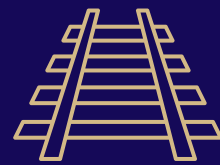


MONARCH SURVEYORS & ENGINEERING CONSULTANTS LTD

www.monarchconsultants.in



Transportation
Road



Transportation
Rail



Urban Planning
& Geospatial



Water
Solutions



Energy
Sector

Content

Roads

Rail / Metro

Building & Architecture

Urban Planning

Water

Energy

Survey Expertise

Why Monarch



About Monarch

Monarch is specialized in Civil Engineering Consultancy, Detail Design, Engineering survey, Environment & Social Feasibility studies. With over 30 years of experience, we deliver comprehensive solutions for infrastructure projects, including Rail, Roads, Metro, Urban planning, Geospatial mapping, land acquisition, water & Energy

ISO 9001, 27001 Certified



150+crore
Profitable Turnover



Footprints in PAN
India & Aboard

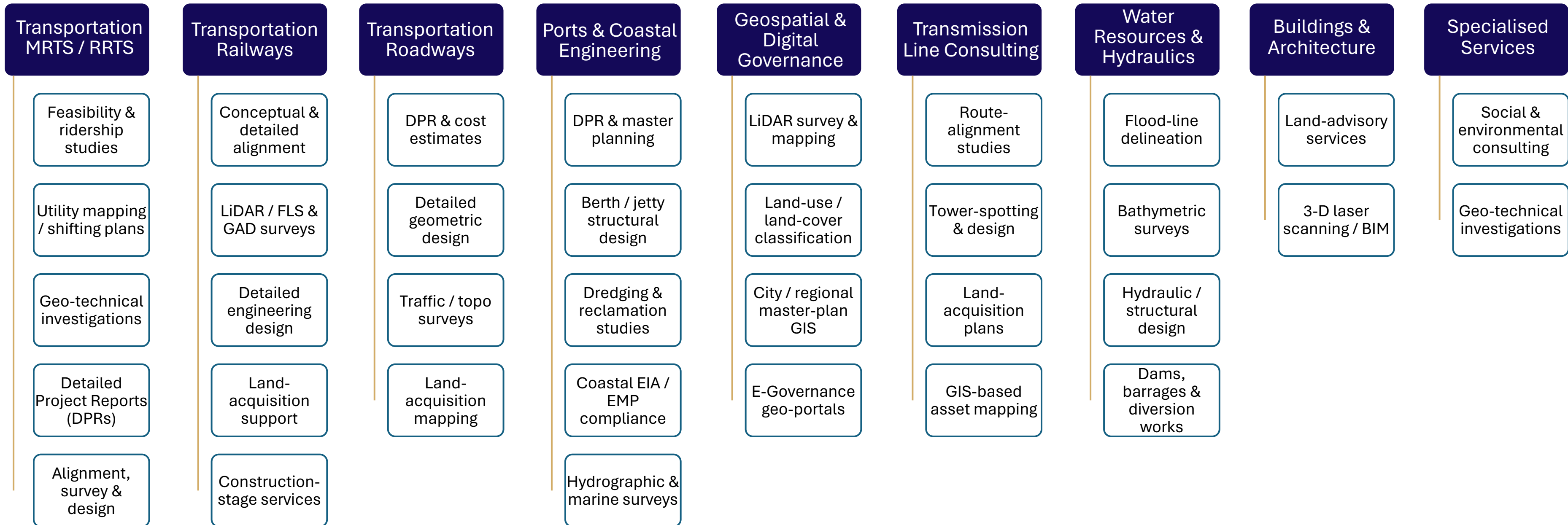
26+ years
Experience



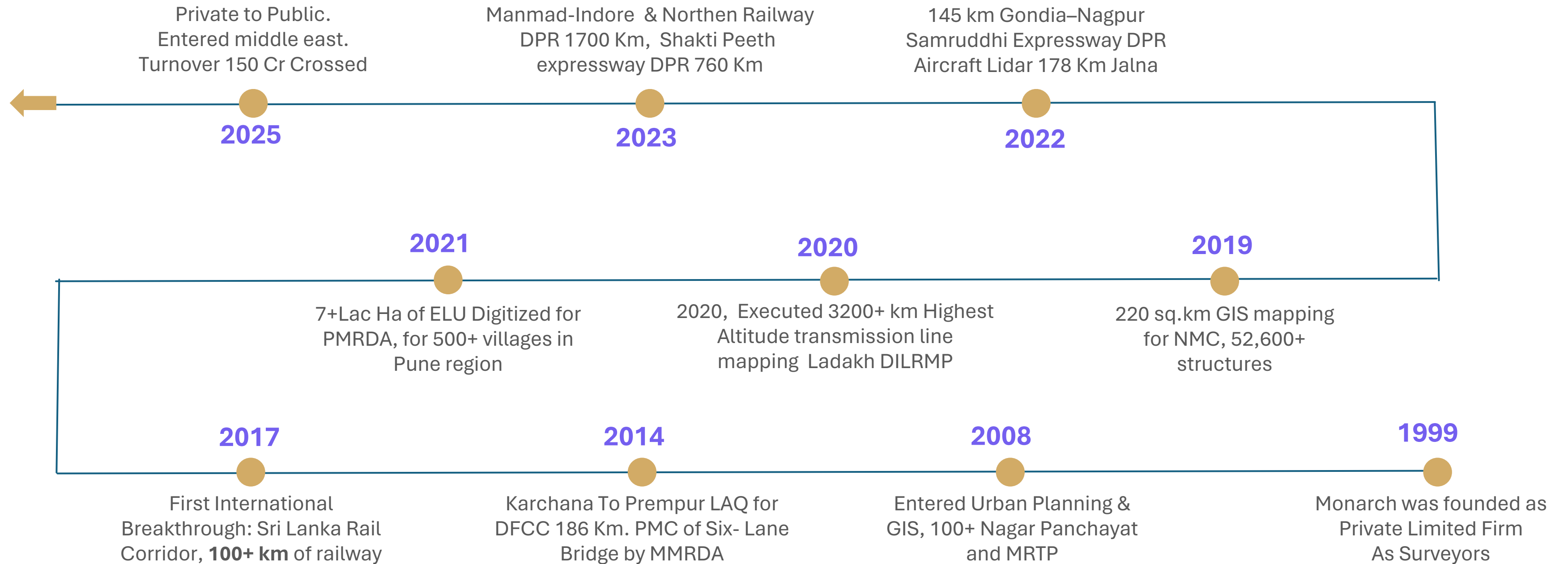
650+ Multi-
disciplinary staff

600+ Projects
Delivered

Our Capabilities



Timeline of Growth



Roadways

Access-controlled expressways, long-haul economic corridors, hill roads, multimodal hubs, bridges, and elevated urban arteries all from Monarch

- Survey Data
- Traffic Study
- Geotech Report
- Environmental Docs
- Design Drawings
- Detailed DPR
- Land Plans



Monarch's Roadway Expertise

- Topographic Survey & Investigations using LiDAR
- Traffic Survey, Analysis, Modelling Subsoil investigations incl GPR Preliminary & Detailed Designs DPR & Feasibility
- Bid Process Management Economic & Financial Analysis
- Land Pooling / Land Acquisition till Mutation & Disbursement as per Act
- Social & Environmental Studies
- R&R Studies and plans including implementation for multilateral funded projects
- Road Safety Audits / Blackspots
- Logistic Park designs & circulation model ITMS solutions and Dashboards
- Network Survey using Mobile Lidar & 3D digitization
- PMC / PMO Services



Flagship projects

- Nagpur–Mumbai Samruddhi Corridor (701 km)
- Pune–Nashik Industrial Expressway (180 km)
- Nagpur–Goa Shaktipeeth Expressway (760 km)
- Jalna–Nanded Access-Controlled Expressway (180 km)
- Nagpur–Gondia-Gadchiroli Expressway (450 km)
- Revas–Reddi Coastal Highway (180 km)
- Multi-Modal Corridor Navghar–Chirner (101 km)
- Extended MUIP works in MMR area



Aerial LiDAR Capability using Drone / Aircraft

Highlight

- The Zenmuse L1 Used for aerial 3D mapping, surveying, and inspection tasks by integrating a Livox LiDAR module, a high-accuracy IMU, and a camera onto a three-axis gimbal
- When used with Matrice 300 RTK and DJI Terra, the L1 forms a complete solution that gives you real-time 3D data

Advantages

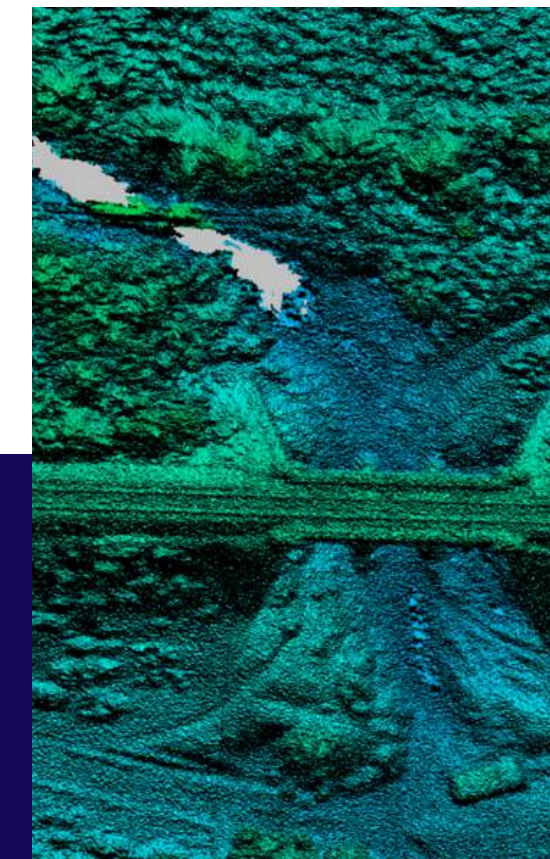
- | | |
|--------------------------|------------------------------|
| • Higher accuracy | • Interface with 3D CAD/ GIS |
| • More detail | • Complex objects |
| • Less obtrusive | • Hard-to-reach areas |
| • Safer | • Copy Existing Situation |
| • Reduced Survey Time | • Data reuse importance |
| • Improved Visualization | • High failure cost risk |



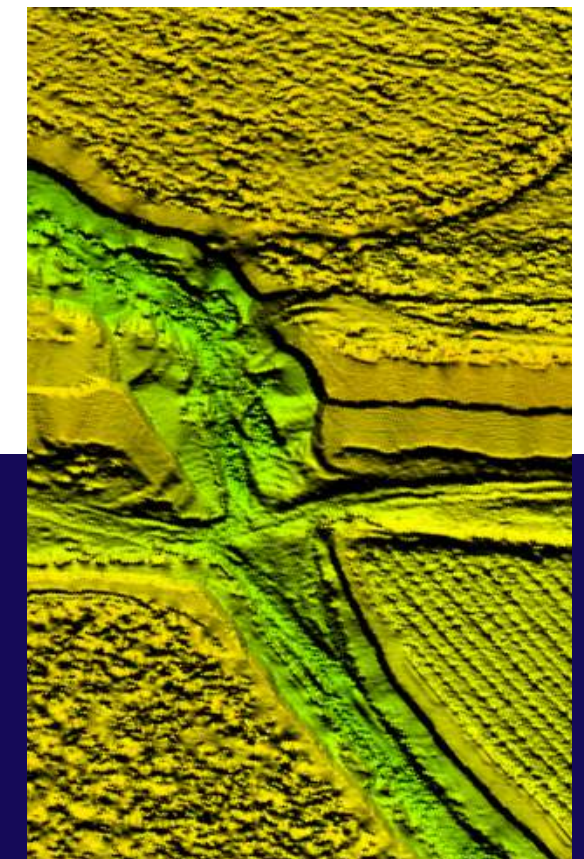
Aerial LiDAR



ORTHOMOSAIC IMAGE



**DIGITAL SURFACE
MODEL (DSM)**



**DIGITAL ELEVATION
MODEL (DEM)**

High Density Mobile LiDAR Scan (MX 90)

Highlight

- large-scale data capture for applications like road and rail inspections, creating 3D models, and surveying.
- It combines LiDAR, high-resolution imagery, and GNSS/inertial technology to capture detailed geospatial data safely from a moving vehicle at highway speeds.

