



Welcome!



“4IR Technologies in Geoint : C-DOT’s Perspective”



CENTRE FOR DEVELOPMENT OF TELEMATICS

Telecom Technology Centre of the Government of India



Industrial revolutions throughout history



1784



INDUSTRY 1.0

First mechanical loom.
Steam-based
mechanical production.



1870



INDUSTRY 2.0

First assembly line.
Electricity-based
mass production.



2014

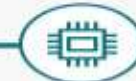


INDUSTRY 4.0

First online mass production
in a smart factory.
Ubiquitous production and control.



1969



INDUSTRY 3.0

First programmable
controller.
Controller-based automation.



Key Technologies for Fourth Industrial Revolution (4IR)

Enabling the convergence of physical, biological & digital world



- **5G** – Ensuring reliable connectivity with low latency & high throughput
- **Artificial Intelligence (AI), Machine Learning ,Big Data** – Enabling Data Analytics for real-time operations & decision-making
- **Augmented reality (AR), Virtual reality (VR)** – Augmenting surroundings by adding digital elements to a live view to replace a real-life environment with a simulated one.
- **Internet of Things (IoT)** – Achieving proliferation of smart devices for various applications : Health, Agriculture, Logistics, Transport, etc.
- **Blockchain** : Building all-encompassing secure database for complex operations
- **Cloud & Edge Computing** – Architecting secure & resilient virtual networks
- **Quantum Computing-** High computational powers for ultra-fast processing of large chunks of data



Fourth Industrial Revolution (4IR) – Drastically Transforming GeoInt Landscape



- Evolving an ecosystem of **location-aware, geography-sensitive and web-accessible sensors** for enhancing geo-spatial intelligence
- Building a well-coordinated **framework for convergence of myriad technologies** to power various GeoInt applications
- Exploring novel use-cases of geospatial intelligence in diverse sectors – **Developing AI/ML & Automation based solutions** for rapid expansion of geo-networks
- **Simplifying** complex geo-spatial data for **ease of use by wider user base** – Enabling Smart Transport, Disaster Management, Intelligent Health Systems, etc.
- Adapting to **emerging technology trends** for Drones & Surveillance
- **Augmenting** GeoInt Systems for Defence, Security-centric & Military operations

Applications of Geolnt Systems



Here are some typical examples of how geospatial technology is applied:

- **Logistics** - Tracking goods and ensuring their quality.
- **Transportations**- Identifying location and time of arrival, route making, and navigation.
- **Meteorology**- Referring weather forecasts to particular territories.
- **Forestry**- Detecting forest fires and deforestation & preventing large-scale wildfires
- **Agriculture**- Assessing vegetation state on a selected terrain.
- **Healthcare**- Monitoring areas of epidemic outbreaks.
- **Ecology**- Tracing species populations in certain areas, preventing and addressing calamities.
- **Marketing and advertising**- Targeting ads to relevant regions.
- **Real estate**- Visualizing and analyzing real estate objects remotely.
- **Insurance**- Managing risks in questioned areas (e.g., via historical georeferenced data analysis).

Challenges to building GeoInt Systems for 4IR



- Availability of **accurate, validated & adequate geo-spatial data** for targeted real-time applications
- Ensuring GeoInt **Data Standardisation** for addressing issues of **data inconsistency , inter-operability and Data sharing** on various technology platforms
- **Storage** of massive amounts of complex Data – Analysis of Data & deriving useful information for actionable intelligence for various use-cases
- Technologies such as Remote Sensing, Image Processing, Photogrammetry, Cartography, GIS, GNSS, AI, Mobile app, Data bases, ERP, MIS, Web etc..
Integration with dynamically evolving and changing communication networks & tech platforms
- Evolving a **collaborative framework at global level** with industry & start-ups for data sharing & building business intelligence
- Addressing **vulnerabilities** emanating from security risks and threats



C-DOT's Indigenous Solutions Based on GeoInt



Fiber Fault Localization System (FFLS)



