Transforming Urban Utilities with IoT, AI & Digital Twins

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Global Pre-Sales

CS TECH Ai
Enhancing Possibilities

India’s Urban Transition: *A City at a Crossroads*

Before speaking about technologies, let us set the stage:

- **India’s urban population will reach 675 million by 2035.**
- **Cities are growing faster than their infrastructure can keep up.**
- **Utility data—water, energy, transport, sewage—is fragmented and inconsistent.**

The real challenge is:

Lack of unified data leads to reactive, not predictive, city management……..

All images representative

The Inflection Point: *Emergence of Digital, Integrated Cities*

Cities are moving from siloed departments to unified digital platforms

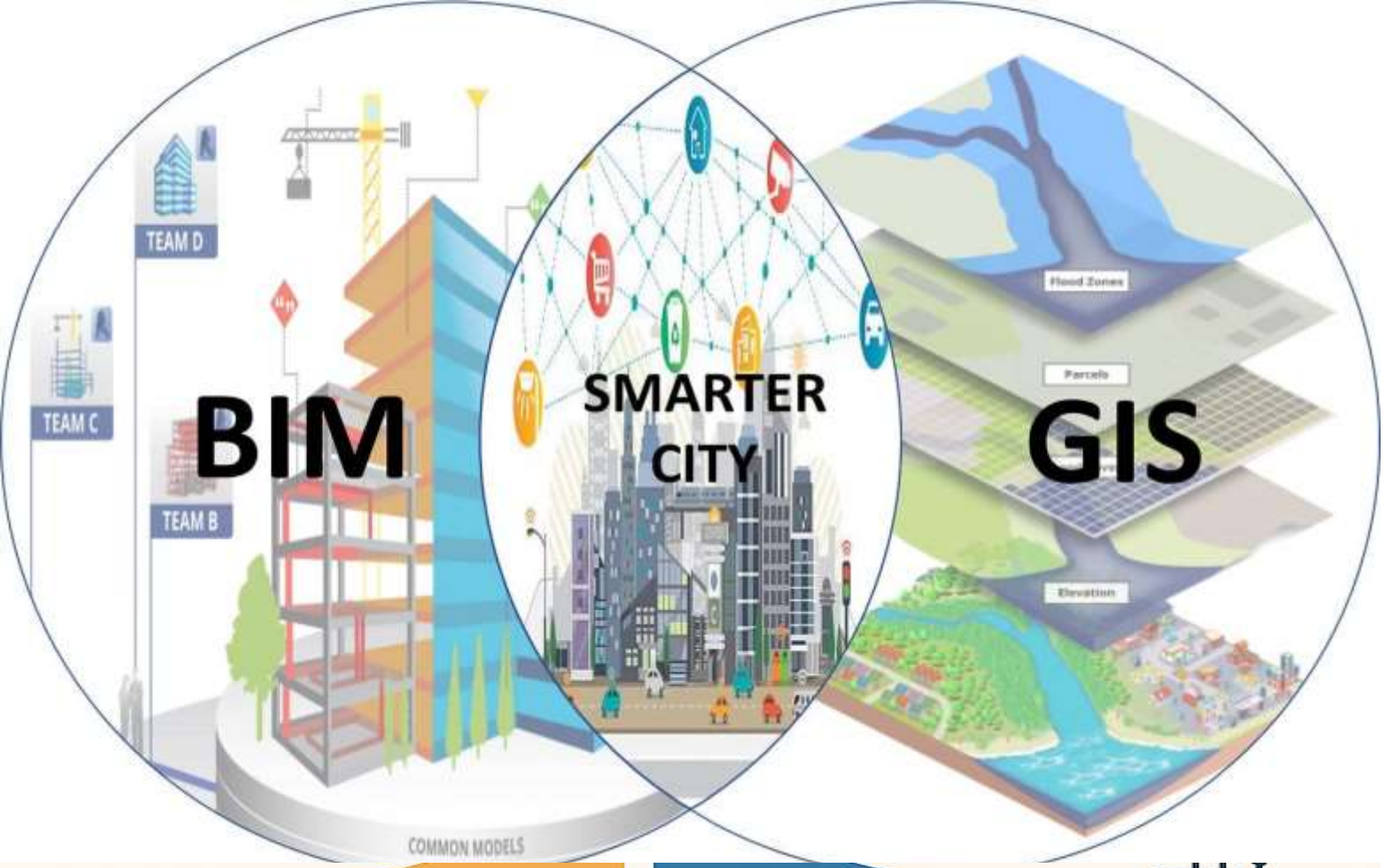
Real-time data enables cities to predict issues instead of reacting to them

India is poised to adopt a federated, multi-agency Digital Twin architecture built for its governance structure

GIS, IoT, BIM, and SCADA are now integrated, not isolated tools

Digital twins provide a single, live view of urban infrastructure and utilities

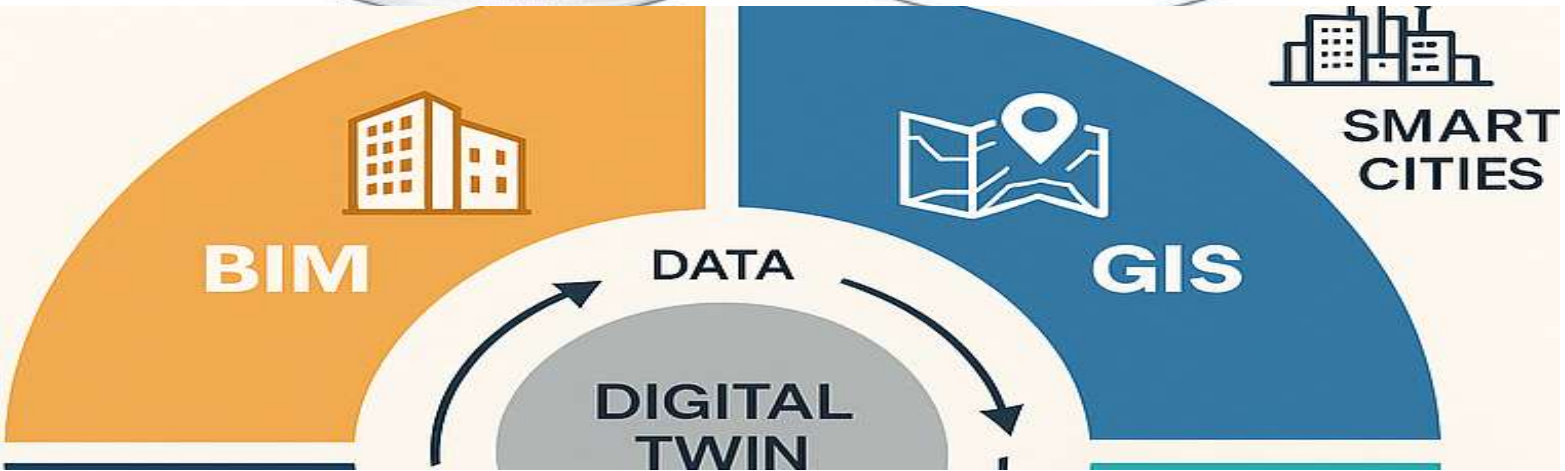
All images representative



The Digital Foundation for Mapping the City

GIS + BIM + AI & Digital Twin

- Aerial surveys & HD point clouds
- Automated AI pipelines → 3D mesh, BIM models (LOD 100–500)
- GIS layers → roads, utilities, zoning, flood lines
- CDE (Common Data Environment) → all drawings, all models, one source of truth
- This creates the **digital baseline** of a city.



