

Building the Next Generation of Surveyors



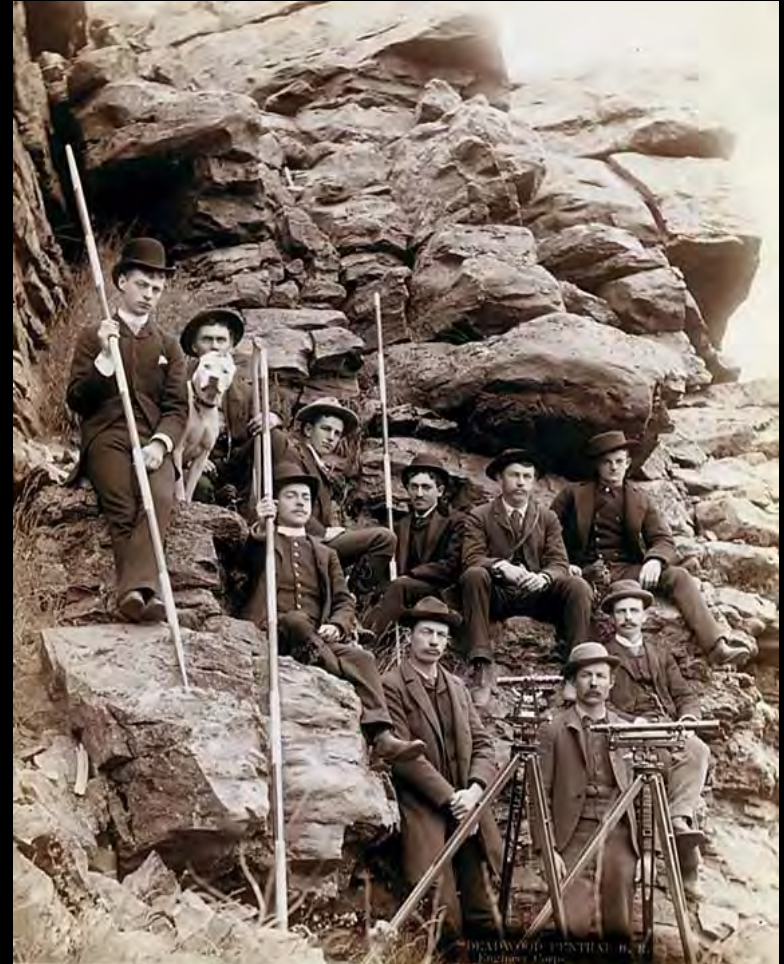
Carl F. Shangraw, PS, CFedS



What is a Surveyor?

MCL 339.2001 (j)

- A person who, by reason of knowledge of law, mathematics, physical sciences, and techniques of measuring acquired by professional education and practical experience, is qualified to engage in the practice of professional surveying.



Retracing Old Boundaries



I. Boundary Surveying

Creating New Boundaries



II. Geodetic Surveying

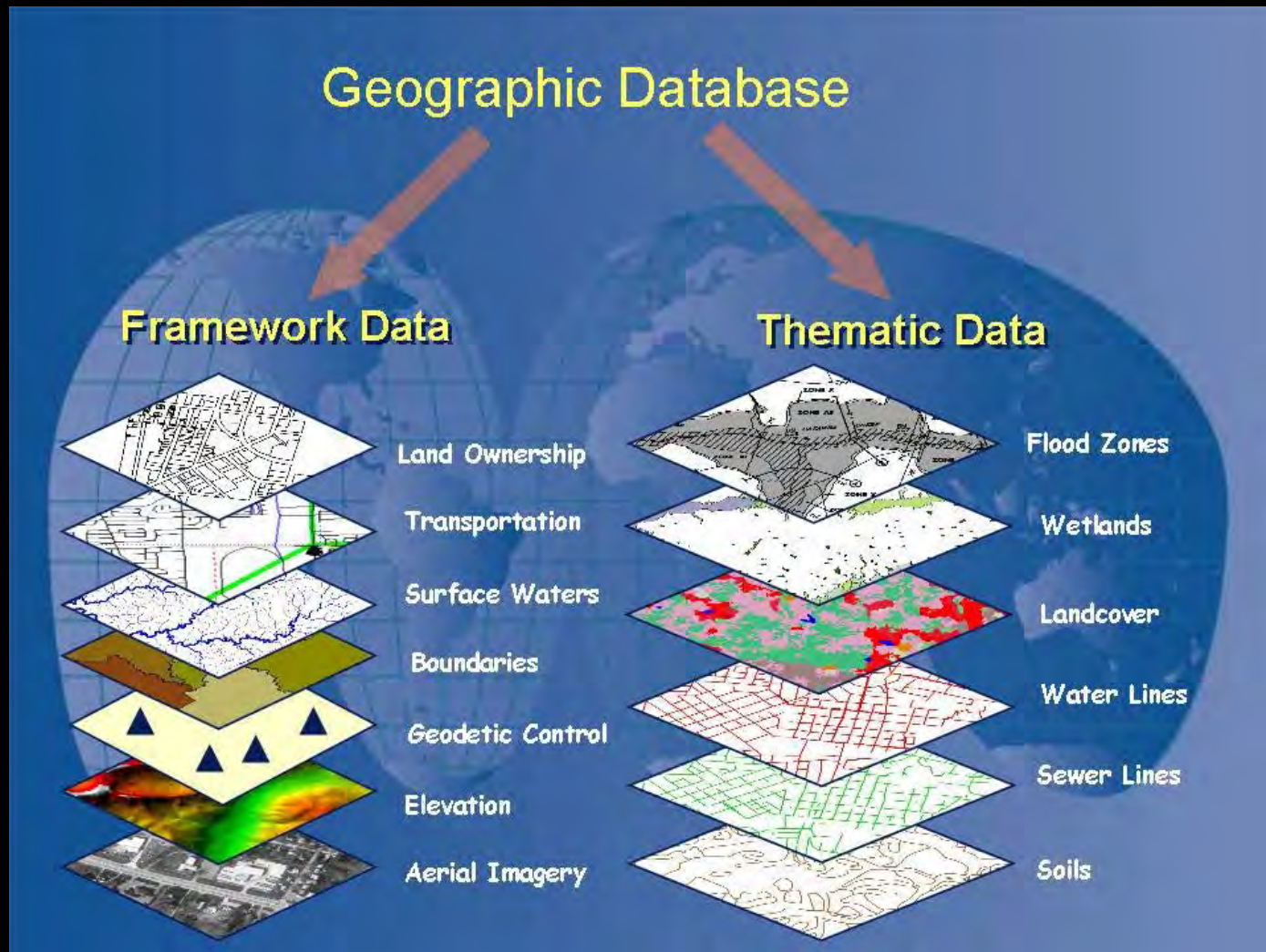
Measuring the Size, the Shape, the Gravity Field of the Earth, and its Orientation in Space, as well as the changes of these, as a function of time.



