TEXMiN Foundation

Mining Technology Innovation Hub
(an initiative of Govt. of India, DST)

**Indian Institute of Technology
(Indian School of Mines)
Dhanbad**

Indian Institute of Technology (Indian School of Mines), Dhanbad - Established in 1926

Choosing the Right Partner

Campus Specialities

01 **Rich Mining Heritage**
~100 years in Mining & Upstream Exploration.

02 **Natural Resources Backdrop**
East India Mining belt provides unparallel infrastructure.

03 **Talent Pool**
IIT Tag attracts the best of the class talent pool.

04 **Research Infrastructure**
Government grants and Faculty base provides excellent research environment.

TEXMiN Foundation

Technology Innovation in Exploration & Mining [TEXMiN] Foundation has been established as a Section-8 Company by the Department of Science and Technology (DST), Govt. of India, at Indian Institute of Technology (Indian School of Mines), Dhanbad to develop and implement Cyber-Physical Systems (CPS) based technologies to achieve 3S Mining (Safe, Smart, and Sustainable Mining leading to Mining 4.0) through operation & process optimization across the mining value chain.

Major Activities

Technology Development

Involves research in CPS, particularly in mining domain.

Centre of Excellence

Dedicated Centre for Mine Automation and Data Analytics in PPP mode.

Capacity Building

Skilling workforce aiming towards Mining 4.0.

Innovation, Entrepreneurship, and Start-up Ecosystem

TBI, Start-ups, grand challenges, promoting early innovators & entrepreneurs, seed support/funding assistance, job creation.

International Collaboration

Carry out CPS-based research activities in mining domain, deliver commercial technology and products as per international standards.

TEXMiN Technologies

1. AI-enabled Intelligent Monitoring

Under the mission of Industry 4.0, Computer Vision is an indispensable component of the automated system and artificial intelligence. Automating the monitoring work is where AI can make a huge contribution. We have developed a digital eye for monitoring your entire mining operations.

Applications

1. Traffic Surveillance
2. Quality Monitoring of Ore
3. Intelligent Proximity Alarming System
4. Unsafe Condition Detection
5. PPE Compliance
6. Workforce Efficiency Management

2. Smart Traffic Management System

An IoT-based, smart signalling system combined with AI-based analysis of logistical movements within an Industrial complex. Fleet management parameters are utilized to optimize productivity & environmental footprints. The system is available on the Dashboard in the form of Key Performance Indicators (KPIs).

The product addresses safety (collisions/accidents due to blind-spots, sharp turns, over-speeding, traffic violations etc.), productivity (queueing, delays) and carbon emissions (congestion cut and fuel saving) for industrial transportation.

Related Services

Design, installation and implementation of an automatic traffic signaling system to ease traffic congestion, and enhance safety.

Suitable installation of the system to capture speed of the vehicles/trucks, display the speed on a LED dashboard (including special keys like simultaneous multiple vehicles) at appropriate location to alert the corresponding vehicle driver, record photograph & vehicle number in case of violation with SMS notification to the driver, owner and other concern with the back-up of real time data for future reference/retrieval.

3. Digital Illumination Surveying and Planning

Industrial workplaces need adequate illumination not only for safety but also for workers' efficiency. All mines (Opencast/underground), smelters, Steel Plants, FMCG warehouses, and National Highways/Streets need illumination planning complying with the requirement. Provides the following key features:
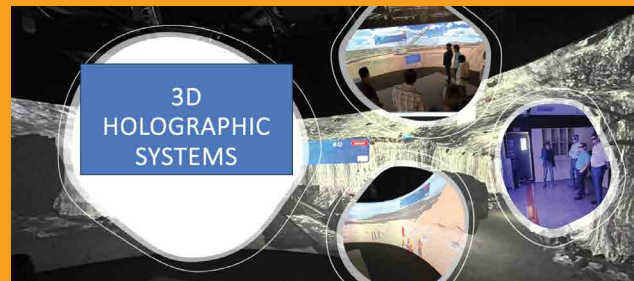
Related Services

- Mapping of the existing light infrastructure.
- Study of existing Illumination plan for adequacy of illuminance.
- Provide the manpower details for the illumination survey.
- Preparation of standard operating procedure & control plan as per DGMS Guidelines.
- Design the illumination through the simulation model required at different locations in mines.
- To design the entire illumination system keeping in consideration the existing lights and inventory.

Immersive Technologies

- IOT-enabled 3D AR/VR and Holographic projection systems have been developed to assist in mine planning and mine design. Several mining libraries are being developed atop the hardware and software made to provide 3D a experience. immersive

- Helping mining operators and managers effectively to improve safety, increase productivity, and reduce costs

- Assist in mine planning and operations management.

