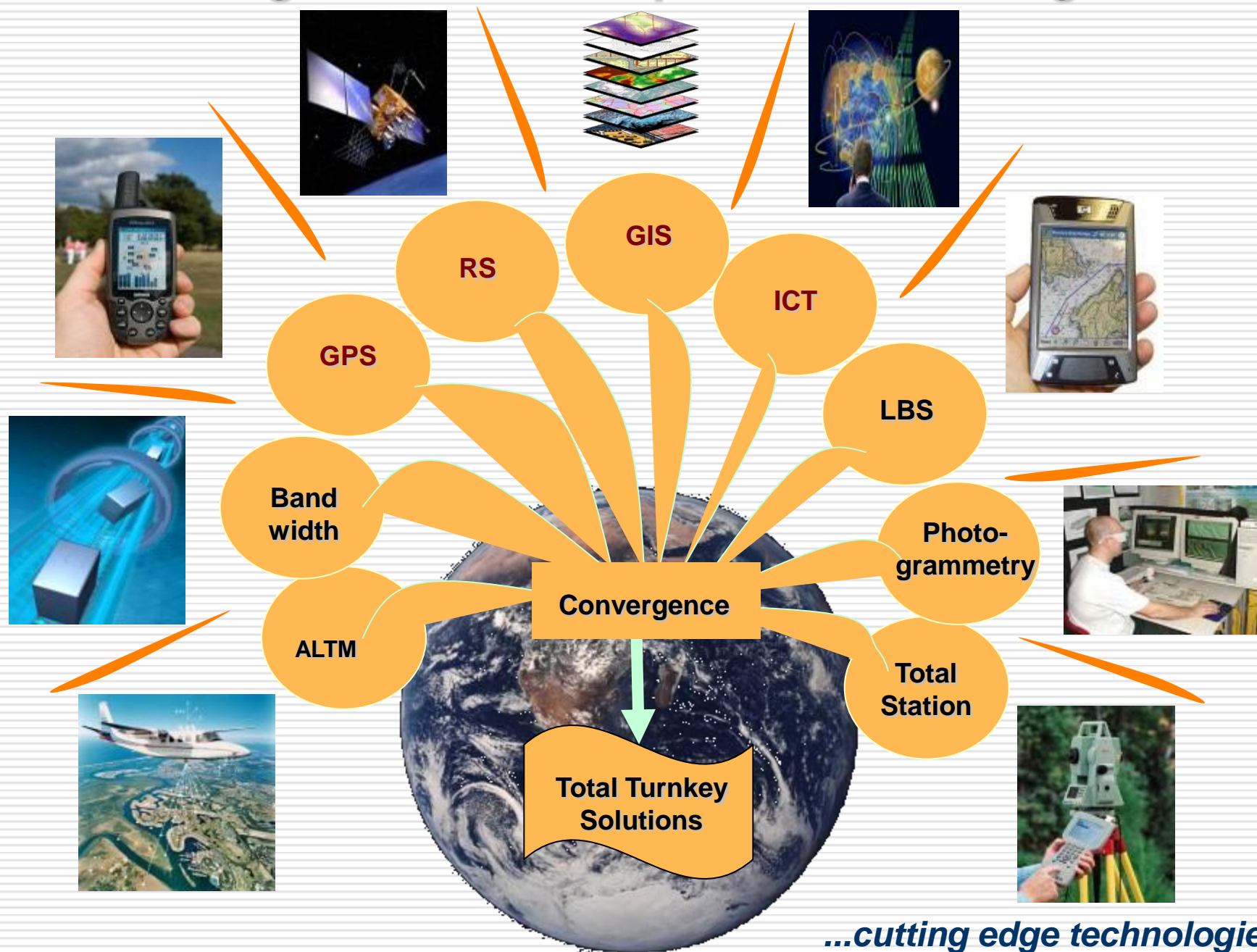


Type of Emergency
Evacuation,
Rescue & Relief
Medical,
Contingency Operations

Type of Emergency Plans Required

Evacuation:	<i>Safe guarding against impact</i> Means of Transport, availability, applicability (Air / land / water) Shelter identification, optimal path (path restrictions, traffic density)
Relief Mgmt:	<i>Taking care of victims</i> Air Dropping of essential items, essential needs at shelter (sanitation, lighting etc), survival needs (food, water, medicines etc), relief distribution, clearing debris / ways/ bodies), restoration etc
Medical:	<i>Life support</i>
Limited Causality	Means of Transport, availability, applicability (Air / land / water) Selection of health services (hospital / diagnostics etc)
Mass Causality	Availability & Applicability of mobile health services, Means of Transport, availability, applicability (Air / land / water) Selection of health services (hospital / diagnostics etc), categorization of patients, informing public about status of activities etc
Contingency : Operations	<i>To limit / minimize the extent of impact</i> Event Specific to the event, follow the individual Ministries SoPs for emergency management

Convergence of Geospatial Technologies



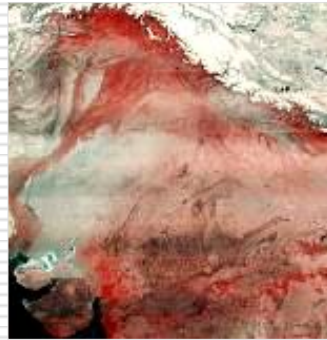
...cutting edge technologies

Space Observations

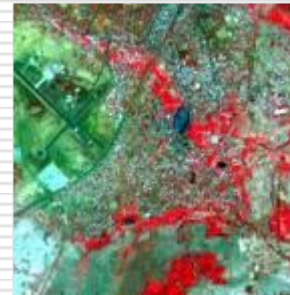
High temporal resolution
Large swath



Medium temporal resolution
Large swath



Low temporal resolution
Limited swath



Low temporal resolution
Very limited swath



Depends on

- Phase of the disaster
- Type of the disaster
- Extent and severity

....

Low spatial resolution
Global level information

Coarse spatial resolution
Regional level information

Medium spatial resolution
Local level information

High spatial resolution
Location specific information

Global to Local

NDEM Project Conception

Multi-Scale Database Organization: 50k – national level; 10k – 350 MHP dists; 2k – 5 megacities

Appropriate Decision Support Tools Development: for assisting decision maker in dealing with emergency situations

DR site: Mirroring at MHA, New Delhi

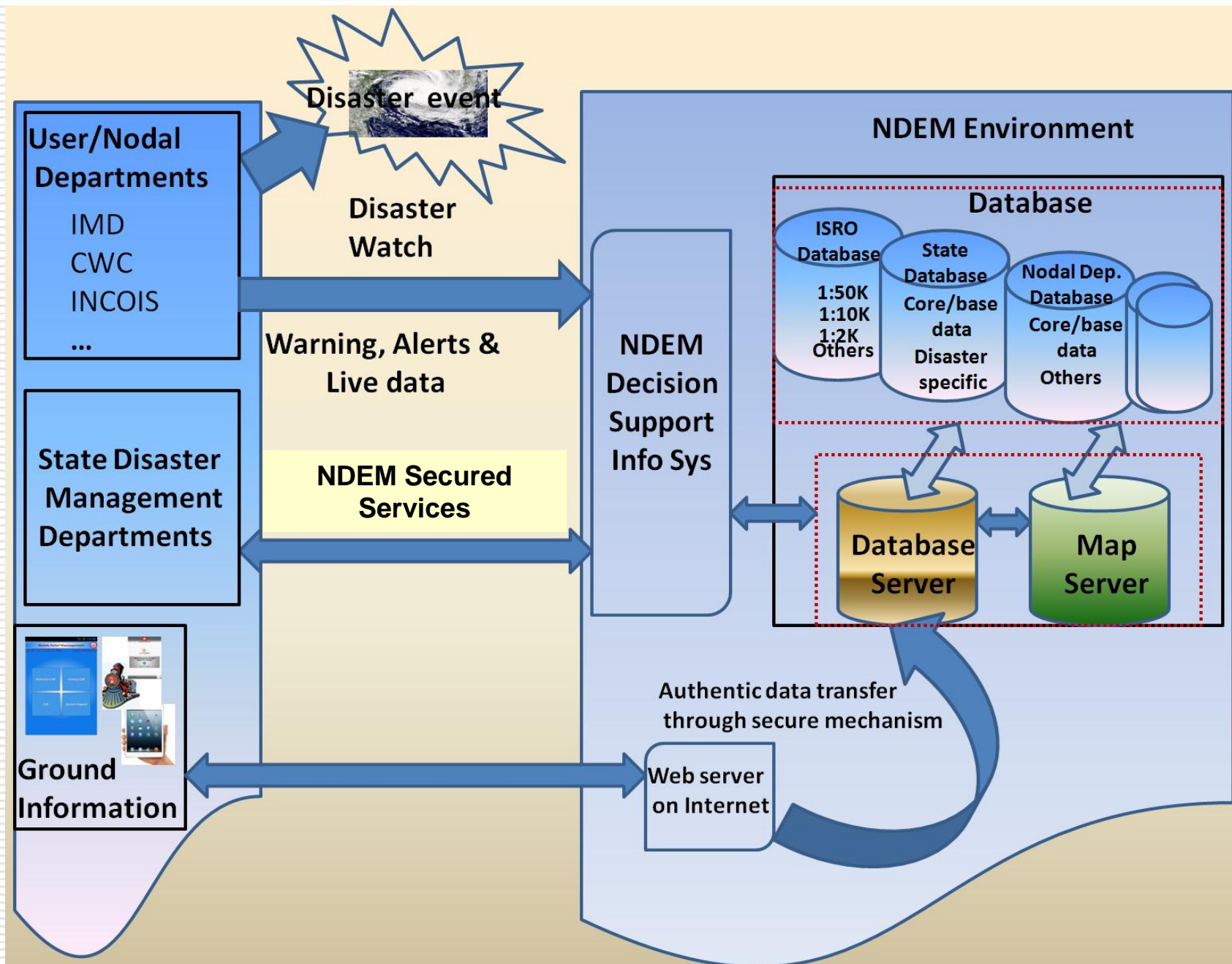
Nodal Ministry: Ministry of Home Affairs

Implementation Strategy: Multi- Institutional Participation, Central / State Depts. Concerned

Implementation Strategy: Multi- Institutional Participation, Central / State Depts. Concerned

Status: Operational

NDEM Data Flow



NDEM Portal Features

News and Alerts

Disaster dashboard highlights current disaster news, disaster warning from available sources, relief manager contact number and portal updates

Active Disaster Details

Shows the details of current disaster occurred with area, geo location on GIS viewer and also available along with reports

Restricted Data Access

For visualization of very high resolution aerial/satellite data for selected disaster situations, restricted access with OTP authentication .

