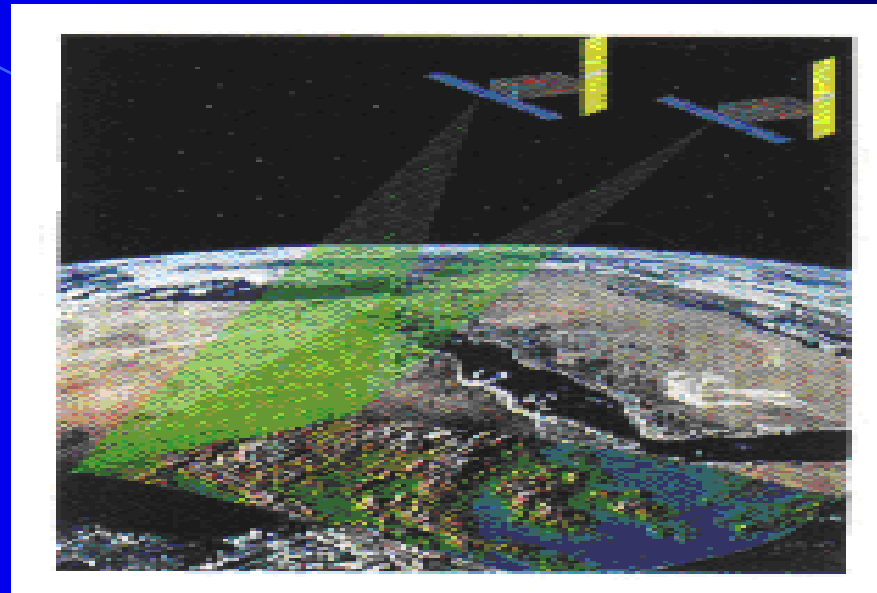


GIS and Remote Sensing Technology



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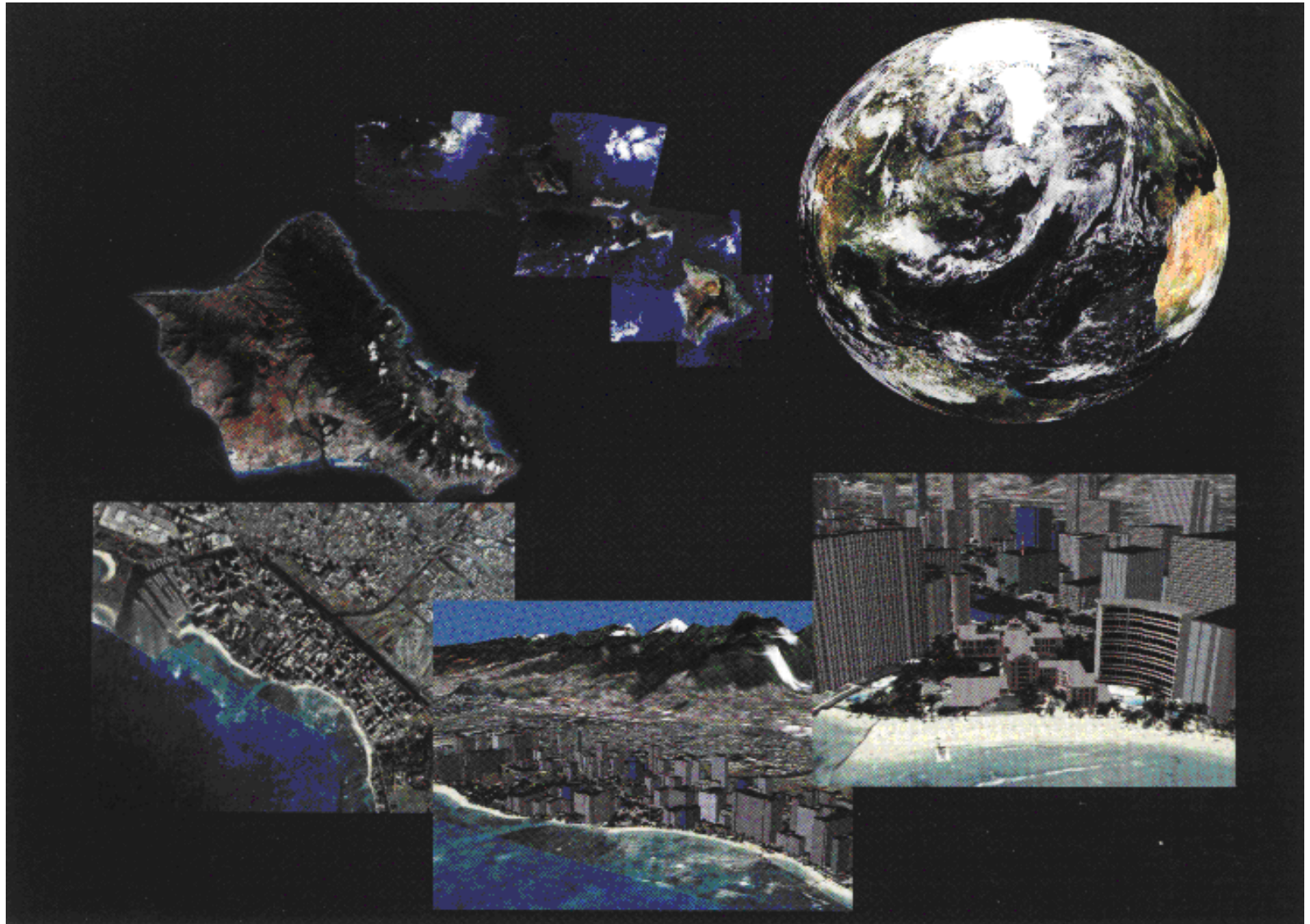
Introduction

