

IPv6 based Emergency Rural Healthcare

Information systems

Socio-economic data
Hazard, vulnerability,
Crisis maps
Common geospatial
infrastructure
Web services
Semantic web

Public Safety Communications

WiFi
IP
Wimax
Analogue radio,
Tetra, Tetrapol, GSM,
3GPP....broadcasting

Sensor Networks

EO satellites
In-situ sensors UAV
HALE
SensorWeb
Smart dust

Preparedness
Early warning
Response
Recovery

IPv6 is not only for IT industry, but for all industrial segments, by the improvement of RoI and by applying the Internet technology

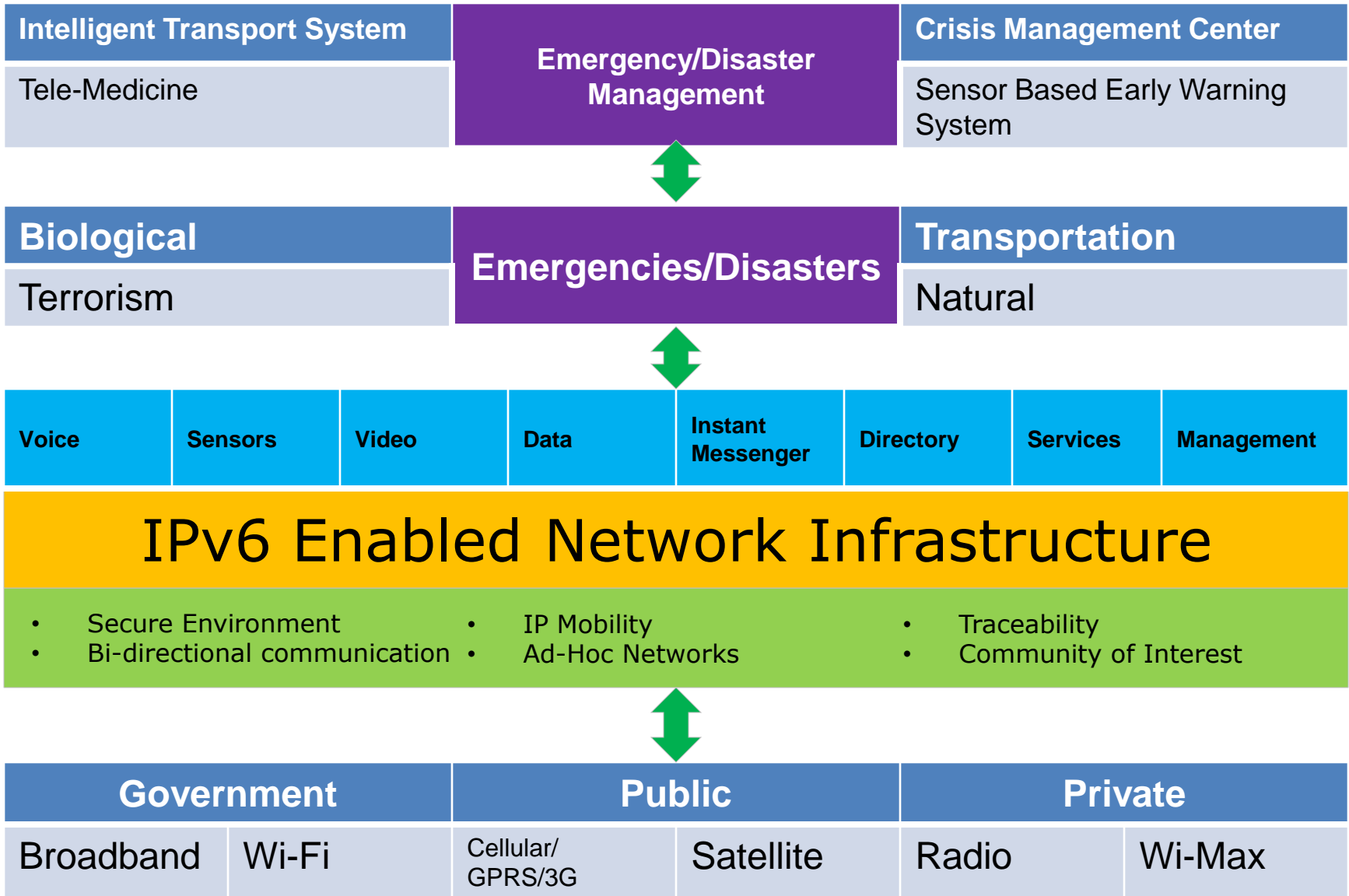
Service development and deployment

- ✓ – Integration of real-space and cyber-space
- ✓ – Apply to public service/security infrastructure
- ✓ – Integration with broadcast business
- ✓ – Deployment of peer2peer applications