IDRN and Health Database

India Disaster Resource Network (IDRN) is useful for relief & rescue operations. It has been also integrated with health database.

Interaction Portal

Dynamic chat amongst relief/disaster manager for exchange of information and support

Multi State Viewer

Information on Disaster products of each state, highlighting latest disaster event occurred in the State, Access to all State database

Historical Disaster Data

Historical disaster data for better understanding of the present situation for further analysis.

Reports and Maps

Comprehensive outputs of the disaster event in the form of reports and maps for utilization by disaster managers

Mobile Application

A suite for collecting field data for relief management activities, incident reporting etc.,

Content Management System

Managing the NDEM administrative activities such as uploading layer, add or delete user, managing event, monitoring the logs and etc.

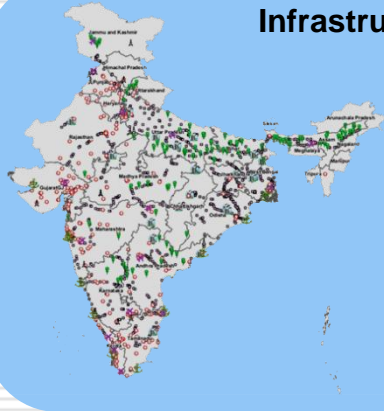
NDEM Database Details

Base Layers



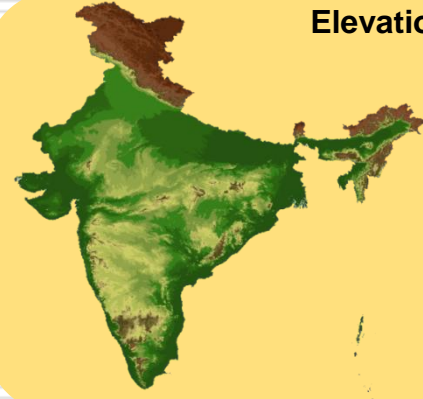
- Admin Boundaries
- Road
- Railway Line
- Drainage
- Canal
- Coastline

Infrastructure Layers



- Point of Interest
- Airport
- Ports
- Gauge Stations
- Railway Stations
- Thermal Plant
- Nuclear Plant
- Hydro
- Wind Power
- Hospitals

Elevation Map



- 0-100
 - 101-200
 - 201-300
 - 301-400
 - 401-500
 - 500-600
 - 601-700
 - 701-800
 - 801-900
 - 901-1500
 - 1501-3000
 - 3001-4500
 - 4501-6000
 - 6001-8000
- In Meters

State wise at 1:50000 scale

S. No	Layer
BASE LAYERS	
1	State
2	District
3	Taluk
4	Village Boundaries
5	Road
6	Rail
7	Drainage
8	Canal
9	Coastline
10	River
THEMATIC LAYERS	
11	Land use / land cover
12	Settlement-area
13	Mining Area
14	Surface water bodies
15	Forest Boundaries
16	Settlement-Point
17	Slope
18	Meteorological data(Point)
INFRASTRUCTURE	
19	Railway stations
20	Hospitals
21	Airports
22	Helipads
23	Ports
24	River Gauge Stations
25	Ponds & Tanks
26	Dams(Point)
27	Dams(Area)or Reservoir
28	Power plants
29	Point of Interest
DISASTER SPECIFIC LAYERS	
30	Flood
31	Cyclone
32	Forest Fire
33	Earthquake
34	Drought
35	Landslide

RASTER

36	LISS IV MX
37	Carto2 DEM
38	ACE2 DEM
39	SRTM DEM

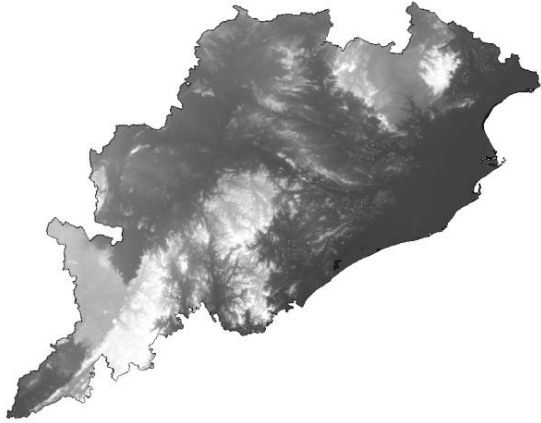
District wise at 1:10000 scale

S. No	Layer
BASE LAYERS	
1	Administrative Boundary
2	Drainage
3	Road
4	Rail
THEMATIC LAYERS	
5	Land cover
6	Surface water body
7	Settlements
INFRASTRUCTURE	
8	Infrastructure
9	Transport nodes
RASTER	
10	Cartosat – 1(2.5m Ortho)
11	Cartosat -1 + LISSIV MX NCC (2.5m)

City-wise at 1:2000 scale

S No.	Content
1	Urban Specific Database <ul style="list-style-type: none"> Hyderabad Bangalore Delhi Mumbai Kolkata
2	Very High Resolution Satellite Imagery (better than 1m)