- **R.S growing is helping us observe, study and learn about our world**
- **R.S is a potentially powerful complement to GIS**
- **R.S integrate into the GIS processing stream**
- **multilayer integration of raster and vector data within the GIS environment is important as we move forward**

Remote Sensing Benefits

- **Allows to collect information over regions too costly, too dangerous or too remote**
- **Takes many forms; aerial photography, digital satellite imagery and radar**
- **Produce maps of the earth's land and seafloor topography, natural resources and urban infrastructure**
- **Serves as a valuable historical record**

Continuous zoom from global-scale imagery to high-resolution aerial imagery overlain with extruded vector data



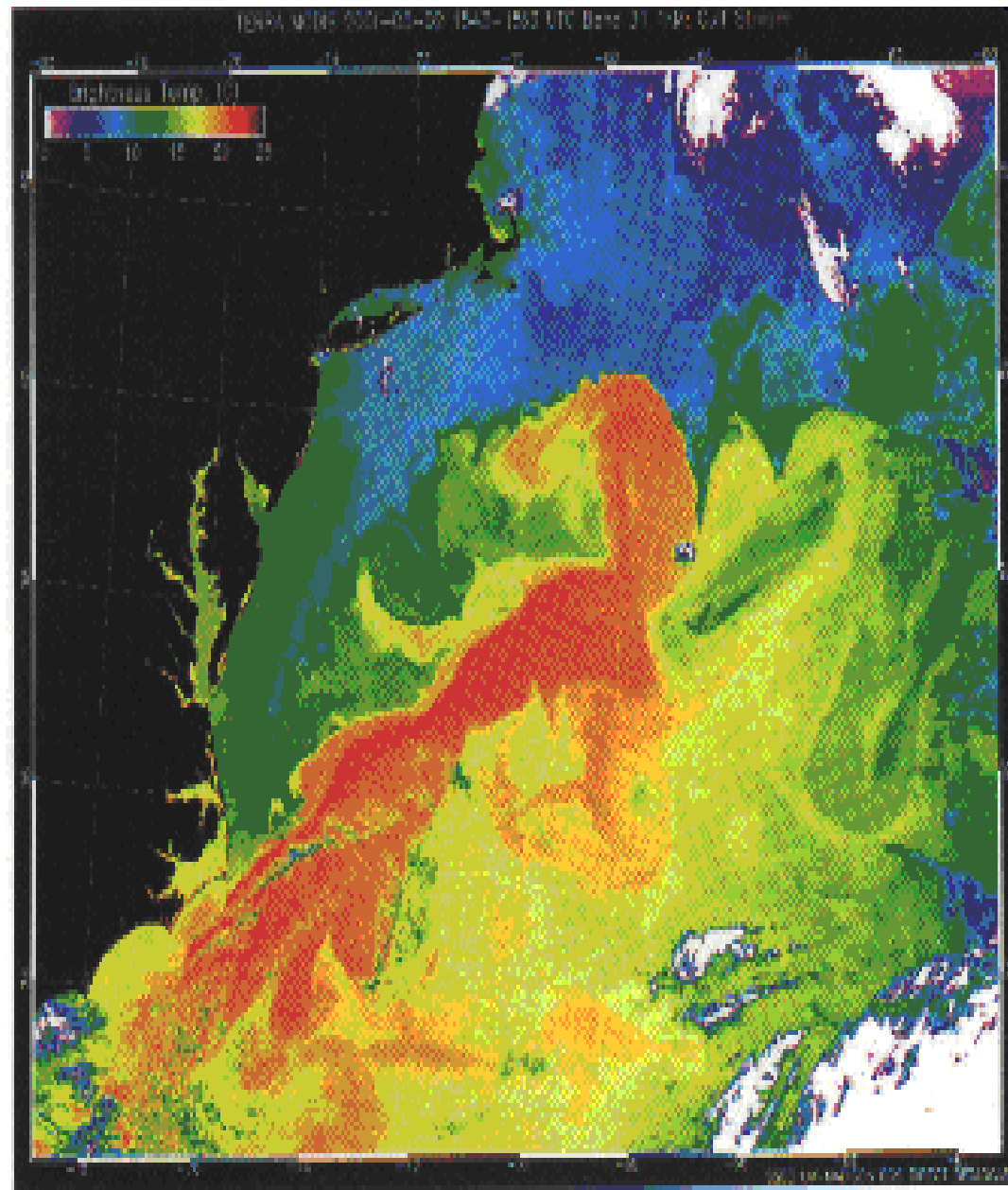
Source: Data courtesy of the City and County of Honolulu

Gulf Stream, E-N USA

This image clearly shows the pattern of the Gulf Stream, the warm water current that flows east toward northern Europe (shown here as yellow, orange and red with red being warmest)

captured by the NASA MODIS® sensor

Source: University of Wisconsin-Madison Space Science and Engineering Center



GIS and R.S Integration

- **R.S is included within the field of “Geomatics” which are the group of technologies, disciplines that collect, store, analyze geospatial information**
- **Improved GIS tools and Software packages**
- **Applications implemented using GIS depend on;**
 - ✓ **datasets derived from remotely sensed imagery**
 - ✓ **use imagery as a background in graphic displays**

