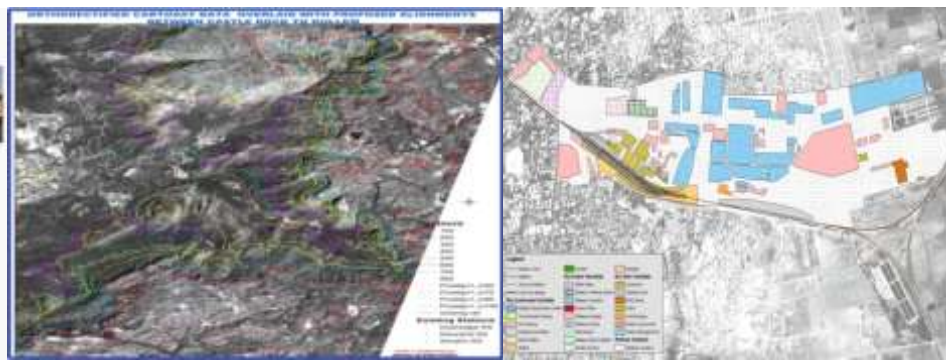
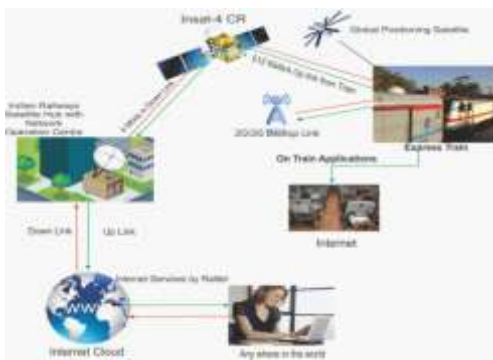




Use of Space Technology on Indian Railways



Next Halting Station is NEW DELHI

Next Stop: **NEW DELHI** | Distance: **14 KM**

Exp Arr.: **22:45** | Delay: **00:02**

अगला पड़ाव नई दिल्ली है

अगला पड़ाव: **नई दिल्ली** | दूरी **14 KM**

अनुमानित समय: **22:45** | देरी **00:02**

Do not keep your luggage unattended.

अपने सामान को तलाशीय न छोड़ें ।



Vision & Mission of Indian Railways (IR)



VISION-

Providing safe, efficient, affordable, customer focused and environmentally sustainable integrated transportation solution.

MISSION Areas (amenable to space inputs) -

- Augment capacity by
 - Constructing new lines & double lines
 - Signalling Improvements.
- **Innovate** & update in terms of **technological advancement** to achieve best possible standards of safety in train operation