NDEM Raster Database



CARTO2 DEM-30M



IRS LISS IV - 5.8M



CARTOSAT 1 + LISS IV 2.5M



CARTOSAT 1- 2.5M

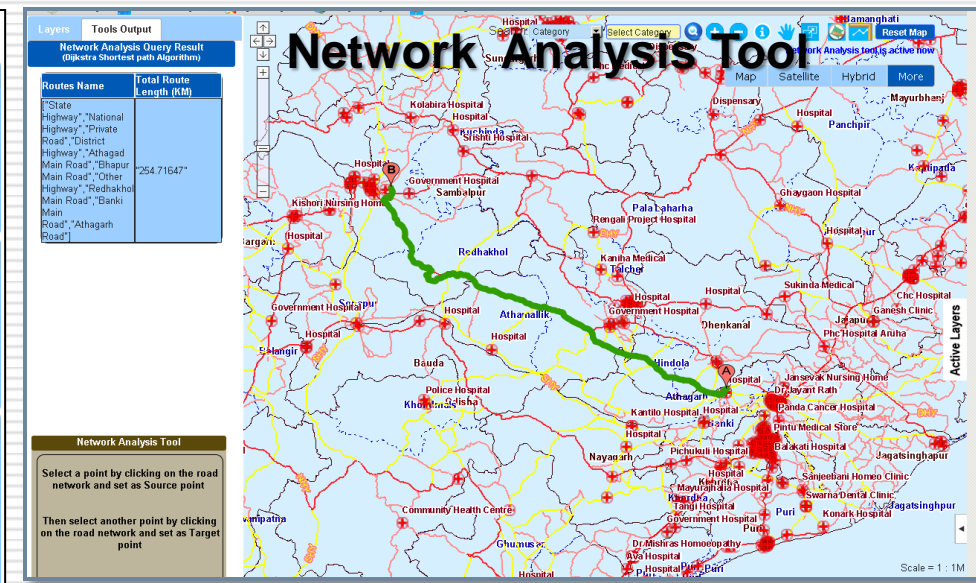
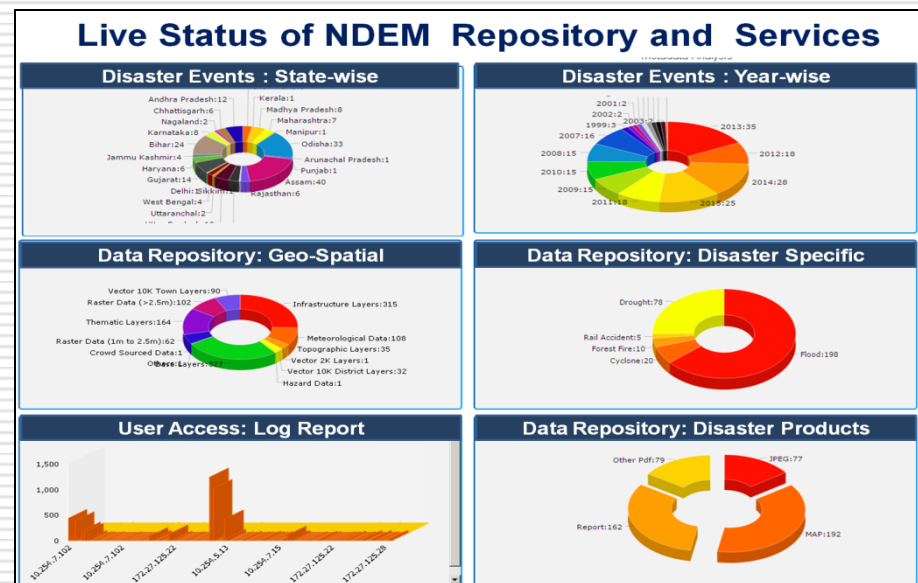
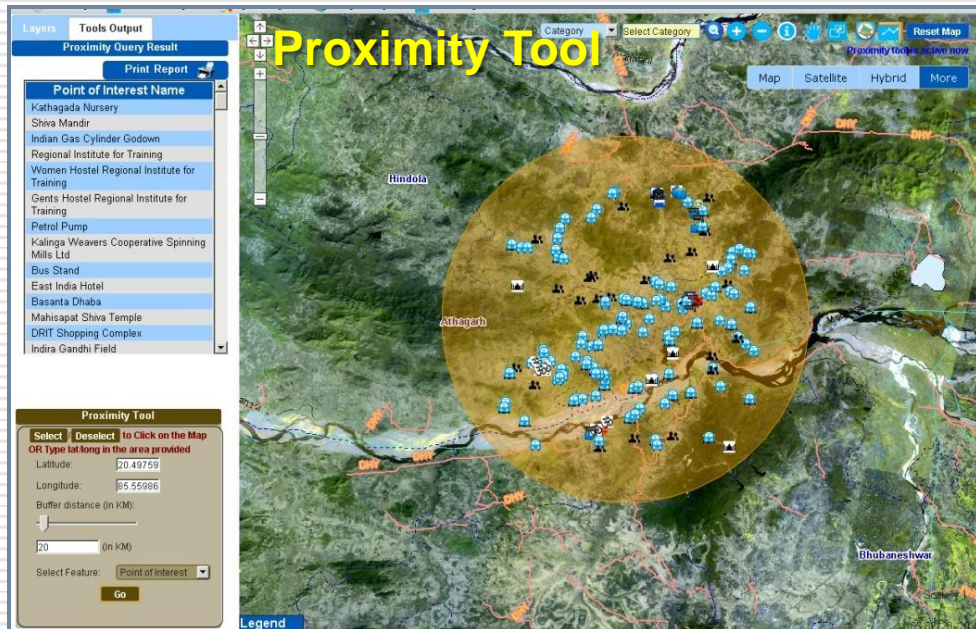
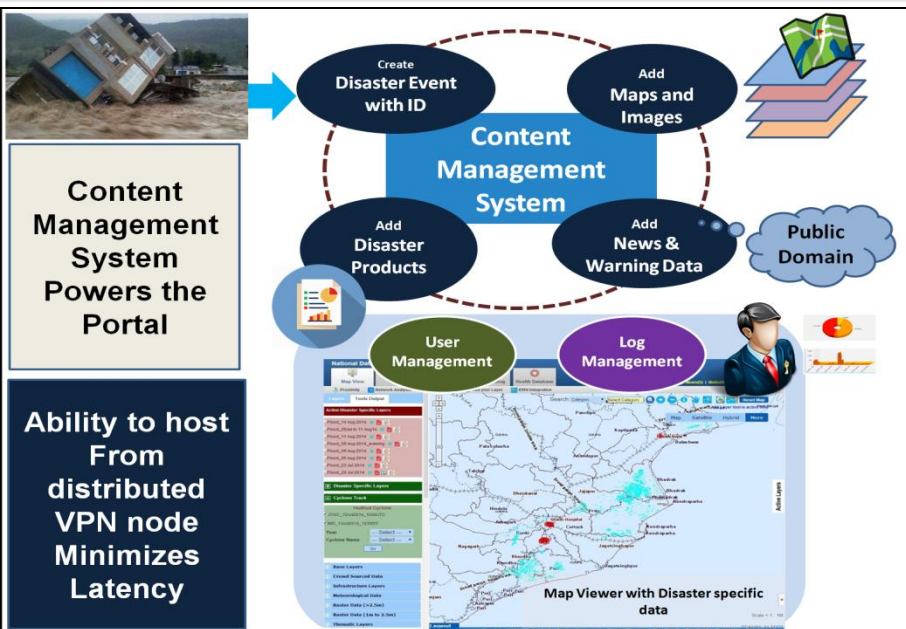


CARTOSAT 2 + LISS IV - 1M

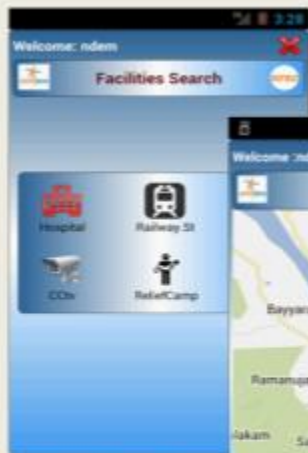


**Very High resolution data < 1M
(from foreign satellites)**

NDEM DSS Tools & Portal Management



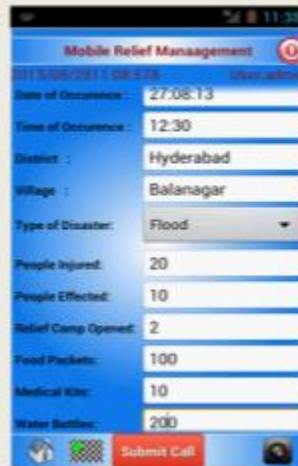
Mobile Apps



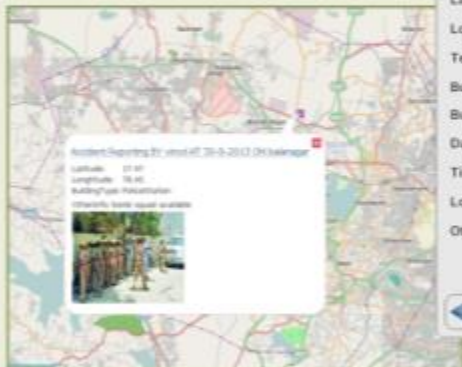
Attribute Collection



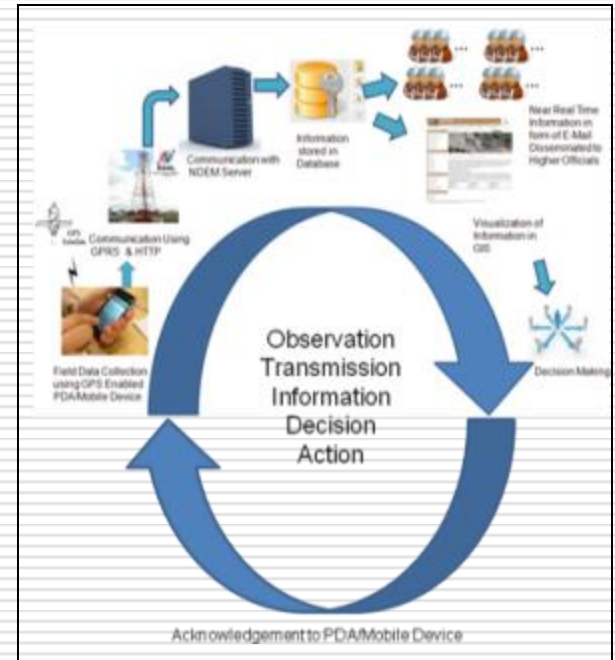
Mobile Applications



Relief Management



Geo Tagging of Emergency Facility



National Database for Emergency Management (NDEM)

Map View

Report

Interaction Portal

NDEM Catalog

Health Database

Mobile Apps

Disaster Statistics

Welcome Guest

Login

Statewise Geospatial

Andaman And Nicobar Islands

Andhra Pradesh

Arunachal Pradesh

Assam

Bihar

Chhattisgarh

Chandigarh

Daman Diu

Delhi

Dadra And Nagar Haveli

Goa

Gujarat

Himachal Pradesh

Haryana

Jharkhand

Jammu Kashmir

Karnataka

Kerala

Maharashtra

DashBoard

Flood | Cyclone | Forest Fire | Earthquake | Landslide | Tsunami | Rail Accident

Android Based Mobile Application Downloads: [NDEM Relief](#) / [DataCollection](#) / [Geotagging](#) / [User Manual](#)

Disaster Statistics Report

Username:

Password:

Login

MOSDAC
Cloud

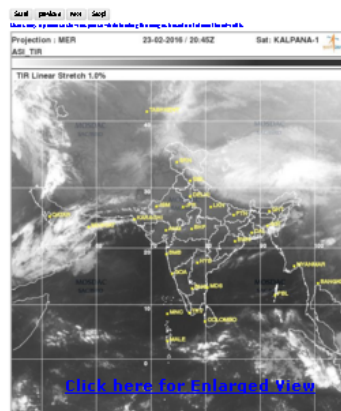
TRMM
Rainfall

IMD
Rainfall

CWC
Water Levels

Live
News

Historical
News



29-02-2016 Disaster News reported today

Portal Updated as on : 29 February 2016

To get NDEM Login Credential, Please fill [User Authorization \(Annuxure-1\)](#) Form and send it to ndem_admin@nrscc.gov.in

ndmcc.nrsc.gov.in/SMS/read

Live Commentary: Railway B...

