



Application of GIS in resource management and operation management

An Outlook to Digital transformation of Mining Sector in India.

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GEOSPATIAL DATA APPLICATIONS IN RESOURCE MANAGEMENT AND OPERATION MANAGEMENT IN MINING

➤ Exploration and prospecting

Advanced geospatial technologies, like satellite and drone imagery, allow for broad-scale to detailed data collection, uncovering the earth's secrets

➤ Site selection and planning

Providing detailed, real-time information about the geographical and geological characteristics of potential mining sites, allows for informed decision-making

➤ Extraction and production

It provides crucial insights that can optimize mineral extraction, such as the most efficient paths for drilling or blasting. [Real-time monitoring](#) of production processes using geospatial data [can improve efficiency, productivity, and resource allocation](#), leading to increased profitability.

➤ Environmental monitoring and compliance

Exploration, prospecting and Planning

- GIS and remote sensing can help you with this by providing you with regional-scale information that can help you identify potential target areas. Can use GIS to overlay different layers of data, such as geological maps, structural features, mineral occurrences, and geochemical anomalies. You can also use remote sensing to detect surface expressions of mineralization, such as alteration zones, gossans, or vegetation anomalies. By integrating these data sources, you can generate prospectivity maps that can guide your exploration strategy.
- Exploration for predict the location of mineral deposits.
- Pit and Design
- Mining Plan Preparation
- Haul Road design
- Mining Plan, OB Dump, Deposit estimation, calculation of Stripping ratio
- Planning

Extraction and production

Safety and risk management

- Top Soil, OB and Coal Stock yard stability
- Erosion detection
- Asset location HEMM
- Damage assessment

Financial

- Stockpile volumetric calculation
- OB Calculation
- Mobile and Static resource calculation
- Economic Mining

Monthly Routine

- TDS
- Mapping inaccessible area
- Boundary management
- Haul road management
- 3D Modelling

Environmental

- Mine Closure Plan
- Water leakage detection
- Vegetation planning
- Trailing management
- Compensatory afforestation
- Safety belt
- Rain water harvesting
- Garland drains planning
- Planning for minimum tree cutting
- Waste water treatment planning for zero discharge
- Detection for auto oxidation of coal
- Pipe line inspection

Legal

- Boundary dispute
- Illegal Mining
- DGMS Compliance
- Deviation from approved mining plan

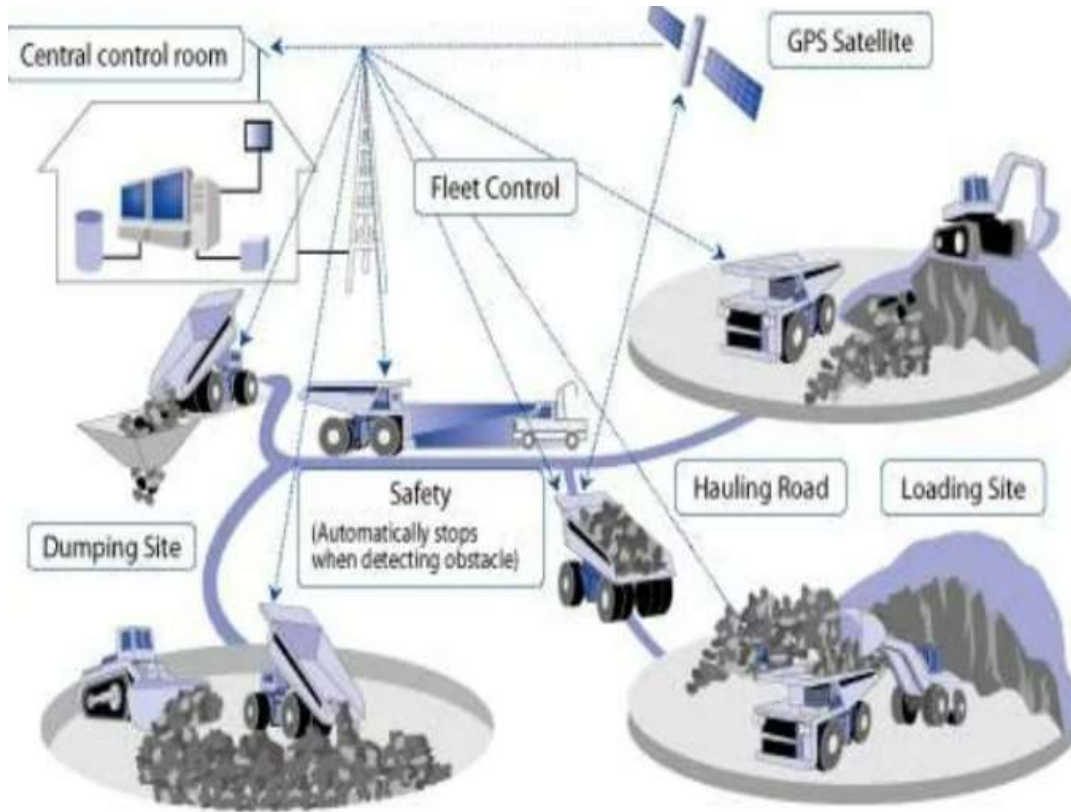
DGPS survey being mandatory for coal blocks