Benefits

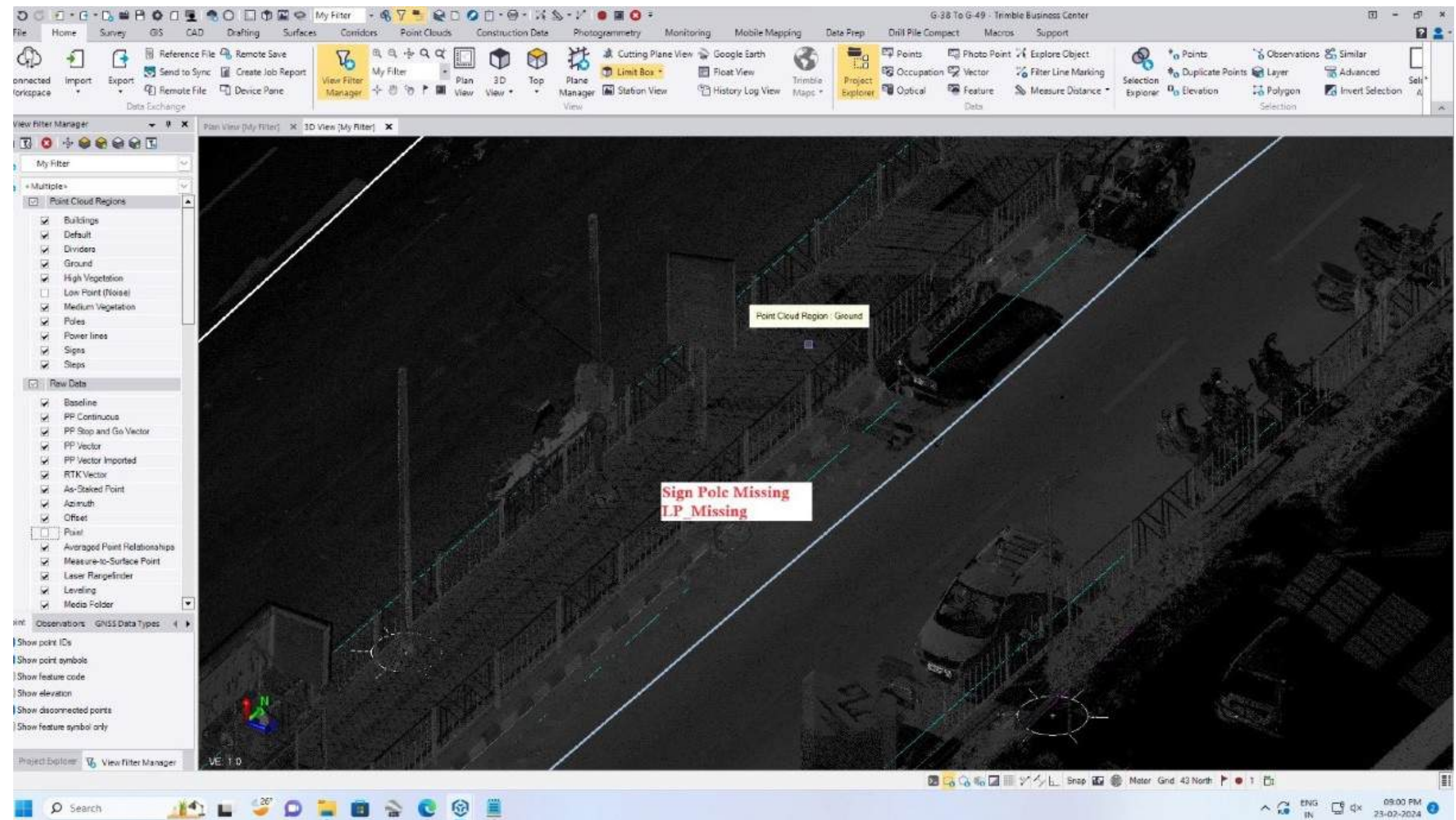
- Absolute Accuracy
- Fast Data Collection
- Highly safe
- Simultaneously collect Large amount of Data (Panoramic and Multi angle)
- Dense point clouds and Images



360 deg photo captured using MX 9

- Complete field-to-finish mobile mapping solution that Capture, process, extract and share high density point clouds
- It has rich, immersive imagery and combines leading-edge hardware with intuitive field software and integrated office software workflow to produce meaningful deliverables.

Dense Point Clouds using MX 9 LiDAR



Road Safety Audits for National Highways & Expressways



Why Road Safety

Prevention is better than cure. All new and reconstructed roads should be as safe as possible



Systematic accident prevention

- DPR & Design Stage Audit
- Construction & O&M Stage Audit
- Black Spot Identification



Projects

- Aunta – Simaria & Khagaria – Purnia , Bihar
- Mandi – Dabwali to Chautala, Haryana
- IT city Chowk to Kurali, Punjab
- Delhi – Vadodara Expressway (3 pkgs), Gujarat
- Dhanbad , Ranchi Jharkhand



Maharashtra
State Road
Development
Corporation

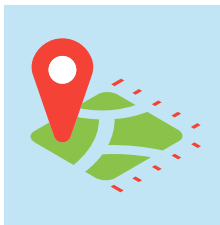


Land Acquisition & Management Solutions



Why Timely Land Acquisition

- Poor land records & data gaps
- Delays in notifications & compensation decisions
- Mapping / area-detail errors slow approvals



Systematic LAQ Solutions

- Early monitoring + dedicated revenue-officer team
- Separate LAQ cell from engineering/DPR for focus
- Post-notification asset valuation & award tracking



Representative Projects

- Samruddhi Expressway – 701 km, land-pooling & LAQ support
- Navi Mumbai Airport – 671 ha acquisition coordination
- Purandar Airport – joint-measurement survey & purchase aid
- Jalna-Nanded Expressway – DPR + LAQ assistance
- Pavnar-Patradevi Expressway – award-stage LAQ tasks
- Pune-Nashik Expressway – DPR-to-award LAQ
- Mumbai-Ahmedabad HSR (Palghar) – LAQ facilitation



Railway & Metros

Monarch supports the entire rail life-cycle for new greenfield lines, doubling and electrification, high-speed and semi-high-speed corridors, freight yards and multi-modal terminals.

- Terrain Models
- Hydro Survey
- Alignment Design
- Land Plans
- LiDAR Survey
- GeoTech Report
- Location Survey



Survey, Detailed Design & aiding Maintenance in Railways

- Final Location Survey & Investigations using
- Aerial / Drone based LiDAR systems
- Traffic Analysis, Modelling Subsoil investigations incl GPR
- Preliminary & Detailed Designs including Tunnels
- Seismic Refraction Survey for Tunnel design Electrical, Signaling & Transmission
- DPR & Feasibility
- Bid Process Management
- Economic & Financial Analysis Land Acquisition till Mutation Social & Environmental Studies
- Goods Yard Design , Station / Yard Surveys Architectural Designs of Modern Stations GEDO Trolley (Pre & Post Tamping)
- Gradient Verification incl 3D vector models General Consultancy Services

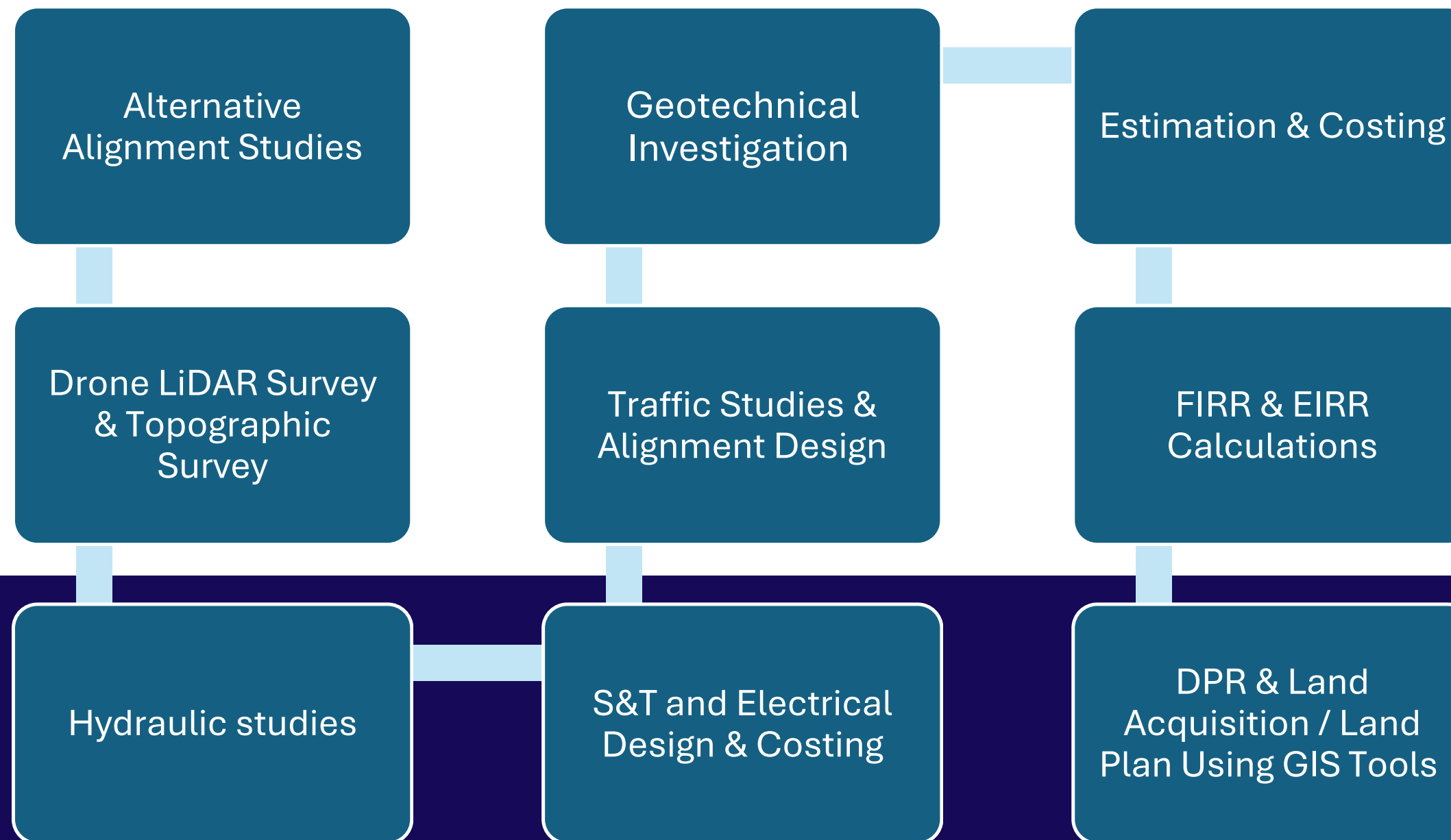


Flagship projects

- Mumbai – Hyderabad (711 km)
- Mumbai – Nagpur SIA (753 km)
- Varanasi – Howrah SIA for NHSRCL (760 km)
- Ghaziabad-Moradabad-Roza-Sitapur (402 Km)
- Manmad – Indore (344 km)
- Bhusawal-Wardha (314Km)
- Jalna – Jalgaon-Khangaon (302 km)
- Bhiwani – Rohtak – Panipat – Ambala (245 km)
- Northern Railway network (1 400 km)
- Guwahati – Lumding (93 ROB)
- Jalpaiguri – Kamakhya (400 km)
- Eastern & Western Freight Corridor (1986 km)



STAGES OF FLS PROJECT LIFECYCLE



The FLS project lifecycle ensures that all technical, economic, and operational inputs are validated before finalising a railway project's feasibility.