National Database for Emerg...

ndmcc.nrsc.gov.in/central/viewer.php

Pending Message(13) | Mails(0) | Welcome MHA | Logout

Map View | Report | Interaction Portal | NDEM Catalog | Health Database | Mobile Apps | Disaster Statistics

Proximity | Network Analysis | Layer Analysis | Add your Layer | IDRN Integration | Print

Jammu and Kashmir

Search: Category

Select Category

Reset Map

Pan tool is active

Layers

Tools Output

Disaster Specific Layers

State Detail

State Data & Services Detail

Disaster Statistics Report

Andaman And Nikobar

G.L: 35

D.S.L: 0

Mail: 0

Andhra Pradesh

G.L: 52

D.S.L: 38

Mail: 0

Arunachal Pradesh

G.L: 41

D.S.L: 0

Mail: 0

Assam

G.L: 54

D.S.L: 47

Mail: 0

Bihar

G.L: 50

D.S.L: 51

Mail: 8

Chandigarh

G.L: 35

D.S.L: 0

Mail: 0

Chhattisgarh

G.L: 44

D.S.L: 6

Mail: 0

Dadra And Nagar Haveli

G.L: 36

D.S.L: 0

Mail: 0

Daman Diu

G.L: 36

D.S.L: 0

Mail: 0

Delhi

G.L: 41

D.S.L: 2

Mail: 0

Goa

G.L: 45

D.S.L: 0

Mail: 1

Gujarat

G.L: 64

D.S.L: 11

Mail: 0

Haryana

G.L: 50

D.S.L: 6

Mail: 0

Himachal Pradesh

G.L: 47

D.S.L: 0

Mail: 0

Jammu And Kashmir

G.L: 57

D.S.L: 25

Mail: 0

Jharkhand

G.L: 44

D.S.L: 6

Mail: 0

Karnataka

G.L: 49

D.S.L: 11

Mail: 0

Kerala

G.L: 47

D.S.L: 1

Mail: 0

Lakshdweep

G.L: 29

D.S.L: 0

Mail: 0

Madhya Pradesh

G.L: 45

D.S.L: 8

Mail: 0

Maharashtra

G.L: 60

D.S.L: 12

Mail: 0

Manipur

G.L: 42

D.S.L: 3

Mail: 0

Meghalaya

G.L: 41

D.S.L: 1

Mail: 0

Mizoram

G.L: 40

D.S.L: 0

Mail: 0

Nagaland

G.L: 40

D.S.L: 3

Mail: 0

Odisha

G.L: 64

D.S.L: 28

Mail: 6

Pondicherry

G.L: 39

D.S.L: 0

Mail: 0

Punjab

G.L: 47

D.S.L: 1

Mail: 1

Rajasthan

G.L: 42

D.S.L: 6

Mail: 0

Sikkim

G.L: 42

D.S.L: 0

Mail: 0

Tamilnadu

G.L: 47

D.S.L: 19

Mail: 0

Telangana

G.L: 45

D.S.L: 0

Mail: 0

Tripura

G.L: 45

D.S.L: 0

Mail: 0

Uttar Pradesh

G.L: 51

D.S.L: 25

Mail: 0

Uttarakhand

G.L: 47

D.S.L: 1

Mail: 0

West Bengal

G.L: 48

D.S.L: 12

Mail: 0

VPN Active State (15)

VPN Available State (20)

VPN Unavailable State (16)

Active Disaster State (1)

G.L: Geospatial Layer

D.S.L: Disaster Specific Layer

Scale = 1 : 11M

Legend

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User Manual

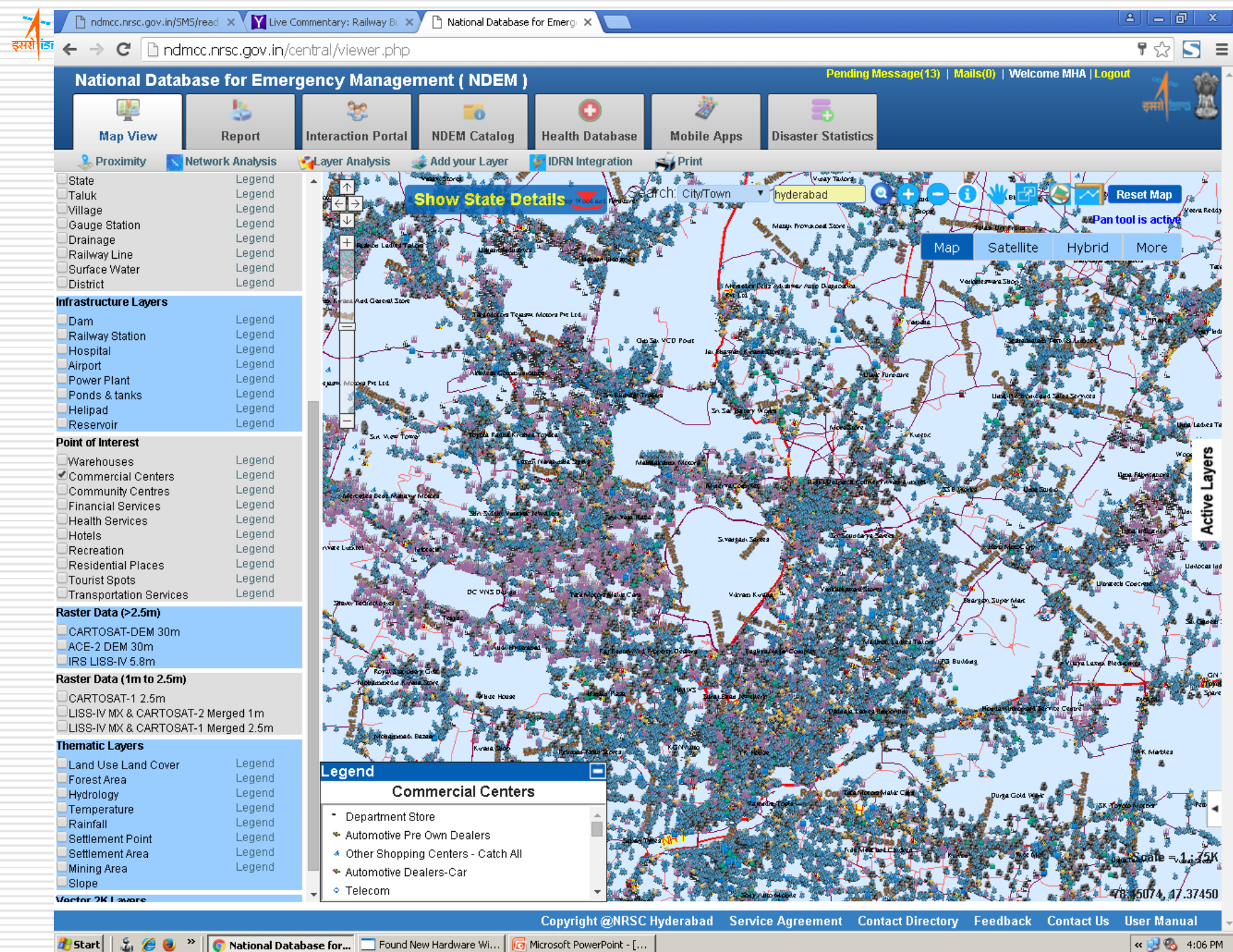
Start

National Database for...

Found New Hardware Wi...

Microsoft PowerPoint - [...]

4:02 PM



NDEM Products & Services during Tamilnadu floods

Google Chrome browser window showing the National Database for Emergency Management (NDEM) website.

Address bar: ndmcc.nrsc.gov.in/central/viewer.php

Page Title: National Database for Emergency Management (NDEM)

Navigation Bar: Home | Pending Message(40) | Mails(0) | Welcome Tamilnadu | Logout

Menu Items: Map View, Report, Interaction Portal, NDEM Catalog, Health Database, Mobile Apps

Sub-Menu Items: Proximity, Network Analysis, Layer Analysis, Add your Layer, IDRN Integration, Tamilnadu Population in Flood Inundation Areas - An Experimental Product NEW

Layers Panel (Left):

- Tools Output
- Taluk Wise Rainfall Maps NEW
- Current Disaster Specific Layers
- 1:50,000 Scale
- Base Layers:
 - Canal Legend
 - Coastline Legend
 - ☒ District Legend
 - Drainage Legend
 - Railway Line Legend
 - River Legend
 - Road Legend
 - Surface Water Legend
 - ☒ Taluk Legend
 - Village Legend
- Thematic Layers
- Infrastructure Layers
- Point of Interest
- Topographic Layers
- Raster Data (>2.5m)
- Historical Disaster Specific Layers

Map View (Center):

Map showing flood inundation areas in Tamil Nadu. Labels: Thottakadu, Vellambakkam, Kalpakkam, Nalur, Madiyur, Neithavay, Nandambakkam.

Map Controls (Top Right): Category, Select Category, Reset Map, Pan tool is active.