3D HOLOGRAPHIC SYSTEMS

Mine Communication

- Private 5G for Mines

- GPT for the Indian mining industry, including holographic GPT

TEXMiN Telematics

- Real-time Asset Tracking: Monitor the location and status of equipment and vehicles to maximize utilization and minimize downtime.

- Load Monitoring Solutions: Track load weights accurately, optimizing productivity and preventing overloads.

- Fuel Monitoring Solutions: Gain insights into fuel usage and consumption for better fuel management and cost savings.

- Indoor Positioning System (IPS): Achieve precise tracking in underground and enclosed environments, enhancing safety

and productivity.

- Video Telematics: Integrate live video feeds with telematics data for a comprehensive view of vehicle operations and operator behavior, promoting safety and compliance.

- Integrated with NAVIC: All solutions are equipped with NAVIC for precise location accuracy.

- Compatible with Private 5G: Seamless and secure data transmission over private 5G networks, ensuring real-time insights across sites.

tracking.texmin.in

Live Location | Remote Engine Cutoff
Pilferage Tracking | Fuel Tracking
Video Telematics | Indoor Positioning System

Designed for MINING 4.0

Real Time Ambient Air Quality Monitoring System

- **Next-Gen technology:**

AI-powered AQ-AIMS by C-DAC, India, advances air quality monitoring. Aligns with "Make in India" and "Digital India" initiatives.

- **Government of India Innovation:**

Funded by Meity under "AgriEnICS" program.

- **Rigorously Tested:**

Data Validation & Field Trial by TEXMIN (IIT (ISM) Dhanbad) ensures accuracy.

- **Made in India, Affordable:**

Manufactured by J.M.EnviroLab Pvt. Ltd. at a fraction of traditional Costs. TEXMIN handles sales on GeM portal.
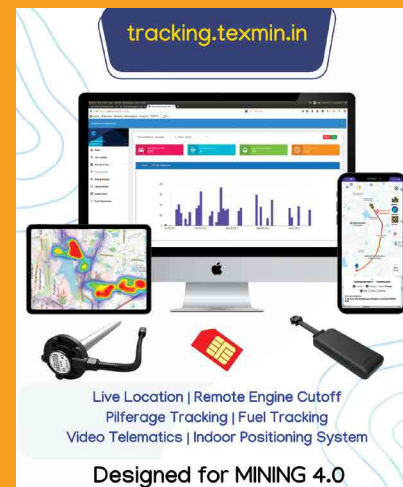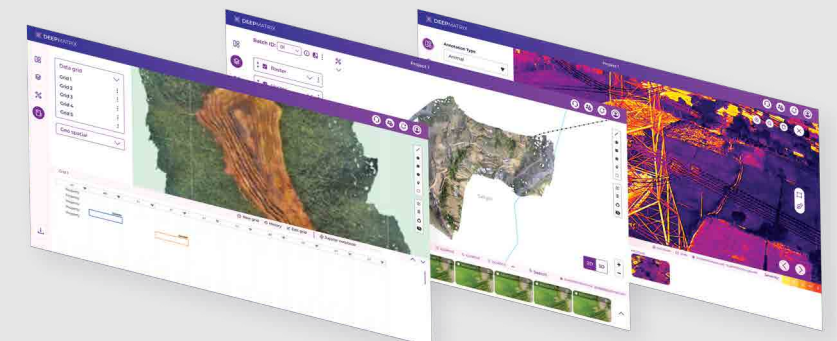
- **GoI Endorsement:**

Government of India endorsed air quality monitoring system under "Make in India".

Ai Based Air Quality Monitoring System (AQ-AIMS)

FLY Platform

Manage all geospatial data needs from collection to visualization at single place