- GIS based FFLS detects and locates optical fiber fault (fibre cut or removal of connector) along with its overlay of fault location based on Geo-spatial processing.
- Based on patented technology(United States (US)-15/524,973; China (201680003582.6); UK(GB2546031))

FFLS Fiber Fault Localization System

Hello, cdot

Haryana Faridabad Dayalpur Exchange 060600463L001P004

Diagnose fault

Fault Description

FaultLatitude	28.28900395133637
FaultLongitude	77.3690478801742
OnFiberId	0606004635001N001
FaultOccurTime	2021-10-28 12:03:19
ONTId	060600463N001
Block	BelaBagerh
PONId	060600463L001P004

OTDR Trace



Geo-Intelligent Network Planning Platform



- It is a Fiber-To-The-Premises (FTTP) System for Passive Optical Network (PON) for minimizing Fiber Laying by utilizing existing laid Fiber
- Used in planning of BharatNet network of BBNL consisting of nationwide Gram Panchayats (GPs).
- Geo-spatial platform to determine the Right-of-way for optical fiber deployment.

Patented technology (01008/DEL/2012, India)





Early Warning Platform for Effective Disaster Management Based on ITU Common Alerting Protocol (CAP)



- Secure dissemination of real-time **early warning information** from various agencies **over multiple channels** for wider reach and effective coordination
- Convergence of various forecasting and disaster management agencies on a **single unified platform**
- Efficient **utilization of available infrastructure** viz. TV, Radio, Satellite, Railways & Coastal Sirens on a common interface for coordinated response during emergencies, natural hazards, pandemics, etc.
- Applications for Public Welfare : **Health Advisory, Real-Time Consultancy for Farmers, Instant Alerts**, etc.



C-DOT's platform deployed in National Disaster Management Authority (NDMA) & State Disaster Management Authorities (SDMAs) to send warnings/alerts related to natural hazards like floods, cyclones, pandemic, etc.



Role of Geoint & AI in Disaster Management

- ❖ **Predictive Analytics:** AI can be used to **predict geo-targeted teledensity**, analyze past data to predict what is likely to happen in the event of a disaster.
- ❖ **Processing Information:** Image recognition of satellite photos to identify damaged buildings, flooding, impassable roads, etc.
- ❖ **Emergency Calls:** AI and Machine Learning can be applied to cope with the volume and different types of calls. Automated assistants can be used.
- ❖ **Social Network Analysis:** Real-time information from different channels and feeds can be analyzed and validated by AI to filter and classify information and make predictive analysis.



Source: Qadir et al., 2018.