**vector data displayed
over an Orthoimage
background in a GIS**

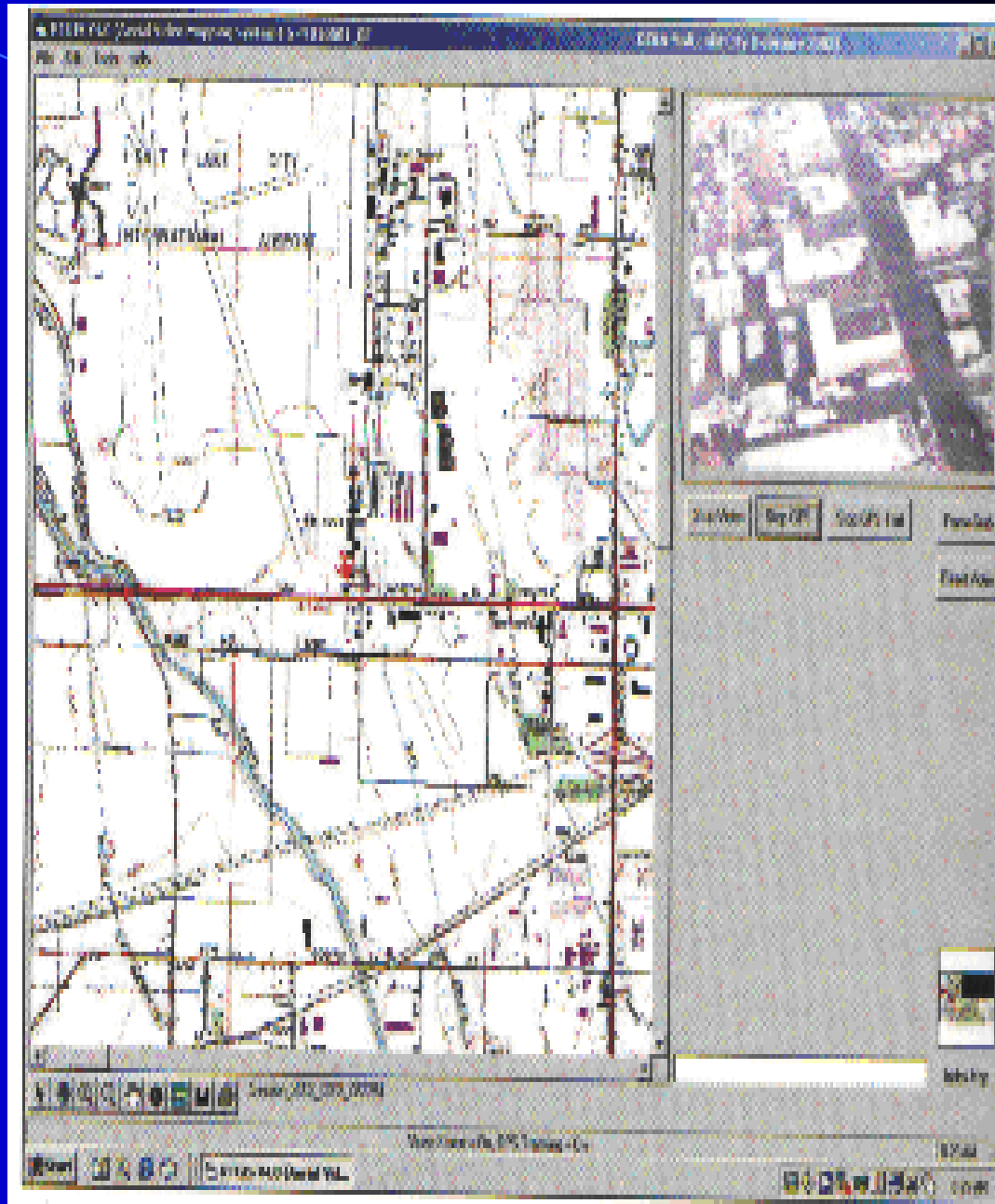
Source: ESRI and DigitalGlobe



real-time Videography integrated with a GIS

GIS-based Videography application provided simultaneous real-time display of the video imagery from a helicopter-based camera and the helicopter position overlaid on a detailed area map

Source: Image courtesy of BlueGlen Technology, Ltd.