- With its cloud-native SaaS platform and AI-driven business model, offers comprehensive capabilities across the entire data life cycle, encompassing data ingestion through to advanced analytics.
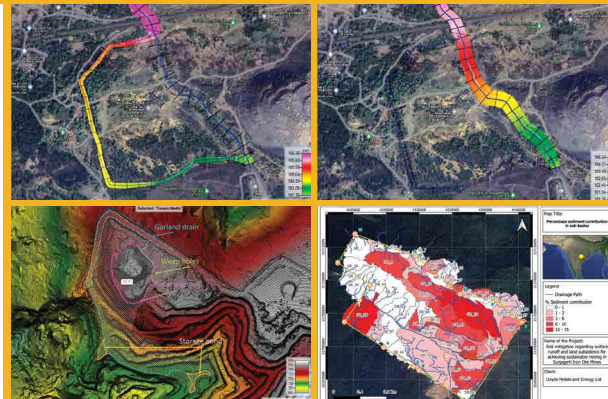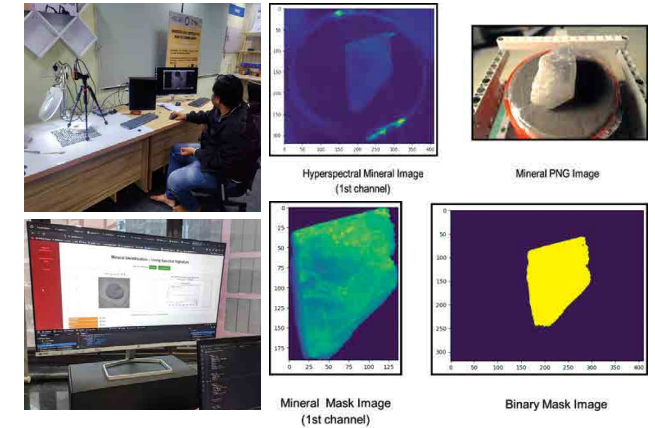
Hydrological Risk Management Solutions

- Mines often face risks associated with water and sediment, especially during the monsoon season, and leverage earth observation data from drones and satellites to provide high-resolution hydrological risks to mine managers. In addition, we also help in the design of various adaptation measures, including drainage systems, check dams, settling ponds, and other hydraulic structures that can help mine operators take suitable measures to enhance the overall safety of mining operations.

Our Solutions

- Flood Hazard Simulation
- Drainage Planning
- Embankment Planning
- Weather Monitoring & Forecast

Hyperspectral Image Processing and Analysis for Exploration in the Mining Industry - Mineral Identification

Hyperspectral Mineral Image (1st channel)

Mineral PNG Image

Mineral Mask Image (1st channel)

Binary Mask Image

Intelligent Mining Solutions

Offers cutting-edge, IP-65-rated, 5G-ready, and AI-enabled drones tailored for the mining industry.

- Our UAVs, equipped with multispectral and hyperspectral imaging, deliver precise exploration, surveying, and real-time monitoring across challenging terrains.
- Thermal sensors and edge computing capabilities provide comprehensive insights and faster decision-making, ensuring safety, accuracy, and cost-efficiency.

Towards a Sustainable Future with IoT & Automation

Our Products:

- IoT Sensors for Mine Monitoring
- Industrial e-mobility solutions
- AGV for heavy-weight mining equipment to be connected to a Private 5G network for teleoperation

Graphene based Products

Specialized in bulk graphene manufacturing with exceptionally high quality without any contamination and graphene-based products in bulk quantities at very low cost, a non-chemical process, scalable, and uses a variety of carbon sources, such as coal, plastic, carbon black, and many others.

Our Products:
- Graphene Powder
- Graphene Ceramic Coating
- Graphene Thermal Interface Material
- Graphene Conductive Ink
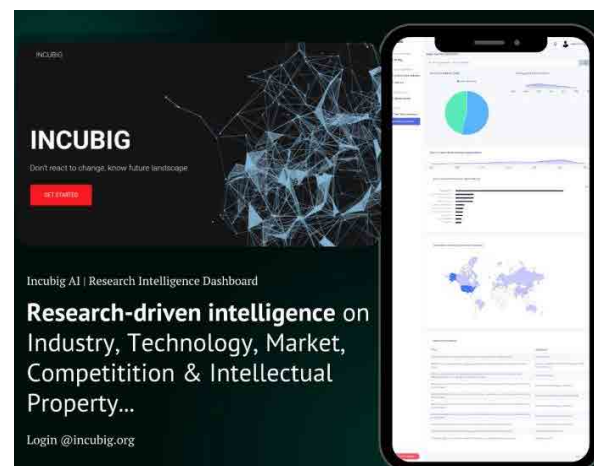- Graphene-based 3D printing Filaments - 1.75mm

Self-Advancing (Mobile) Goaf Edge Supports (SAGES 200T) (Sponsored by Ministry of Coal, GoI)

- Automated Roof Support System "SAGES" for SAFE, PRODUCTIVE and ECONOMIC extraction of locked coals from underground mines.
- Facilitates substantial reduction in its weight and cost up to 70% of the mobile supports available in the international market.

Patent & Research Intelligence Consultancy

The AI research intelligence platform would enable any R&D, business professional to easily search millions of global research data and access personalized and predictive insights in real time.