COVID-19 Sāvdhān



**Information about Covid-19
Test Centre in locality**



**Essential commodities supplier
in a specific area**



CURFEW

**Alert on law and order issues
for people in specific areas**



**Information regarding Covid-19
Quarantine Centre**



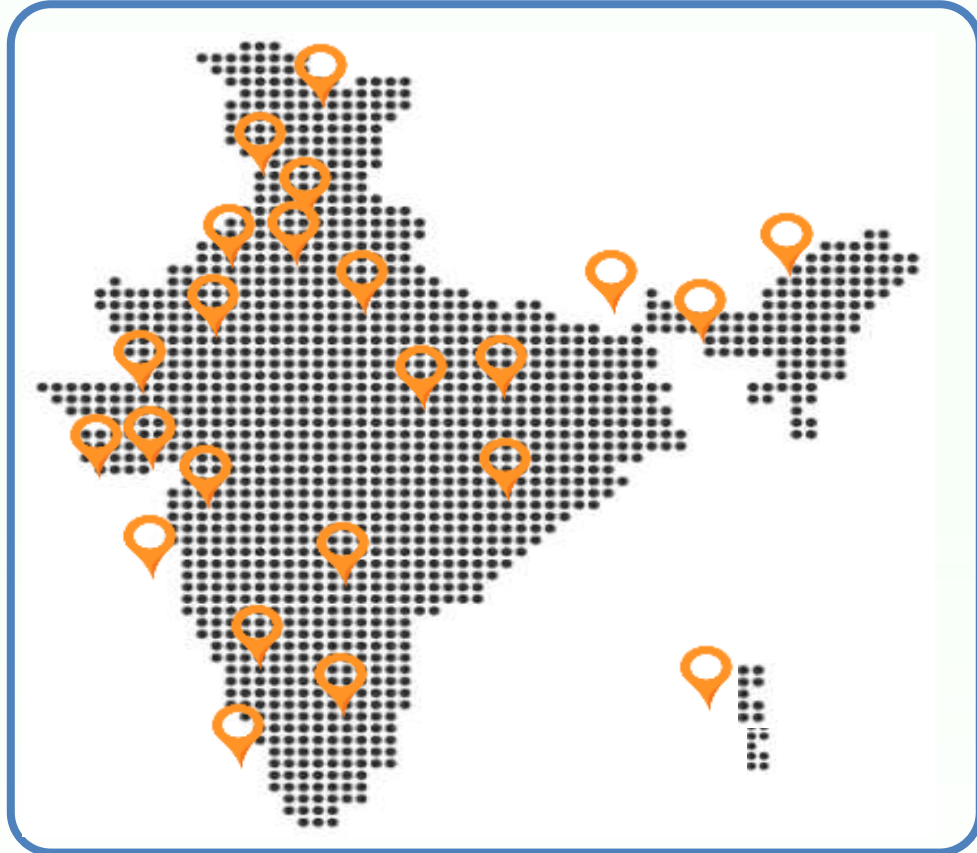
**Alert in nearby area on new hot
zone of Covid-19 positive cases**



**Instruction to the people of
specific area by SDMA/DMs.**



COVID-19 Sāvdhān



346 Crores SMS

1051 Warnings

26 States & UTs

In 11 Languages *

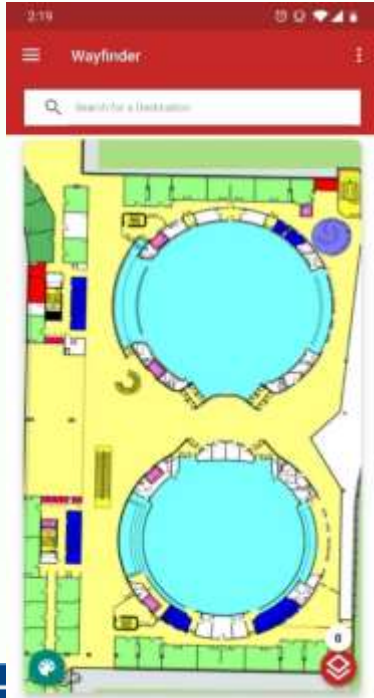
73 % Area

* English, Hindi, Bengali, Kannada, Malayalam, Marathi, Gujarati, Odia, Punjabi, Tamil, Telegu



WayFinder /Indoor Navigation Solutions

(Deployed in UN Building, Geneva)



- Developed for UN building in Geneva
- Assistive and Interactive Navigation inside complex buildings
- Augmented/Virtual Reality (AR/VR) based solution
- Support for alternative routes
- Wrong route detection
- Provision of alerts to both user and admin