Architecture

- ✓ – True mobility supporting
- ✓ – Unwired connectivity
- ✓ – Provide IP layer end2end security (i.e., IPSec) and ease of operation and management

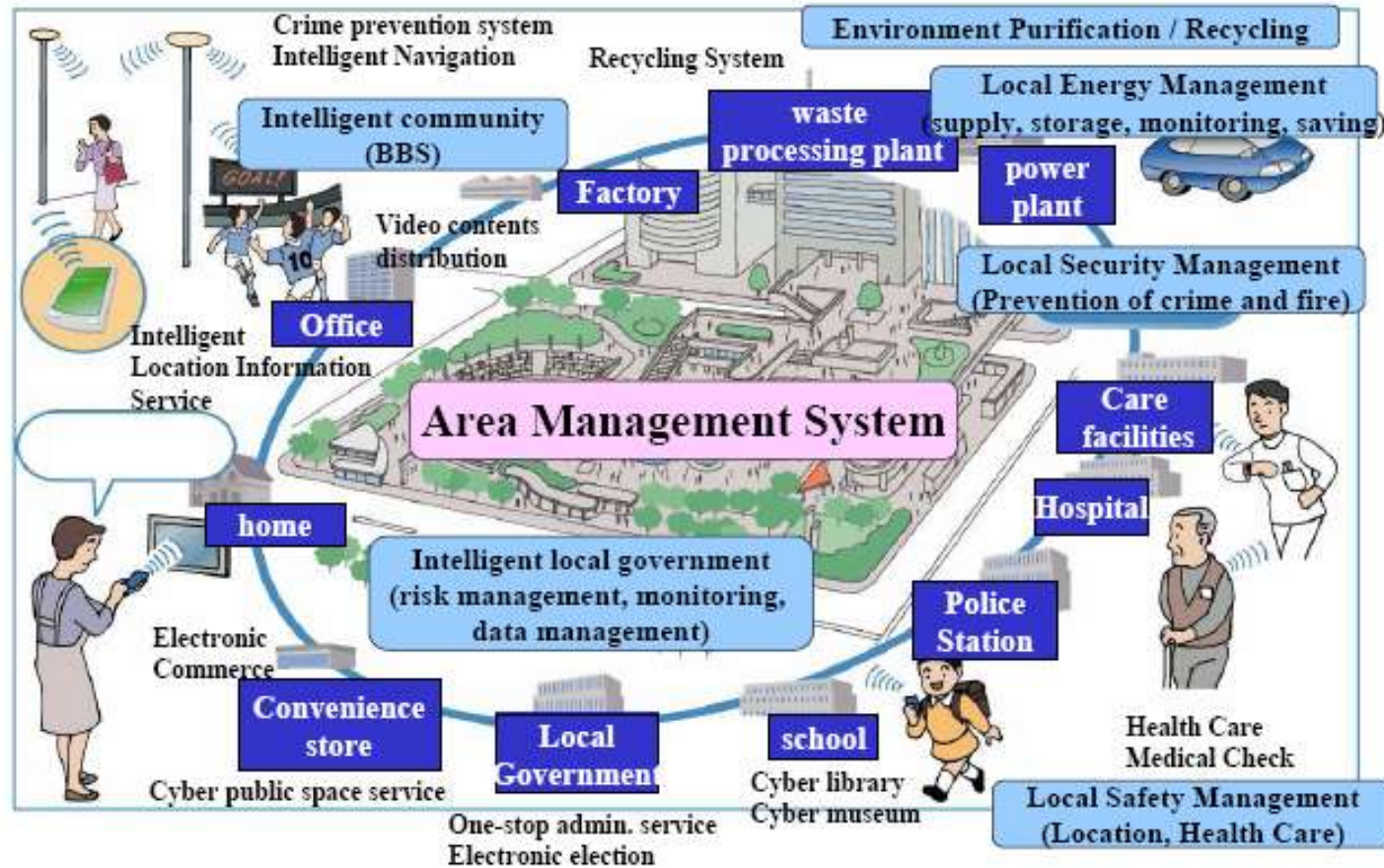
Emergency/Disaster Management



IPv6 Emergency/Disaster Management System - Metropolitan Design – Real Space Internet with IPv6