MX 90/ Total Station / Gedo Scan

- Feature Extraction
- 360 panoramic Image
- Infringements Analysis
- Existing Bridge condition mapping
- Point Cloud Data of Bridge
- Existing Rail track Grade analysis
- Geotagged data set
- Extraction of sag height
- Data Extraction Structural Details
- Pre & Post tamping Track measurement & correction of alignment



Highlight

SX12, integrates a high-precision total station and a 3D laser scanner, used for tasks like topographic surveying, construction site monitoring, and documentation



SX12



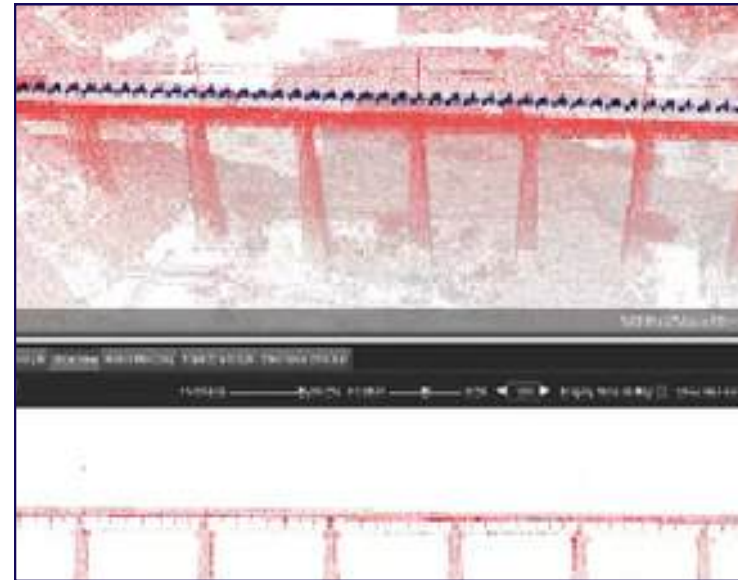
MX90



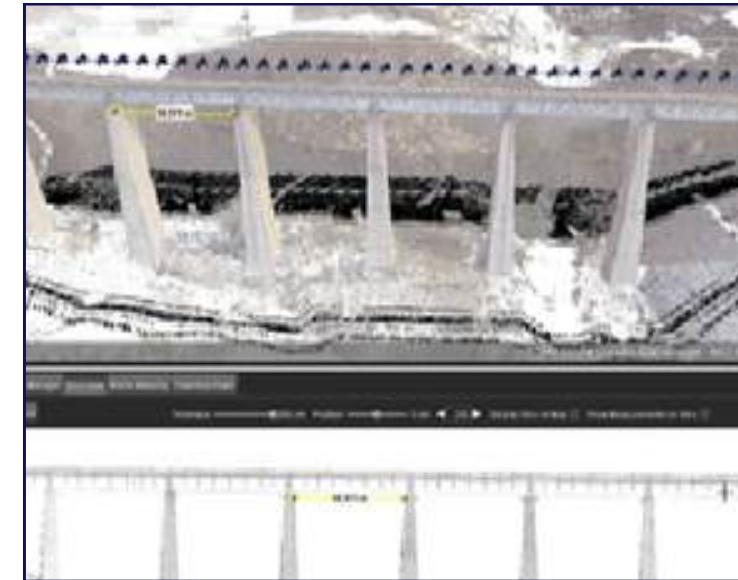
Data Processing Images

Showcasing Monarch's end-to-end rail-survey workflow:

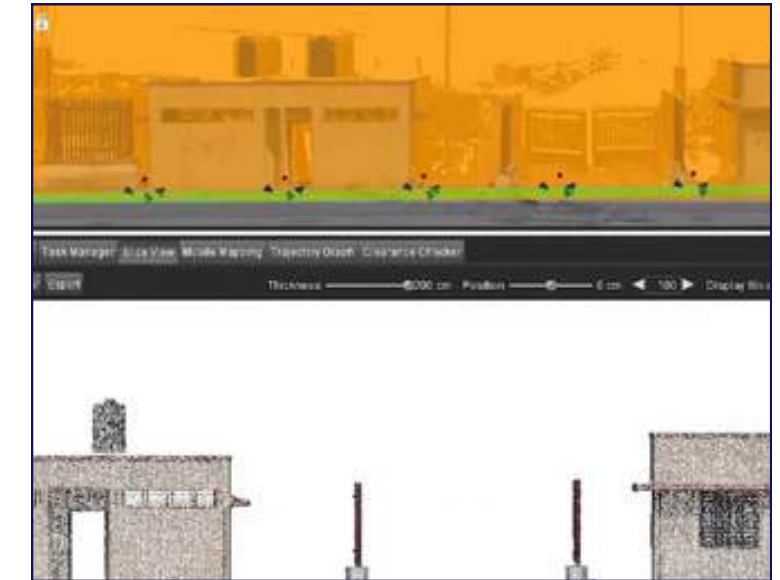
ultra-dense LiDAR point clouds, 360° panoramic imagery and AI-driven feature extraction work together to capture bridge clearances, OHE sag, station geometry and other critical assets with sub-centimetre accuracy



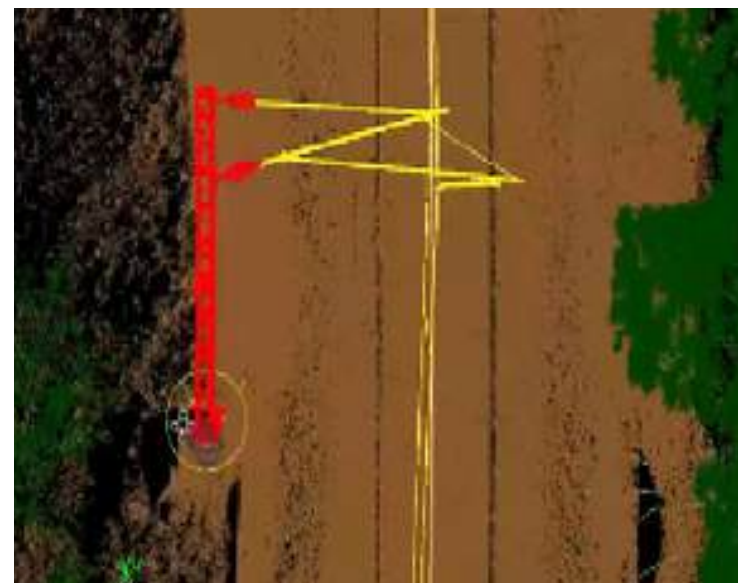
Point Cloud Data of Bridge



360 panoramic Image



Data Extraction Structural Details



Sag height measurement OHE



Feature extraction OHE pole



Laser Points collection

Building & Architecture

From public institutions to commercial complexes and residential developments, we ensure each project meets regulatory standards, user needs, and environmental goals.



- Building Drawings
- Layout Plans
- Structural Drawings
- MEP Services
- Elevation Drawings
- Station Layouts
- GFC Drawings



Innovative Urban Infrastructure consultancy

Railway Infrastructure & Stations

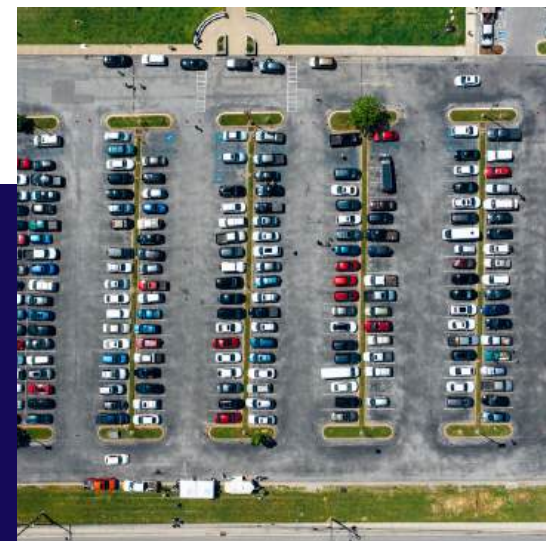
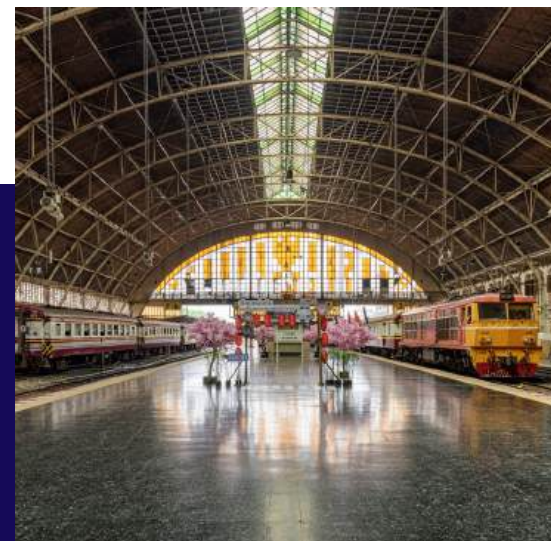
- 4D BRiM bridge digital-twin survey – NWR
- Dankuni world-class goods-shed consultancy – ER
- Amrit Bharat station master-planning – eight stations

Metro Rail Investigations

- Detailed engineering survey & studies – 57 km corridor
- Geotech investigations – Nagpur Metro (44 km, twin corridors)
- Underground NS-corridor geotech – Pune Metro (20 km)
- SIA & EMP – BMRCL Phase-3 alignments (44.6 km total)

Logistics & Industrial Development

- Logistics-park feasibility & DPR – Tuppa village, Samruddhi Mahamarg



Dankuni Project

Bridge Inspection: 4D BRiM



Periodic Inspection ensures structural integrity, safety and longevity of Bridge. Various Methods in Bridge Inspection

