

# New Technologies for Pipeline Monitoring Using RS and GIS

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**Abstract** - Advances in geospatial sensors, data analysis methods and communication technology present new opportunities for users to increase productivity, reduce costs, facilitate innovation and create virtual collaborative environments for addressing the challenges of security improvement and risk reduction. Sensor developments include a new generation of high-resolution commercial satellites that will provide unique levels of accuracy in spatial, spectral and temporal attributes. now a days availability of high resolution space imagery gives increased applications for monitoring of integrated systems in different areas of industry and commercial purposes. They are SAR, LIDAR multispectral and hyperspectral, sensors unmanned aerial vehicles (UAV). cone of the advance methods of feasibility study of appropriate services for monitoring of integration systems is based on remote sensing data and GIS developments. Objective of this approach is to improve safety, security aspects of integration systems, reduse survey costs and improve transportation and transmission efficiency through an increased monitoring frequency.

## I. INTRODUCTION

A definition for most effective method for providing suitable and successful transportation of oil and gas through the pipelines and solution of problems related to the ecology of environment is the main requirement aspect of oil and gas safety transportation. Annually collects the statistical data which presents information on incidents as a result of intervention of third party, ground landslides or spillage of methane. The purpose of investigations for founding out the new approach management for the infrastructure with use of satellite monitoring system. This approach allows operators of pipeline to carryout permanent monitoring indicated of pipeline status in any weather conditions and day. Part of the challenge is matching the best sensor to the specific transportation related application. Visualization and advanced data analysis methods are also important capabilities. Automated change detection within a defined sector is one example of analysis cap ability that will assist in detection of unauthorized intrusion events. A specific application of these techniques to power distribution security is the detection of unauthorized intrusion onto pipeline right of ways. Pipelines often cover thousands of miles and are located in remote areas that are difficult and expensive to monitor. In one case study satellite imagery and target identification analysis is used to detect unauthorized intrusion onto a pipeline right-of-way in a remote area. There are also challenges that may slow or impede the application of geospatial technologies to the electric utility sector. These include the need for improved methods and authorities for better data sharing across institutional boundaries. The developers and user communities need to communicate better and overcome some significant disciplinary differences. There are also challenging technical issues in the multi-sensor data fusion area to be overcome. Finally, there is a need for a focused interdisciplinary effort to match geospatial capabilities with specific user requirements.

## II. MONITORING OF PIPELINE/NETWORK

Most of the interactions by third party dwellings, excavations around the pipeline or using large construction machines. This can be determined by change detection. Change detection and classification of priorities.

This can be done by qualitative and quantitative approaches, using algorithm based qualitative and NDVI (Normalized difference vegetation Index), cloud to mesh (C2M) and Multiscale Model to Model Cloud Comparison (M3C2) as qualitative change detection of excavations, surface deformation, and diggings. After detecting the changes categorize them with priority and then classify to different levels from small to large level of changes.

### *Monitoring of Pipeline/Network*

Monitoring a network of pipeline is complex system. To do this we divide monitoring into 2 main components. First one is Operator Monitoring Systems (OMS) involves delivery and processing information of oil or gas. Secondly Remote Sensing Data Monitoring system (RSDMS) i.e. it contains the satellite data of pipeline surrounding area and information of change detection and hazard vulnerability information.

1. Operator Monitoring System (OMS) having the information of delivery and processing information of oil or gas. And the amount of pressure on the system, its constructional details and status of the lifespan of the pipeline system. It can be monitor time to time basis.
2. Remote Sensing Data Monitoring System (RSDMS) having the information of satellite data of change detection of small to large scale dimensions, surface ground deformation and surrounding environment changes such as climate, vegetation.

Intergration of this two systems for better decision making and safe and secure transmission of oil or gas for long lifetime. Using geospatial technologies we can make a safe and secure transmission of oil or gas. And easy monitoring of pipeline network is possible compared to time taking manual survey of pipeline network monitoring.

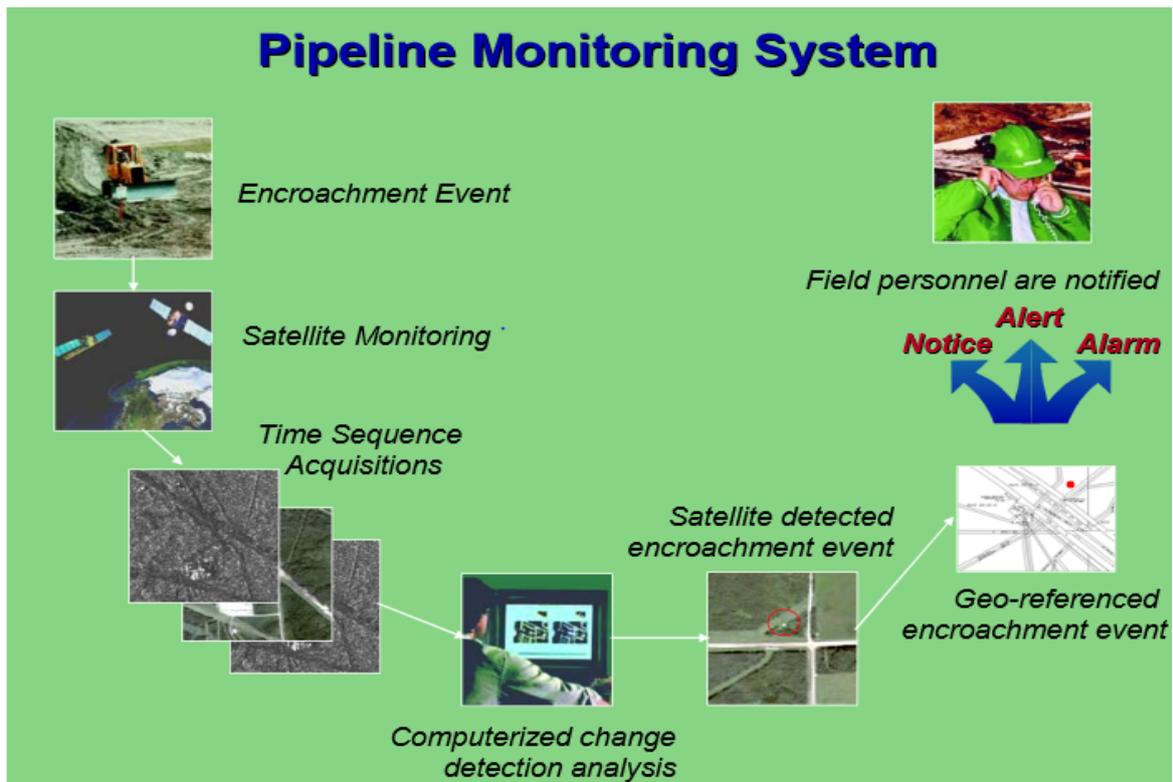


Fig 1 Pipeline Monitoring System

### III. CONCLUSION

Every year in india many pipeline leakages, pipeline blasts are happening frequently. To avoid those disasters we can reduce them to lower statistics by using GIS and Remote sensing Technologies, generally we use Geospatial Technologies only for mapping and site selection of pipeline corridor. But to Monitor the Network Remote Sensing and GIS technologies are

Cost effective and accurate methods. Currently High Resolution data of imagery such as SPOT7, IKONOS 1m resolution and also LIDAR, RADAR, SAR data are available. This system is most helpful in decision making and Monitoring of Pipeline Network.

### REFERENCES

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