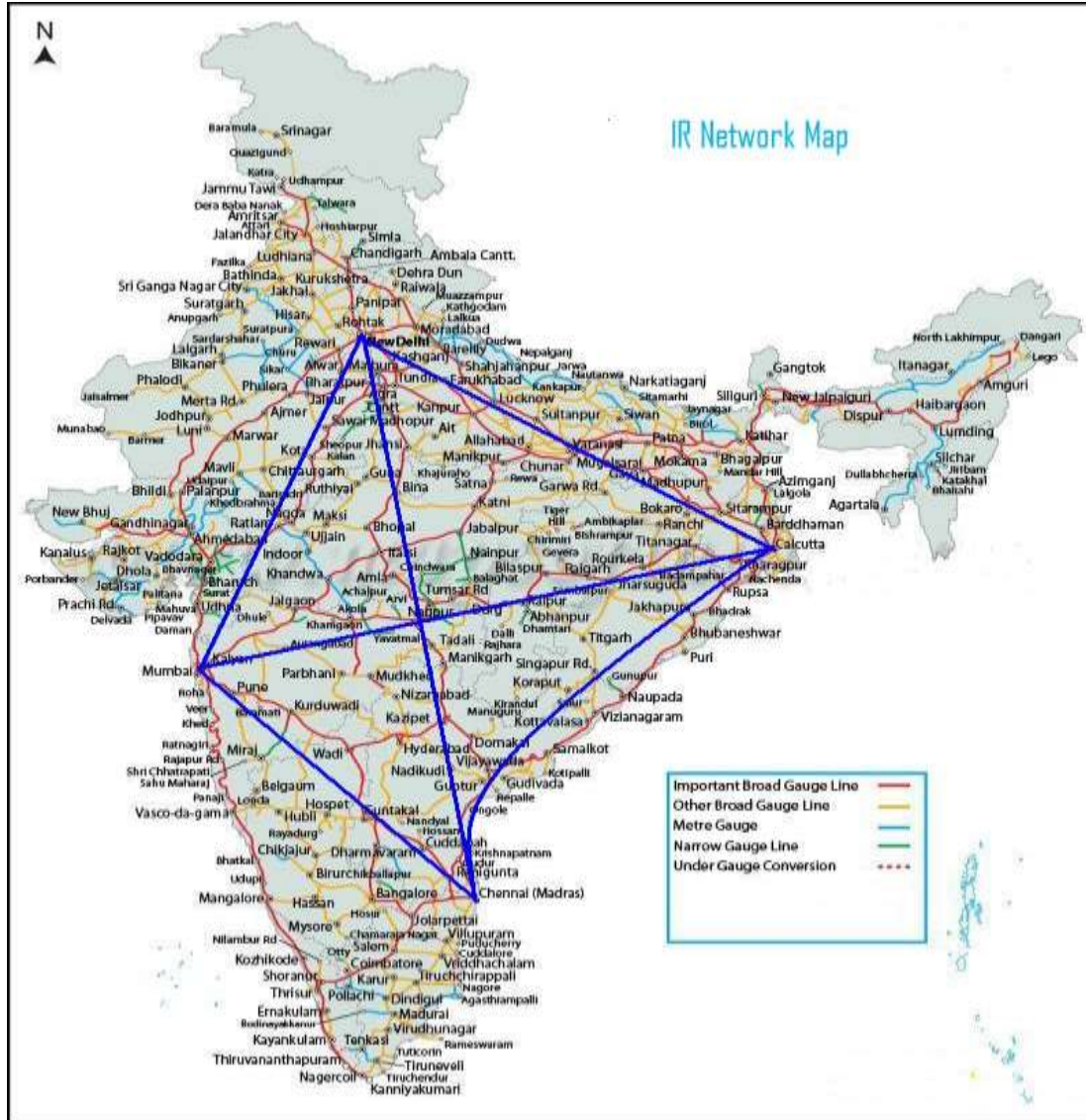


IR – Network and Resources At a Glance

- 66,000 Route Km;
- Predominantly Broad Gauge – 58,177 Route kms(88%)
- Electrified route km -39% (26,300 Route Kms)
- 7,133 Stations ,10500 Locomotives , 250000 wagons & 66,000 coaches
- 3 Passenger Coach Manufacturing Units, 2 Locomotive Manufacturing Units, 2 Wheel and Axle Plant and 1 Locomotive Rebuilding Plant
- 1.33 Million Employees



IR – Network at a Glance



- High Density Corridor
- Golden Quadrilateral + Diagonals
- 16% of route Km carries 52% of passenger & 58 % of freight



Transportation Statistics



▪ Freight Operations

- 1052 million Ton
- 666 billion Net Ton KM
- Major commodities – coal, iron ore, steel, cement, fertilizer, POL, container
- 7000 + freight trains per day

▪ Passenger Operations

- 8450 million Originating Passengers;
- 53% suburban, 47% non suburban
- 1098 billion Passenger KM; 14% suburban, 86% non suburban
- 12,000+ passenger trains per day (23m pass /day)



The Next 5 years ...