- Visual Inspection / Traditional
- Advance Technology like Drones
- Pressure Gauges



Equipment Used & Out put

- Terrestrial Scanner & UAV
- Point Cloud Data & 360Panoramic Image



Merging 360 panoramic image and 3D Model we can analyse

- Bridge Element Dimensions
- Visualization Bridge Member Joint & Supports



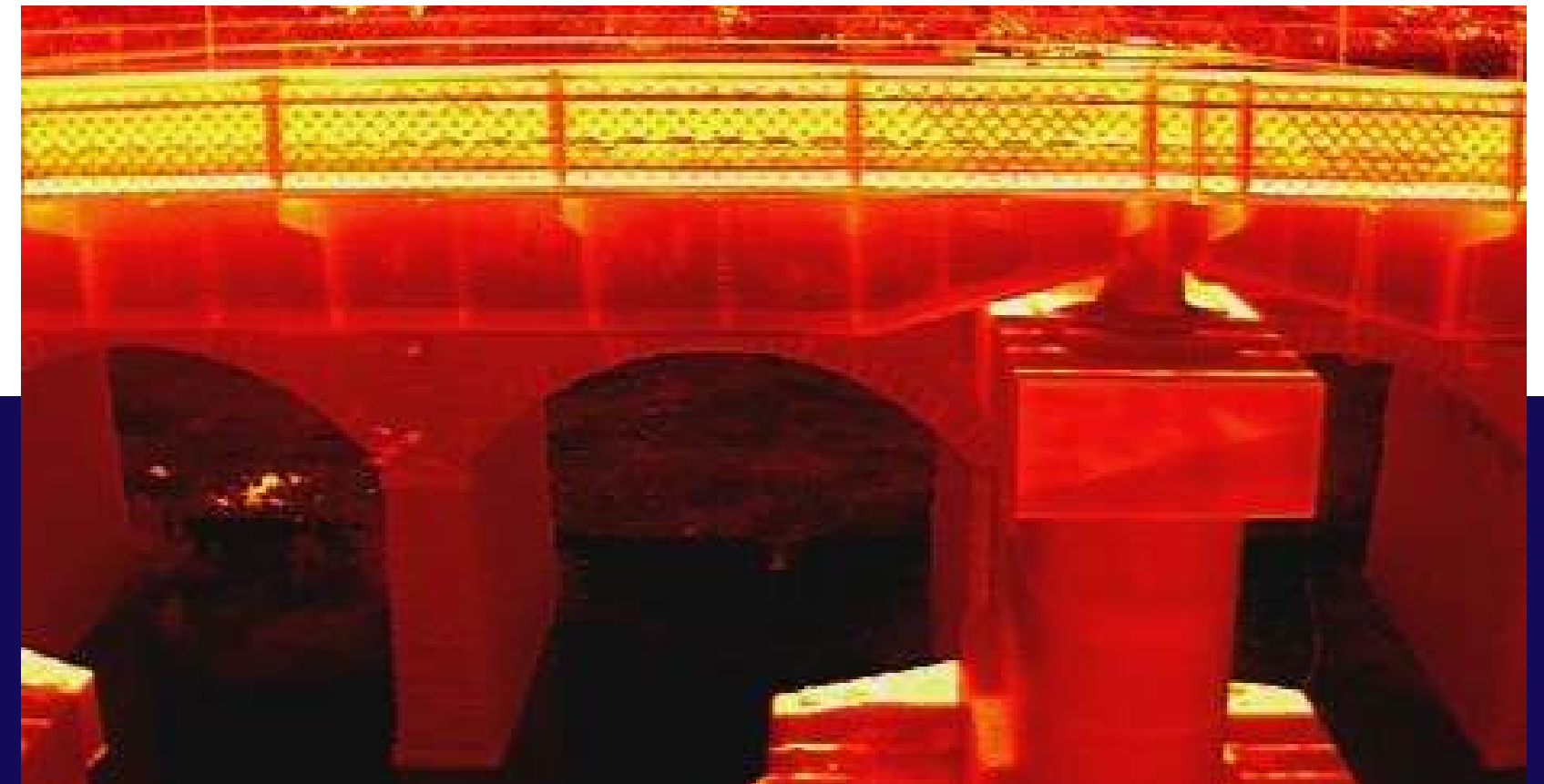
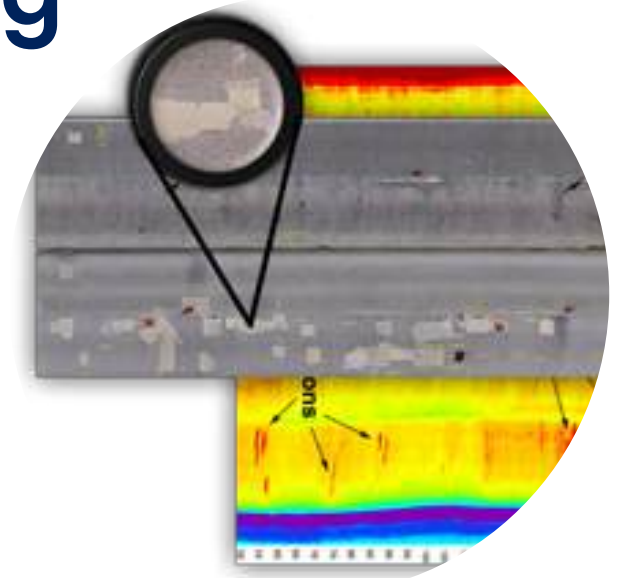
Bridge Inspection: 4D BRiM Output

Conducting drone survey by Unmanned arial Vehicle based visual inspection of bridge & conducting digital twin modeling of Railway bridges with the help of drone and terrestrial based inspection on bridges of North Western Railway.



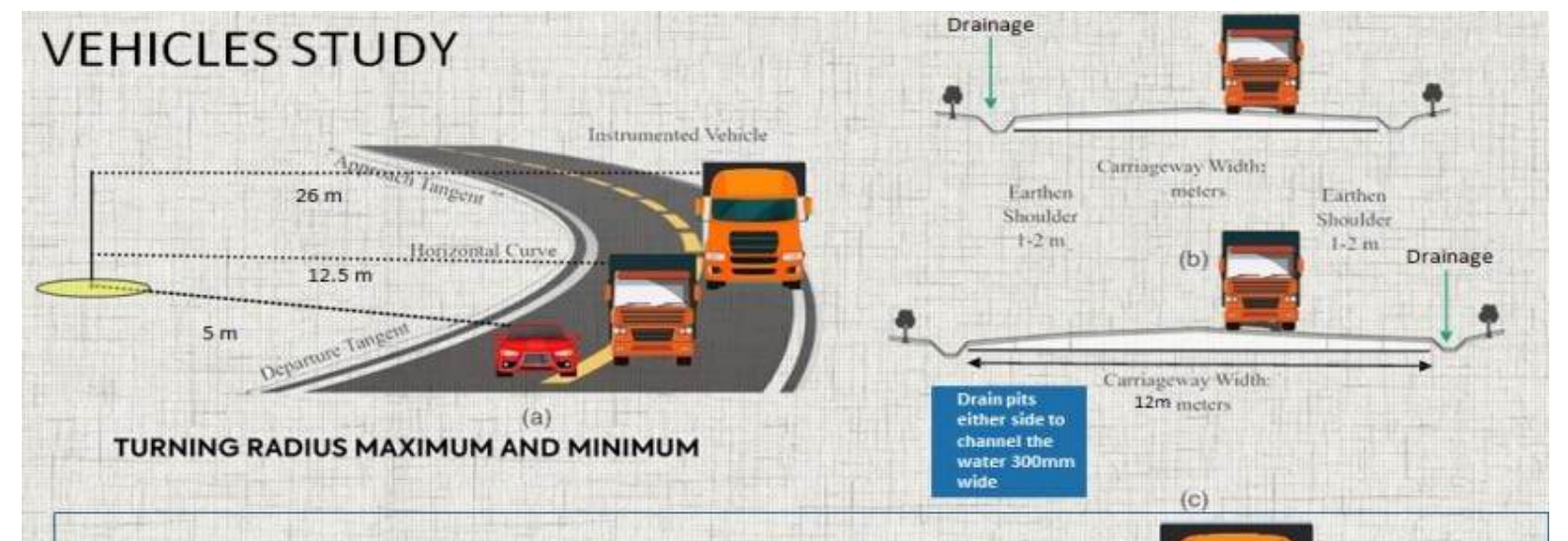
Bridge Health Monitoring using Thermal Imaging

Conducting Radiometric Thermal Analysis Improved Visualisation & Interactive Multi-Layer View



Goods Yard & Logistics Planning

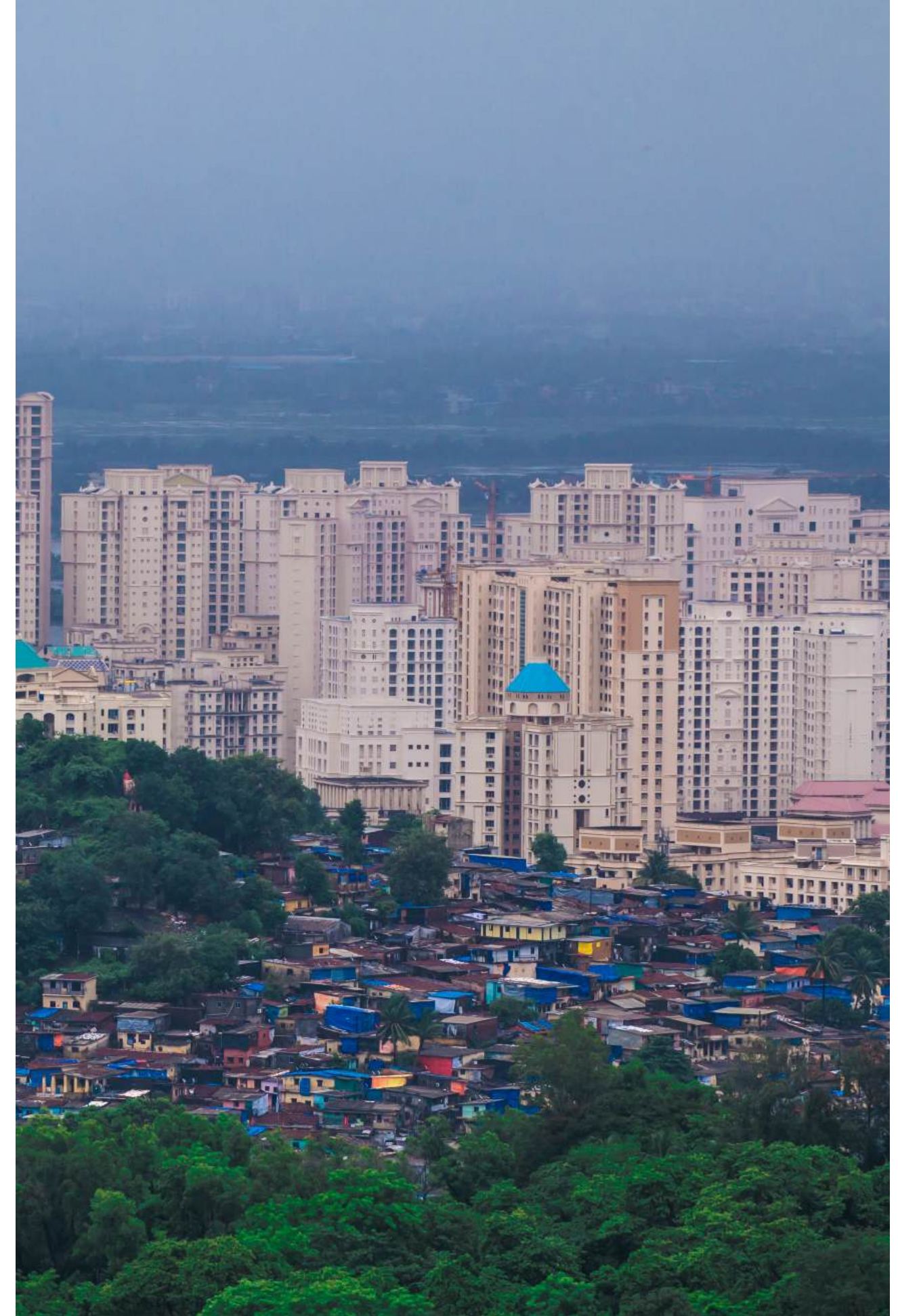
- Masterplan for wharf, covered shed, parking facilities & goods-shed office
- Survey & investigation
- Detailed design & drawings (engineering scale plan, landscape plan)
- Cost estimation