III. Design Surveying/Construction Layout



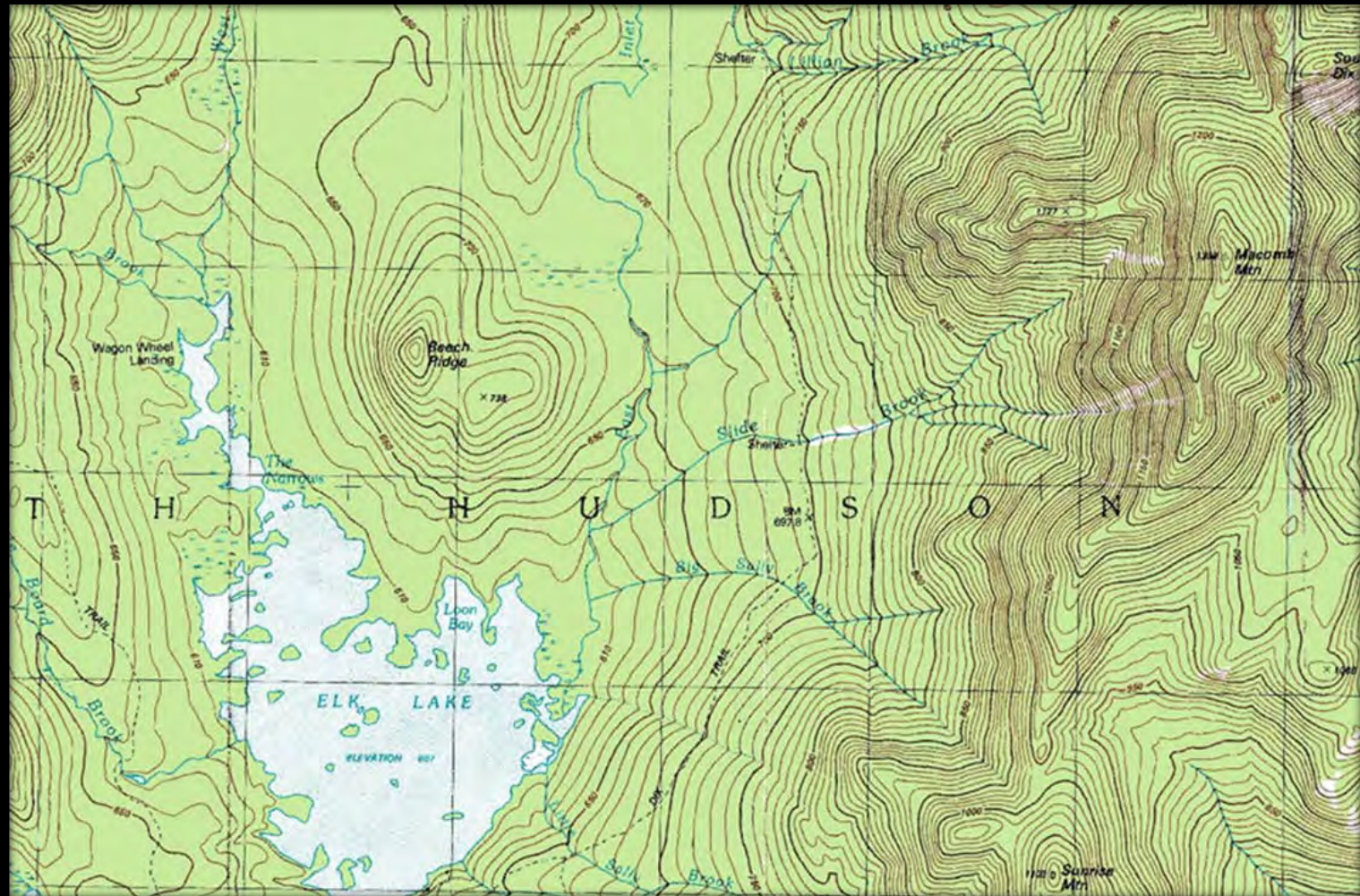
IV. Geographic Information Systems (Map-Data Base-Query Mechanism)



