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Remote Sensing Application for Locating Deep Oil Storage and Decoding Geological Signatures

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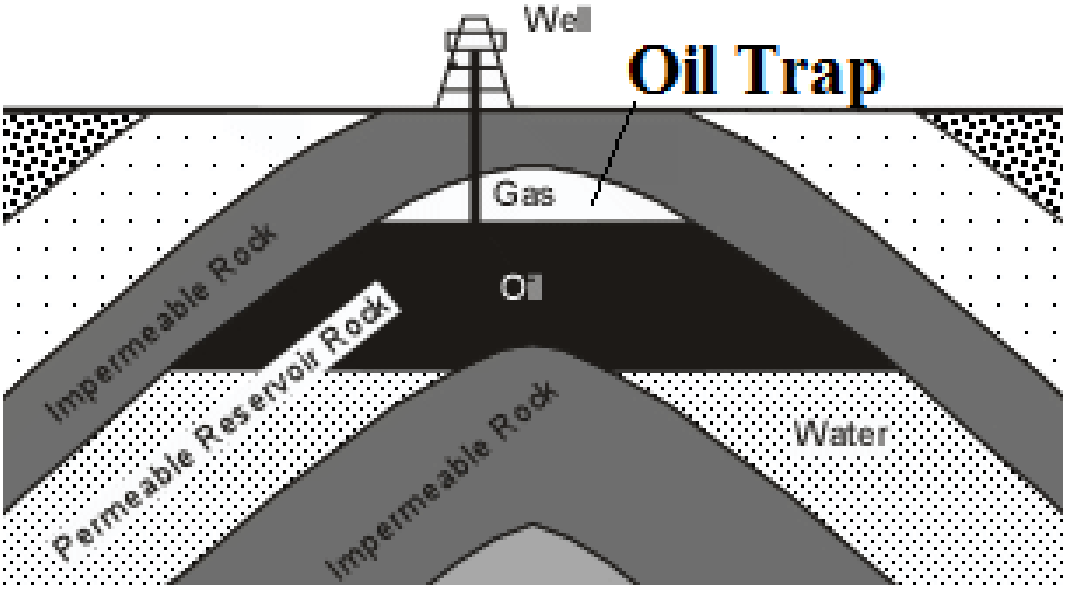
Abstract
The research envelopes the application of remote sensing technique in determining the oil sources trapped deep in earth crust layers. It is essential process before drilling well for crude oil, as oil pits are very specific and rare in location. It is a major challenge for the engineers for locating these traps using geophysical techniques. Main objective of this research is to analyze the use of remote sensing in oil exploration and potential extension of this technique for more accurate decoding the geological signatures. The research involves deep study for oil exploration techniques and geological signatures for oil exploration.

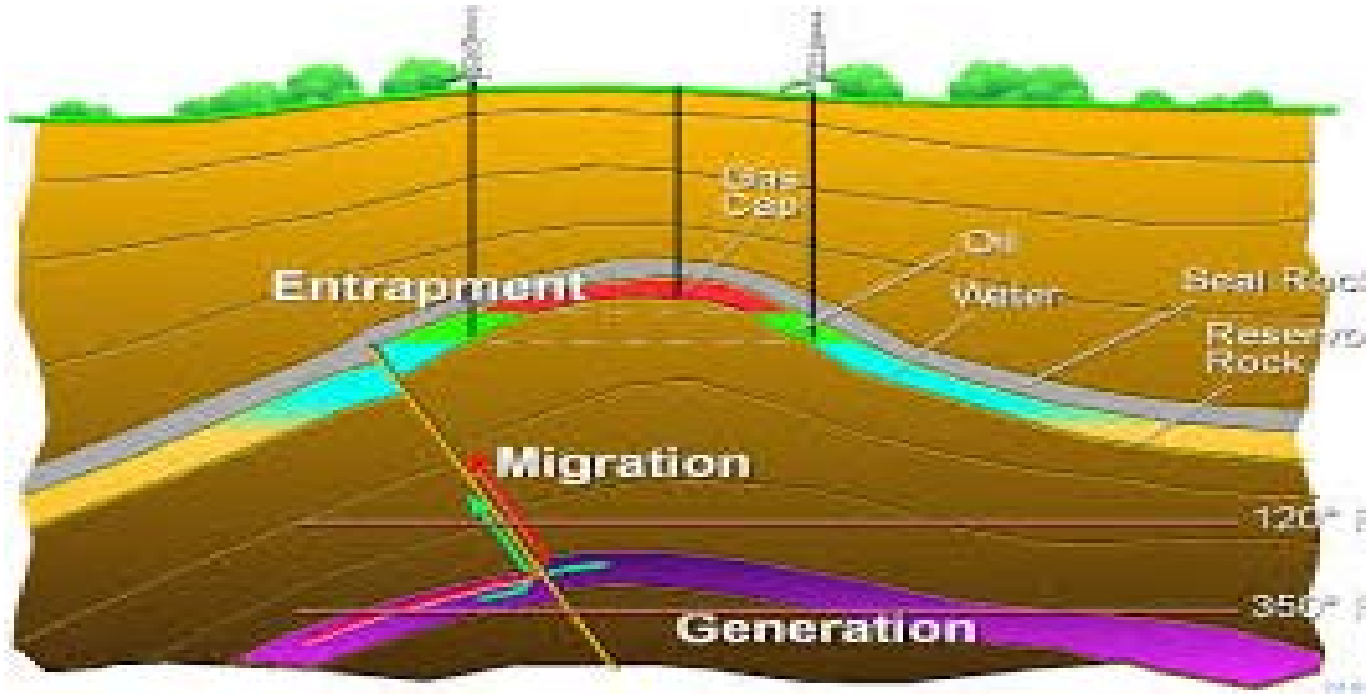
Keywords: Geological Engineering, Chemical Engineering, Remote Sensing, Active Sensors, Data Computation and Interpretation, Polymer Extraction Technology.