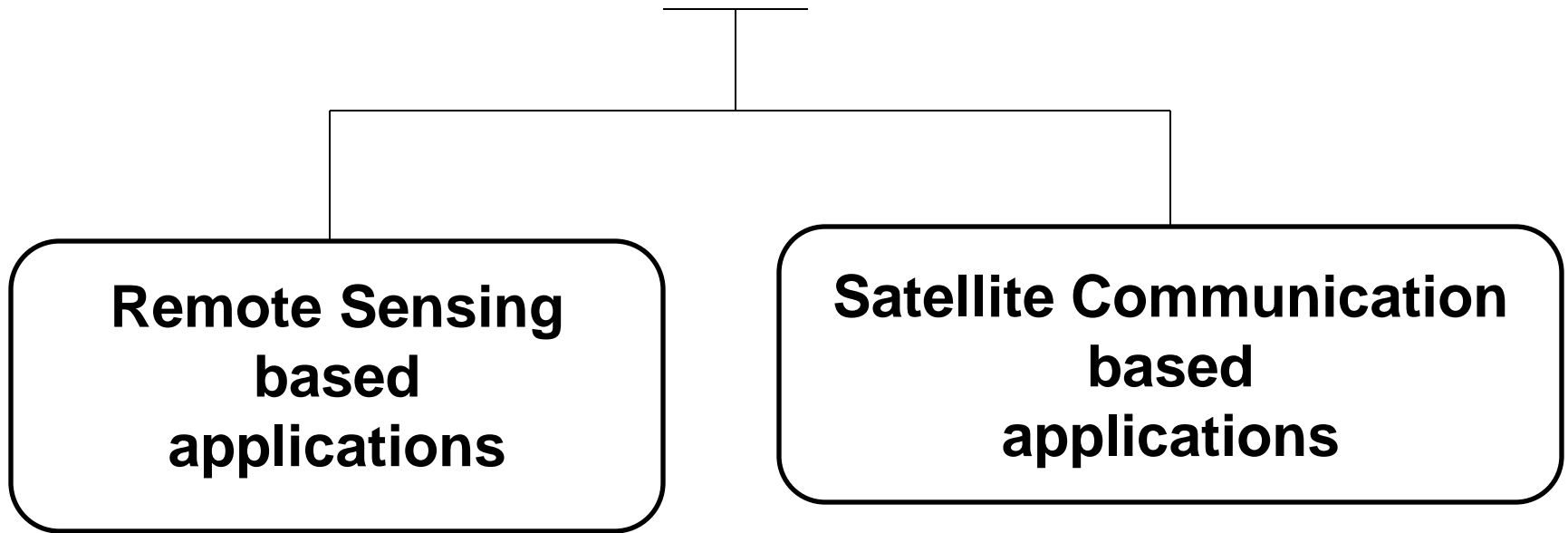


- Eastern and Western Dedicated Freight Corridors (3300 km)
- New Lines – 4000 km
- Doubling – 7500 km
- Gauge Conversion – 5500 km
- Electrification – 10,000 Route kms
- Develop High speed Corridors
- New terminals and terminal development



Past & Current Usage of Space Technology

Use of Space Technology grouped in two categories

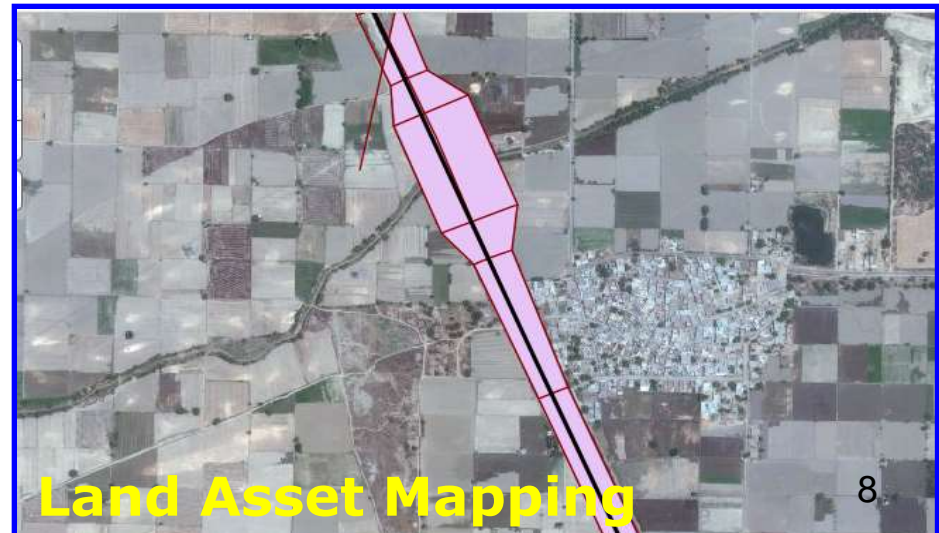
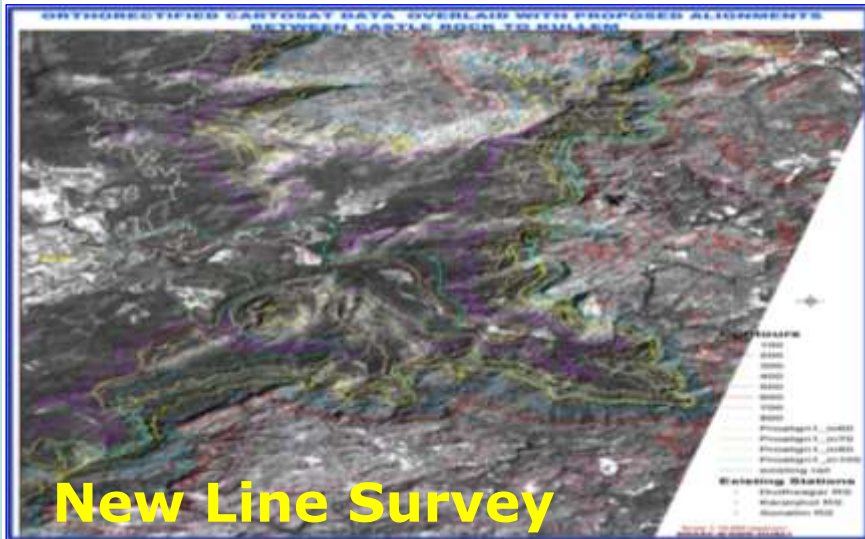