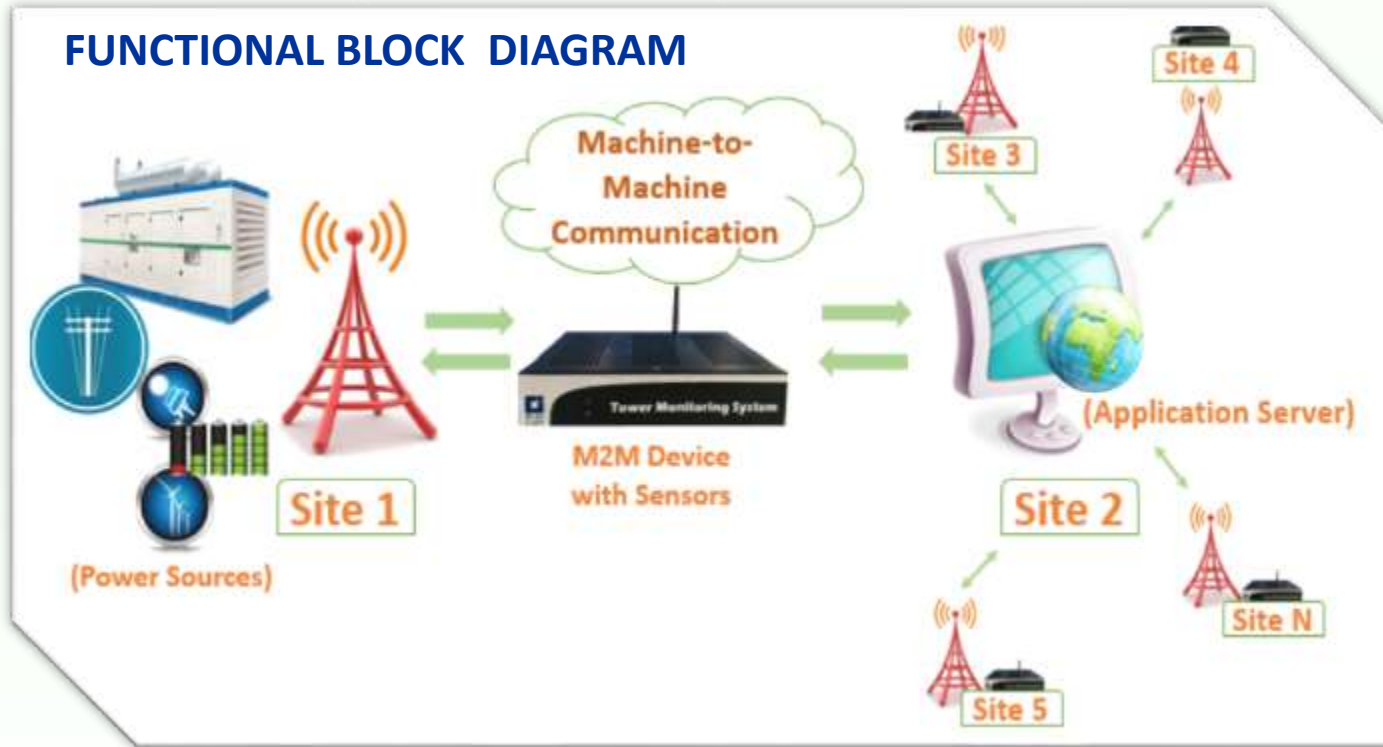




IoT based Carbon Footprint Monitoring System

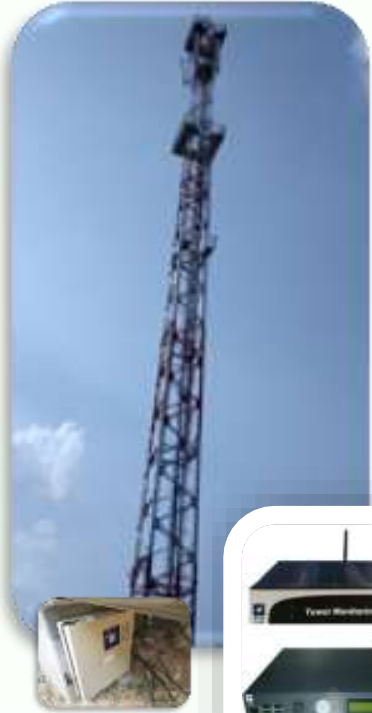


FUNCTIONAL BLOCK DIAGRAM





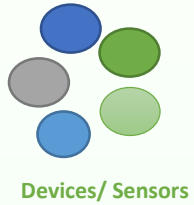
IoT based Carbon Footprint Monitoring System



- Real-time Tamper-proof Monitoring
- Monitors Grid, DG power supply presence status and Backup Battery voltage
- Reduces diesel handling cost
- Surveillance facility for un-manned site