Source: Matsushita Electric Works



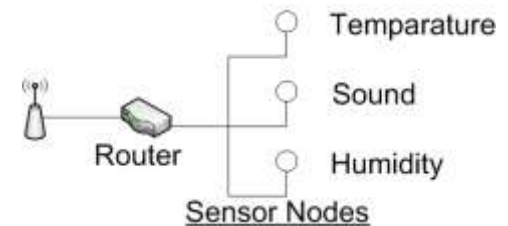
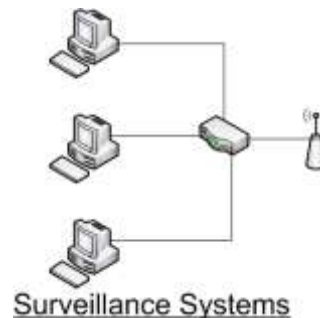
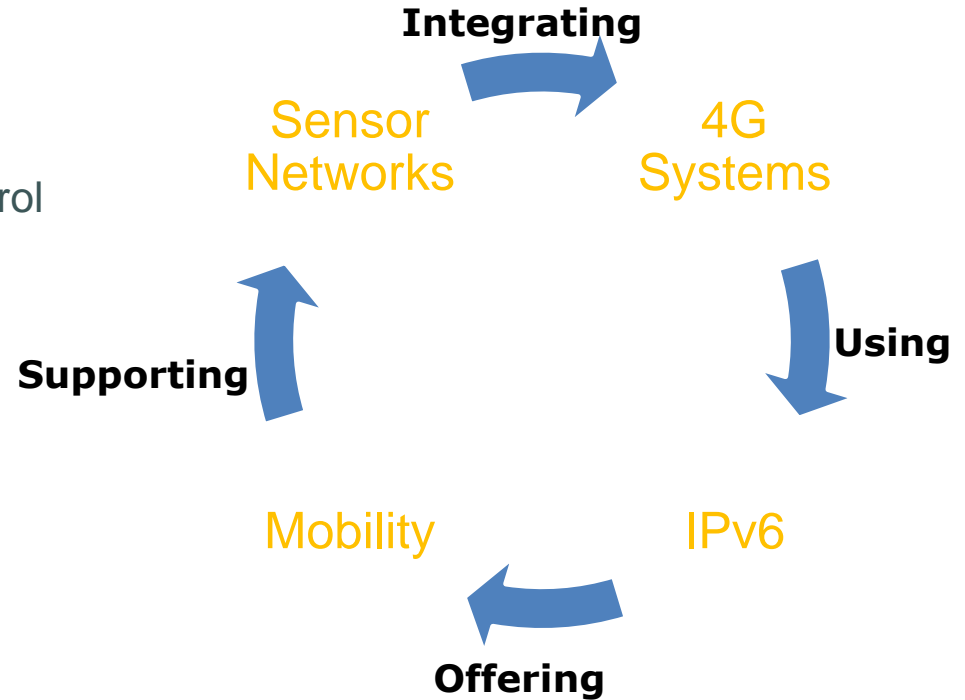
Sensor Based – Early Warning System	Tele-Medicine
Intelligent Buildings	Integrated Communication Network
Intelligent Transport	Next Gen – Crisis Management Center