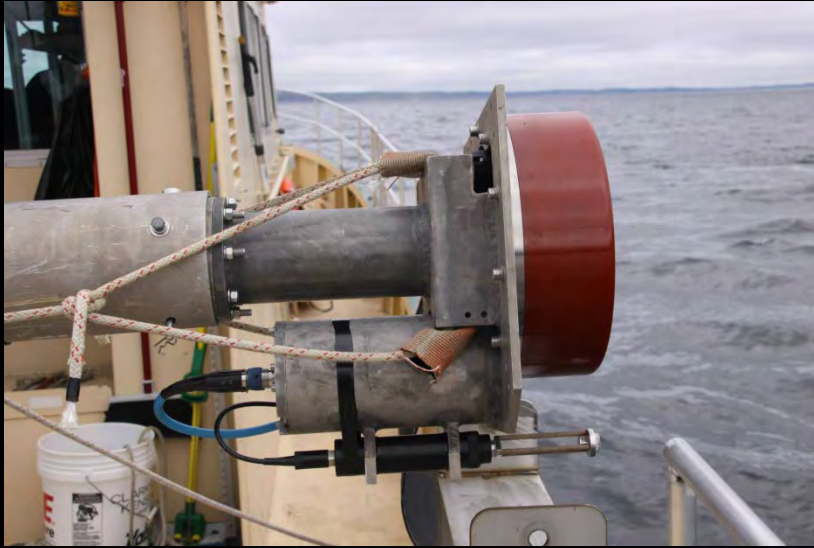
V. Cartography



Va. Topographic Surveys



Vb. Hydrographic Surveys



Surveying Applications



Bridge Layout and Monitoring