Introduction
Concept behind the deduction of geological features and signatures involves involvement of active sensing technology assisted by Remote Sensing. For finding signatures or deducible data for finding oil storages, the analysis of geological formation of oil traps is carried out.



Above shows most commonly used method for trap detection and geological signature associated with it. The formation shows the oil location in the form of a floating media trapped in between the layers of crust.

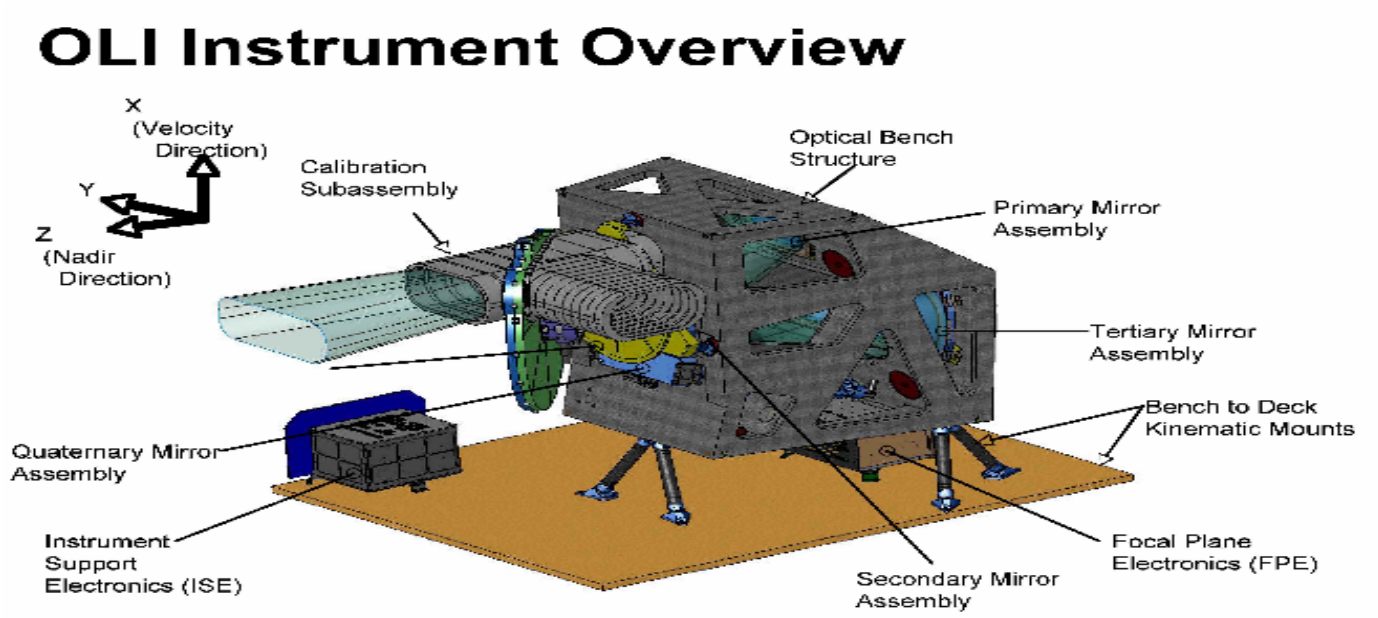
2. Methodology
2.1 Defining Geo Signatures
Oil comes from the decay of plant and animal material usually marine that has been buried by mud. Over time and further burial by sediments the decayed organic materials are exposure to heat and pressure.