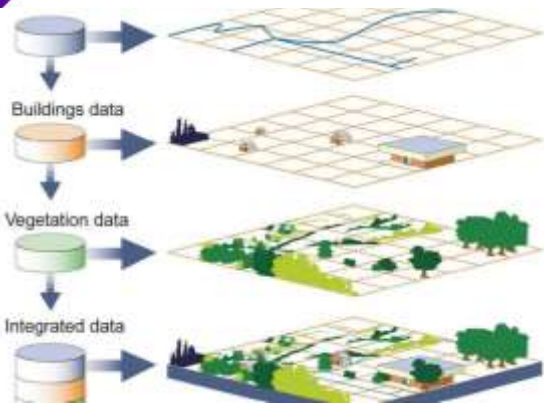
Building the City Brain

DSS, AI & IoT Sensors

- IoT sensors → live data from flow, pressure, quality, pumps, energy → real-time visibility across all utility layers
- AI models → detect anomalies, predict failures, optimize operations
- Automated decisions → pump scheduling, valve control, alert routing
- Unified intelligence → one operational picture for the entire city

This becomes the **city's real-time decision engine.**

Connecting the dots…



GIS-> the geospatial spine anchoring spatial context

BIM delivers the engineering truth

Digital Twins for real-time operational intelligence

AI for proactive maintenance & citizen-centric services

IoT for situational awareness and public safety

A Unified CDE (Common Data Environment) orchestrates everything

- Harmonizes all the layers and field intelligence
- Single source of truth for Authorities,
- Automated governance: compliance, documentation, digital as-builts

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What Can Be Accomplished with BIM + GIS + AI+ Digital Twin: Digital Twin City

Planning — Geospatially Intelligent Decisions

- Smart Alignment Selection
- Land-acquisition Optimisation

Integrated Digital Project Management System

O&M — Digital Twin as the Operations Command Layer

- Asset-level preventive maintenance scheduling
- Incident, traffic & structural insights unified in single source of truth

Design — Engineering

- engineeringmodels federated into the CDE
- Clash-free geometry

AI, IoT based Real-Time Field Intelligence

- Drones for as-built reality synced with models
- Live QA/QC dashboards

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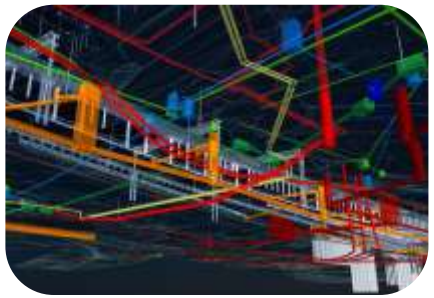
Digital Twin City Layers..

Urban Planning & Development



Utilities

Land Management

Housing

Transportation

City Infrastructure Asset Management

Change Detection & Encroachments

Urban green space Modelling, Mapping and Analysis

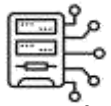
Web portal & Mobile App

3D data display Dashboard for Government departments

Process Flow

Base Layer Development

Layering & Attribution



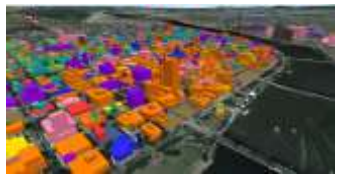
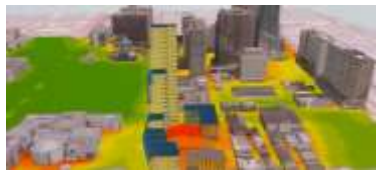
Link IoT sensors (water flow, power load, bin levels)

Impact Analysis

Web-based live Dashboard

All images representative

Digital Twin City Model Analytics

Utilities Level	 **Above ground level**	 **Underground level**	 **Street level**
Building Level	 **Building level**	 **Floor level**	 **Street level**
Visual Analytics	 **Thematic**	 **Photorealistic**	 **Sensor data**
Urban Heat Canyon			

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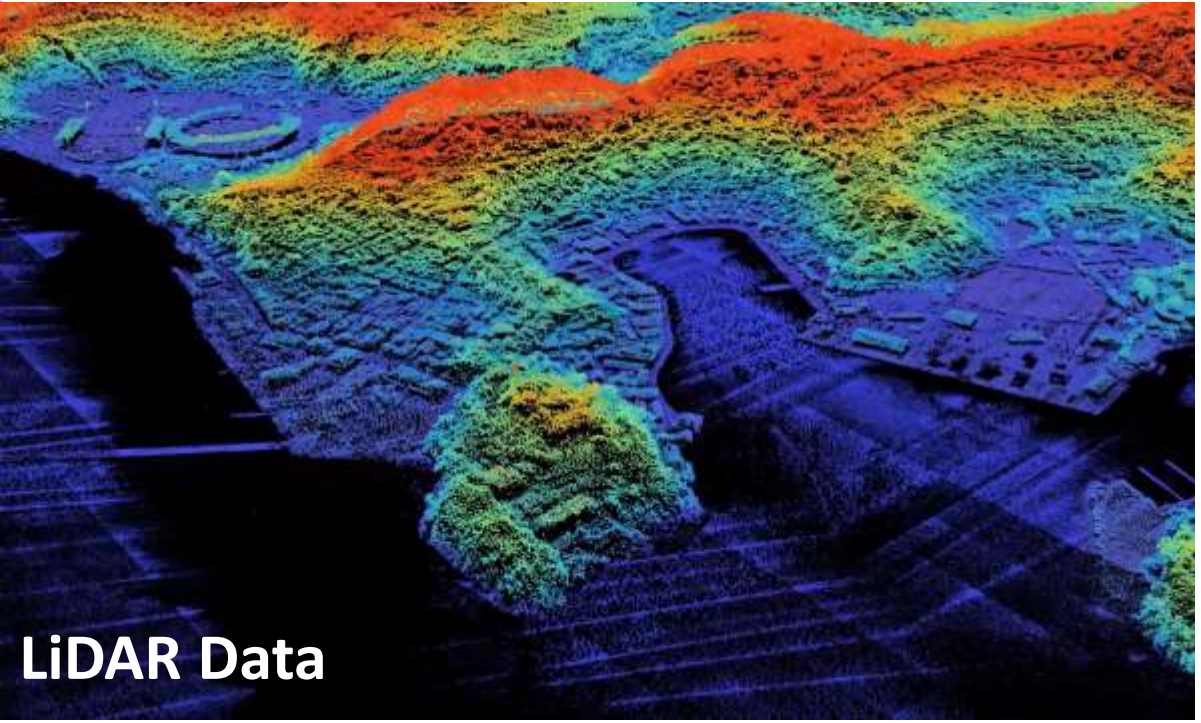