High Speed Rail



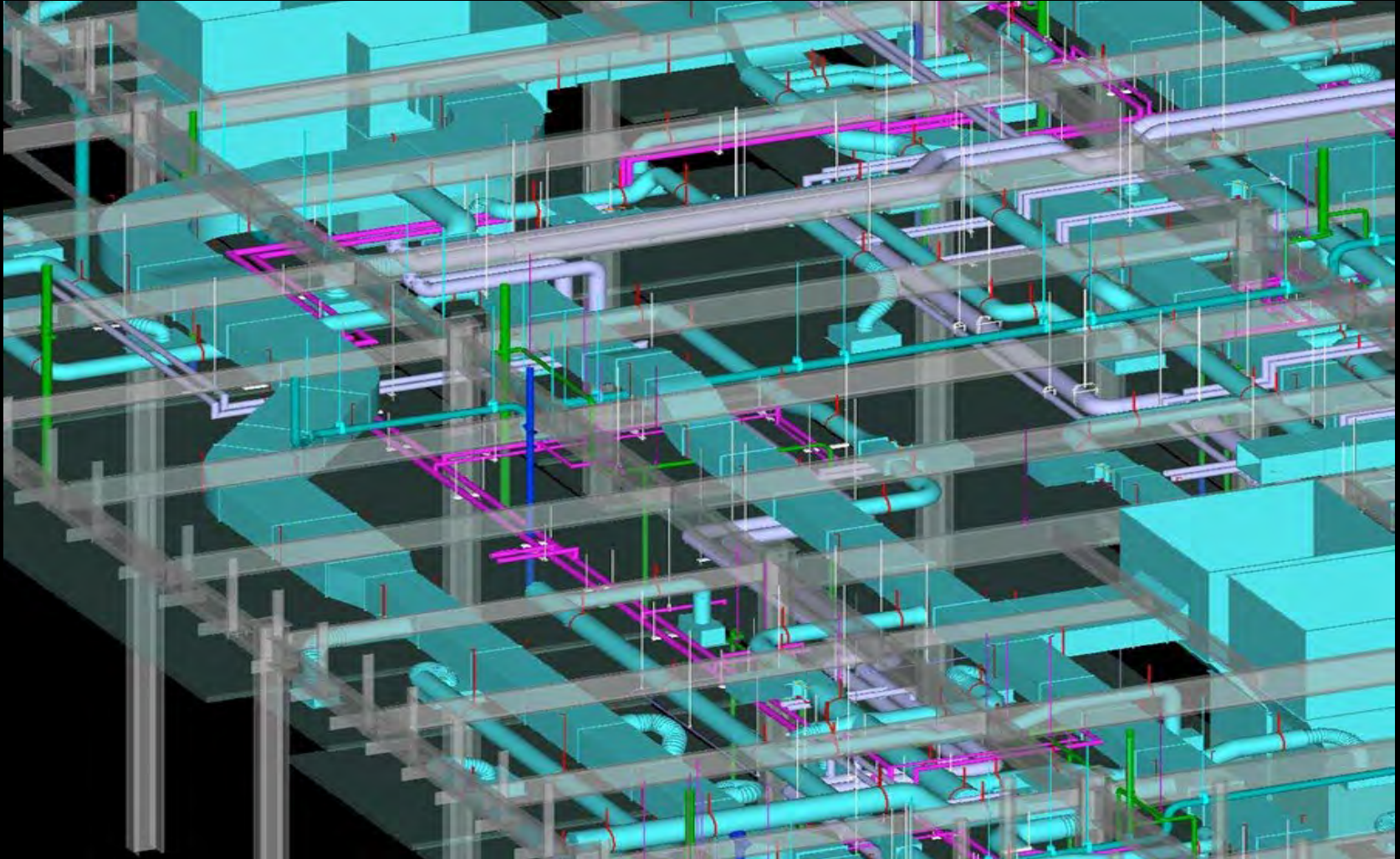
Deformation Studies



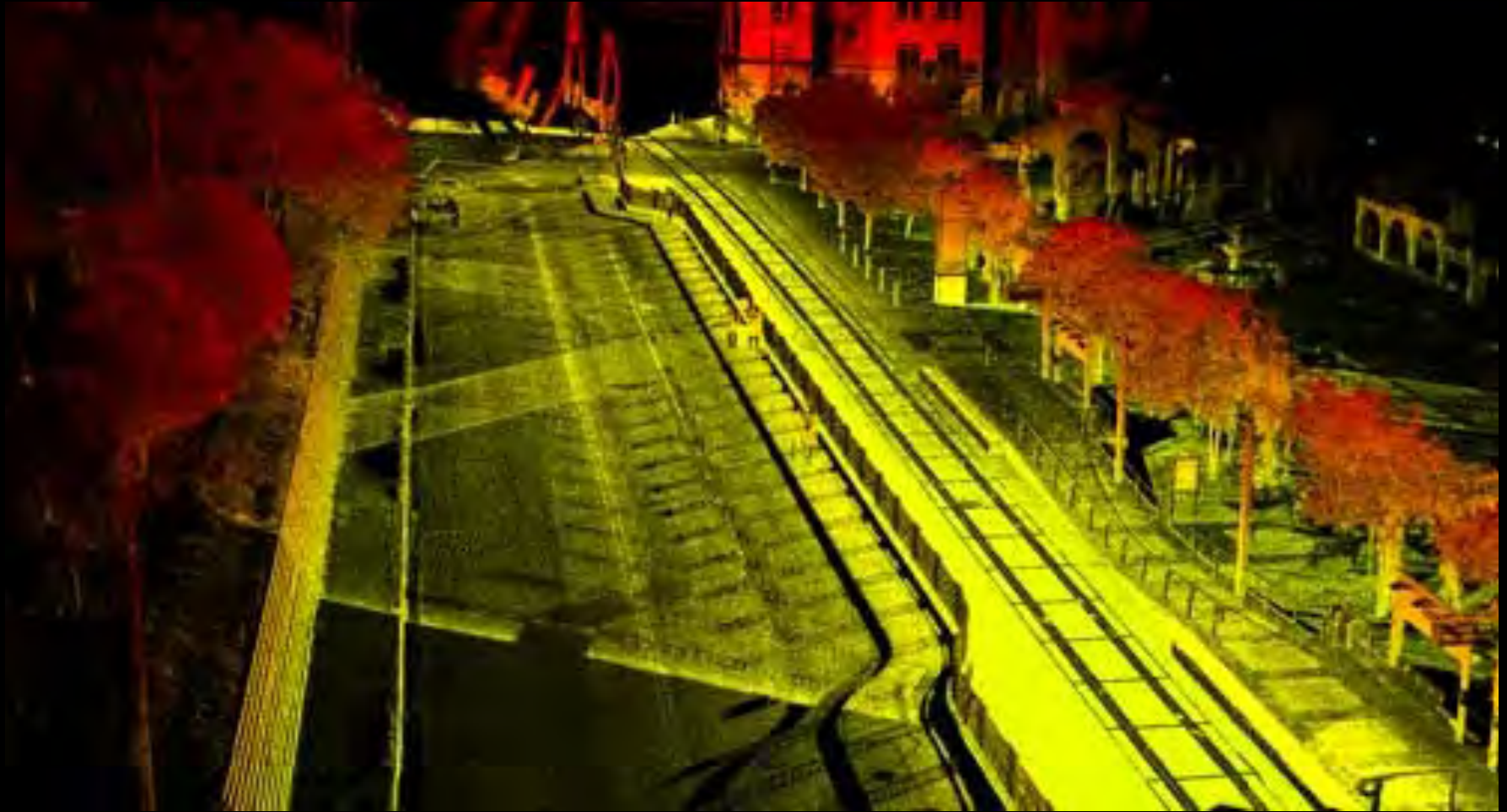
Architectural Surveying



Building Information Modeling (BIM)