Using IPv6 in sensor networks

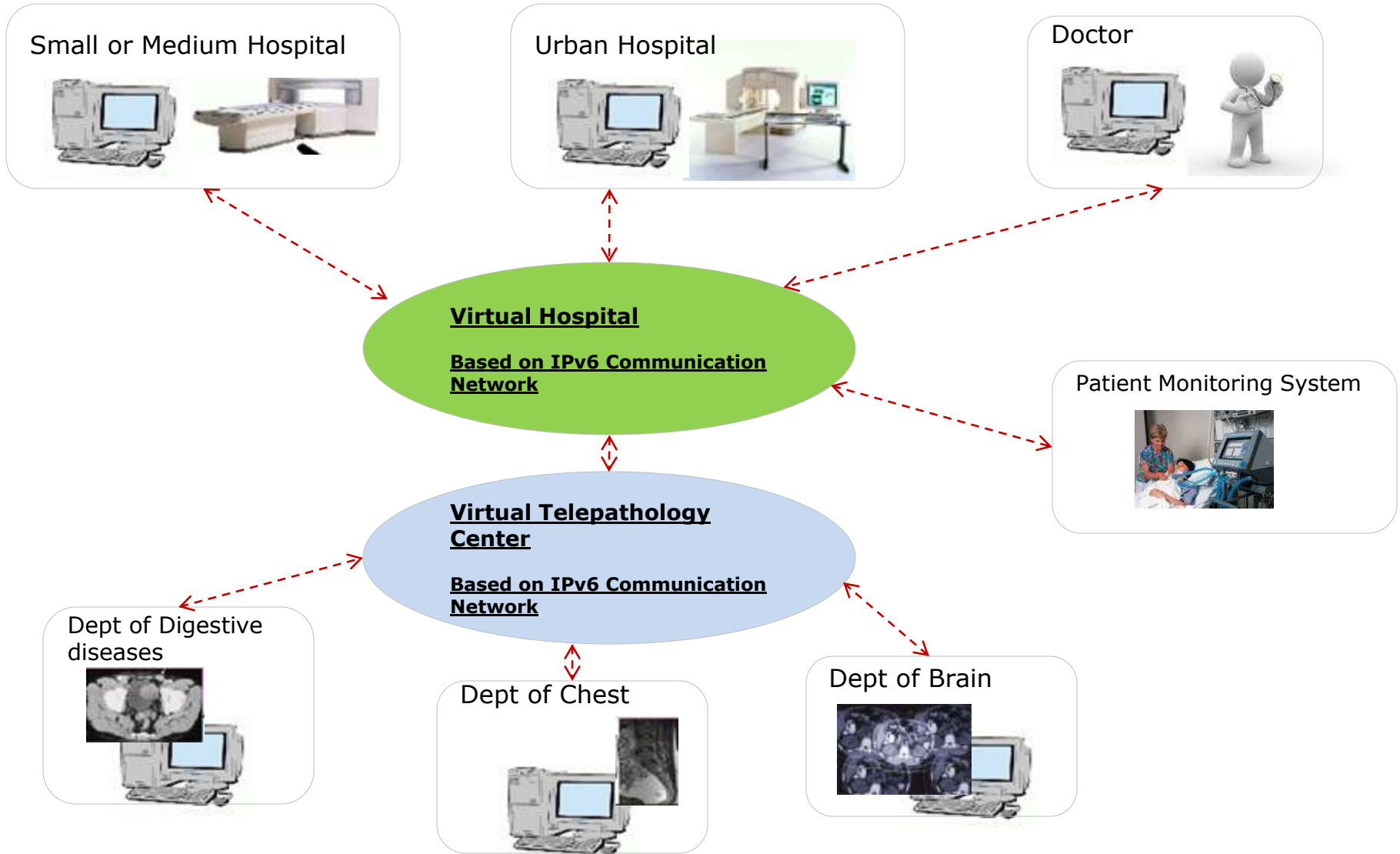
- Increases Network Connectivity
- Helps build intelligent monitor and control system
- Increases the flexibility of sensor node interaction
- Self Organized System
- Low power system
- Highly Secure System