LiDAR Data


LiDAR Data- *Automatically Identify and Classify Features*

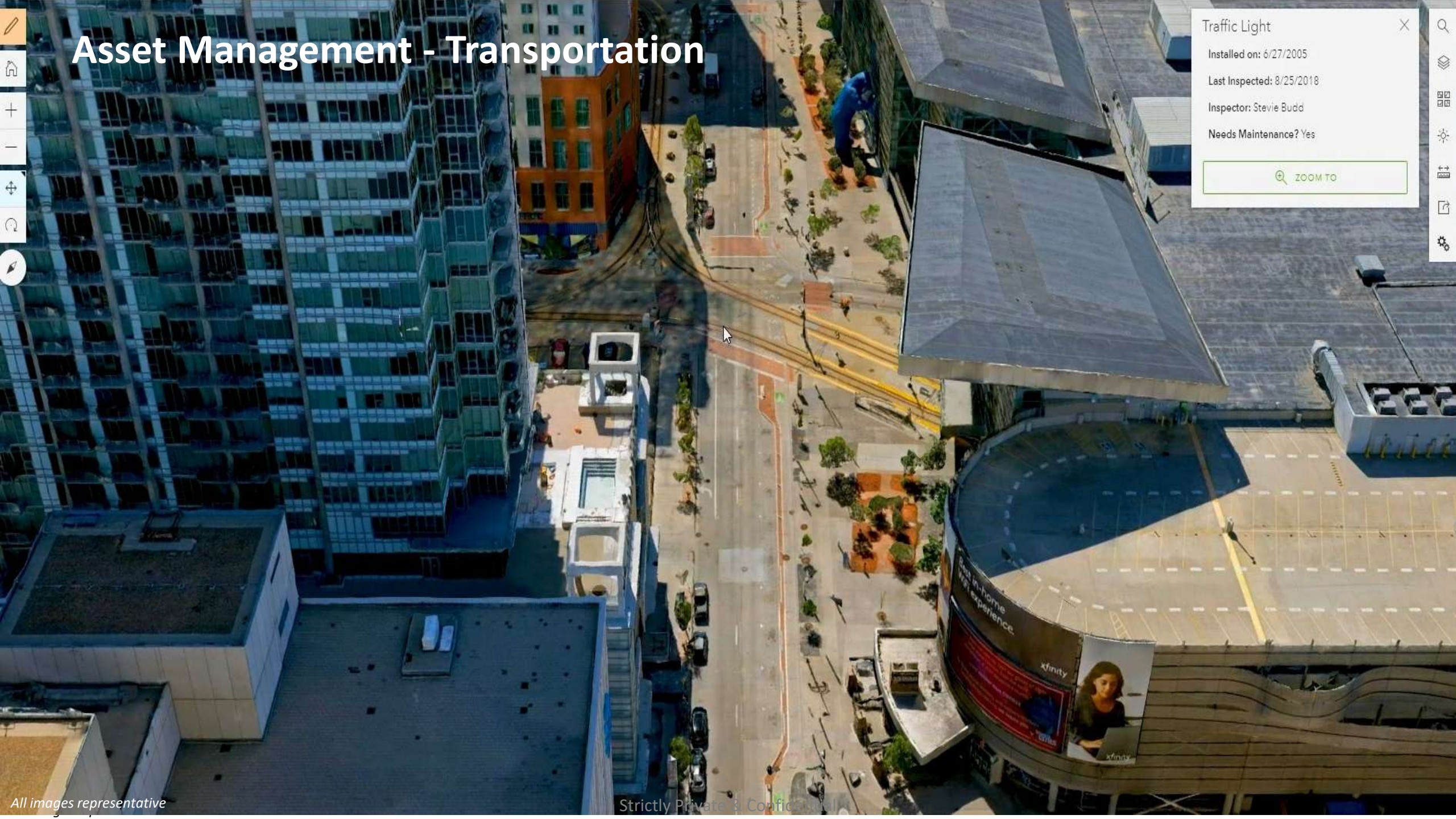

LiDAR Data – *Extract Schematics*


3D Features
Deep Learning
3D Mesh
Reality Capture

Geo Visualization of 3D Data Model

All images representative

Asset Management - Transportation



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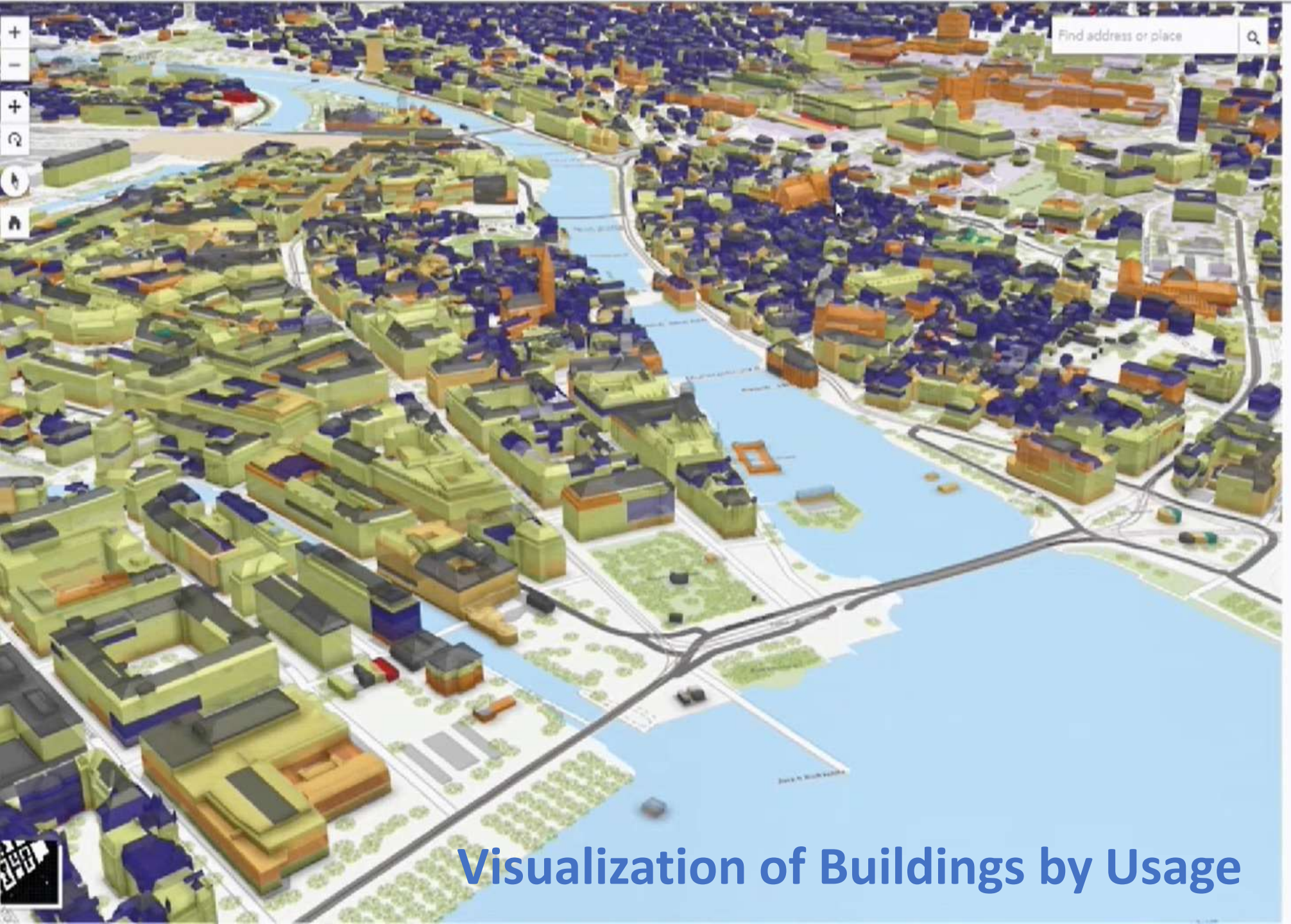
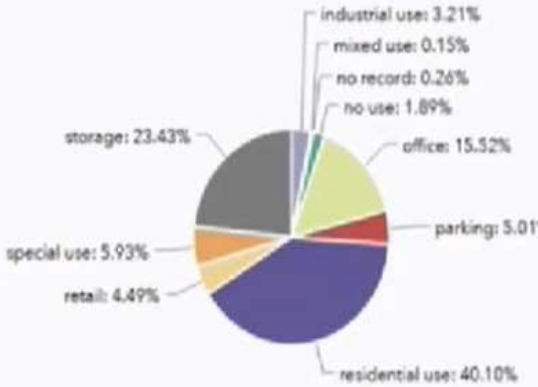


