

LUNAR SURFACE GRAVIMETRY FOR FINDING ORE DEPOSITS ON THE MOON. K. A. Carroll, Gedex Systems Inc., 407 Matheson Blvd. East, Mississauga, Ontario, Canada L4Z 2H2, kieran.carroll@gedex.com

(Abstract for a 5-minute Lightning Talk.)

Many valuable natural resources on the Earth are found in ore deposits: rock containing a high enough concentration of the desired material, in a form that is amenable to refining, as to make it economical to extract it. It is an open question as to whether this will also be the case for economically viable deposits of resources on the Moon. That rather depends on markers developing for lunar resources, which is speculative. Consider, for example, water as a Lunar resource. Water in the form of ice deposits in permanently shadowed polar regions may be particularly localized in some parts of such PSRs; or, perhaps every shovelful of dirt from a PSR will have about the same concentration of water in it, as every other shovelful.

On Earth, explorers for natural resources have developed numerous tools and techniques for finding likely locations for various types of ore deposits --- in a word, for Prospecting. Should some valuable Lunar resources be located in concentrated ore deposits, then existing terrestrial prospecting techniques may be useful for finding them.

One well-established and widely-used geophysical prospecting technique on Earth, is ground gravimetric surveying --- using a sensitive gravimeter instrument to make measurements of variations in surface gravity, along a traverse line or over a survey area, due to variations in density of subsurface rocks. With the development of Gedex's VEGA instrument (an absolute vector gravimeter developed for use in space, suitable for operation aboard small robotic Lunar rovers), it is now possible to employ that technique on the Moon's surface. Some possible examples of Lunar ores that could exhibit a detectable density response are water ice, and ilmenite (another possible feedstock for producing oxygen and water on the Moon).