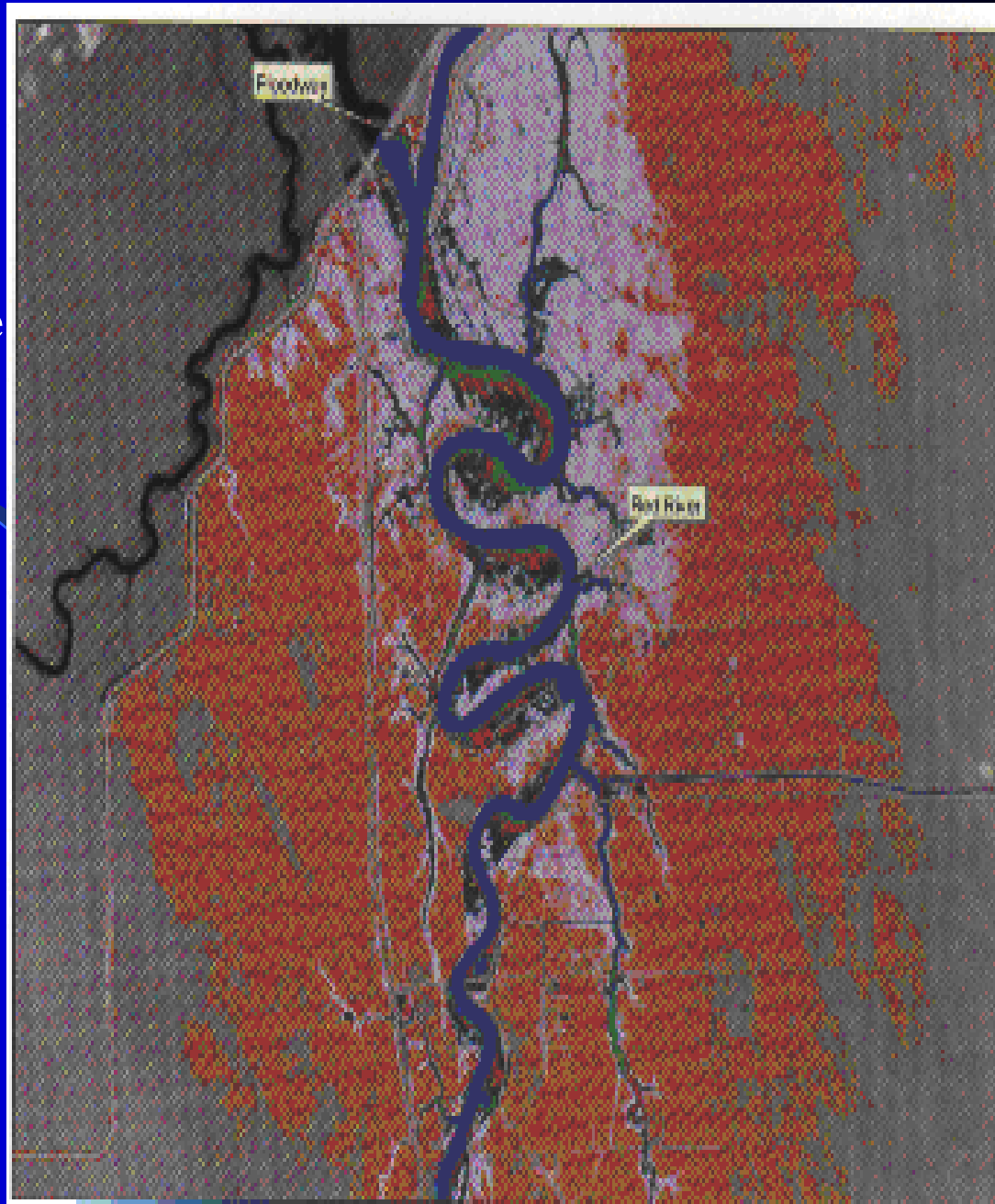


Flood risk mapping

Digital elevation models generated from lidar data of the Winnipeg Floodway and Red River were used in hydrologic models to identify areas that would be inundated at different flood levels

Key: 1m flood level-light green, 2m-dark green, 3m-brown, 4m-purple, 5m-beig. The accuracy of the dataset is 15-30cm

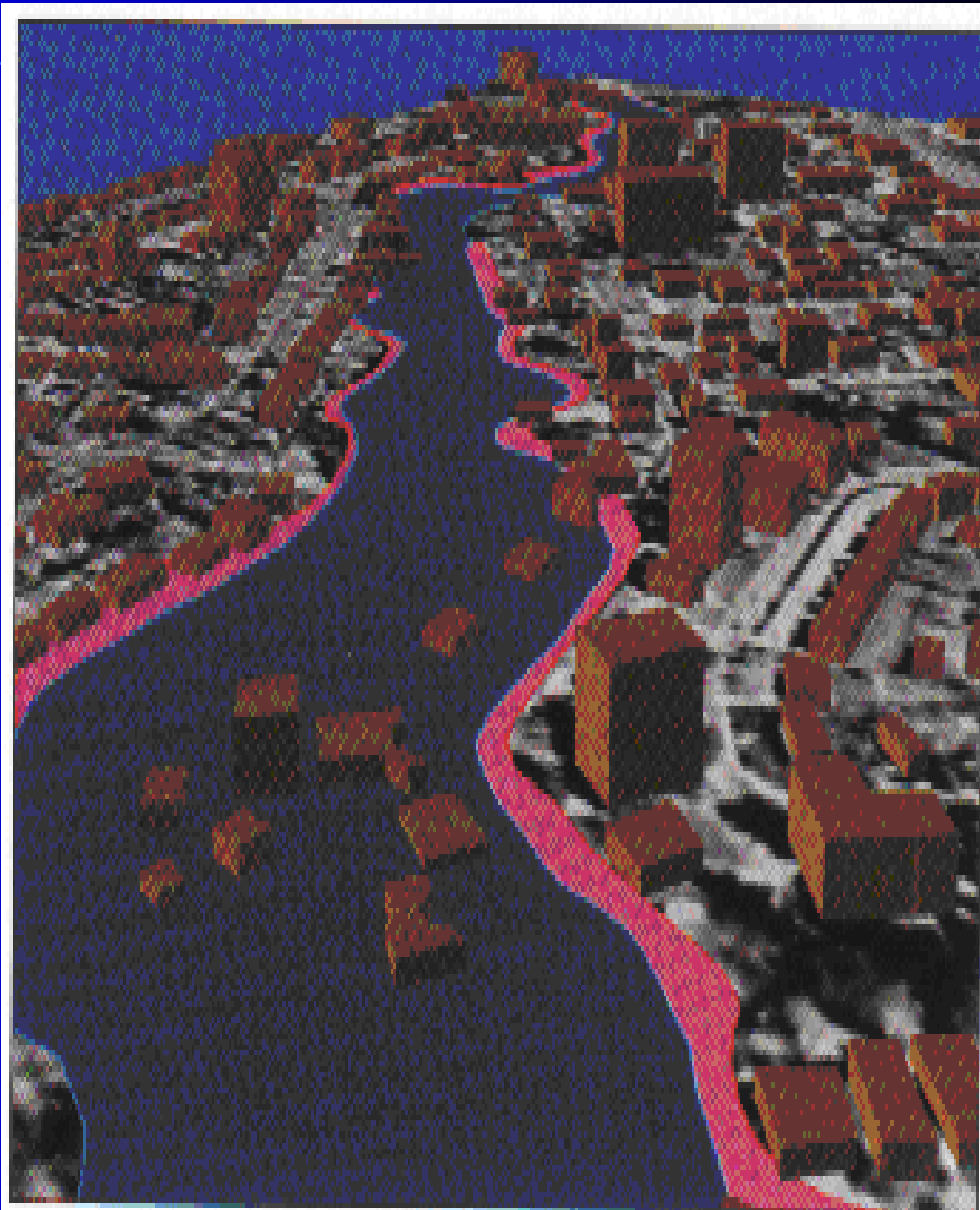
Source: Mosaic Mapping System, Inc./TerraPoint USA, Inc.