Selection: City Level

Number of Buildings: 49408

Visualisation by

none | usage | area



Filter by

Select Floor | Select Usage

0 — Min Area

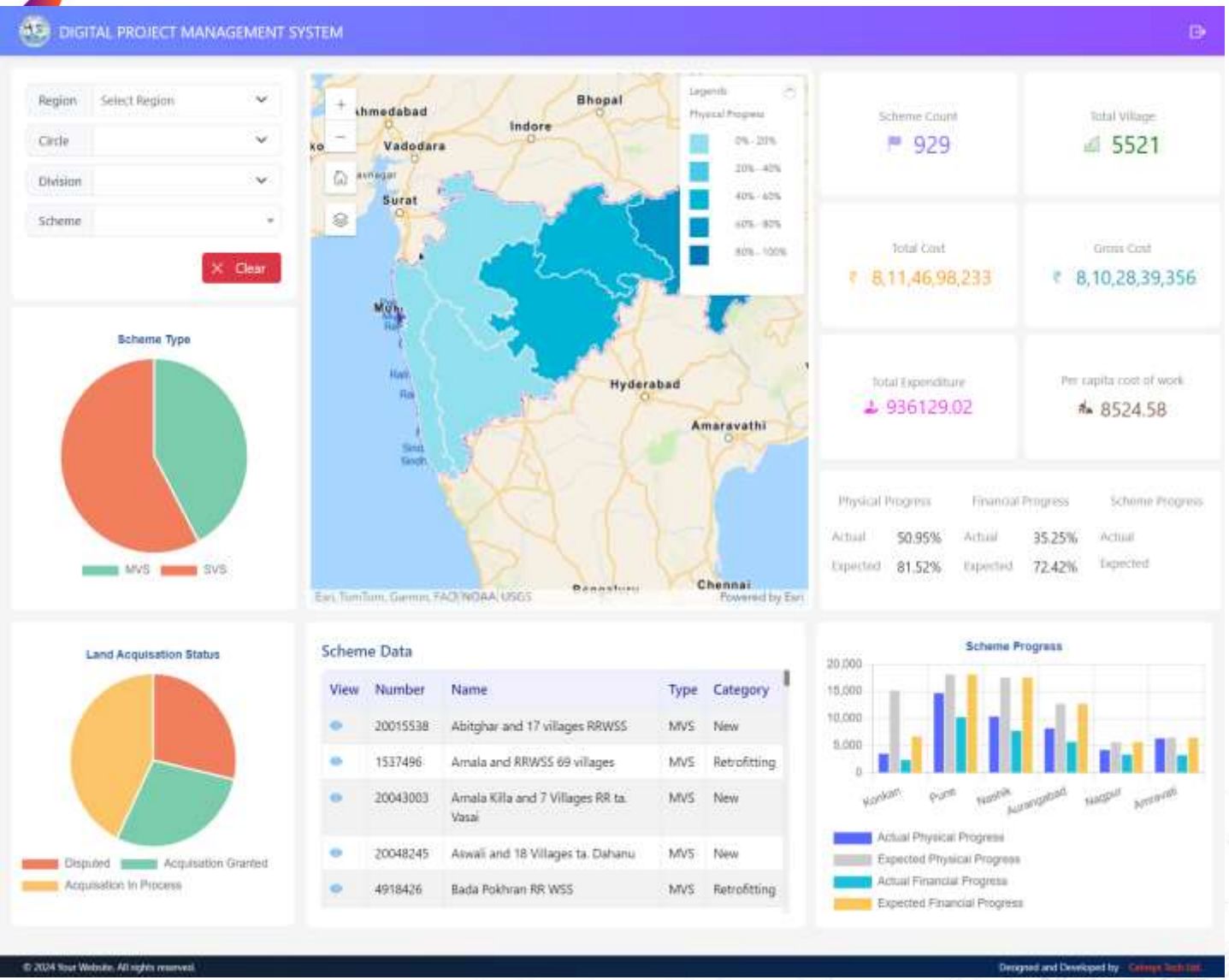
35685 — Max A

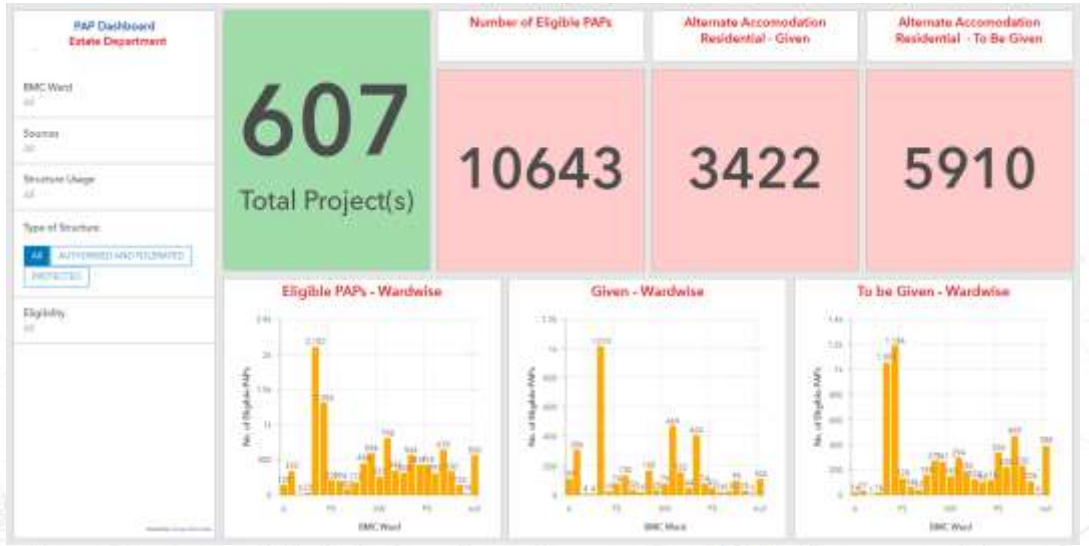
Reset

Visualization of Buildings by Usage

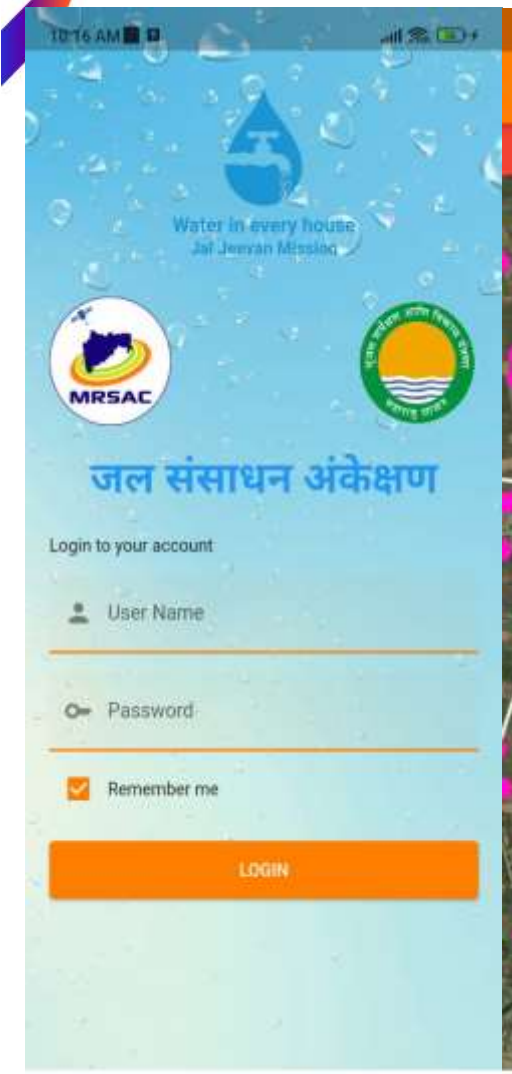