Different Sensor Services

- Image
- Sound
- Radioactivity
- Humidity
- Luminosity
- Temperature
- Movement

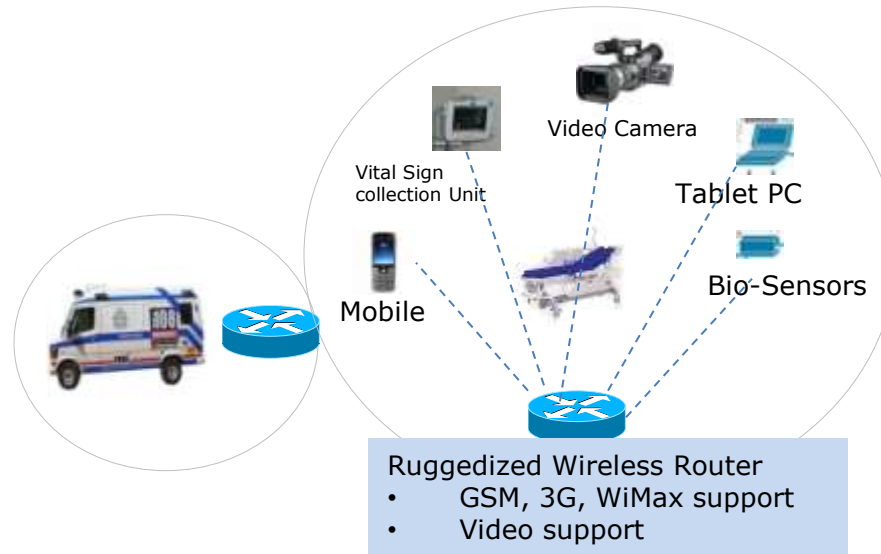


IPv6 based Tele-Medicine



Tele-Diagnostics, Tele-Consultancy, Tele-Surgery, Tele-Monitoring

IPv6 communication Equipment – Enabling Next-Gen Rural Healthcare



Network Equipment	Details
Ruggedized – Emergency router	Router with redundant communication capabilities across GSM, CDMA, 3G, WiMax ...etc
Cellular Diversity Antenna	An antenna, for diverse communication technologies, spanning, 3G, Wi-Max, CDMA ...etc
IPv6 Bio-sensors	IPv6 based Bio-sensors which help in collecting information about vital signs
Medical Vital sign tracking Unit	Medical vital signs collection unit
Video Conf system	IPv6 based Video conf system, which will help I patient monitoring and treatment
Video encoder/Decoder Cards	Video Cards that would fit in the Emergency router
Tablet PC for Information Gathering and transmission	Emergency information gathering and collation unit
Multi-Frequency Mobile Phones	Mobile phones, which take care of the diverse communication technologies,
GPS Tracking system	Location and tracking of the ambulances



Current Work Style

Officers sent to Emergency/Disaster site report with telephone or Radios



IPv6 Emergency/Disaster Management System

Officers are assisted with detailed information obtained via sensors and surveillance systems

IPv6 and EMRI

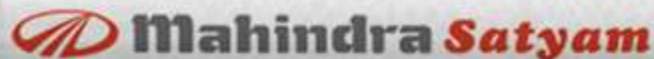
Background

- Geography: Majority of the areas are remotely located from cities and towns
- Poor medical resources in rural areas
- Lack of Hospitals in Rural areas
- Lack of doctors in Hospitals in Rural areas
- Medical help in case of Emergencies reaches very late

National Rural Health Mission (NRHM)

- Seeks to provide effective health care to the entire rural population in the country with special focus on 18 states which have weak public health indicators.
- Strengthen Rural hospital for effective curative care
- Seeks to improve access of rural people, especially poor women and children, to equitable, affordable, accountable and effective primary healthcare

Rural Emergency Healthcare – one of the key components to make NRHM Succeed



- EMRI is a pioneer in Emergency Management Services operates under Public Private Partnership mode with **Mahindra Satyam as Technological partner.**
- EMRI is the only professional Emergency Service Provider in India today.
- EMRI provides free service delivered through state-of-art emergency call response centers and has over 2056 ambulances across Andhra Pradesh, Gujarat, Uttarakhand, Goa, Chennai, Rajasthan, Karnataka, Assam, Meghalaya and Madhya Pradesh.



Vision 2010

- To provide Free emergency response services for Medical, Police and Fire emergencies across India by 2011 in PPP (Public Private Partnership) framework**
- To respond to 30 million emergencies and save 1 million lives annually by 2011**
- To deliver services at global standards through Leadership, Innovation, Research & Training and Technology**
- To be recognized as best-in-class and become 1 of 8 wonders of the World**

