

Short Term Course

On

SYNTHETIC APERTURE RADAR (SAR) TECHNOLOGY FOR MINE PLANNING AND SAFETY MANAGEMENT

(During **February 07-10, 2017** at Department of Mining Engineering, IIT Kharagpur)

Synthetic aperture radar (SAR) interferometry has recently established itself as an effective tool for monitoring mining and geological criticalities. Slope monitoring in the surface mining industry is an essential safety-requirement and indispensable for reliable geotechnical risks management. Slope failures in large surface mines have caused major disasters and economic damages in many mines in the world. It is needless to emphasize that slope management require long-term monitoring of slope stability and to this end RADAR technology has emerged as prolific through demonstration at number of renowned mining operations in the world.



The necessity to excavate the deep seated seams with high stripping ratio and the constraints of land requisition have placed the mining companies under a great challenges of designing steeper slopes for mining as well as to manage high over burden and lean ore dumps to accommodate maximum volume of overburden or lean ore within the limited available area. Moreover, the mine sites must be rendered harmless for post mining land use and restoration of the mine sites for future economic activities.

Thus geotechnical monitoring and assessment of risks of stability failure of the surface mining high wall of particularly in deep opencast mines and of the slopes of overburden dumps are of critical concerns and the criticality may vary from site to site.



GBInSAR is used internationally as a leading-edge tool for near-real-time monitoring of surface slope movements in landslides and open pit mines. The success of the technology relies mainly on its ability to measure slope movements rapidly with sub-millimetric accuracy over wide areas and in almost any weather conditions. In recent years, GBInSAR has experienced significant improvements, due to the development of more advanced radar techniques in terms of both data processing and sensor performance. These improvements have led to widespread diffusion of the technology for early warning monitoring of slopes in both civil and mining applications. Using such monitoring data are generated for identifying the most likely failure mechanisms and can assess and validate geotechnical models. In India, this technology has been recently introduced however, there are very few experts working on data interpretation and modelling.

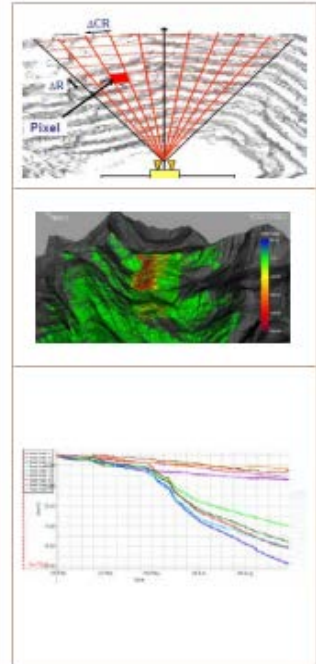
It is felt that more discussions amongst the practicing engineers of the Indian Mining Industry are necessary so that the various case studies of the world are better understood to take decisions of selecting, implementing and using this technology in Indian mines.

Course Content:

The course will include the following areas:

- A. Application potential of SAR Technology in Mining Industry
 - i. Main technical features of modern SAR technology for slope monitoring
 - ii. Comparative analysis with other monitoring technologies
 - iii. Examples of successful slope monitoring. Using GBInSAR

- B. RADAR Knowledge Base
 - i Radar Basics and Working Principles: Various development and IBIS RADAR
 - ii Rover basics Module
 - iii Data Flow and Network Integration
 - iv Data Processing and Atmospherics
- C. IBIS Software
 - i Controller
 - ii Guardian
- D. Early Warning Software highlights and applications
 - i. Maps analysis and interpretation
 - ii. Hazard Maps and Alarms
 - iii. Hazard Time Series and Inverse Velocity
 - iv. Analysis of slope failure behavior
 - v. Export features



Course fee

The course fee of this non-residential course is **Rs. 25,000.00** per participant payable by demand draft in favor of "**CEP-STC, IIT, Kharagpur**" payable at **Kharagpur** or by electronic money transfer to "**CEP STC IIT Kharagpur**" to the account number **9556220002955** of **Syndicate Bank at Branch SRIC IIT Kharagpur (IFSC Code SYN009556)**. The course fee will not be refunded unless the nomination is withdrawn 3 weeks before the course commencement. The **course fee does not include boarding and lodging charges**. IIT Kharagpur is exempted from Income Tax and while sending the course fee TDS will not be applicable.

Companies sending more than 4 participants will avail the following reduced fee:

For 5 participants: Rs 1, 00000.00 (Excluding boarding & lodging).

More than five participants: Rs. 20,000/- for every additional participant (Excluding boarding & lodging).

How to Send Nomination

Please send the names of your nominees with their designations and addresses to the Course Coordinator before **31.01.2017**.

PARTICIPATION: The course will be useful for the executives and supervisors engaged in Environmental Management, Mining Operation, Environment and Safety Control as well as those who are engaged in planning and information processing. The higher and middle level management who would prepare documents for decision-making regarding various issues related to mine safety and mine closure would be highly benefited by the course.

Address for Communication:

For any other information or sending nomination please write to:

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For any query please contact

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