Flooding Simulation

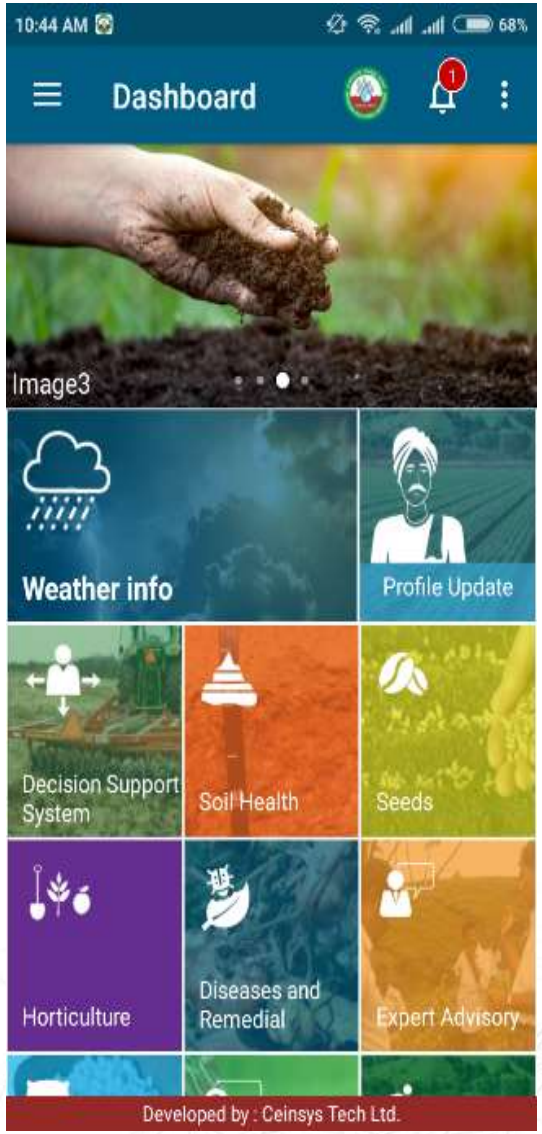
WebGIS & Dashboards





Mobile Apps

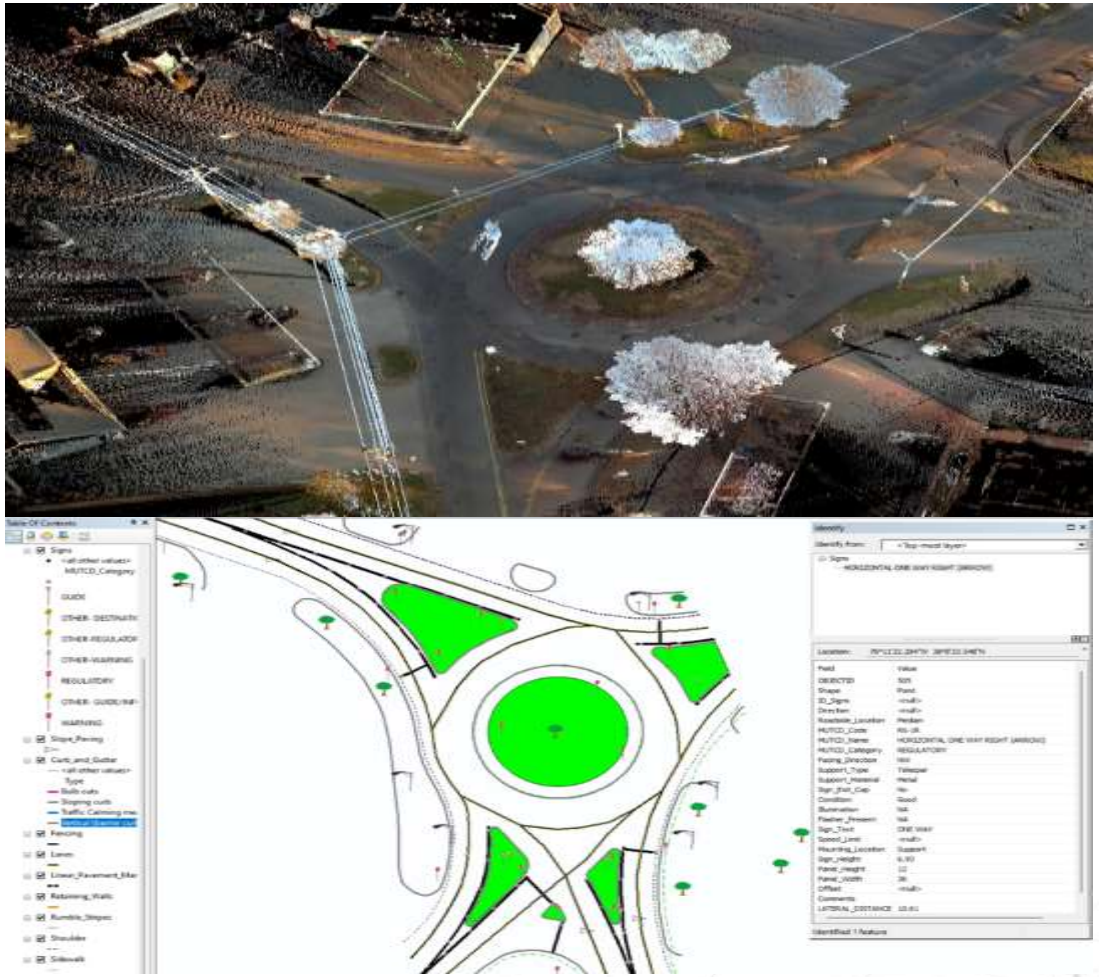




Strictly Private & Confidential

Case Studies

3D Assets Extraction



Project Objective: To provide solutions for roadway asset data collection services to manage their road infrastructure.