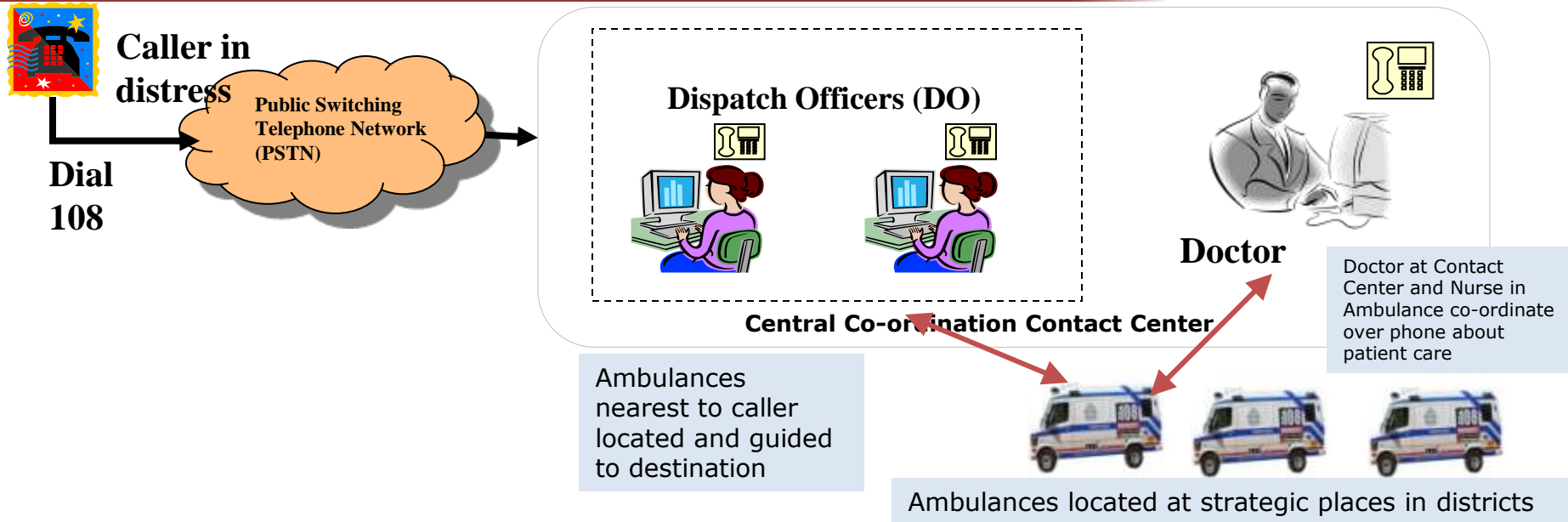
AWARDS

EMRI has bagged the NASSCOM-CNBC TV 18 IT User Award- 2008 for using technology for saving lives.

EMRI bagged the first prize in the health care category at the Computer World Honors Laureate award -2008

2007 MICROSOFT® PARTNER OF THE YEAR AWARDS - CITIZENSHIP PARTNER OF THE YEAR WINNER
SATYAM COMPUTER SERVICES LTD., INDIA

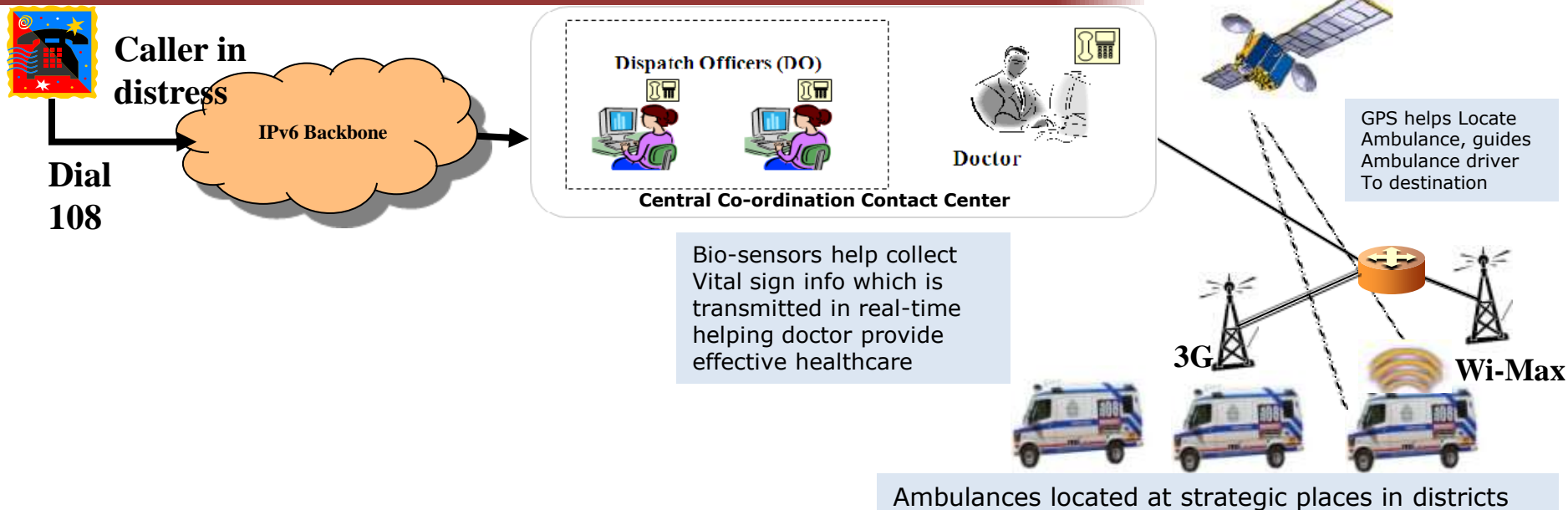
The Citizenship Partner of the Year Award recognizes the exceptional partner that has made a sustained commitment to society and its communities and can demonstrate the impact of its work.