Flood simulations

Lidar data was used to generate a bald earth surface, the 100 and 500 year flood inundation limits, and 3D model of building in an urban area for this flood simulation

Source: Image courtesy of Earthdata Holdings, Inc



Advantages

- **Facilitate access to a variety of data and information**
- **Facilitate the creation, updating and modification of maps**
- **Improve our ability to model important science research questions and operational resource management tasks**
- **Enhance graphic display of complex phenomena, and thus, our understanding, and**
- **Provide tools for enhancing decision making**

Important Developing Trends

- **Improvements in the quality and quantity of remotely sensed data available**
- **Improvements in computer hardware and software**
- **Increasing population and competition for natural resources**
- **Decreasing resource availability and environmental quality**

Important Developing Trends

- **Recognition of the global nature of problems**
- **An increase in the number of public and private organizations working on local, national, regional and international problems**
- **The creation of larger and larger data bases to provide information in various scale**

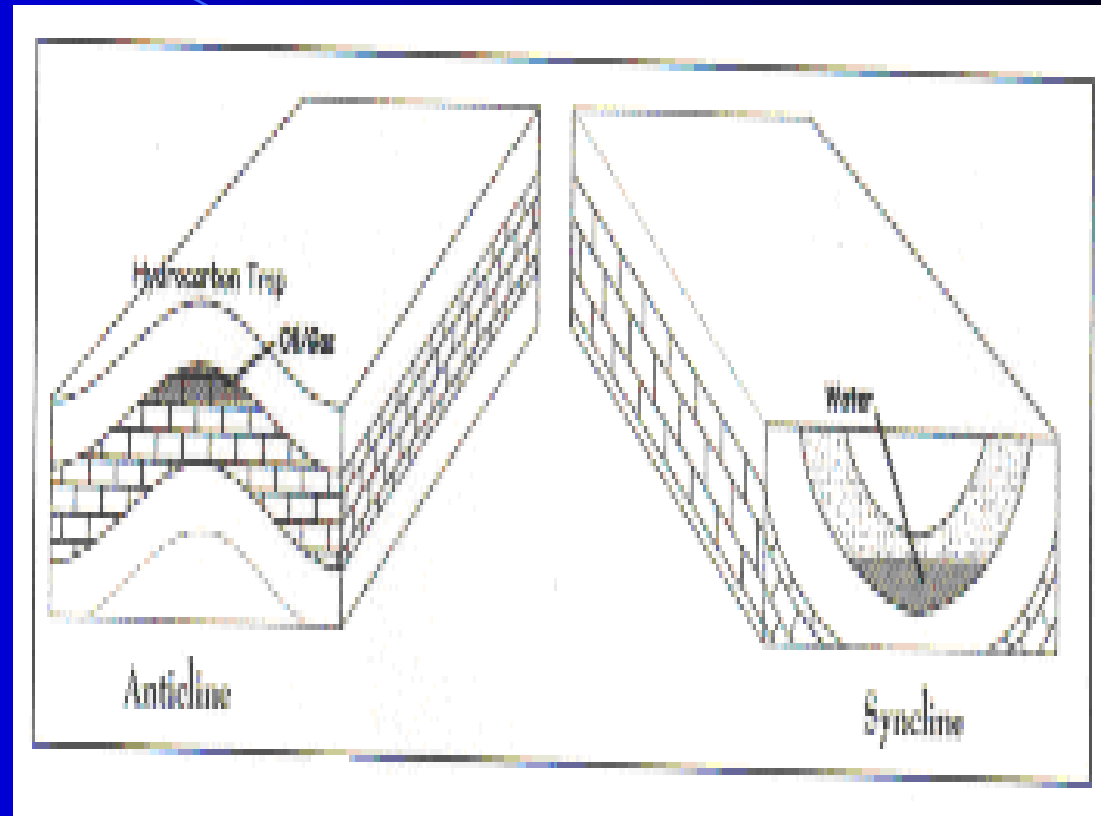
Examples of Integration

GIS and R.S technology have been applied to a range of applications such as;