Urban Planning

Monarch's strength lies in spatial data integrity, stakeholder coordination, and plan compliance. From TOD zones to township plans

- Survey Data
- Base Map
- ELU Map
- Master Plan
- GIS Portal
- Feasibility Study
- DPR Report



Marquee Projects in GIS & E-Governance Portals

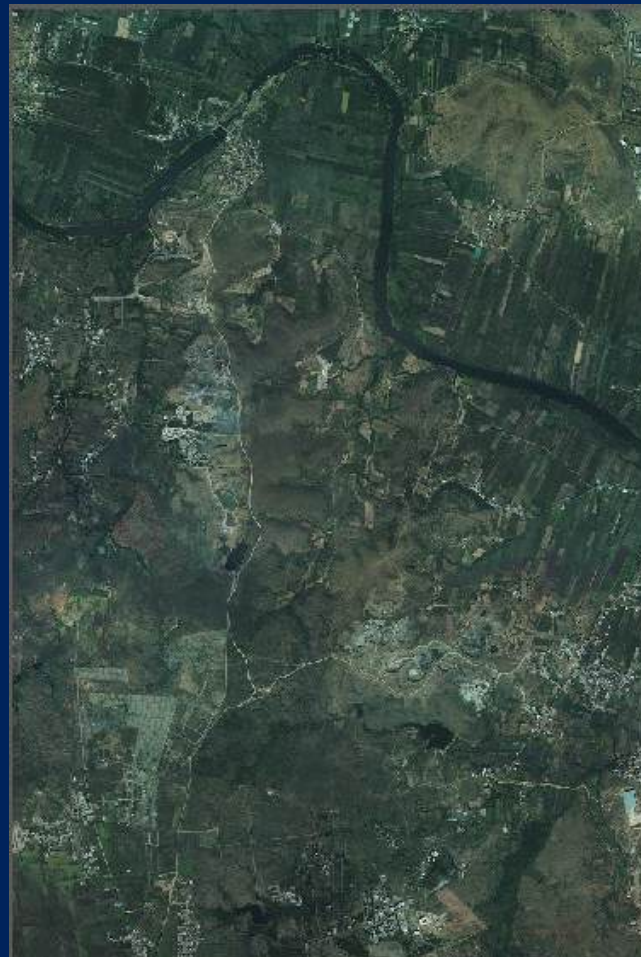
- Drone-LiDAR / DGPS Base Mapping
- Revenue Map Digitisation
- Existing Land-Use Analysis
- Master & Development Plans
- Zonal Development Plans
- Socio-economic Surveys
- Traffic & Transport Studies
- Mobile LiDAR Asset Mapping
- Digital Twin 3D Modelling
- Web-GIS Portals & Dashboards
- Cadastral GIS Land Records
- EPC / Bid Process Docs

Flagship projects

- PMRDA – Geospatial DB + ELU via aircraft LiDAR (7 356 km²)
- Nagpur MC – LiDAR-based ELU, fixed-wing survey (226 km²)
- GMDA Assam – Drone LiDAR + GeoHub data (486 km²)
- CIDCO Navi Mumbai – Govt land-bank mapping (84 km²)
- Amravati MC – ELU survey & map (122 km²)
- Patna Metro – Land-pooling scheme (300 ha)
- Ladakh UT – Land-records revamp, DILRMP (2 623 km²)

Georeferencing, Feature Extraction & Superimposition

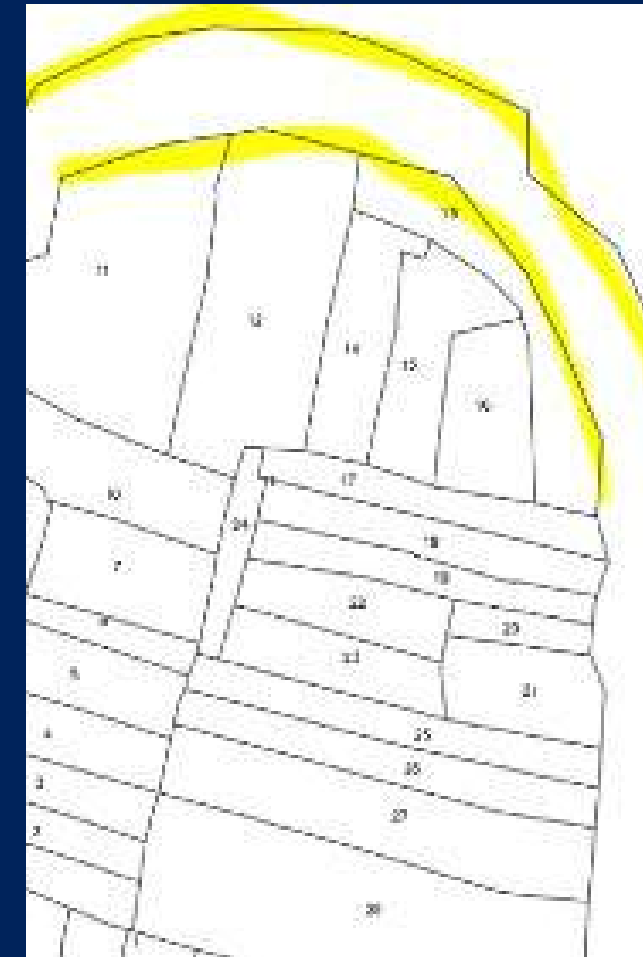
Survey Number Village map is properly Scaled by taking references of prominent features in village and superimposed on orthorectified and georeferenced Aerial image



ORTHO RECTIFIED IMAGE /
SATELLITE BASE MAP



GEOREFERENCED AERIAL
IMAGE WITH SURVEY MAP



PROMINENT
FEATURES RIVER



GEOREFERENCED AERIAL
IMAGE WITH SURVEY
NUMBER VILLAGE MAP

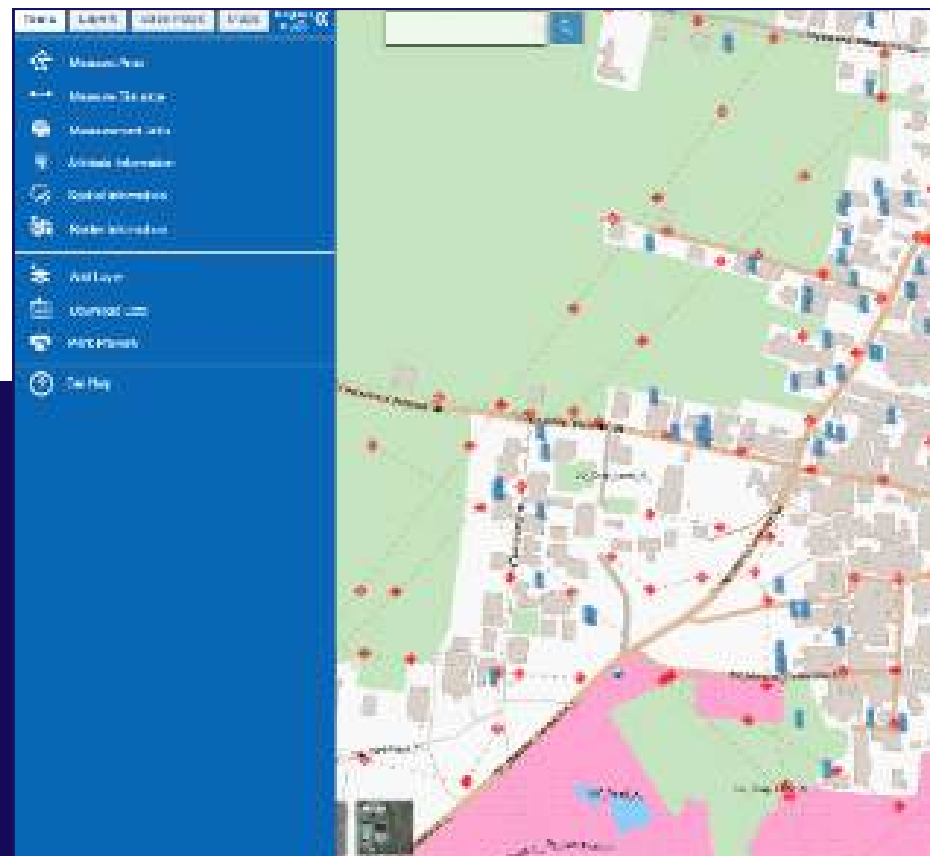
Preparation of GIS Based Development Plan as per MRTP act 1966

Declaration of intention of Preparation of Development Plan and Inviting Suggestions and Objections

Preparation of Existing Land Use Map

Preparation & Publication of Draft DP & inviting Suggestions & Objections

Incorporating
modifications in the Draft
DP and handholding till
final approval



Geo-Spatial Consulting

Our expertise converts raw geospatial data into actionable intelligence for better decision-making.
From transport corridors to smart city assets

- City/Village/Private GIS Survey
- Aerial Survey (Drone Photogrammetry & LiDAR)

Flagship Projects

- Amravati MC – 122 km² DP/ELU via DGPS + total-station
- Thane MC – CTS land-records GIS, 113 km²
- Chiplun – 16 km² base map & ward digitisation
- Satara – UAV/LiDAR industrial-cluster survey
- Chandrapur MC – urban base map for DP
- Nagpur Metro – UAV orthophoto + alignment
- Pune MahaMetro – GIS asset inventory
- Nanded – 750-acre cadastral & utilities GIS