Past & Current Usage of Space Technology

Remote Sensing based Applications

- Satellite Imaging for new railway line alignment.
- Geo-fencing applications for Mobile unreserved ticketing.
- Asset Mapping – Pilot for Delhi division done. Work in progress for complete Railways.





Past & Current Usage of Space Technology

Remote Sensing based Applications (Contd...)

- Remote Monitoring of Locomotives.
- Passenger Information System in Mumbai Suburban trains.
- GPS based clocks for synchronised timings.





Past & Current Usage of Space Technology

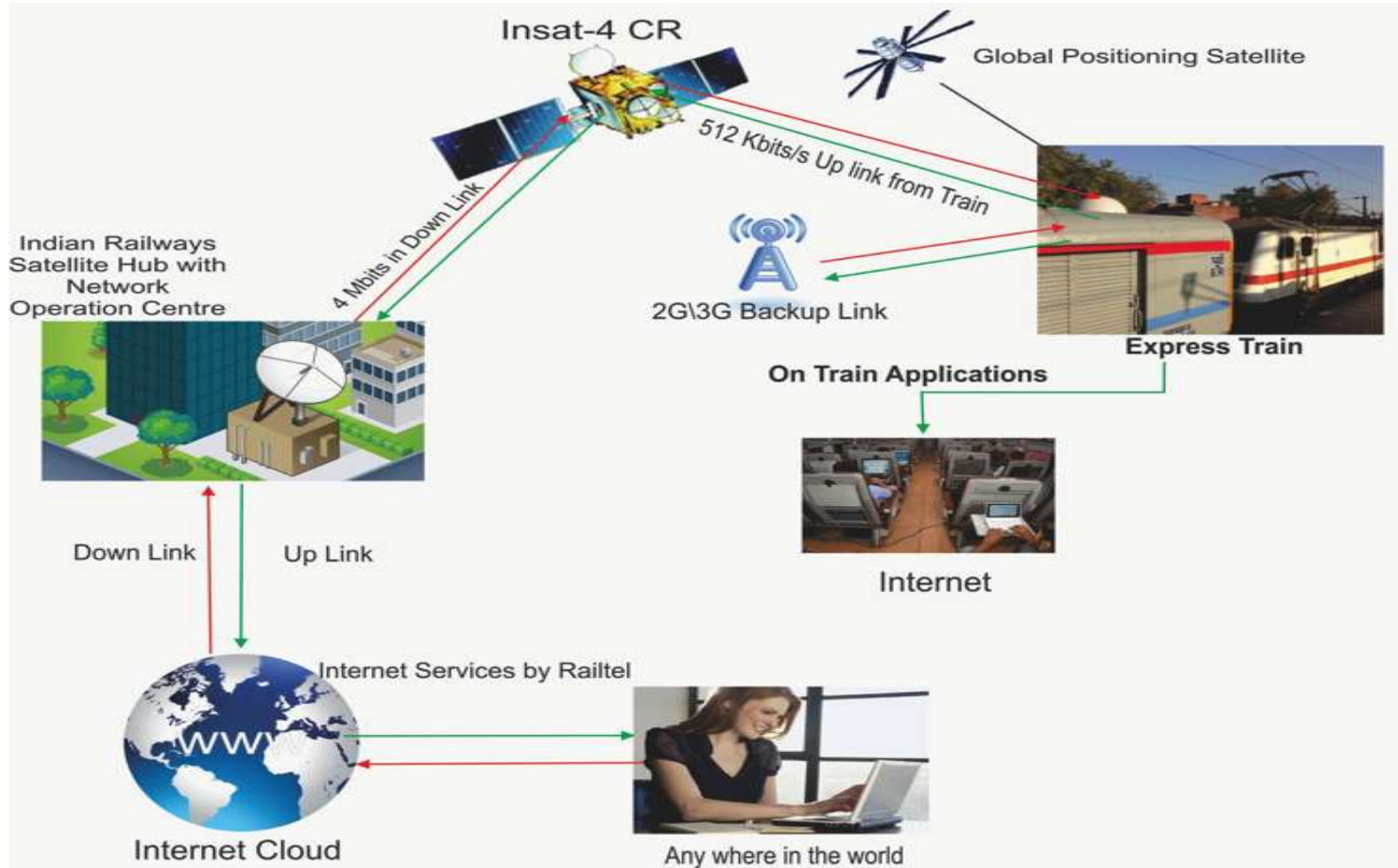


Satellite Communication based Applications

