

#### LOT #162 High Definition Cryogenic Airborne Gravity Gradiometer





#### Gedex Systems Inc.

#### Technology Overview

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September 2019

## Why Gradiometry?

#### Gravimeter



**Gravity Gradiometer** 



Signal = L

Unit = mGal (10<sup>-6</sup>g) Earth 980,000 mGal Anomalies 1-10 mGal *1 in 1,000,000* Vector, Gm1m2/r<sup>2</sup> Signal =  $(L_1 - L_2)/d$ 

Unit = E ( $10^{-10}$ g/m) Eötvös Earth 3000 E Anomalies 1- 10 E *1 in 1,000* 3D Tensor, Gm1m2/r<sup>3</sup>

#### Easier to Measure Gradient from a Moving Platform



#### Sensor Performance Goal

 Ultimately the Gedex HD-AGG<sup>™</sup> System will Detect the Change in Gravity over **One** Metre

– One Part in a Billion –

one Eötvös (E)

One Part in a Billion = The First 40 Centimetres of a Trip to the Moon

To be Commercial 10 E is Sufficient



# **Enabling Technologies**





#### HD-AGG<sup>®</sup> Sensor





#### How it Works



(femtometer-10<sup>-14</sup>m)





#### How do We Detect Geology?





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#### Singular Accelerometer Issue





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#### **Differential Mode: Gradiometer**





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# Common Mode (Reject): A/C Acc'n



Differential-Mode Response

Orthogonal Pair of Angular Accelerometers, *Turbulence* 



# Flight Cryostat



 Interior Temperature 4 Degrees above Absolute Zero



- Temperature Kept Constant to within a Millionth of a Degree
- Pressure Kept Constant to within 10 Millionths of an Atmosphere





#### **Isolation Mount**



#### The Gedex Advantage



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