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Advances in Near-Surface Geophysics

Geophysical methods see a broad range of uses and span a wide range of scales and technologies. While the fundamentals of the field are well understood, there is constant advancement and refinement of the techniques and methodologies.

Applied geophysics appears in support of many human endeavours. Historically, the most common use has been in oil and gas exploration closely followed by mineral exploration. Both resource-based communities constantly advance geophysical technology and mapping techniques on depths scales of hundreds to thousands of meters.

Recently, engineering and infrastructure needs are driving rapid advancement in high-resolution geophysics. These applications are extremely diverse and range from assessing engineered structures, ground water search and evaluation, environmental site assessment, archeology, forensics, unexploded ordnance, and many others. Many of applications fall into the classification of "near-surface geophysics". While dependent on the same fundamental physics, these applications demand much higher spatial resolution, typically on the sub meter to 10's of meters scale.

Achieving this level of detail requires much higher spatial data density, more rapid data acquisition and more scale sensitive geospatial imaging. Ancillary control information require the same level of detail to aid with data evaluation and interpretation. Accomplishing all this at an affordable cost is extremely challenging!
Over the last five to ten years, the challenges are steadily being overcome by the advancement of sensor technology, computers and communications. Applications of geophysics, felt to be unattainable because of cost, are now becoming common place. This presentation will use some current examples to illustrate how the commercial drivers are creating a new world of applied geophysics for the near-surface.

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