- **Emergency/Disaster Communication** from remote locations using **Satellite phones** and **V-SAT Terminals**.
- **V-SAT** terminals for extending the **connectivity** to the remote locations for passenger reservation system, freight operation information system.
- **Wi-Fi internet** connectivity in 3 rakes of Howrah Rajdhani Express.
- On board **satellite TV** (Palace on Wheels).



Broadband on Trains





On-Board Satellite Equipments



Satellite Tracking Antenna With Radome Mounted on the Power Car at non Vestibule End



Top View



Side View

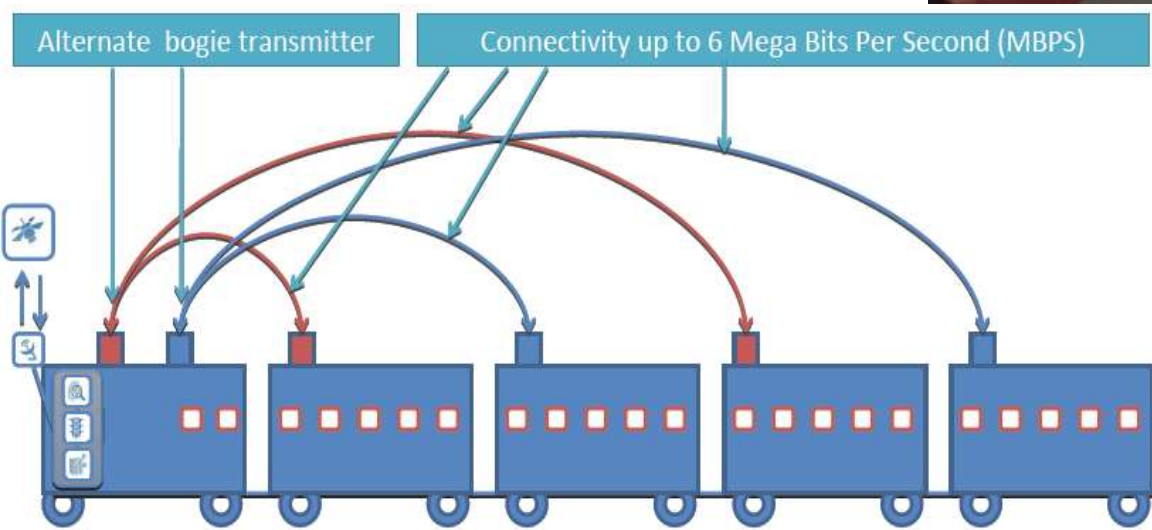
On Train Control Panel comprising of Satellite Modem (MCPC), Antenna Control Unit, MAR, Access Control Gateway etc