Map Style: Map, Satellite, Hybrid, More

Current Updates (Right):

- Tamilnadu Flood_08 Dec 2015 Layer Updated on 09/12/2015 NEW
- Tamilnadu Flood_07 Dec 2015 Layer Updated on 07/12/2015 NEW
- Tamilnadu Flood Recession Layer Updated on 07/12/2015 NEW
- Tamilnadu Flood_06 Dec 2015 Layer Updated on 06/12/2015 NEW

Active Layers (Far Right):

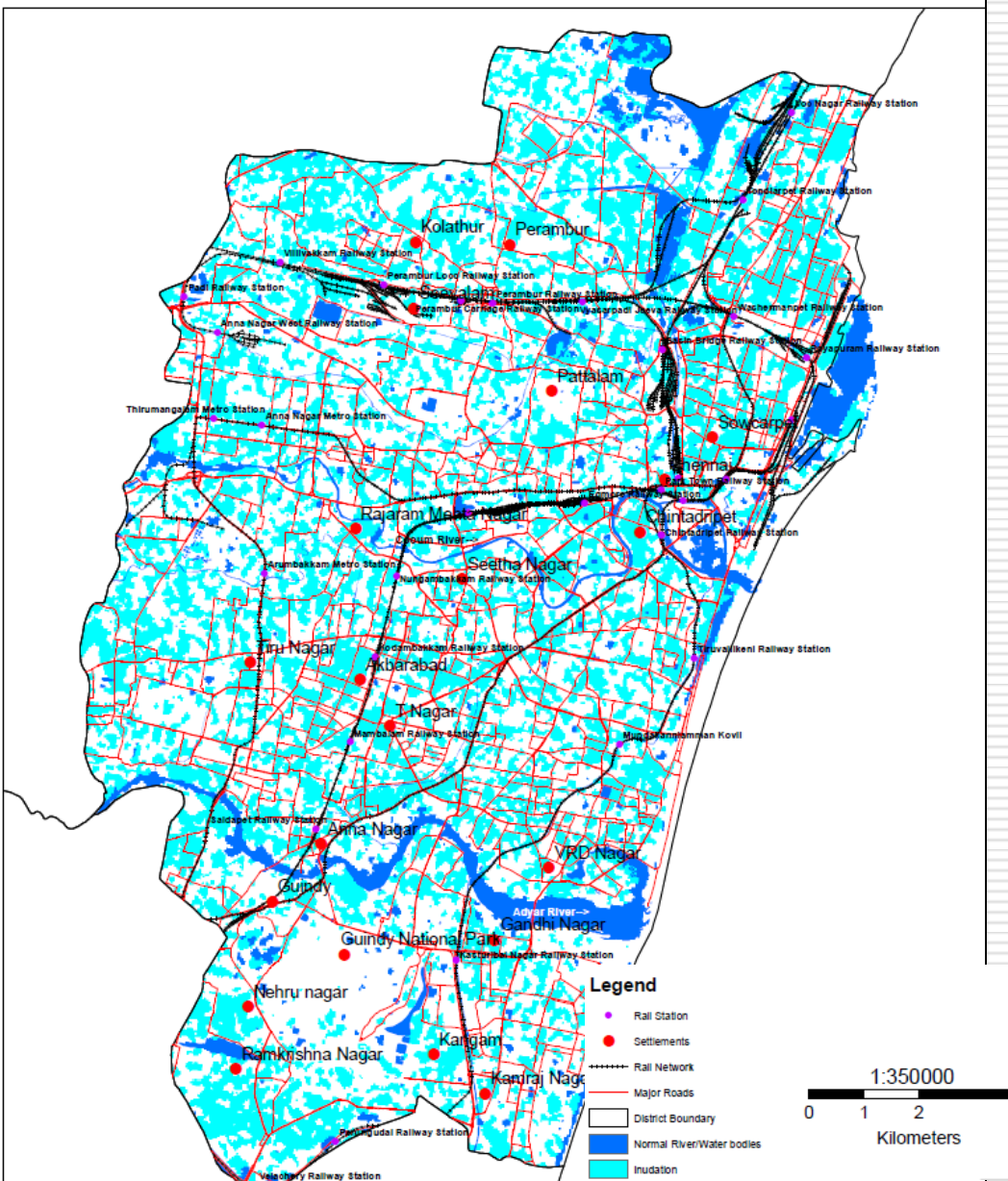
Legend (Bottom Left):

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System Tray (Bottom Right): 23:15, 26-12-2015

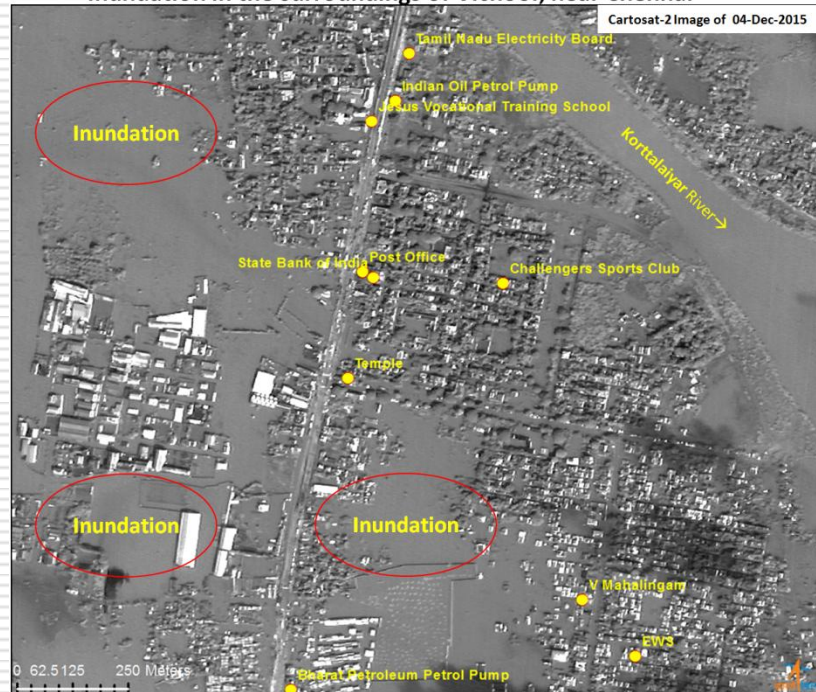
Heavy Rains in Tamilnadu State Inundated areas in Chennai District

Based on the analysis of RISAT-1 data of 03, 04 & 06th December,2015

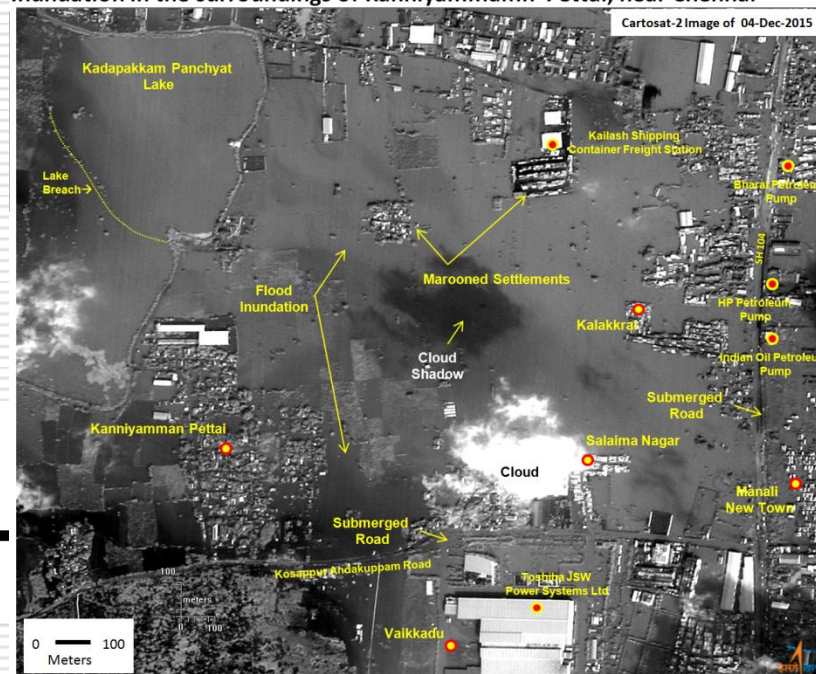


Note: When publishing this map as part of any report, source may be indicated as " NRSC (2015) - Inundated areas in Chennai District,Tamilnadu State (as on 03,04&06th December 2015)" dated 08.12.2015 DSC/NDEM Map no : 2015/27, NRSC/ISRO, Hyderabad

Inundation in the surroundings of Vichoor, near Chennai



Inundation in the surroundings of Kanniayammam Pettai, near Chennai

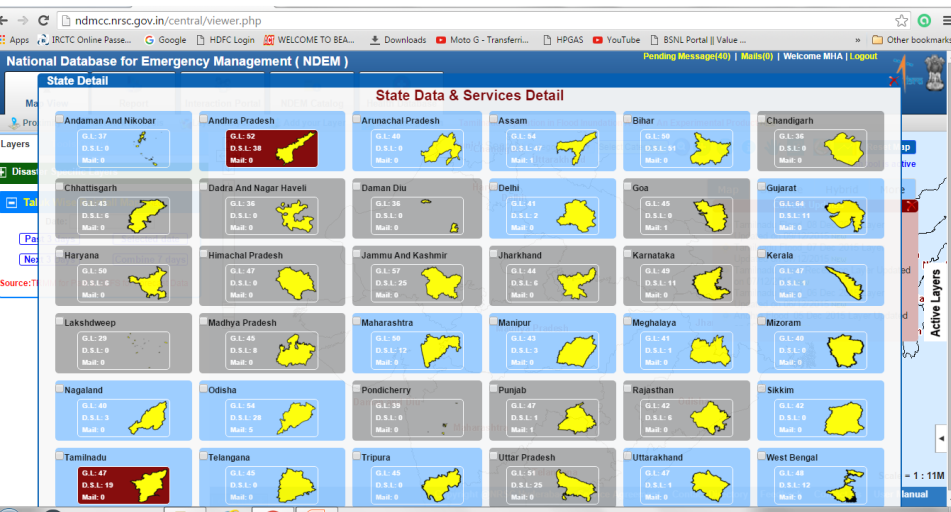


Dharahara Tower, Kathmandu (Plaeides 27.04.2015)