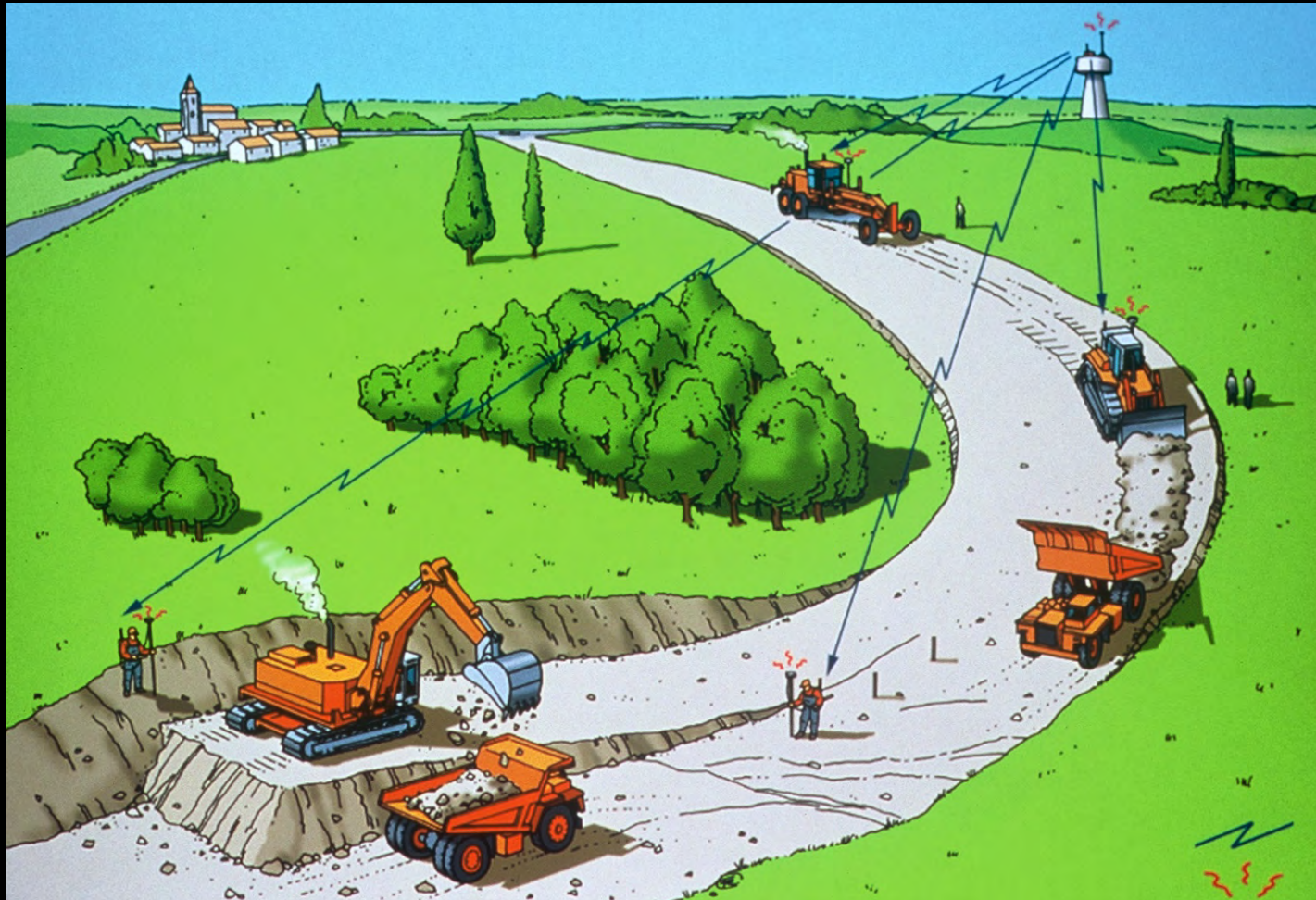
Mobile Mapping



Satellite Imaging



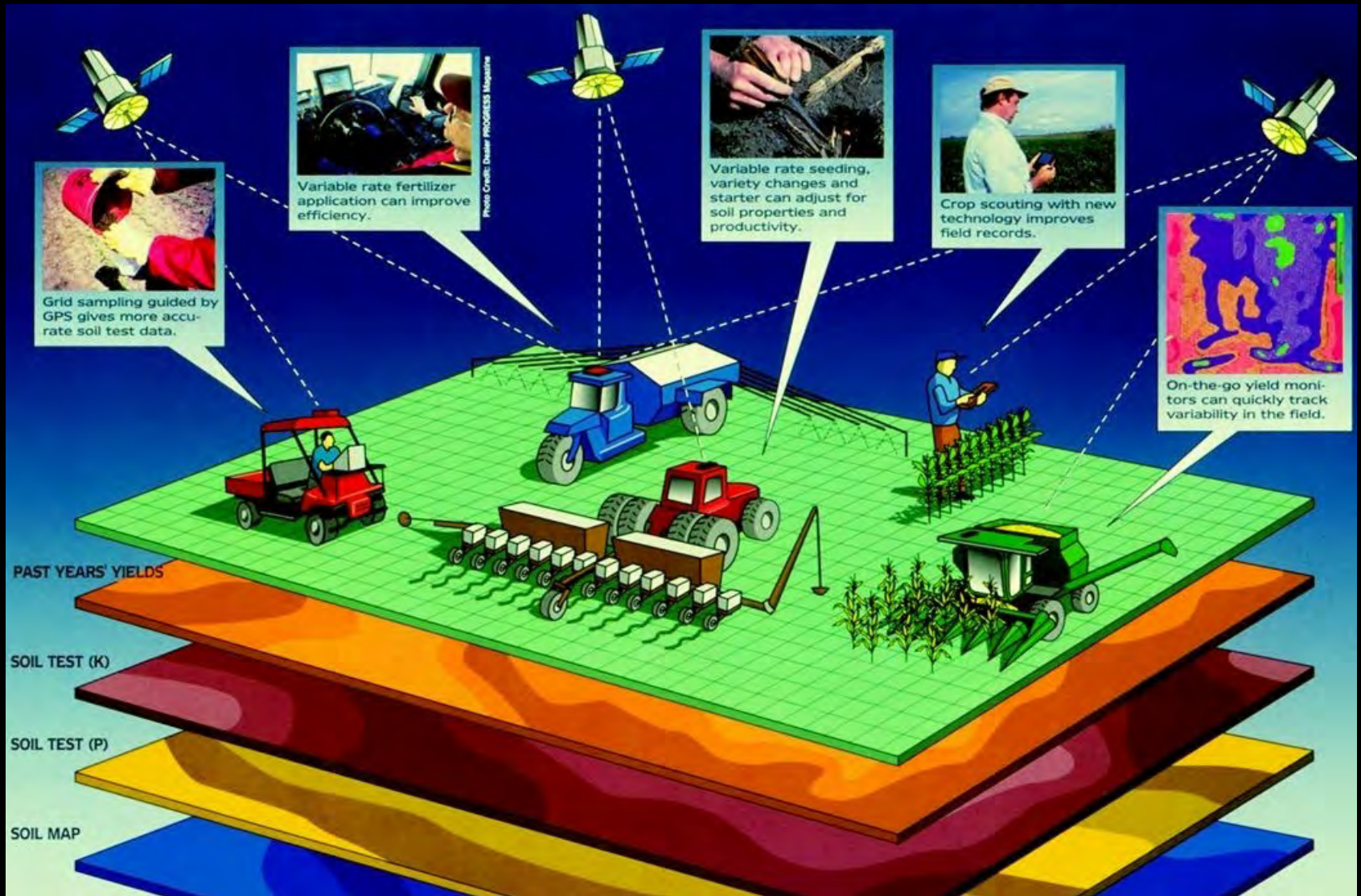
Machine Guidance



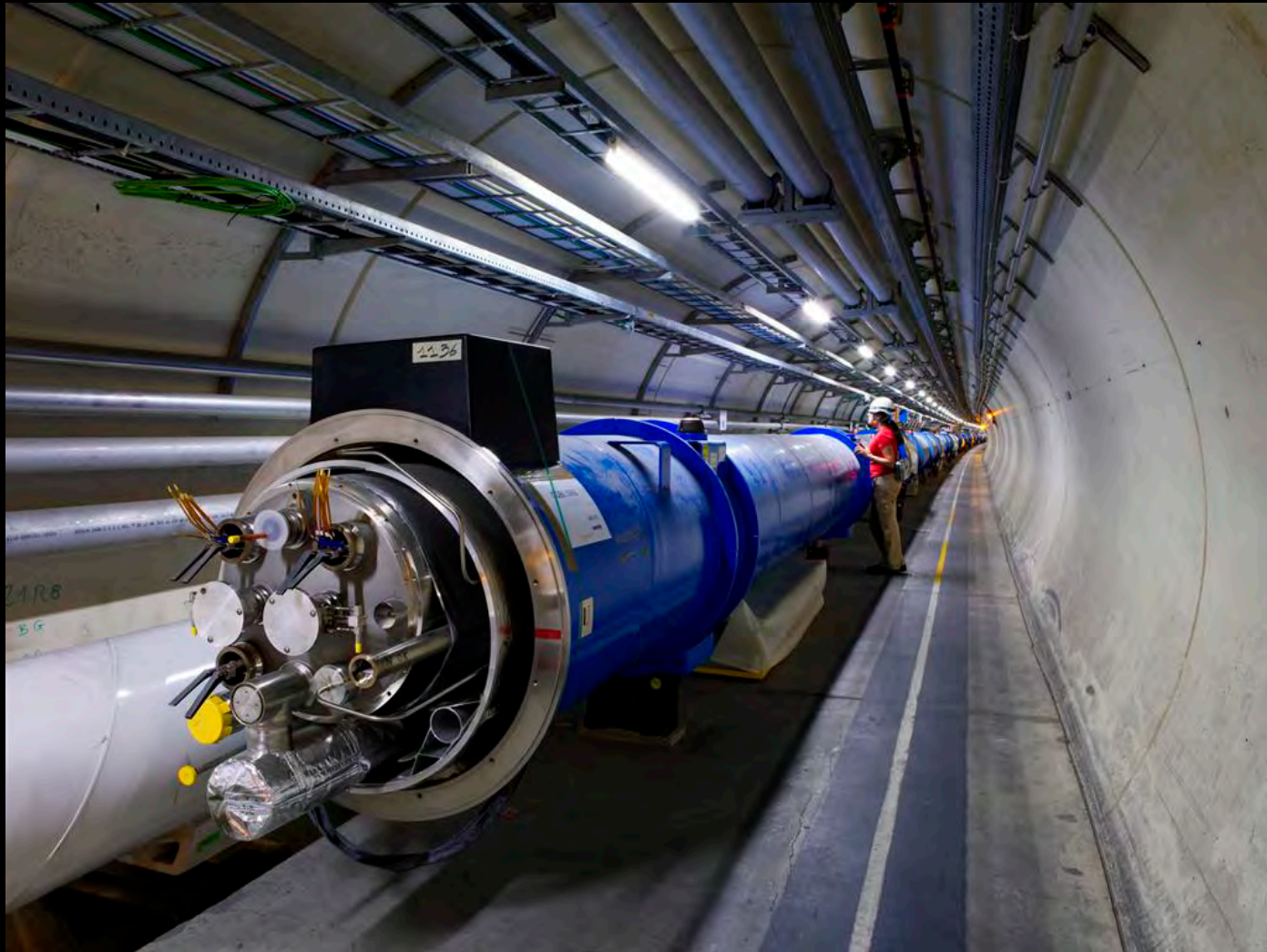
Precision Agriculture



Precision Agriculture



Metronics



Metronics



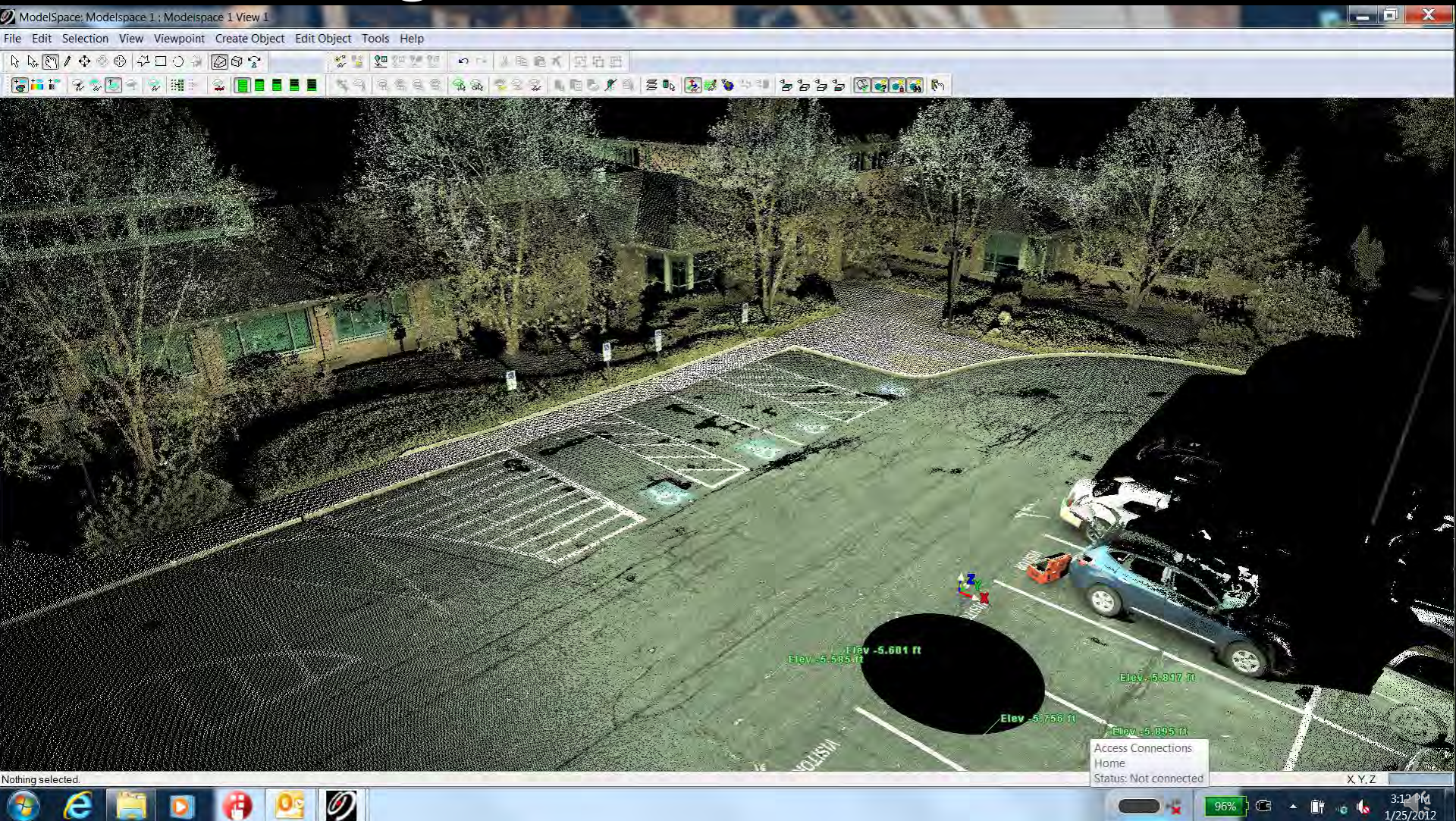
U2 Concert Stage



Environmental Remediation



Forensic Surveying/Laser Scanning



Search and Rescue



Energy Exploration