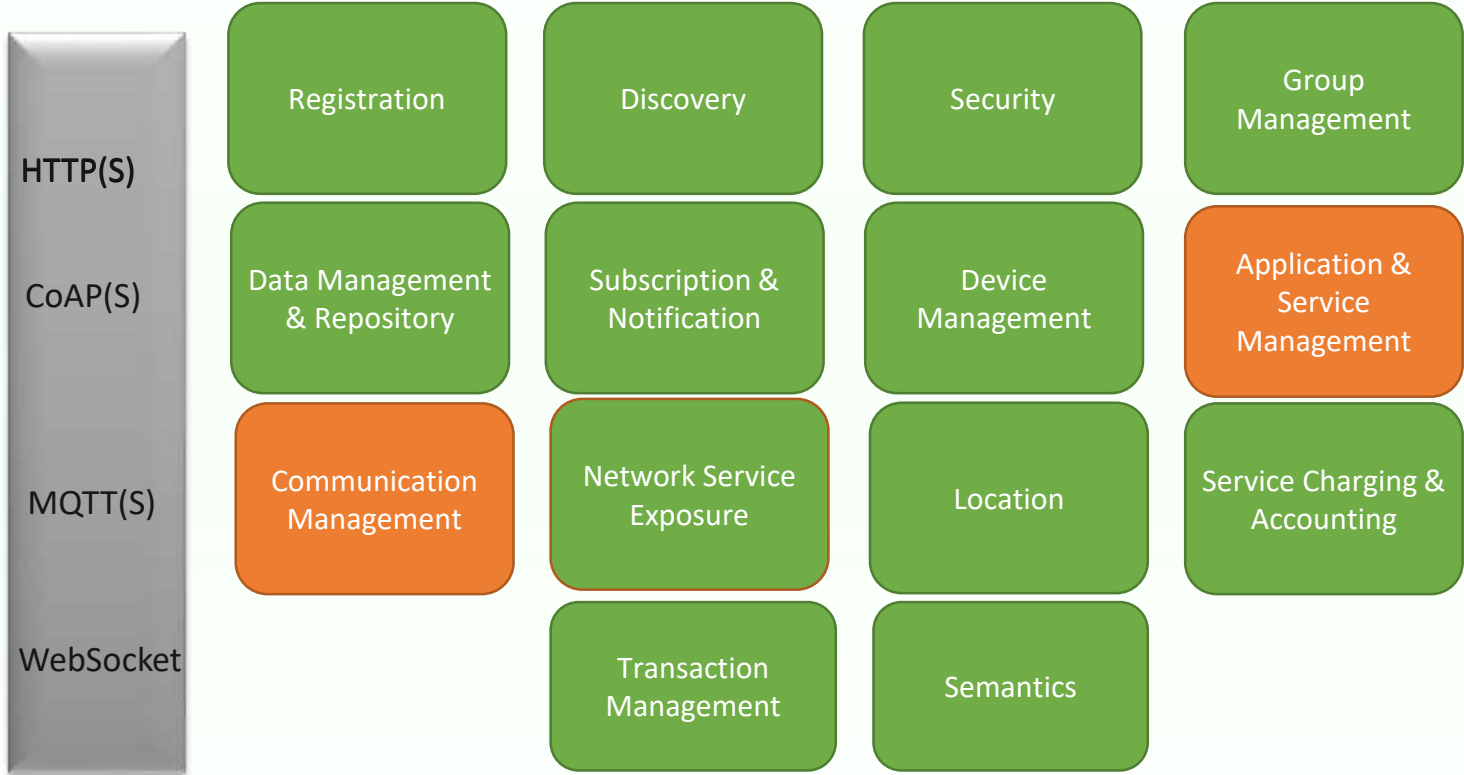
CDOT Common Service Platform based on OneM2M



Devices/ Sensors



Applications
in the Cloud



Supported by
CCSP 

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Start-ups are welcome to use this platform and make applications/devices OneM2M Compliant





THANK YOU

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