Capacity Building

MHA access to all States products & Services



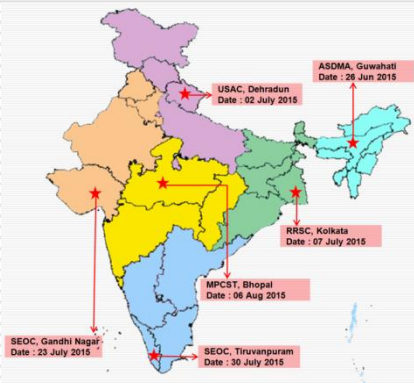
Exclusive Training Programme to 11 NDRF Bns



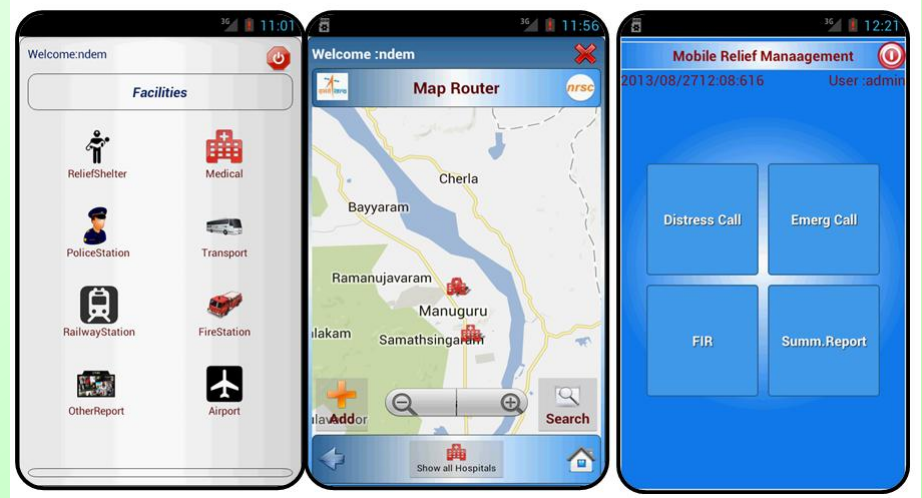
MoUs with NDRF & SDRF, MP for capacity building and customization of services

Disaster Products	2013	2014	2015
Event layers	73	125	65
Maps	108	92	111
Reports	65	116	90

Six Regional Training Progs & one Central training prog during Jun-Aug 2015

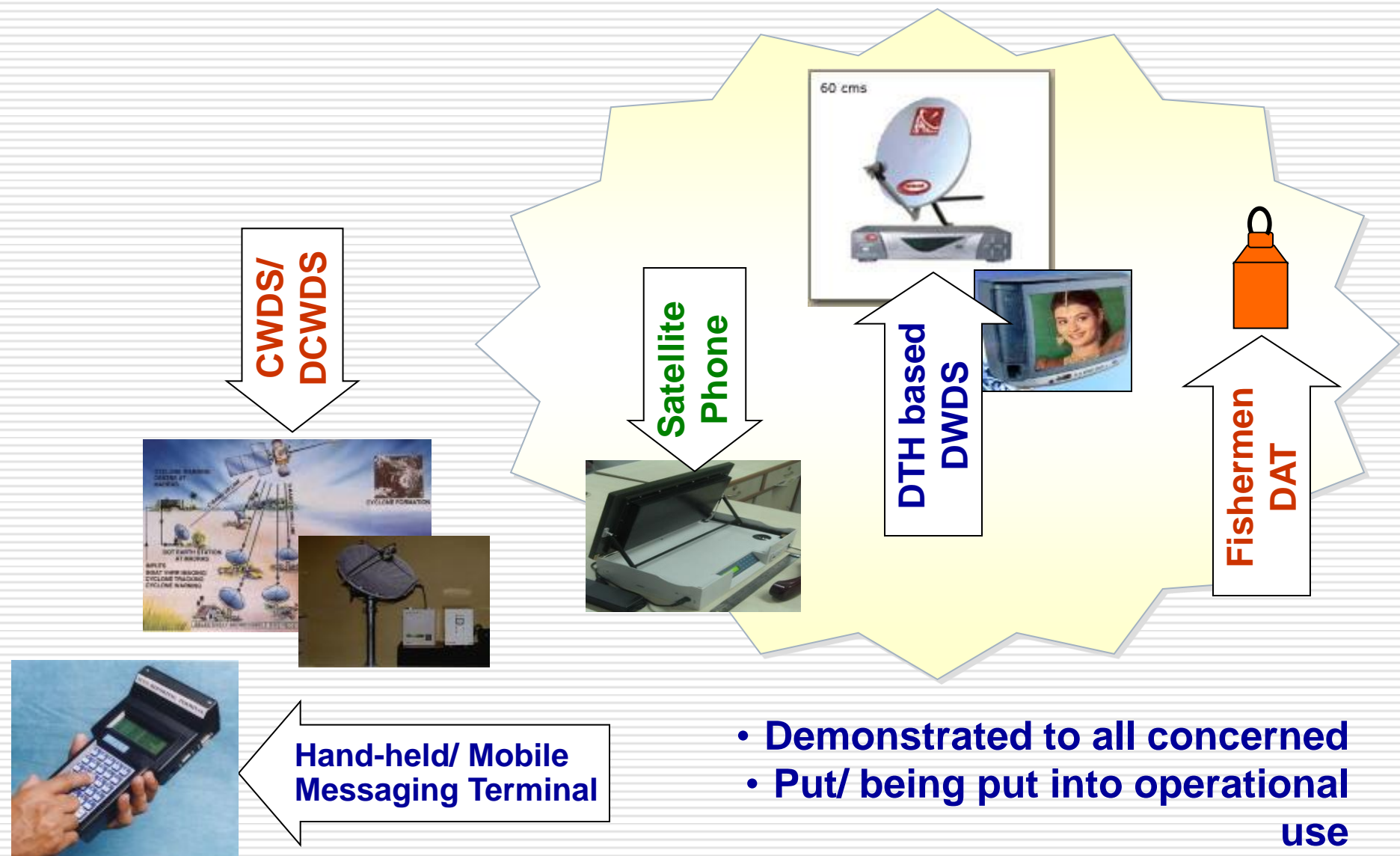


Mobile apps Developed



Geospatial Data Collection Geo tagging of Emergency Facilities Relief Management

Satellite (INSAT) based Emergency Communication Systems



International Association

Sentinel Asia

Emergency requests responded during 2014

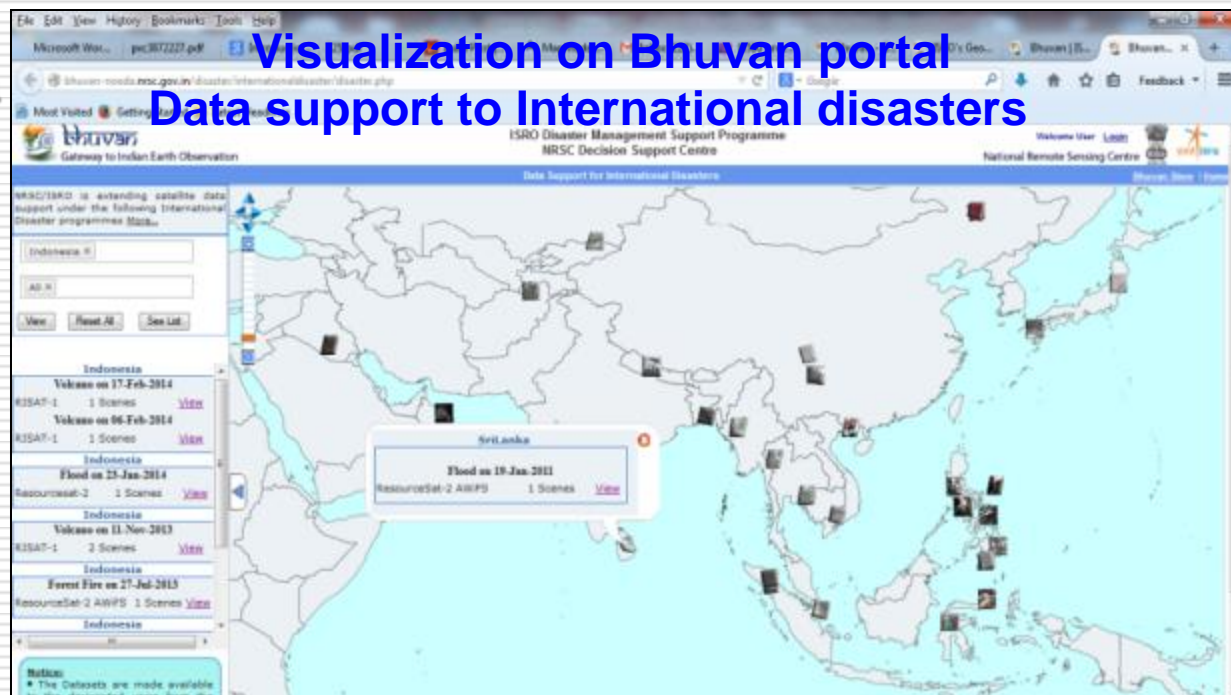
- Tonga, Tropical Cyclone, Jan 2014
- Indonesia Floods, Jan 2014
- Indonesia Volcanic Eruption,- Mt Kelud Feb 2014
- Indonesia Volcanic Eruption,- Mt Sinabung Feb 2014
- Solomon Islands Floods, Apr 2014
- Tajikistan Landslides & Mudflow, Apr 2014