Specialized Equipment

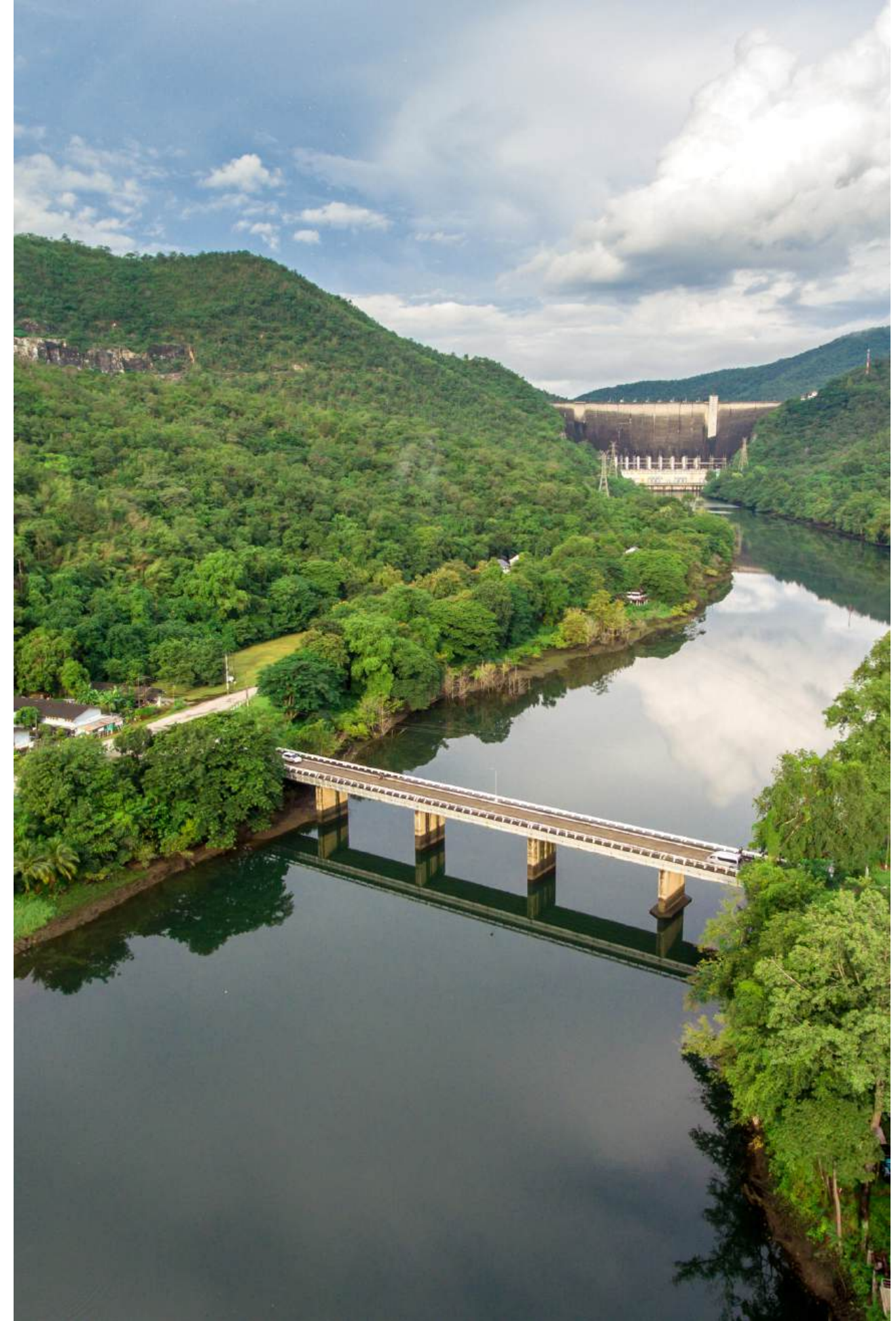
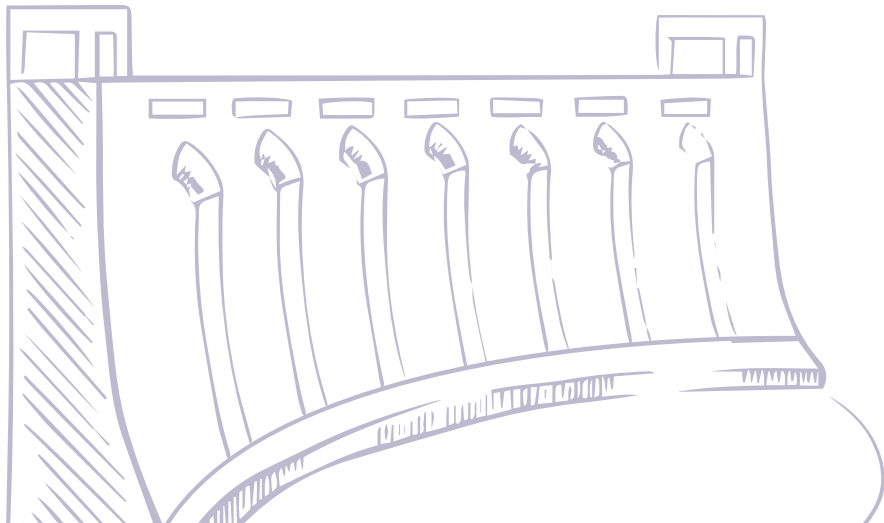
- UAV Drones: DJI Matrice 300 RTK, Phantom 4 RTK
- LiDAR Systems: Riegl VUX-1UAV, Velodyne HDL-32E
- GNSS/DGPS: Trimble R12i, Leica GS18 T
- Total Stations: Leica TS16, Sokkia CX-105
- Mobile Mapping Units: Trimble MX9
- Aerial Cameras: Phase One iXM-100, Sony A7R IV
- GIS & Processing Software: ESRI ArcGIS Pro, QGIS



Water

We bring expertise in hydraulic modeling, treatment-plant design, irrigation planning to create sustainable systems that secure resources and improve resilience.

- Flood Mapping
- Bathymetric Survey
- Hydraulic Survey
- Drainage Design
- Design Engineering
- Data Acquisition
- LiDAR Mapping



Ports, Coastal, Lake, River works

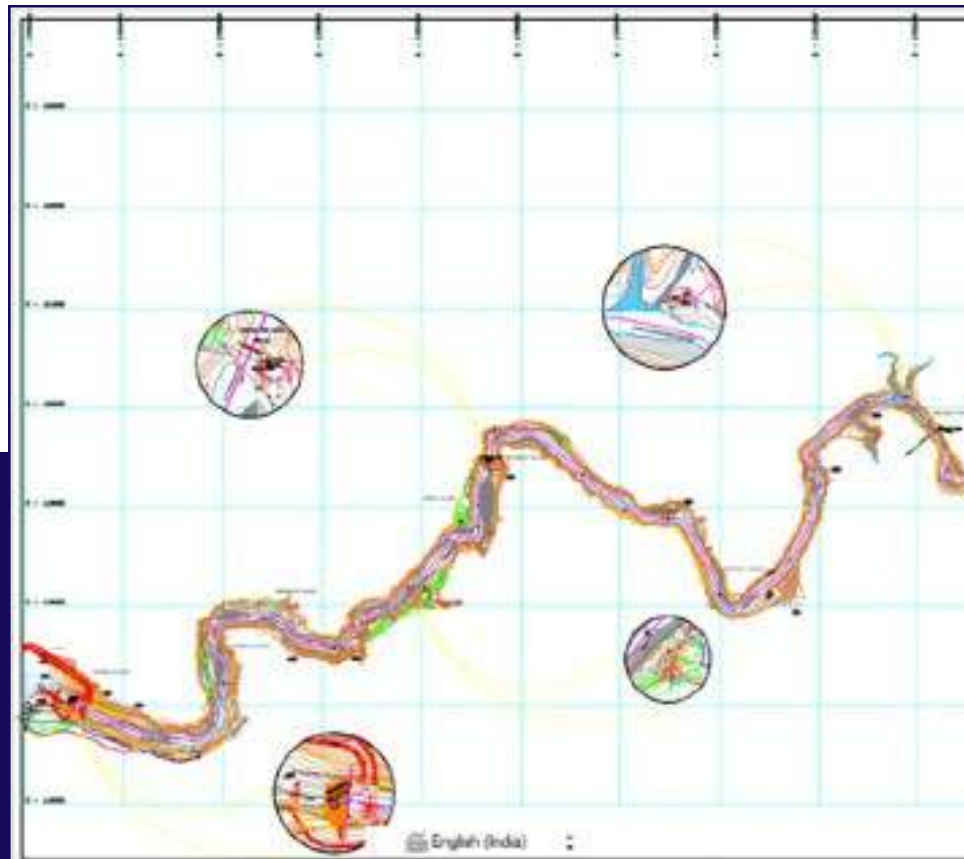
- Airborne LiDAR Mapping – rivers, wetlands, catchments
- Bathymetry Surveys – echo-sounder depth models
- Flood & Run-off Modelling – 1D/2D, dam breach
- Embankment Protection – siltation / stability checks
- Drainage Design – urban, mining, industrial sites
- Red/Blue-Line Surveys – legal watercourse GIS
- Canal Condition Audits – structure & capacity
- GIS Basemaps & Utility Layers
- Live Dashboards – real-time water assets
- Risk-Based Planning – cost & stakeholder sync



Flagship projects

- Sea-erosion Bund DPR – Murugwada → Mirya, Ratnagiri
- Engg.+PMC – Colaba sea-wall (Machimar Colony → G.D. Somani)
- EIA & CRZ nod – Versova-Bandra Sea Link (3.4 km)
- Jetty design – Bhavani Island & Punnami Ghat, Vijayawada
- TEFS – Captive terminal, Terekhol Creek, Sindhudurg
- FSI & Masterplan – Mazagon Dock premises
- Hydro-topo study – MMR streams / rivers / creeks
- Maharashtra coastline survey – ~720 km
- Rejuvenation of Lakes & Rivers in Nagpur city of Sonagaon & Gandhi sagar Lake.

Delivering Excellence in Water Resources



Catchment area mapping in (Dams / Lakes)