Some Notable Technologies

- Geospatial Data Processing
- Surveillance & Monitoring
- 3D Holographic Solutions for Mines
- TEXMiN Tracking Solution
- Digital Mining Infrastructure
- Graphene - Carbon based nano research
- Sensor Based tracking - Various sensors, Robots, Automated Guided Vehicle
- and many more...
- Mine Specific Solutions - Illumination Surveying, Disaster Management due to mines.
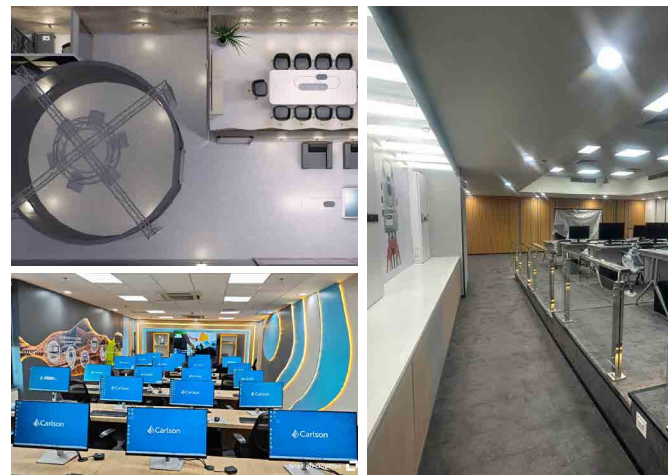
World Class CoE's and Labs

- **Coal India Innovation and Incubation Centre**
- **Sandvik Mine Automation Learning Centre**
- **3DS-Mining Technology Excellence Centre**
- **ESRI India Geospatial Centre of Excellence**
- **Carlson Geodesy Centre**
- **HxGN Centre for Digital Transformation and Excellence in Mining and Monitoring**

- **CIL Centre of Innovation in Mining - IMiN (Upcoming)**
- **AEL 3S Mining Excellence Centre (3SMEC) (Upcoming)**
- **There are a few more in the pipeline**

Labs

- **FabLab/Maker Space for CPS Technologies**
- **Idea Thinking Lab**
- **AR/VR Lab**
- **Mine Automation**
- **Mine Simulation Lab**
- **Rapid Prototyping**

TEXMiN Other Services

- Technology Service Provider - Projects productivity improvement, upscaling and implementation of advanced integrated mine planning to assist uplift production.
- Supervision, Quality Assurance / Quality Control (QA / QC) for mineral resource mapping.
- Development & implementation of mineral exploration database management system.
- Drone Surveying and mapping of existing and upcoming mining projects.
- DPR preparation and implementation for smart mining.

- Technical support services for performance enhancement through digital transformation in the mines.
- The GIS-based platform for real-time monitoring of mining activities.
- Hyperspectral image processing and analysis for exploration in mining industry.
- Other Consultancy Services for Mining & Exploration like PFS, TEFR, DPR, Feasibility & Pre-Feasibility Report, Mine Production & Pit Design and allied services.

Various Ministries

Ministry of Mines | Ministry of Coal | Ministry of Telcom | Ministry of Electronics and Information Technology

Our Partners, Collaborators and Industry Outreach

	Coal India	MOIL	OMC ODISHA Mining Happiness	GMDC FUELING THE GROWTH	TATA STEEL #WeAlsoMakeTomorrow	adani
SANDVIK	esri	DASSAULT SYSTEMES	HEXAGON	Carlson	TALPA SOLUTIONS	Curtin University
Epiroc	SCMS SKILL COUNCIL for MINING SECTOR	srk consulting	CSIR CIMFR	icreate	iem International Center of Excellence in Mining	JSW
BCCL Bharat Coking Coal Limited	MCL	Survey of India Department of Science & Technology	LLOYDS METALS	RASHMI GROUP	vedanta	NCL
POWERGRID		AURO REALTY	HINDUSTAN POWER Combating energy crisis	ADITYA BIRLA HINDALCO	many more...	

Our Startup Ecosystem

Start-Up Opportunities at TEXMiN:

Seed Funding and Infrastructure	Marketing and Business Development	Continuous Technology Improvement

Interested in Building the Startup Ecosystem! Join Us
Few of our Flagship Startups:

ECROSS TECHNOLOGIES	bidaol	FUTUROTEC SOLUTIONS	FxUAV Technologies Pvt Ltd	GRAPHENERA CARBON PRIVATE LIMITED	DEEPMATRIX	Climate-B Ventures Building Resilience. Empowering Enterprises.
LYNNOVATE DEVICES PVT. LTD. Innovating Lives	NIRAL NETWORKS	nyunai	VYOMCHARA	QuroLabs	INCUBIG Research Intelligence	many more...

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All creation is a Mine, and every Man a Miner.

- Abraham Lincoln

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