Geology of where Oil is found the liquid oil and gas produced by the heat and pressure migrate away from the source rock and is often held in place by a subsurface geologic feature known as a "trap". There are many different types of traps. Traps hold the oil in place until it is released by natural means like erosion or extracted for use by drilling.

2.2. Satellite Raw Data Analysis

Remote Sensing in Mineral and Gas Exploration Satellite Imagery and Oil Exploration Landsat, SPOT, and other satellite imagery - large scale Oil Exploration Mapping of the Earth's surface is the starting point for oil exploration.



Above shown figure shows the set of sensors used in Landsat 8 for remote sensing application and collecting Raw Data for deduction of geological signatures associated with traps.

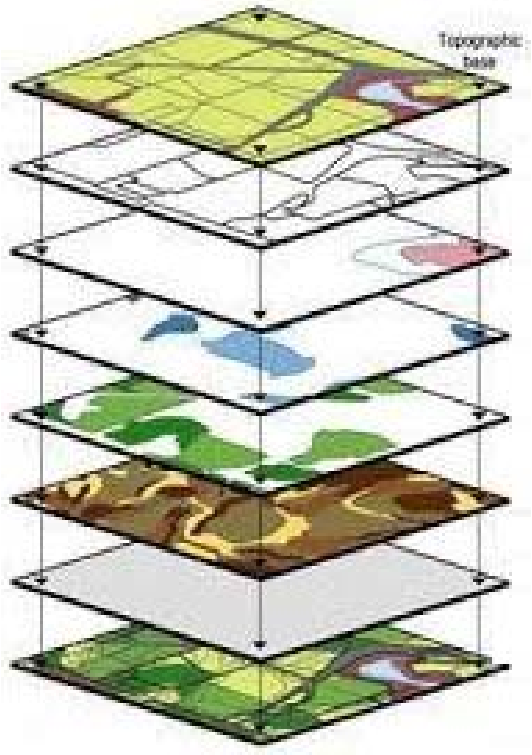
3. Interpretation Methodology

3.1 Image Filtering

Features such as traps can be seen on the surface however they are frequently buried by sediment and rock layers. Creating surface maps over time have become easier with aerial photography and satellite imagery. The next step is subsurface exploration. This is geophysical in nature and largely involves seismic testing to see below the surface. This can give us 3D models of subsurface traps.

3.2 Statistical Interpretation

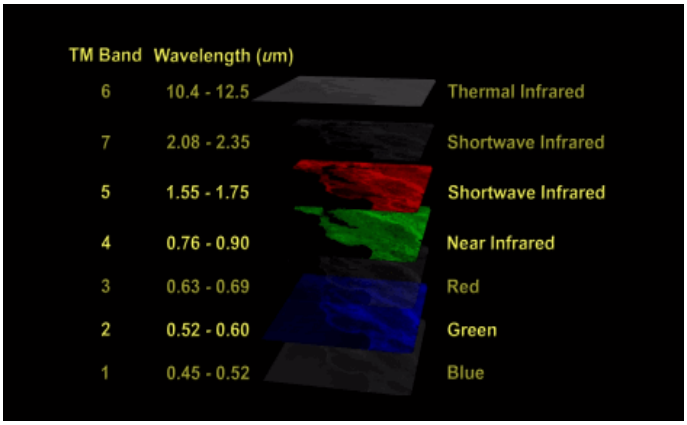
The data from the remote sensing raw imagery technique is then compared to preexisting statistical analyzed data of interpretation. The various band reflections represents the different features of the reflecting geographical surface. The associated reflection bands calls for mapping of the geology in desirable form.



4. Spectral Band Selection Sensing

Surface Alterations Micro seepage Models AVIRIS (Airborne Visible Infra-Red Imaging Spectrometer) Measures Earth's surface with hundreds of spectral images.

Information collected as sets of images in close intervals Images or "spectral bands" represent a range on the electromagnetic spectrum Bands are combined to create a hyperspectral cube Imaging Spectrometry is defined as "the simultaneous acquisition of images in many narrow, contiguous spectral bands".



The requisite band is chosen for Raw Data collection for geo signatures detection and the data is processed for interpretation of traps geography.

5. Acknowledgment

We wish to thank our mentors and college for supporting us in completing our work regarding "Remote Sensing Application for Locating Deep Oil Storage and Decoding Geological Signatures". We also wish to thank our parents for providing us with assets that helped us completing research regarding this concept.

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