Rack Inside the train



Wireless Backbone



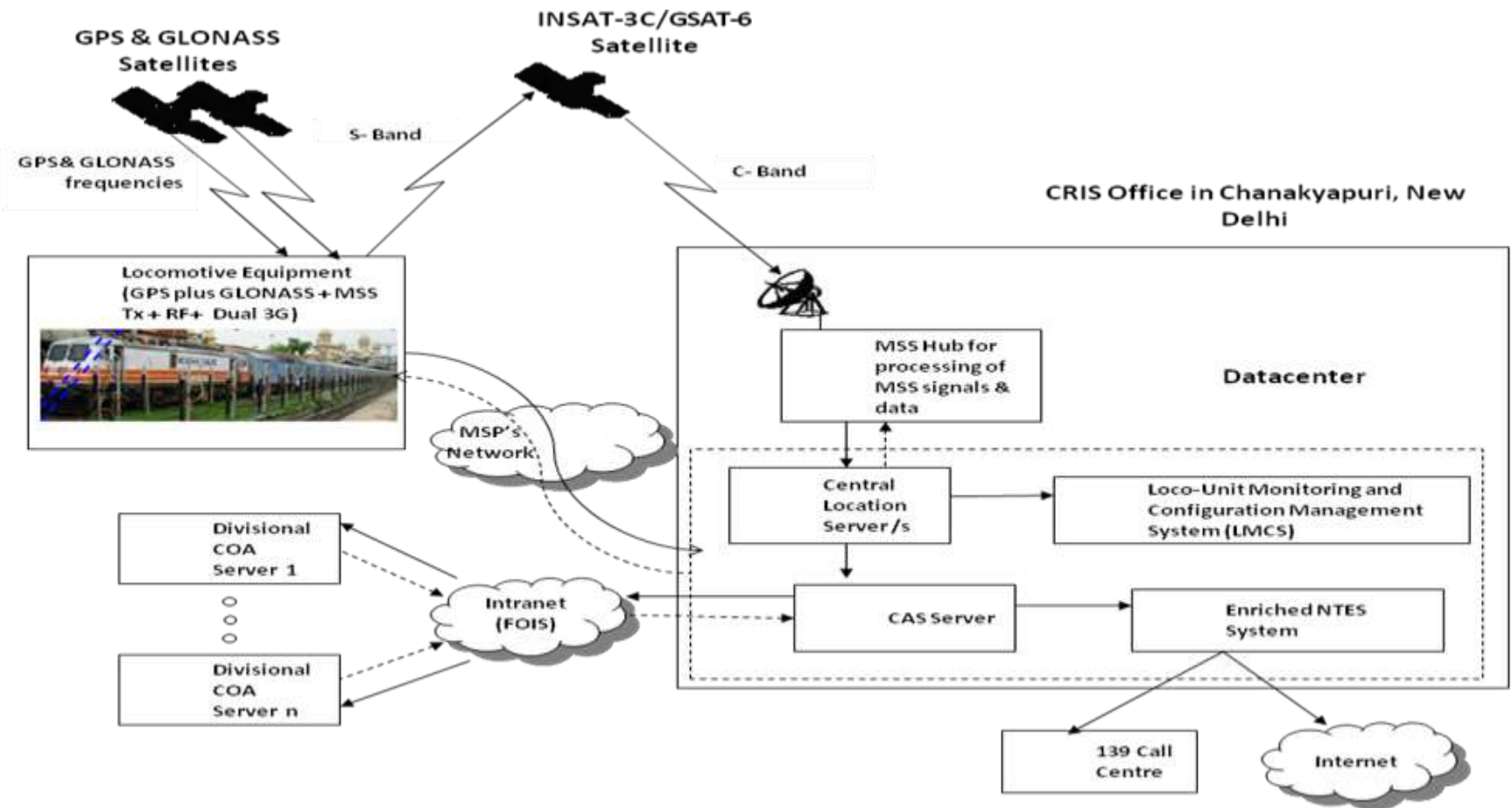


New Initiatives Planned



- Passenger Information System in all coaches of superfast trains
- Mapping of IR Assets including land, monitoring of encroachments, establishing IR Geo-portal
- Feasibility study for new Routes & Alignments
- Identification & assessment of flooding vulnerability of rail bridges
- Mapping of Land slides in Hilly Area/ Ghat Sections
- Warning to road users at Unmanned Level Crossing without intervention of train drivers
- Disaster support, Disaster Management and Disaster vulnerability mapping
- Real-time Train Information System (RTIS)

RTIS





Expected Benefits from New Initiatives



- Enhancing safety in Train operations.
- Dissemination of information to Passengers on Real time basis.
- Effective utilization of Railways assets.
- Effective Asset/Land utilisation & Encroachment monitoring and prevention
- Significant cost and time reduction in Project implementation
- Identification of vulnerable stretches with respect to floods, landslides etc,
- Effective and efficient management of Railways



Institutionalization & Capacity Building



- **MoU** between Railways and ISRO.
- Establishing **BHUVAN node** in Railways Data Centre for departmental applications and citizen centric services
- **Capacity Building** –
 - Training of Trainers for Centralized Training Institutes of Indian Railways.
 - Customized courses on Geospatial Technology Tools for Railway Officials.
- **Technical guidance** for various geospatial applications



Challenges



- Allotment of S-band resources for Real-time Train Information system.
- Rationalization of Bandwidth charges.
- Need to have Geospatial Information Act.



Thanks