- **Agriculture**
- **Forestry**
- **Geology**
- **Archaeology**
- **Military**
- **Geospatial intelligence analysis**
- **Urban infrastructure**
- **Business geographic**
- **Meteorology, Oceanography and Climatology**

Geology

Satellite images gave geologists a unique opportunity to observe the complex interaction of large-scale geological structures that make up earth's landscape

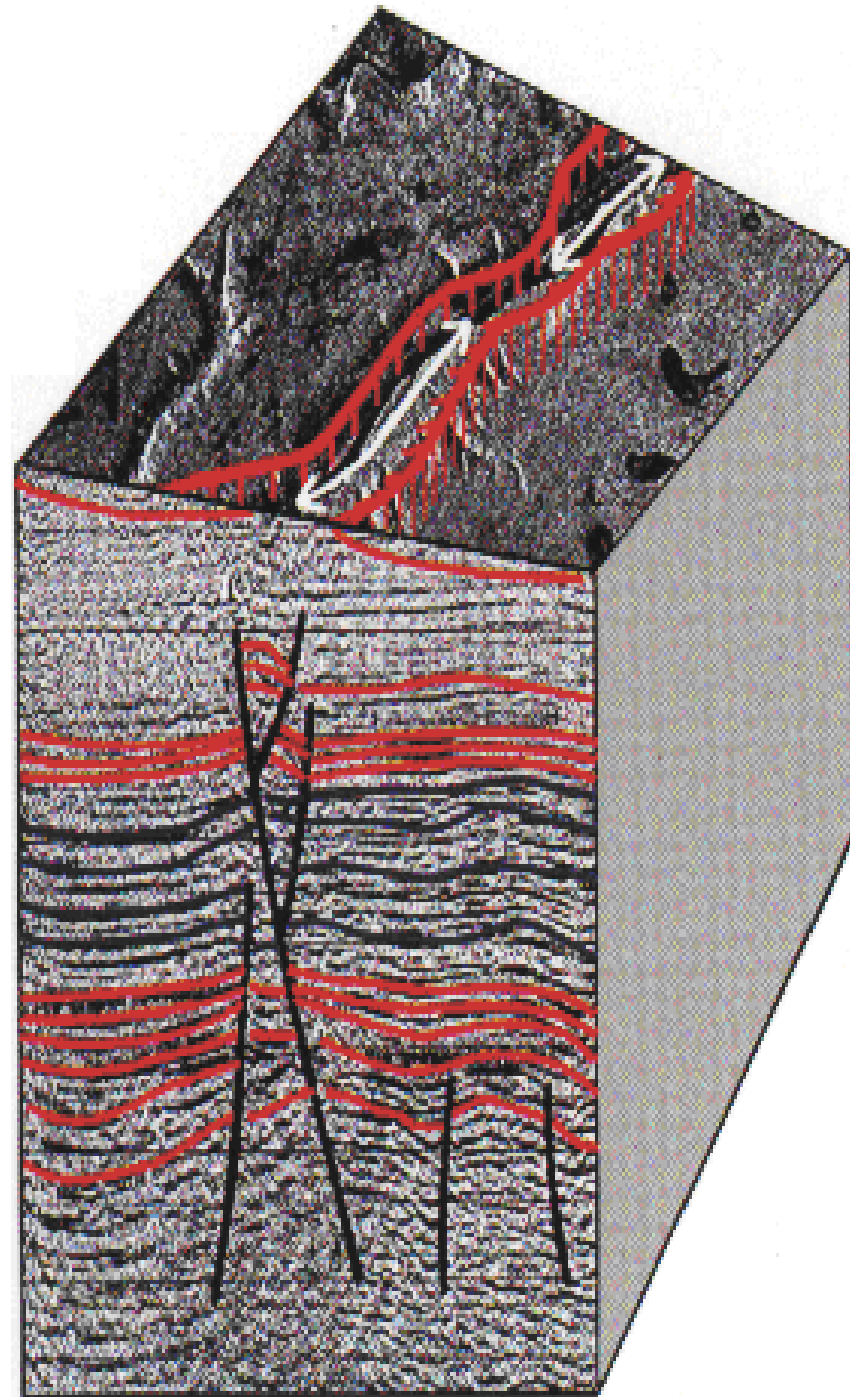


Source: Courtesy of Image Interpretation Technologies. Calgary, Alberta.