- All new Coal Block Allottees have to do DGPS survey for their mine boundary demarcation as per MoC, Gol.
- The survey of coal blocks will be one of the guiding factors for grant of ML (mining lease) or prospecting license (PL).
- The Steel & Mines department, GoO has issued guidelines for DGPS survey and preparation of digital geo-referenced maps for coal blocks.
- The survey will be done by Odisha Space Application Centre (ORSAC), the state notified agency or through its empanelled agency.
- Coal blocks where demarcation has already been carried out prior to the issue of these guidelines are to be taken up first for verification by ORSAC.
- Block boundary of coal blocks where demarcation has been completed by adopting conventional survey procedure will be verified through DGPS survey by ORSAC and such verified coal block boundary will be considered as final and frozen.
- According to the guidelines, all coal block allocates should apply to ORSAC for preparation of digital geo-referenced block boundary map. The coal block allotment order of the Ministry of Coal and CMPDI certified coal block map also need to be submitted.

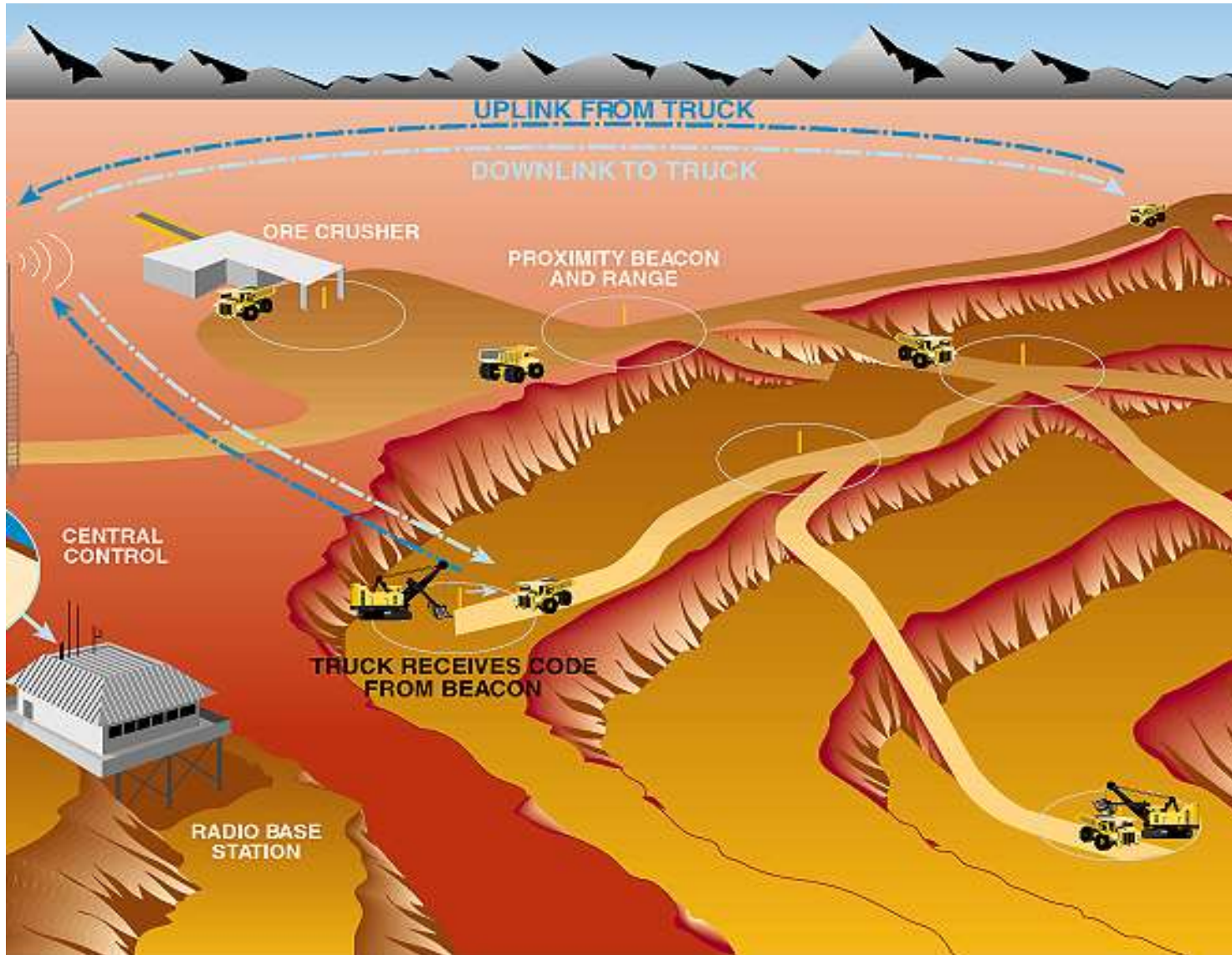
**LiDAR(Light Detection and Ranging) Survey by
Drone by CMPDI, Ranchi
at Utkal-D&E Coal Mines,NALCO for Soil and
Moisture Conservation study**



TRUCK DISPATCH SYSTEM FOR OPERATION ENHANCEMENT.



USE OF TDS IN THE MINE.



- Providing mine management entire view of the operations.
- Improve communication.
- Enhance safety of the mining operations by reducing incidents of over speeding.
- Increase utilization of HEMM thus Improvement in their Productivity.
- Real time tracking of moving equipment.
- Reduction in fuel consumption by minimizing idle time.
- Better maintenance management of HEMM

Path Options for Dispatching