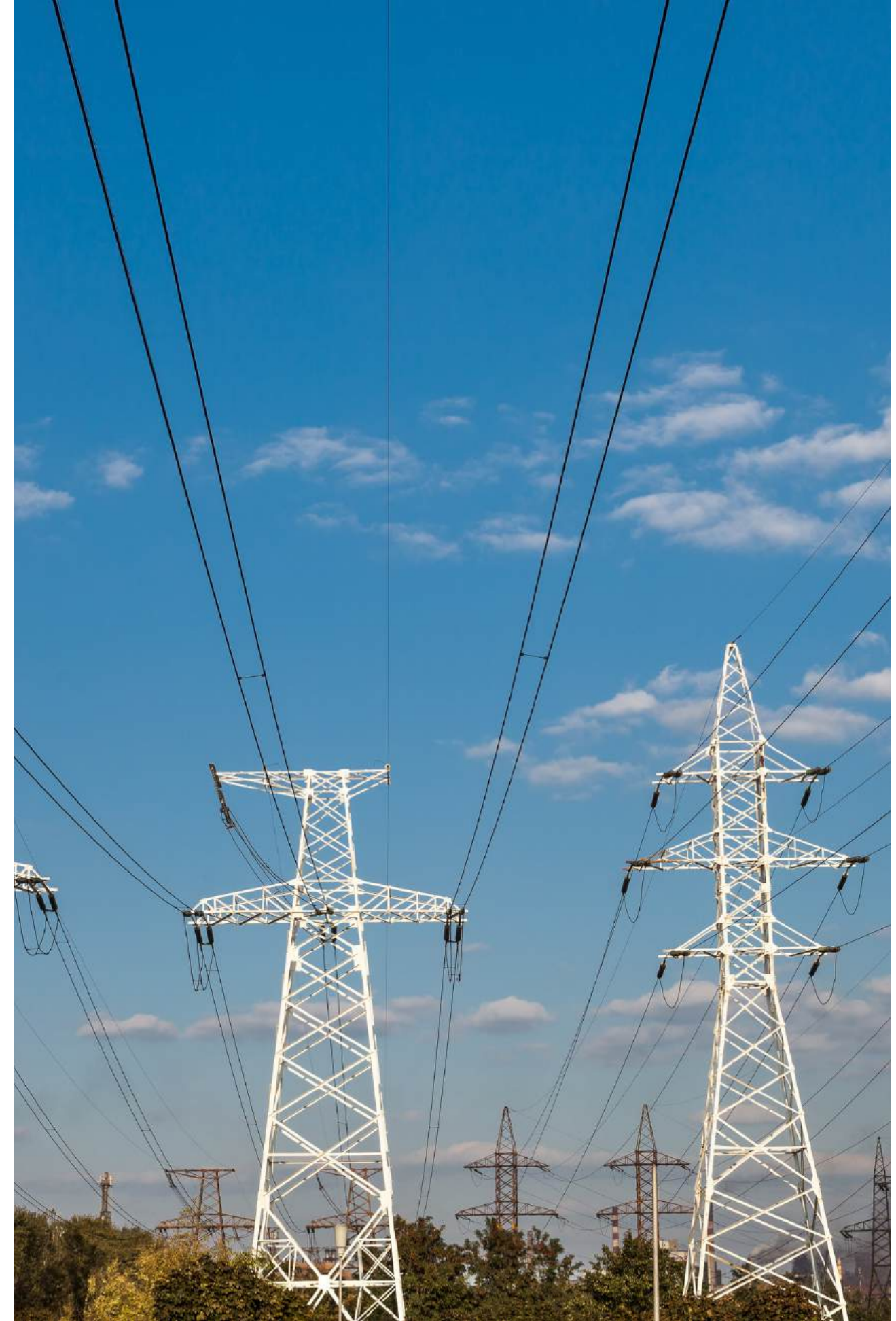
1. Lonavala Dam
2. Walvan Dam
3. Shirota
4. Somvadi Dam
5. Thokarwadi Dam - 2005 HA
6. Mulshi Dam - 2880 HA

- Rejuvenation of Lakes & Rivers in Nagpur city of Sonegaon & Gandhi sagar Lake.
- Ascertain record of rights of land and by deploying complex surveying and data visualization methods in Alakhnanda Dam in Srinagar

Energy

We delivers integrated solutions for renewable energy, and power infrastructure. solar and wind energy projects, and power transmission systems

- LiDAR Mapping
- Geo Tagging
- Sag Analysis
- Cadastral Plan
- Thermal Audit
- Asset Portal
- Drone Inspection



Transmission Line: GIS based Mapping

- Aerial (Aircraft / Drone) LiDAR mapping of TL
- Mobile LiDAR Survey
- Cadastral Mapping and Land Acquisition plan
- Alignment Design
- GIS based portals for asset monitoring
- Operation & Maintenance of Towers and other members
- Inspection using photogrammetry drones for all members
- Thermal imaging of towers for hotspot identification
- Sag height measurement and vegetation length using LiDAR survey



Flagship projects

Kargil Division – Survey / Geo-tag electrical assets

- HT lines: 1 449 km
- LT lines: 1 783.5 km

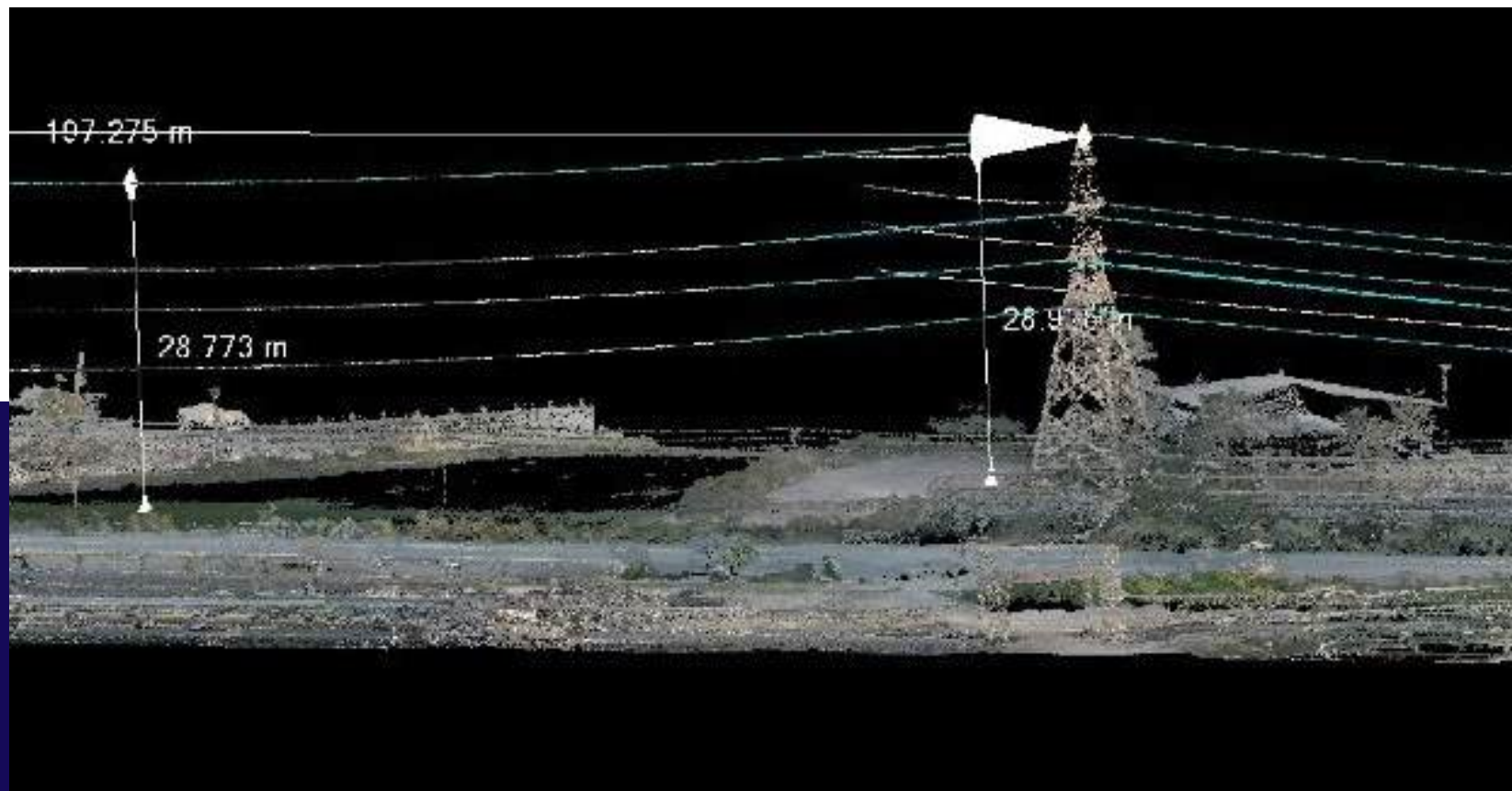
Leh Division – Survey / Geo-tag electrical assets

- HT lines: 2 300 km
- LT lines: 2 665 km

Mahagenco – Land-acquisition purchase assistance

Transmission Line Inspection using LiDAR: Sag Height

- Drone LiDAR builds 3-D cloud of towers + wires
- Auto-checks sag/ground clearances vs norms
- Flags hotspots—overstress, vegetation, tension
- Color maps & exception lists speed fixes
- Digital twin aids predictive O&M



Transmission Line Inspection: Photogrammetry & Thermal

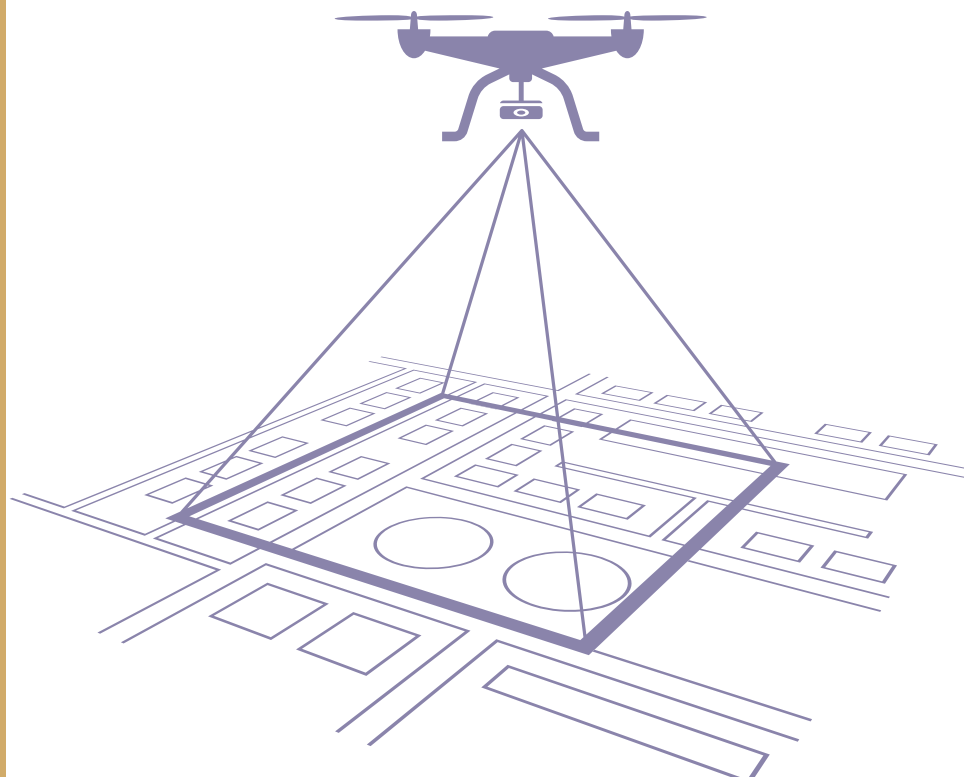
- Individual Tower Video Visual and Thermal
- Tower Inspection Photos Visual and Thermal
- Tower Inspection Report Visual



Engineering Survey

A comprehensive suite of specialised services designed to support diverse infrastructure needs.

Delivering reliable, high-quality solutions across multiple project domains.



- Survey Reports
- Design Drawings
- Impact Studies
- Traffic Analysis
- GIS Mapping
- Project Monitoring
- Digital Models



HYDRAULIC SURVEY

- LiDAR/ Drone does not capture data below the water surface.
- Hydrological Survey is carried out to determine levels below the water surface of stream/ river across the alignment.

Instruments used –

- 1. DGPS
- 2. Echo-Sounder : Single Beam / Multi – beam / Unmanned



GEOTECHNICAL INVESTIGATION – NABL

- Geotechnical Investigation is carried out to know the sub-surface of the earth.
- Helps to decide type of foundation, ground treatment if required, etc.
- Bore logs are taken at specified locations.