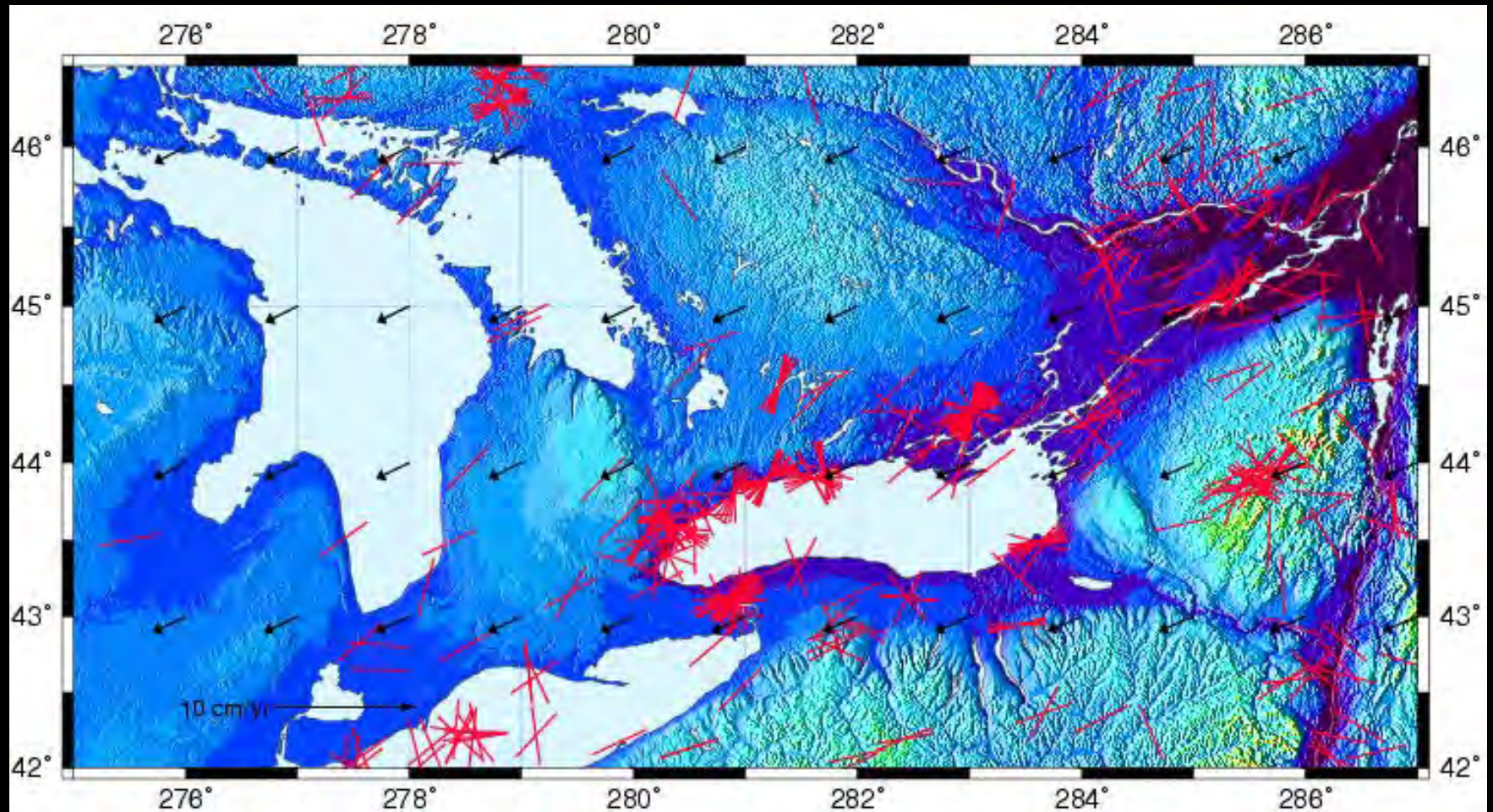


Mineral Surveys

- Performing Seismic Surveys
- Establishing Easements and Rights of Way
- Determining Drilling Units
- Well Location Surveys



Crustal Motion Surveys



Reconnaissance



Military Targeting and Navigation



Geospatial Intelligence



Mining and Tunneling



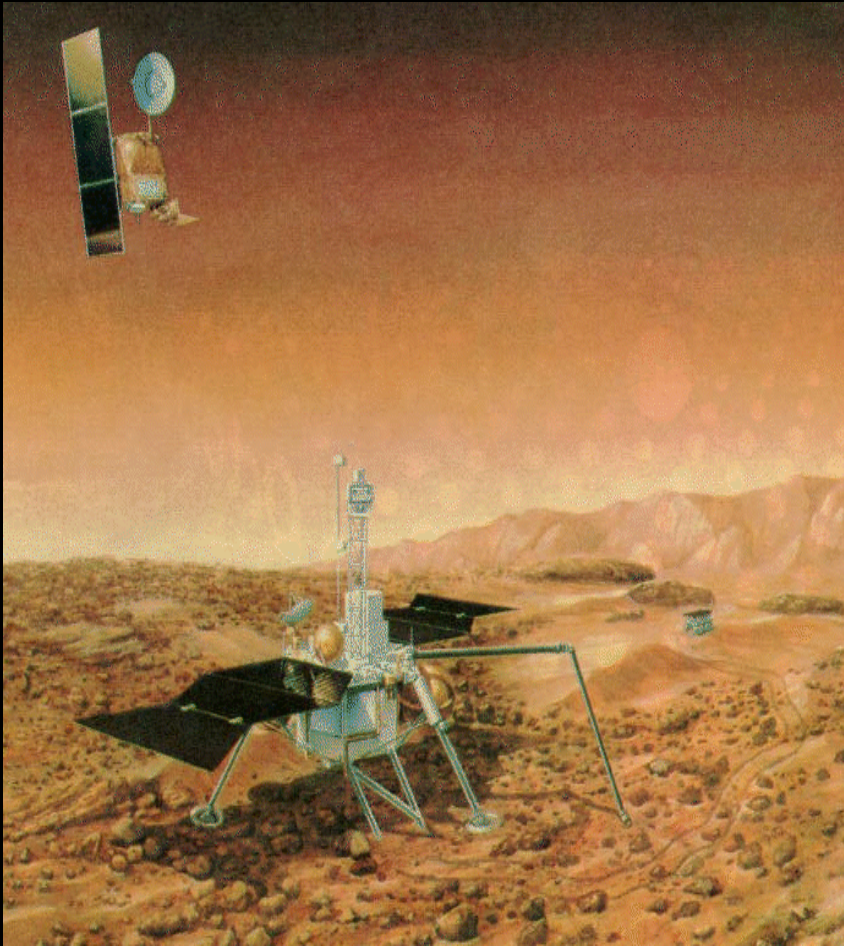
Mining and Tunneling



Quarry Operations



Mapping (Extraterrestrial)



Sunken Wrecks and Pirate Gold



Northwestern Michigan College

Founded in 1951

#2 ranked Veterans college in the country

Top 10 in nation for short term study abroad

Industry leading Commercial Pilot program

GLMA -1 of 6 federally authorized maritime academies



Strategic Directions

- Global preparation
- National/International leadership/competencies
- Networked delivery
- Lifelong relationships
- Transcribe most learning



Surveying Degree at Northwestern Michigan College

- Comprehensive survey specific courses:
 - Fundamentals of Survey Operations
 - CAD for Surveying
 - Construction Survey Applications
 - Surveying Calculations
 - Survey Positioning
 - Boundary Surveying
 - Remote Sensing Systems
 - GIS
 - Great Lakes Research Technologies
 - UAS Survey Operations



Thank you

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