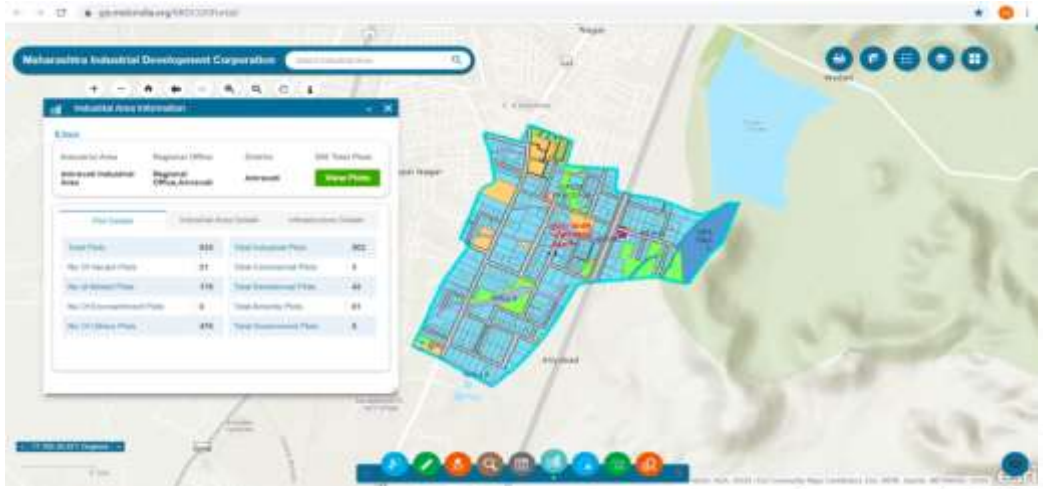
Project Solution:

- 3D Line, Point features extraction using LiDAR Point cloud data and Panoramic images by using TopoDOT and S2M software
- 24 Different Roadway Asset Features Extracted
- Assigned attributions for each Asset like Type of asset, condition, and color with the help of Point cloud data and Panoramic images.
- Attribution assigned for road, lanes, lamp, streetlight, signal, signs, pavements etc.
- Performed Three statistical checks, 1. Area, 2. Geometry, & 3. Attribution.

Key Benefits:

- 15500 Miles (USA)
- 24 Different Roadway assets
- Infrastructure
- Data driven business
- Road asset datasets which is used for any Transportation and Infrastructure Project datasets and 3D modeling
- Valuable database with the data of all assets in each city, such as streetlights, traffic signs, trees, utility poles, and pavement markings.

Land Asset Management Solution



Project Objective– Land management system for identification and demarcation of encroachments for industrial area planning and eradicating the flaws.

Solution –

- Drone survey and High-Resolution GIS map creation
- Enterprise GIS Portal development for employees and citizens
- Process automation for industrial area development and approval for change in existing industrial area plan
- Integration of existing enterprise systems – ERP, LAS, LMS, BPAMS, SWC, WMS
- Executive Dashboard for key official & Decision makers

Benefits –

- Land bank record updation and verification
- Land Encroachment Change Detection, Identification and Quantification

Key Project Highlights

- Statewide Implementation for 700 Industrial Areas covering 100,000 Ha

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Enterprise GIS for Municipality, Property Tax and Analysis

Project Objective: Capture reliable as-is ground reality Property Survey and data Analysis for efficient, transparent tax assessment.

Project Solution:

- Data Acquisition using MLS, TLS & UAV
- Creation of base map and integration of other layers such as Road, Sewerage, Storm Water, SWM, Public Utilities, Electrical Poles, Hoardings, etc.
- Change Detection as an input to decision support system
- Design and develop a Cloud based Web GIS solution with intelligent visualization tool to display integrated data.

Project Statistics

- 110 Sqkm area covering 1000+ Rkm road network
- 300k properties
- Web GIS application with 360 pano image integration on ESRI Platform
- Integrated data analysis reports for property tax enhancement.

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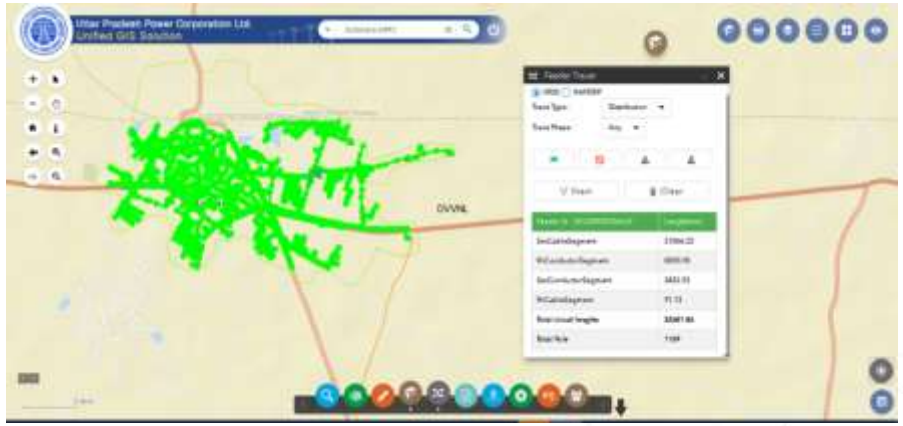
Unified GIS Solution for Power Distribution Network



Project Objective: Designing unified GIS solution to curb load shedding and crippling financial losses.

Solution:

- Professional Consulting services
- Upgradation & Implementation of existing ESRI GIS system to Latest version
- Data migration from existing GIS application to upgraded GIS application.
- Re-designing and re-engineering of overall system application Software, subsystems, elements, system facilities, equipment, services
- Integration of GIS platform through appropriate connector/web services with existing legacy system ERP, CRM, MDAS, NA, EA and SCADA systems.

Benefits:

- A Unified GIS solution catering to all key business systems
- Resolved performance issues with the GIS platform
- An integrated solution for efficient and effective functioning of business processes
- Improved field operations and efficient maintenance support activity using Offline/Online Mobile GIS application resulting in accurate and timely updates

Key Project Highlights:

- Web based SLD and report module increase electric productivity of engineering group
- Outage management module proved immediate attention to customer outage issues
- Load shedding reduced to 15%