Challenges in Today's – Rural Emergency Healthcare scenario

- Patient Vital sign information provided offline by phone – Blood pressure, ECG, Temperature .. Etc.
- Patient condition and scenario explained over the phone – Doctor lacks the ability to see the patient's visual condition
- Doctor provides Offline Healthcare – Based on Vital sign info conveyed over phone
- Effective Emergency Healthcare hampered by lack of continuous vital sign info.
- Dispatch officer locates nearest Ambulance to caller – manually by calling Ambulances
- Dispatch Officer manually guides Ambulance over the phone to the destination

IPv6 Enabled Rural Emergency Healthcare



IPv6 Technologies – Rural Emergency Healthcare

- Bio-Sensors
- IPv6 based Real-time Vital signs data transfer
- IPv6 based Real-time Vital signs data transfer
- Seamless Video-Conference

- VoIP enabled Telephony
- Automatic Vehicular Location System
- Real time Inventory Asset and Inventory tracking using IPv6

Benefits – IPv6 Rural Emergency Healthcare scenario

- ✓ Patient Vital sign information collected on a continuous basis by Bio Sensors– Blood pressure, ECG, Temperature .. Etc,
- ✓ Patient's condition is seen in real time Video by Doctor – Providing effective healthcare to patient
- ✓ Doctor provides Effective Emergency Healthcare, based on Real-time Vital sign info
- ✓ Dispatch officer locates nearest Ambulance to caller – by using GPS
- ✓ Ambulance driver reaches destination faster via automatic guidance using GPS

IPv6 simplifies and enhances Rural Emergency Healthcare

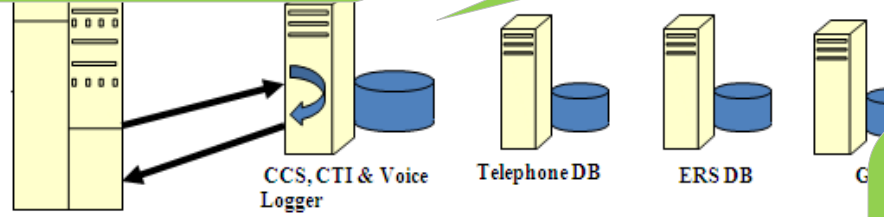
EMRI - Vision – IPv6

- CTI
- VoIP
- Voice Calls
- Fax
- SMS
- Email
- Chat
- Sensor based switches
- Hot Lines

108 Call
Sense

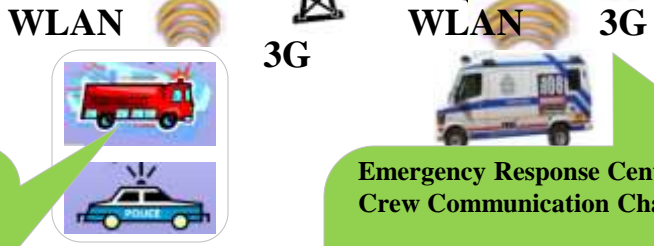
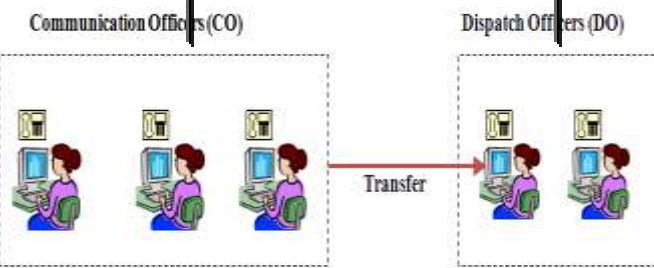
Caller Location Identification
Location Based Sensing with Geocoded information of Buildings, Landmarks, Fixed Lines, and by Triangulation for calls originating from Mobiles

Emergency Response Centre
Remote Site Operations with seamless fully automatic BCP



Fleet and Inventory Management
Automation using RFID, Barcode Readers, AVL, PC in Ambulance, Vehicle Telematics, Tripsheets, Dynamic location of Ambulances based on the incidents history, Traffic Sensors