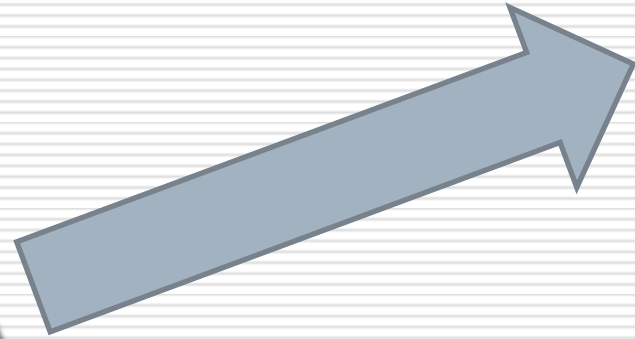
Support to Charter Activations - 2014

5 April	Flood in the Solomon Islands
2 April	Tsunami in Chile
21 March	Flood in north region of Brazil
11 March	Missing Malaysia Airlines jet
13 February	Indonesia
12 February	Flood in Bolivia
11 February	Flood and landslide in Burundi
10 February	Snowfall in South Korea
7 February	Floods in Zimbabwe
6 February	Flood in south-west England
5 February	Forest fire in Mt. Japfu, India
21 January	Flood in Huancavelica, Peru
7 January	Volcano in Indonesia
6 January	Flood in England, UK
1 January	Cyclone in La Réunion Island

Visualization on Bhuvan portal Data support to International disasters



Way Forward



Info on Micro Blogs ...

This information helps in assessing the impact of the event for further monitoring. Visualisation of information on spatial map viewer for further analysis.

Twitter Samvad to keep the govt.-citizen conversation going

Curated tweets, text messages to reach cellphone users daily

Yuthika Bhargava

NEW DELHI: The Union government launched a new platform on Tuesday to curate tweets and text messages, helping boost e-governance plans.

The Hindu
25 Mar 2015



Prime Minister Narendra Modi with Twitter CEO Dick Costolo in New Delhi on Tuesday. - news in

To start with, the service has 16 partners, including Prime Minister Narendra Modi, the Chief Ministers of Andhra Pradesh, Gujarat, Uttar Pradesh and West Bengal, Chandrababu Naidu, Anandiben Patel, Akhilesh Yadav and Mamata Banerjee, respectively; the Railway Ministry, and the Bengaluru City Police.

"Based on Indian technological innovation, Twitter Samvad is dedicated [to], and specially built, for the largest democracy of the world. As part of the Prime Minister's Digital India initiative, this tweet-powered service enables citizens to be the first to know about the govern-

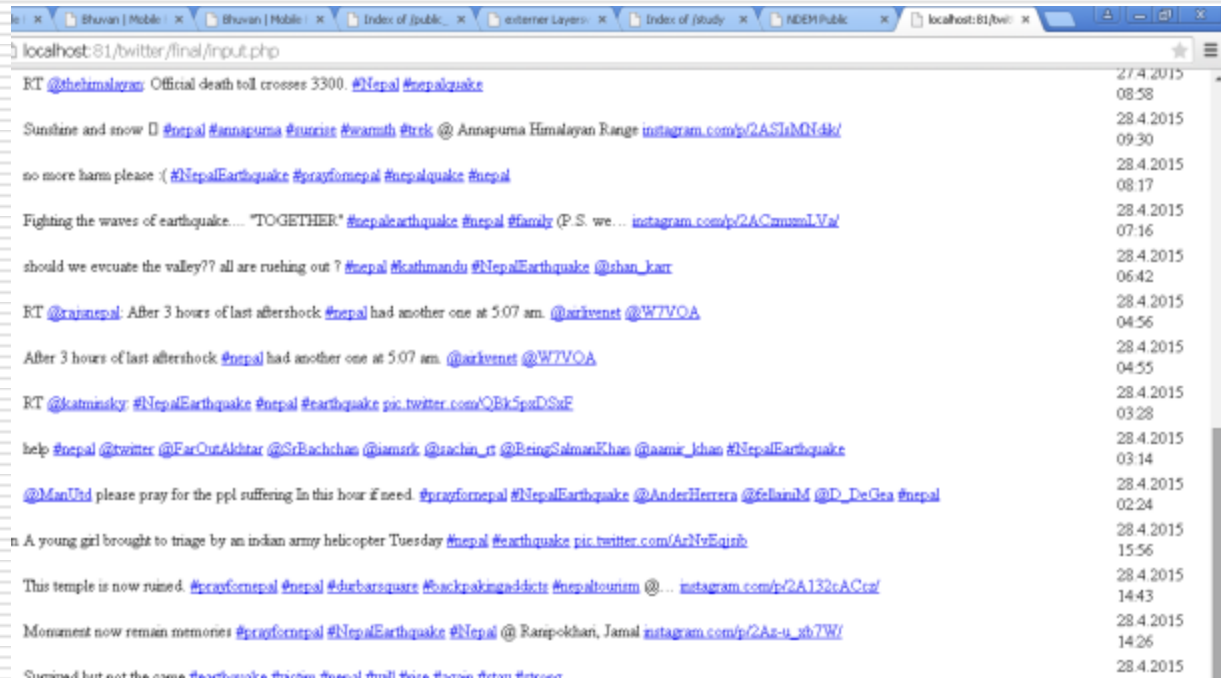
ment's actions by receiving political content in real-time on their mobile devices anywhere in the country," said Dick Costolo, chief executive officer of Twitter, who met Mr. Modi on Tuesday.

Through Twitter Samvad, a set of curated Tweets will be delivered every day from the accounts of the government and the leaders to mobile-phone users across the country as text messages. The service can come handy during emergencies as government agencies can share live updates, even time-sensitive information on law and order or rescue.

ZipDial, an Indian company recently acquired by Twitter, making this its first Indian service launched using indigenous technology.

An official statement said that during the meeting with Mr. Costolo, the Prime Minister spoke about avenues through which Twitter could help in initiatives such as the Swachh Bharat Abhiyan and the Beti Bachao, Beti Padhao.

by initiating a prolonged effort to support these initiatives. "He urged Twitter to help promote India's rich tourist potential across the world," the statement said.



localhost:81/twitter/final/input.php

RT @thehimalayas: Official death toll crosses 3300. #Nepal #nepalquake

Sunshine and snow ☐ #nepal #annapurna #survive #earthquake @ Annapurna Himalayan Range [instagram.com/p/2ASuM0f4k/](https://www.instagram.com/p/2ASuM0f4k/)

no more harm please :(#NepalEarthquake #prayfornepal #nepalquake #nepal

Fighting the waves of earthquake... "TOGETHER" #nepal #earthquake #nepal #family (P.S. we... [instagram.com/p/2ACmum1Vv/](https://www.instagram.com/p/2ACmum1Vv/))

should we evacuate the valley?? all are rushing out ? #nepal #kathmandu #NepalEarthquake @shan_kan

RT @rajnepsal: After 3 hours of last aftershock #nepal had another one at 5:07 am. @arkvetnet @WTVOA

After 3 hours of last aftershock #nepal had another one at 5:07 am. @arkvetnet @WTVOA

RT @katminsky: #NepalEarthquake #nepal #earthquake pic.twitter.com/QBk5paDStE

help #nepal @twitter @FarOutAkhstar @SrBachchan @samsrk @nacin_r @BeingSalmanKhan @asmi_jhaan #NepalEarthquake

@ManUtd please pray for the ppl suffering in this hour if need. #prayfornepal #NepalEarthquake @AnderHerrera @ellamim @D_DeGee #nepal

n A young girl brought to triage by an indian army helicopter Tuesday #nepal #earthquake pic.twitter.com/ArNv5qinb

This temple is now ruined. #prayfornepal #nepal #earthquake #backpackingindia #nepalounion @... [instagram.com/p/2A132cACcz/](https://www.instagram.com/p/2A132cACcz/)

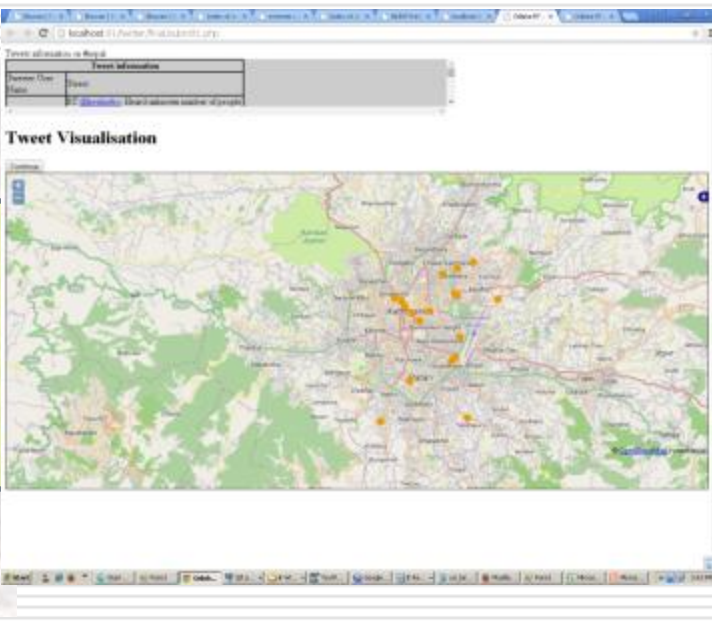
Monument now remain memories #prayfornepal #NepalEarthquake #Nepal @ Ranipokhari, Jamal [instagram.com/p/2Az-u_xb7W/](https://www.instagram.com/p/2Az-u_xb7W/)

Summed but not the same. #earthquake #nepal #nepal #nepal #nepal #nepal

the accounts of the government and the leaders to mobile-phone users across the country as text messages.