Technology Stack

esri ORACLE

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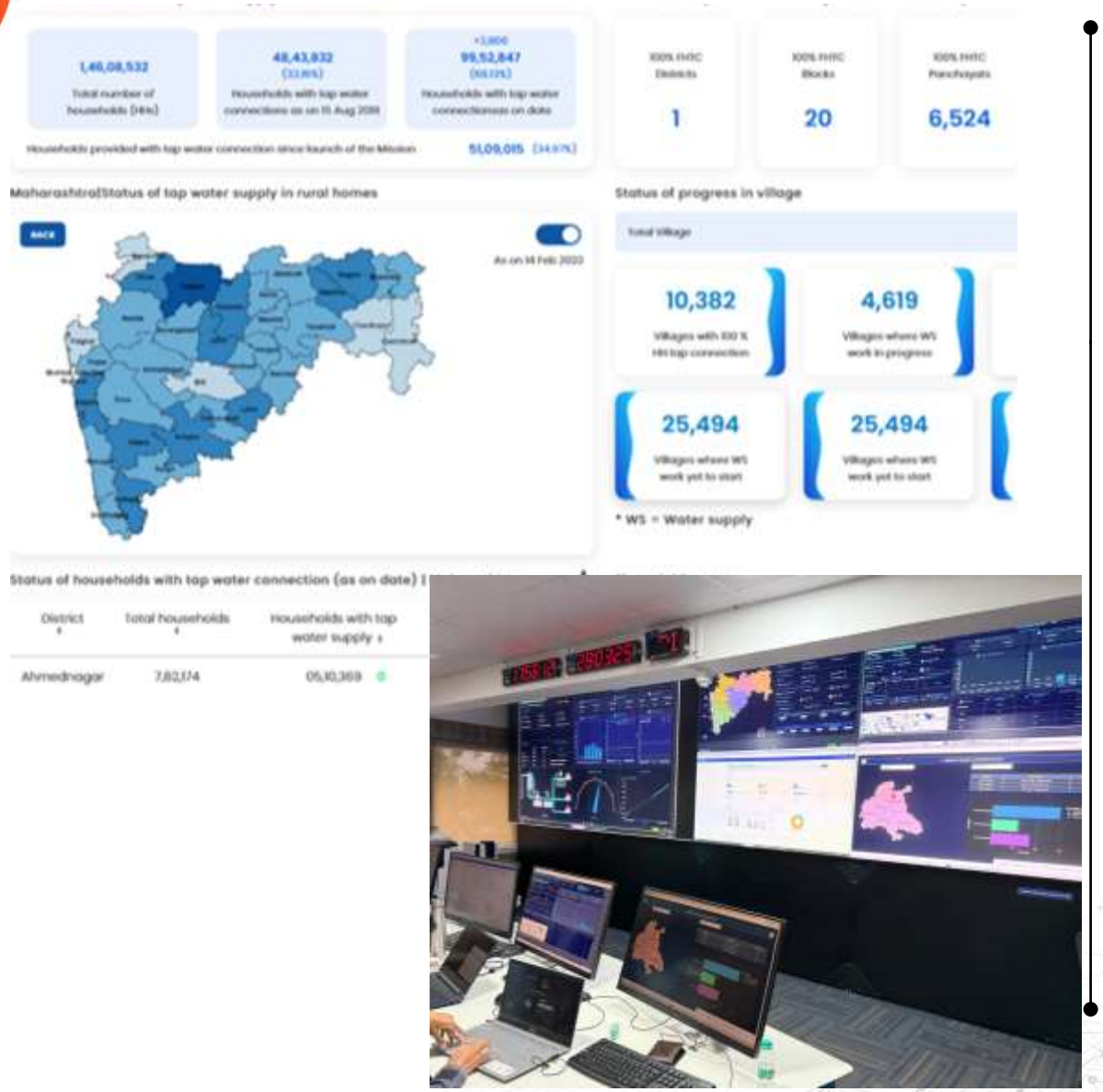
IoT Implementation for Smart Water Management



Problem Statement – Challenges in Managing multiple Water sources , Reservoirs & Water Infrastructure facilities for Equitable Water distribution

Solution –

- GIS Mapping of Surface and Ground Water assets including mapping of IoT sensors.
- Digitization of the entire product life cycle management.
- Real-time visibility of equipment operation.
- Asset benchmarking & visualization across locations.

Benefits –

- Increased operational and decision-making efficiency of the enterprise
- End-to-end visibility of water supply & Real-time event response
- Equitable water delivery
- Long term sustainability of water sources
- Data-driven and evidence-based planning for new schemes/ modifications
- Improved life of water supply schemes .
- Improved transparency and accountability.

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Digital Project Management System for Water Supply Construction Monitoring

Project Scope of Work

DPMS integrates Common Data Environment (CDE) and Geographic Information System (GIS) for efficient project tracking and stakeholder coordination.

Key components include:

- Implementation of Digital Project Management System
  - GIS Application for progress monitoring
  - Common Data Environment
  - Helpdesk management system
- Control Centre Setup
- Integration with CPMS, e-MB applications
- Resource deployment across regions for O&M and Support to Actual Progress Monitoring

Project Benefits

- 924 Multi Village water supply schemes
- Seamless execution, monitoring, and tracking of schemes within timelines and budget
- Early detection and mitigation of cost overruns
- Centralized platform providing a single source of truth for project data
- Standardization of workflows and project management practices
- Streamlined contract management and communication workflows

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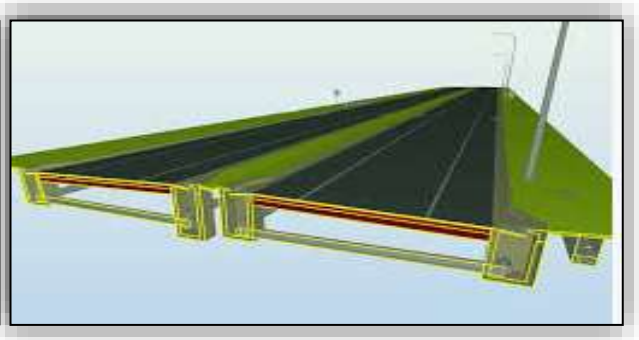
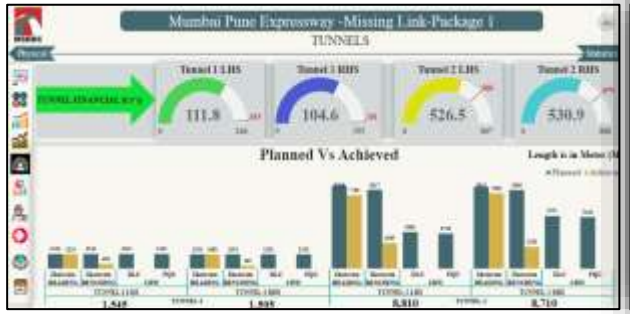
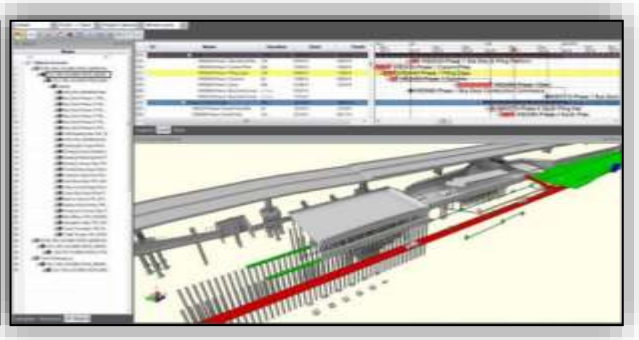
5D BIM Implementation & Project Management for Road Infrastructure







Project Scope:

- Establishment of Owners Support Office (OSO)
- Implementation and Maintenance of CDE, GIS, ERP and Business Analytics applications
- Establishment of BIM guidelines and Implementation of 4D/5D BIM
- Drone Survey for the purpose of surveillance and construction monitoring
- Integration of Spatial Data and Legacy Data Digitization and Migration
- Command and Control Centre
- Single Sign on (SSO) for DPMP
- Helpdesk Support & Facility Management

Project Benefits:

- Optimization of time and cost overruns through integrated DPMS platform
- End to end project communication through document & drawing management system.
- Real time physical & financial progress monitoring.
- Optimized CAD quality assurance to automatically validate
- Version control.