IPv6 backbone Network, Internet
Reach

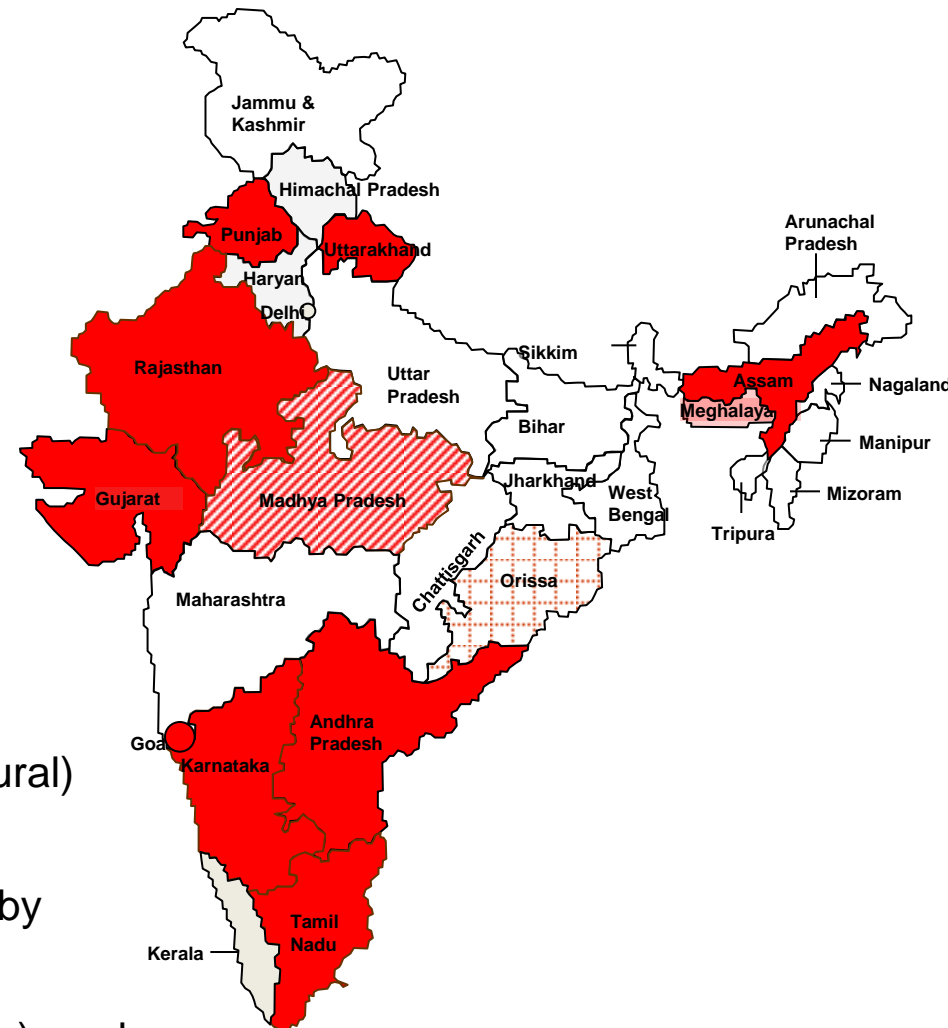


Care
ERC
Telemedicine
Online streaming of Vitals, Video, Medical Images to Emergency Response Centre, Online Hospital Networks, Bio-Sensors

Emergency Response Centre – Other Agencies Communication Channels
any combination of origin and destination with PSTN, GSM, CDMA, 3G and Radio

Emergency Response Centre – Field Crew Communication Channels
CTI, VoIP, Voice Calls, Fax, Two way SMS, email, Hot Lines, any combination of origin and destination with PSTN, GSM, CDMA, 3G and Radio

- 12,000 + EMRI Associates
- 6,800 + Private Hospitals / Nursing homes
- 2,000 Police / Fire Stations
- 280 M population covered in 11 States
 - 100+ Lakh calls received till date
 - 500,000 emergencies handled
 - 6,500 emergencies in a day (2.4 Million annualized)
 - 1,900+ Ambulances - 6+ trips a day
 - < 3 minutes Ambulances assigned
 - < 14 minutes (urban) and < 21 minutes (rural) Ambulances reached
 - 100% virtual handholding (in ambulance) by EMTs and physicians
- 100+ lives are saved each day (46,000+ till now) and 6,370 victims receive timely, high-quality pre-hospital care



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- MetroNet6 – <http://www.apan.net/meetings/xian2007/presentations/ipv6/metronet-6.ppt>
- U2010 – <http://www.eu-orchestra.org/docs/ISTworkshop/U2010%20-%20Latif%20Ladid%20-%20IPv6%20Forum.pdf>
- IPv6: Experience in the Transportation Sector – <http://gstproject.org>
- A telemedicine system on the broad band network and some aspects of throughput in the IPv4 and IPv6 network environments - http://k-inet.ee.t.kanazawa-u.ac.jp/~yamada/yamada_lab/janzs2004/paper/ppt/no50.ppt
- IPv6 Deployment Status in Japan -Exploring New Business Area - http://ipv6.eu/admin/bildbank/uploads/Documents/Vienna_June_2006/Keynote_1_Hiroshi_Esaki_-_UTokyo.pdf



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