Seismic surveys record

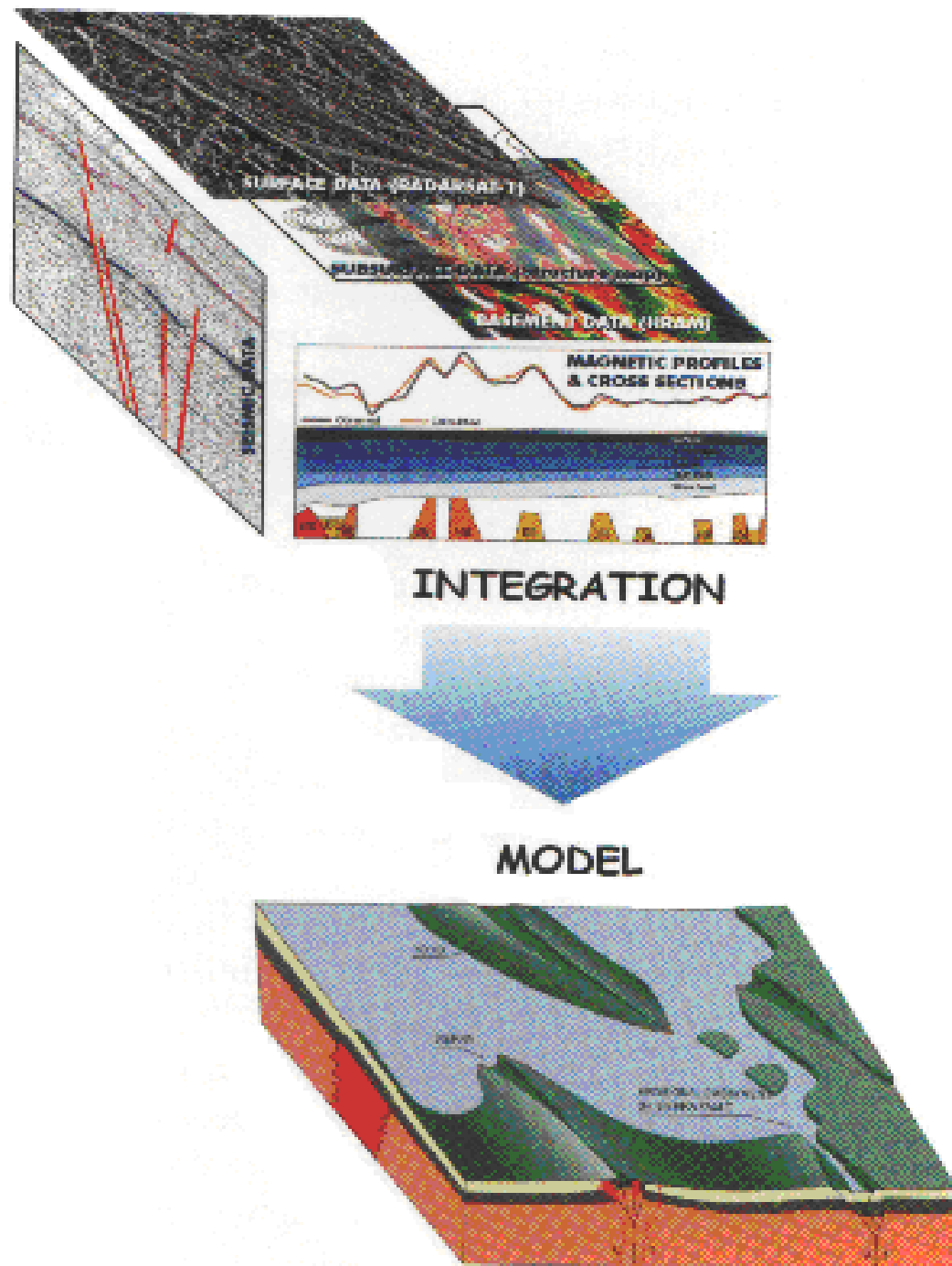
The time and strength of sound waves reflected from different rock strata beneath the earth's surface to a set of receivers placed in the ground. The illustration shows a typical presentation of this data as a profile

Source: Courtesy of Image Interpretation Technologies, Calgary, Alberta.



Today the availability of integration of satellite imagery with traditional exploration datasets and how GIS can be used to integrate multiple datasets to refine interpretation

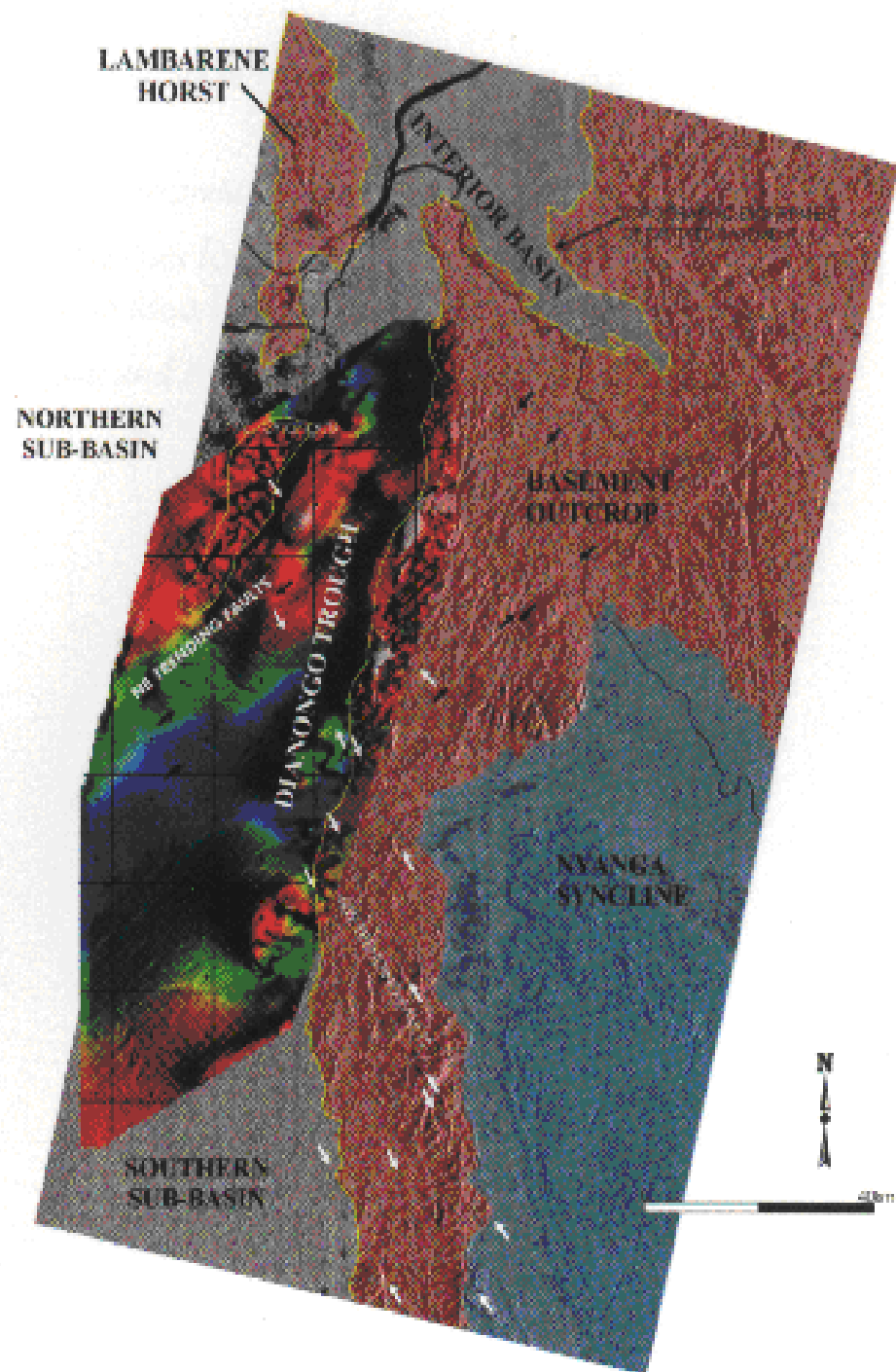
Source: Courtesy of Image Interpretation Technologies, Calgary, Alberta.