The service can come in handy during emergencies as government agencies can share live updates, even time-sensitive information on law and order or rescue.

Twitter Samvad is based on a platform provided by



Location Based Services



The Hindu
04 Jun 2015

Smart maps for smart cities

Study says
their use will help
save \$8 billion

Sanjay Vijayakumar

NEW DELHI: The use of smart maps in Prime Minister Narendra Modi's ambitious smart cities project will lead to \$8 billion in savings and value in a year, according to a study by Dalberg Global Development Advisors, a strategy and policy consulting firm. This also needs a strong policy and regulatory framework, it said.

The firm's report, "Smart maps for smart cities: India's \$8 Billion+ opportunity", said India was expected to see the greatest migration to cities of any country in the world in

BIGGER & BETTER WITH TECHNOLOGY

SMART MAPS

- Aim to provide tools, data to inform decision-making and enable citizens to develop their potential
- Will help search for places of interest, pinpoint addresses, optimise routing, communicate better and understand neighbourhoods



73% of Help women scout neighbourhoods on devices before they go out, and send messages for help when they feel unsafe

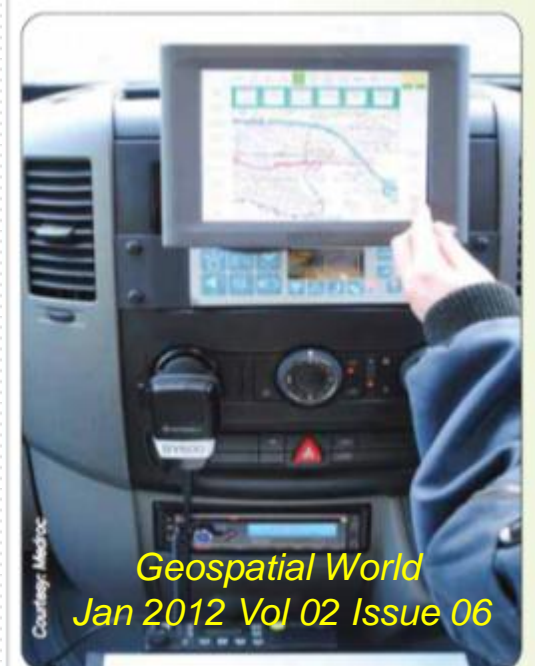
POTENTIAL TO SOLVE PROBLEMS

- Ambulances lose up to 25% of response time locating addresses
Smart Maps will save 13,000 lives by reducing emergency response time
- One in 4 urban workers spends 90 minutes commuting each day
Save \$1.6 bn in productive time, fuel, and 1 mn metric tonnes of CO₂ emissions
- Only 20% of local map searches for businesses convert into an in-person purchase, compared to 73% in the U.S.
Raise revenues to local retailers by \$2.2 billion and save users 12 million hours in lost time

of infrastructure that is 20 times the capacity that has been added to India's cities maps, including traffic and commuting, local retail, tourism, women's safety, city

Ambulances lose up to **25%** of response time locating address

Smart Maps will save **13000** lives by reducing emergency response time



Governments have a responsibility to provide essential services to its citizens. For example, in-car vehicle navigation for emergency services enables ambulances to reach their destination as quickly as possible

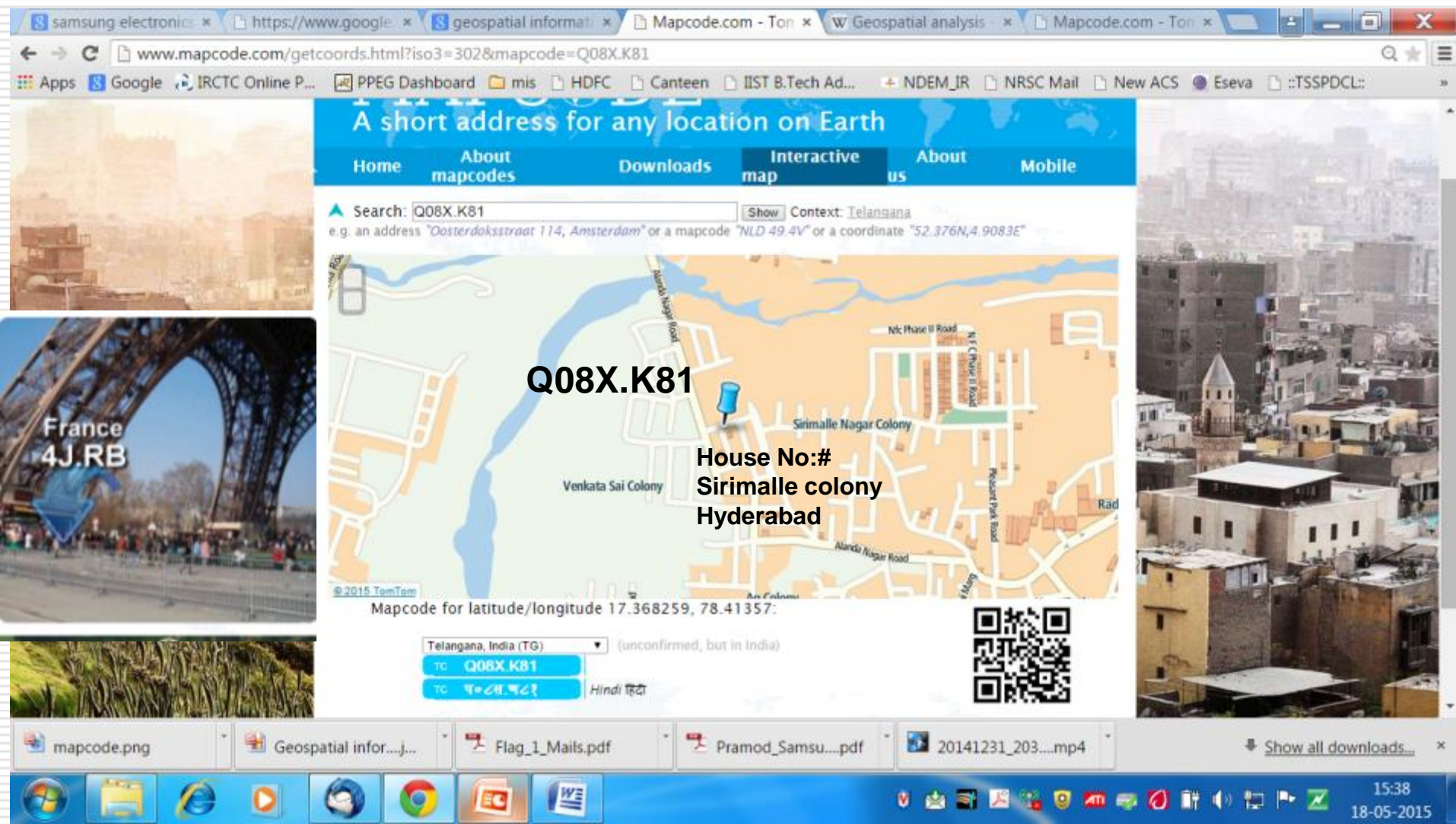
V Bhnaumurthy
Flat No: XXX
Building Name
Locality, Street name
Opp XXXX
Hyderabad – 500 048



Can we replace
this address with
simpler one?

MAPCODE...

A mapcode represents a location. Every location on Earth can be represented by a mapcode. Mapcodes were designed to be short, easy to recognise, remember and communicate. They are precise to a few meters, which is good enough for every-day use.



Q08X.K81

House No:#
Sirimalle colony
Hyderabad

Mapcode for latitude/longitude 17.368259, 78.41357:

Telangana, India (TG) (unconfirmed, but in India)

TC Q08X.K81

TC 4J.RB Hindi हिंदी

15:38
18-05-2015

Challenges in Operational Services for DM

Timeliness:

Most Crucial

Minutes, Hours, Days, Months ...



Contents:

Extent of detail

Regional, Local, location specific ...



Product

Usability

Soft, Hard Copy, GIS Layer .



Transmission

Mode

Post, e-mail, ftp, web service, Mobile app ...



Technology :

Applicability

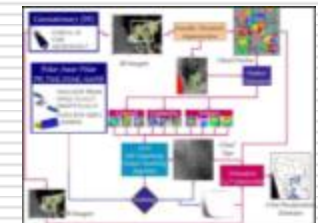
Limitations, unusual, constraints ...



Automation :

Applicability

Automatic feature extraction, Pattern recognition

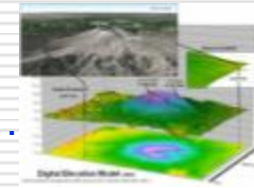


Domain:

Understanding

Knowledge

Process, modelling, forecasting, accuracy...



Implementation:

On ground

Feasibility, acceptability, Adoptability, funds



Thanks...