Where our investigations add value:

- **Rail & Metro** – Bridge foundations, tunnel linings, depot yards
- **Highways & Expressways** – Flyovers, embankments, soft-soil ground improvement
- **Ports & Coastal Works** – Tetrapod revetments, sheet-pile walls, offshore piling
- **Power & Energy** – Dam abutments, switch-yards, wind-turbine pads
- **Urban Real Estate** – Deep basements, high-rise raft and pile systems

TRAFFIC STUDIES

Traffic Study for FLS Works evaluates existing and future passenger and freight movement through detailed surveys, data collection, and corridor analysis

Data Collection – Primary & Secondary Traffic Surveys:

- O-D Survey (Goods + Coaching)
- Passenger Preference Survey
- Classified Traffic Volume Count
- Industrial Survey
- FOIS data, CRIS Control Office Application data, Prime passenger data

Existing Situation Analysis:

- Line capacity & saturation analysis
- Detention, speed & delay analysis
- Goods & passenger trends
- Demographic and socio-economic study
- Variation in modewise traffic counts



ELECTRICAL AND S&T DESIGN

1. **Field Survey Protocol** – Conduct location surveys for substations and OHE, mapping routes and verifying clearances.
2. **Power Demand Estimation** – Assess power needs based on train operations and identify utility constraints.
3. **Finalizing Locations** – Decide optimal substation and OHE locations using survey inputs and operational requirements.



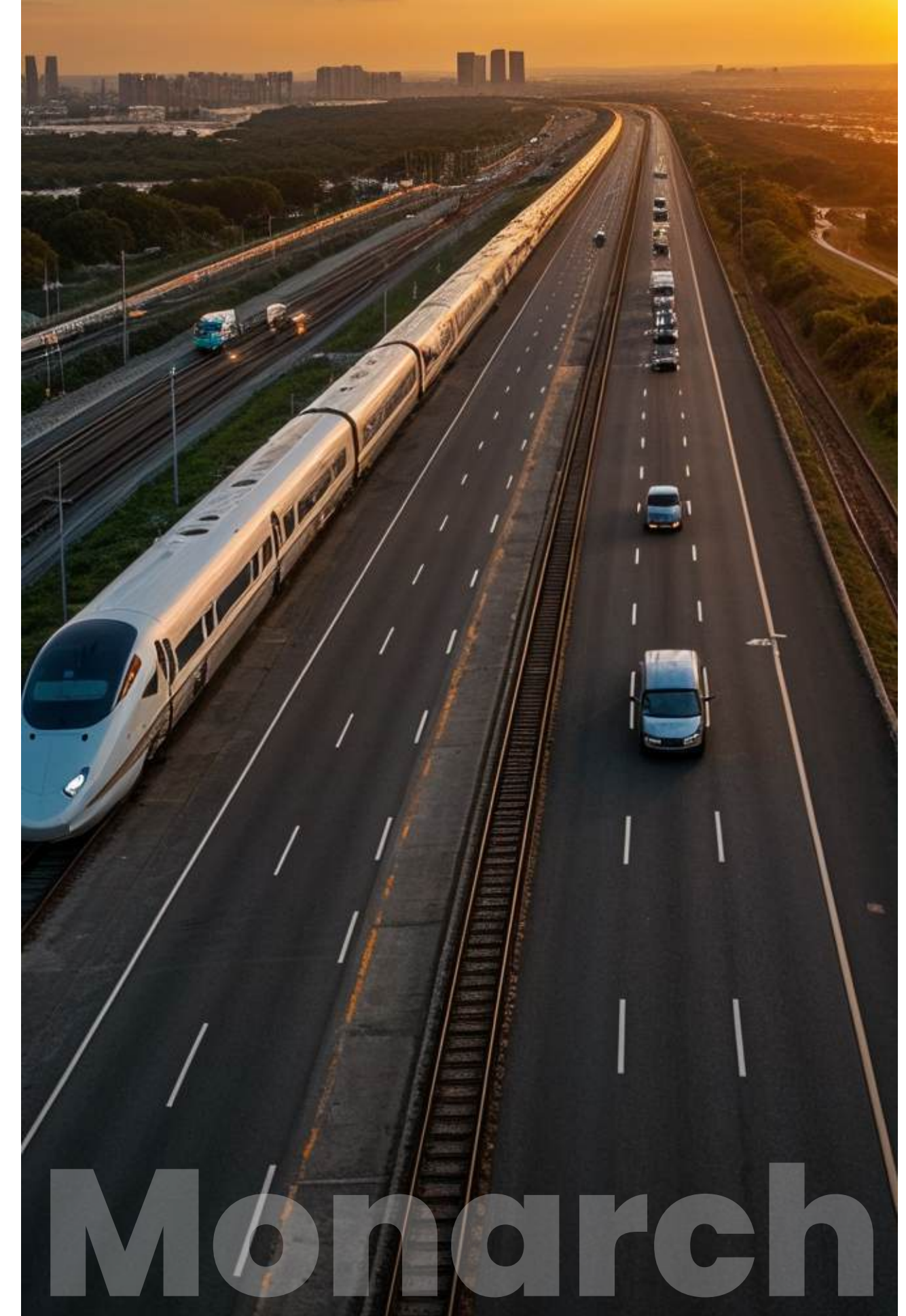
S&T Design

- **Integrated Survey Approach** – Conduct integrated S&T surveys to map signaling assets, cable routes, and interlocking requirements for reliable system coverage.
- **Design and Documentation** – Prepare signaling layouts, schematics, and BOQs as per RDSO standards, ensuring safe block sectioning and efficient system integration.

Monarch Value Proposition

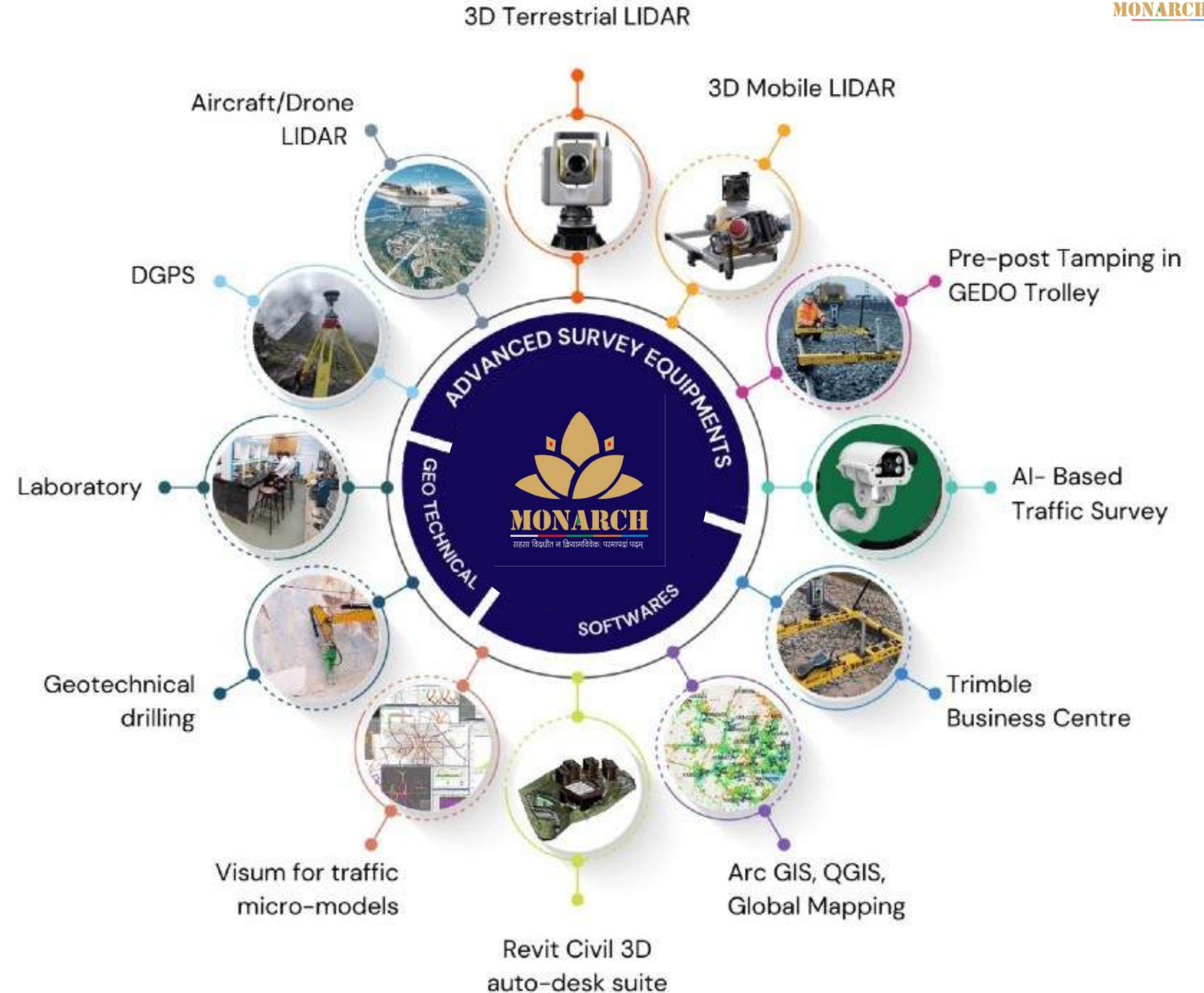
Decades-deep infrastructure knowledge plus India-wide LiDAR, GIS, and design assets give Monarch a single-source edge from survey to commissioning.

- **Road : 22,000+ km** Roads – Expressways, Ring Roads, Urban Corridors
- **Rail: 25,000+ km** Railways – FLS, DPRs, High-Speed, Metro, GEDO, Tunnel Design
- **200+ sq.km digitized urban zones** for ELU, DDP under MRTP Act
- **15+ lakh hectares** of mapping across India
- **100+ River/Canal** Surveys using Drone LiDAR, DGPS, and Orthophoto integration



Vertical Integration: In-house Equipment & Softwares

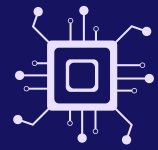
This end-to-end digital-twin ecosystem lets us capture, process and analyse high-resolution spatial data faster and more accurately



Your Strategic Choice



Customized Solutions for Every Client: Our expertise spans multiple states and a PAN-India footprint, ensuring comprehensive service delivery.



Specialisation in Modern Survey Technologies (LiDAR, etc.): Leveraging LiDAR and related tools, we deliver top-notch, client-specific solutions.



Track Record: 32+ Years in Road, Rail & Geospatial: A long list of successful projects nationwide underscores our commitment to results.



Client-focused: Our client-centric approach guarantees dedicated focus and attention to each client's unique needs.



Experienced Team: Our multidisciplinary team of licensed engineers, planners, GIS experts, and field specialists brings decades of cross-sectoral execution



Ethical & Quality Driven: ISO-certified, policy-compliant, and technically auditable



Our Client Portfolio



Trust, compliance capability, & national-scale impact



Technical trust, engineering parity, digital collaboration



Your vision. Our expertise; Together, let's shape tomorrow's infrastructure

Contact Us: Our Head Office: Pune & regional offices in Mumbai, Delhi, Nagpur,
Guwahati, and Bangalore



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Thank You

For Your Attention

monarchconsultants.in



Corporate video