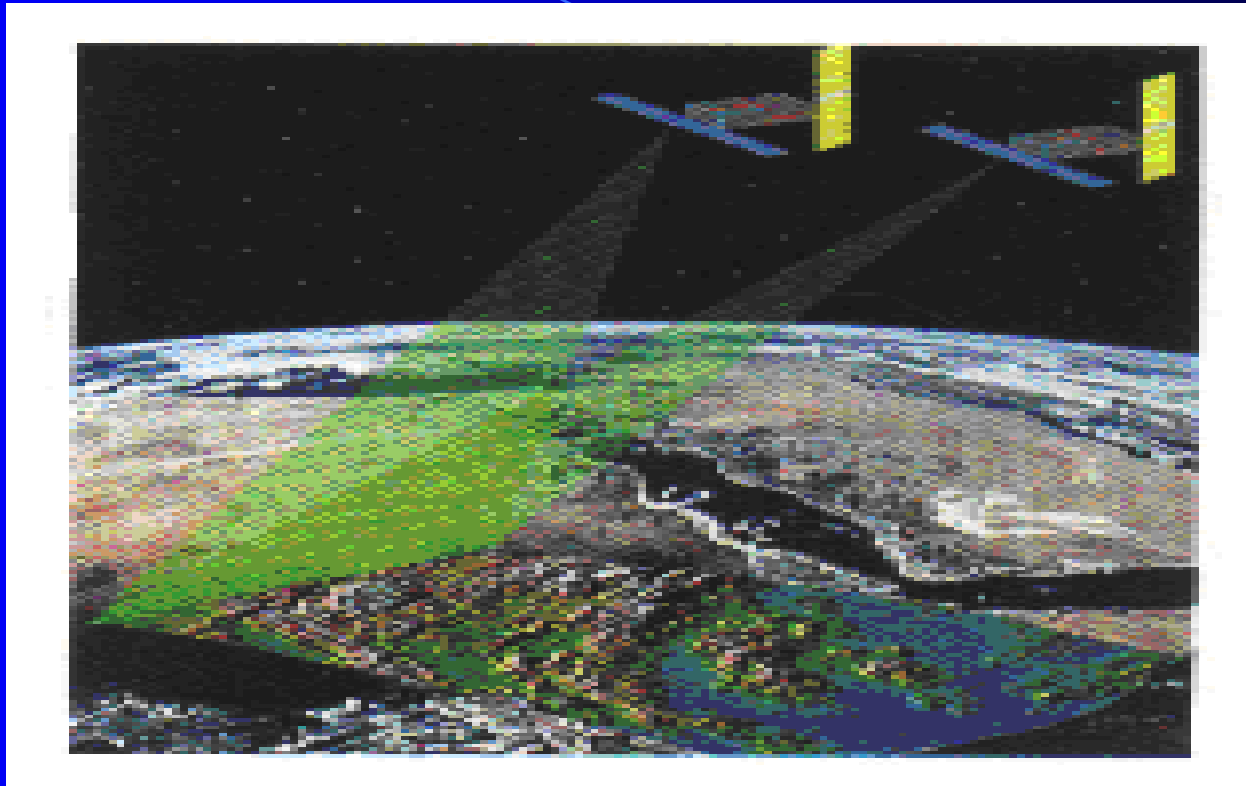
HRAM and Radarsat-1 data integration over the Dianongo Trough, Gabon

The imagery has been overlain with a color transparency to indicate the main geological outcrops in the area

Source: Courtesy of Image Interpretation Technologies, Calgary, Alberta.



Thanks for your attention



Question

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