Mumbai – Pune Missing Link Project

Company Overview

- **27-years of innovation** – incorporated in 1998 and BSE-listed, focused on high-impact technology services.
- **Pure-play focus on Geospatial, Technology solutions and Mobility**– end-to-end GIS data services, enterprise Web GIS/DSS, and full-vehicle product & industrial automation engineering create a seamless geo-mobility value chain.
- **Strategic expansion and Inorganic Growth to scale up and build International presence:**
  - **2022 - acquired AllyGrow Technologies** - a Mobility solutions company in vehicle product-engineering & industrial-automation.
  - **2024 - acquired VTS – a US-based reality-capture firm** which brings 3D scanning and digital-twin capability.
  - **2025 - to acquire companies specialized in providing GIS solutions and** which have significant presence in USA and Europe specialized tech enabled tools and products for providing solutions to Geospatial, AEC-BIM projects. The two companies are expected to add to the topline of more than Rs. 100 cr in the 1st year of takeover.
- **Flagship national programs** – GIS-driven water-infrastructure and equitable-distribution solutions for complex initiatives such as **Jal Jeevan Mission**, **Amrut 2,** backed by Decision Support Systems.
- **Marquee client roster** – trusted by global utilities, transport authorities, telecom operators, manufacturing OEMs and public agencies for mission-critical projects.
- **Sustainable, future-ready outlook** – Internal investments prioritized for AI-powered automation, smart-city digital twins and next-gen embedded mobility electronics, enabling clients to move up the value chain.

Certifications:

CMMI DEV | ML 5 APPRAISED Appraisal # 68700 | Exp.Jan 08, 2027

ISO 45001:2018 ISO 9001:2015 ISO 14001:2015 CERTIFIED ISO 20000-1:2018 COMPANY ISO 27001:2022

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Business Credentials

27 Years +
of Proven Performance

200+ Customers
50% business from
repeat Customers

1,300+
Dedicated and technically
qualified employees

Pure-Play
GIS and TS
Services Company

Global Footprint
Presence across US, UK, Germany
& India

GIS

100K+ Miles
Electrical Network
Processed & analyzed

GIS / ES

35K+ Miles
of Water Network
Designed & Implemented

GIS

650K+ Miles
High Resolution Image Data
for Business Intelligence

GIS

2.2 Mn Sq. Ft.
Infrastructure analyzed

ES

7 Mn + Hours
of Engineering Services delivered

Order Book
to be executed **INR 11,970 Mn.**
as of 31st March 2025

GIS

Awarded
Prestigious River Linking
Project of INR 3,810 Mn.

Technology Partners

esri AUTODESK SIEMENS AVEVA Bentley MAXAR xylem

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Industries Covered

Water

- Non Revenue & Smart Water Management
- IoT and SCADA Solutions
- Detailed Design & Consultancy
  - Water Supply
  - Water Resources
  - Sewerage
- Project Management Consultancy
- Command and Control Centre

Energy

- Unified Enterprise GIS Implementation – ESRI, GE Small World
- Transmission & Distribution Asset Management
- SCADA & Automation
- Change and Facility Management Services
- Operational Data Infrastructure

AEC & BIM

- BIM Services – LOD 500
- 5D BIM and Common Data Environnent
- Integrated Digital Project Management System
- Remote Resource Deployment

Municipal & Govt.

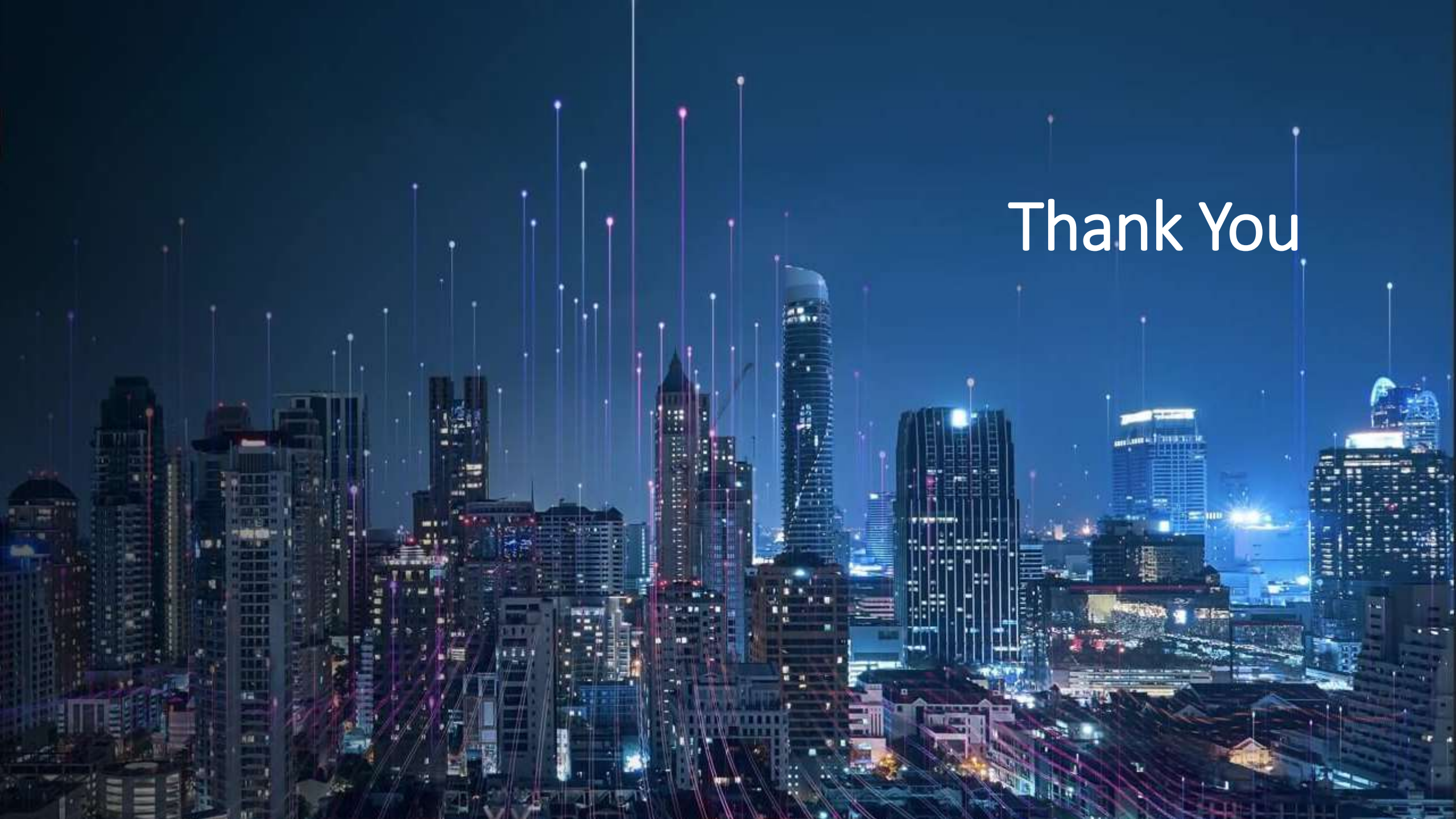
- 3D City Modelling and Digital Twin
- Lidar and GPR Surveys
- Enterprise GIS solution
- Customized Mobile Application
- Intelligent Decision Support Systems
- Geoportals
- Spatial Analytics: Dashboards

Transportation

- Road Asset Inventory and Condition Monitoring
- Detailed Design & Consultancy
- Project Supervision & Audit
- Digital Project Management System
- Digital Navigation

Telecom

- FTTx: Network & Fibre Planning
- GIS & Engineering
- Digital Twin and As built
- WebGIS Enterprise Solution


Thank You