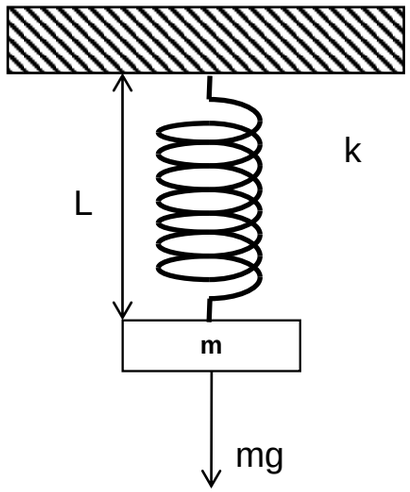
Gedex Systems Inc.

Technology Overview

September 2019

Why Gradiometry?

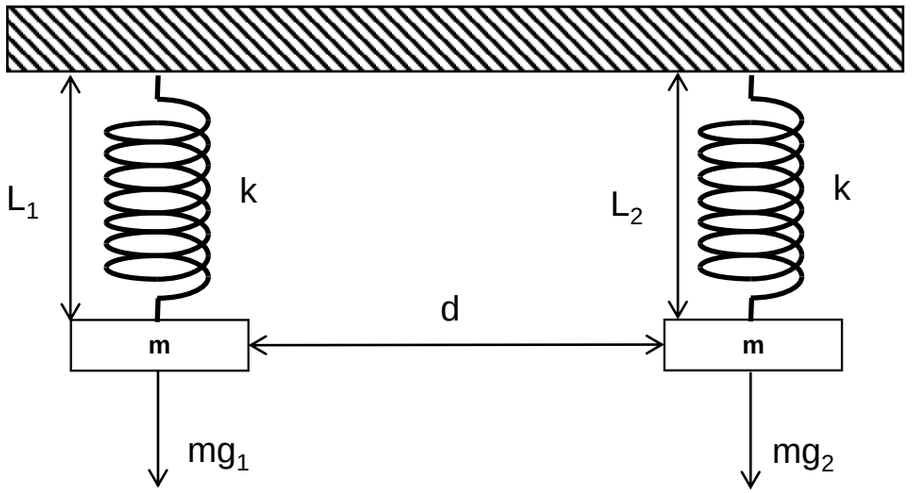
Gravimeter



Signal = L

Unit = mGal (10^{-6}g)
Earth 980,000 mGal
Anomalies 1-10 mGal
1 in 1,000,000
Vector, Gm1m2/r^2

Gravity Gradiometer



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^3

Easier to Measure Gradient from a Moving Platform

Sensor Performance Goal

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

– One Part in a Billion –

***one* Eötvös (E)**

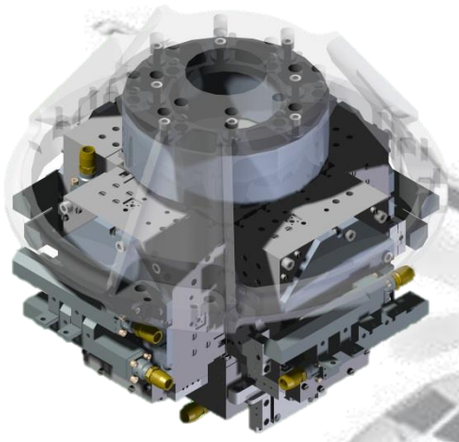
One Part in a Billion = The First 40 Centimetres of a Trip to the Moon

To be Commercial 10 E is Sufficient

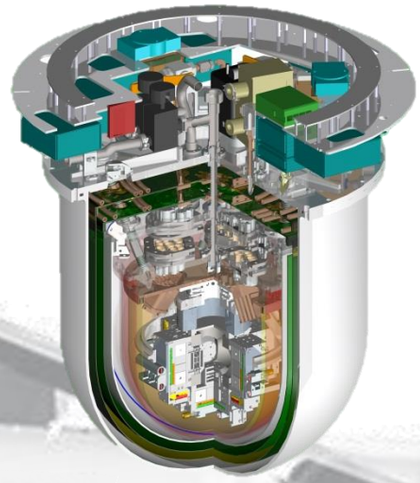
Enabling Technologies

HARDWARE
(HD-AGG™ System - Proprietary to Gedex)

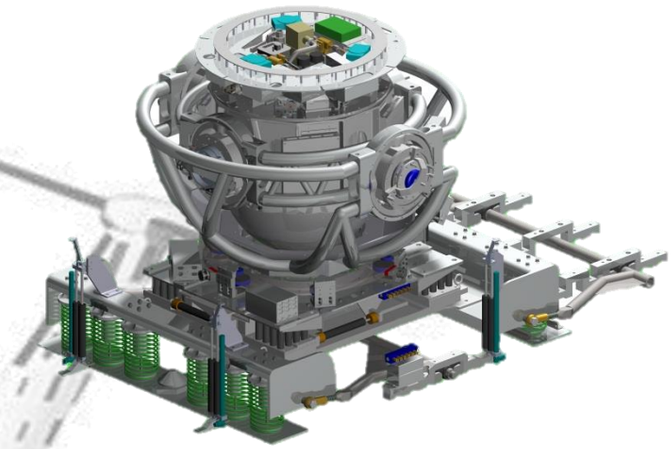
Gravity Gradiometer Instrument



Flight Cryostat



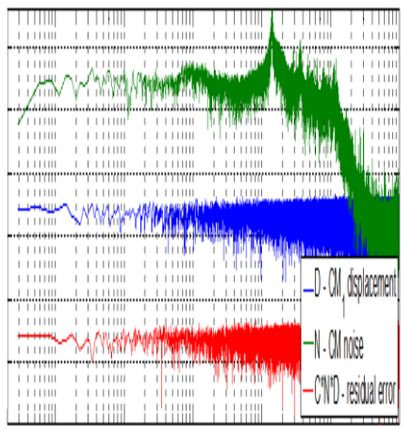
GeoMIM Isolation Mount



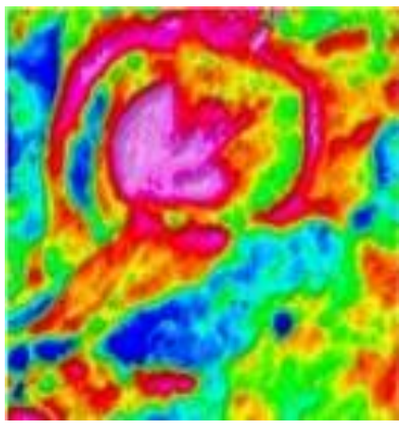
Raw Data Collection

Dash-8 Survey Aircraft

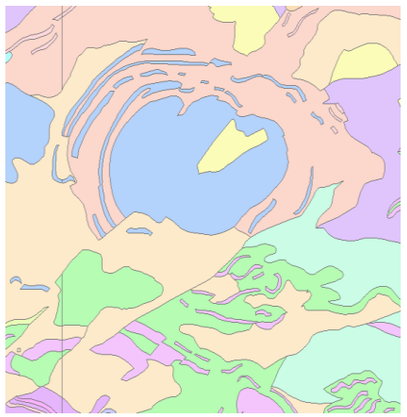
SOFTWARE
(Specialized Programs Proprietary to Gedex)



Post-Processing Software



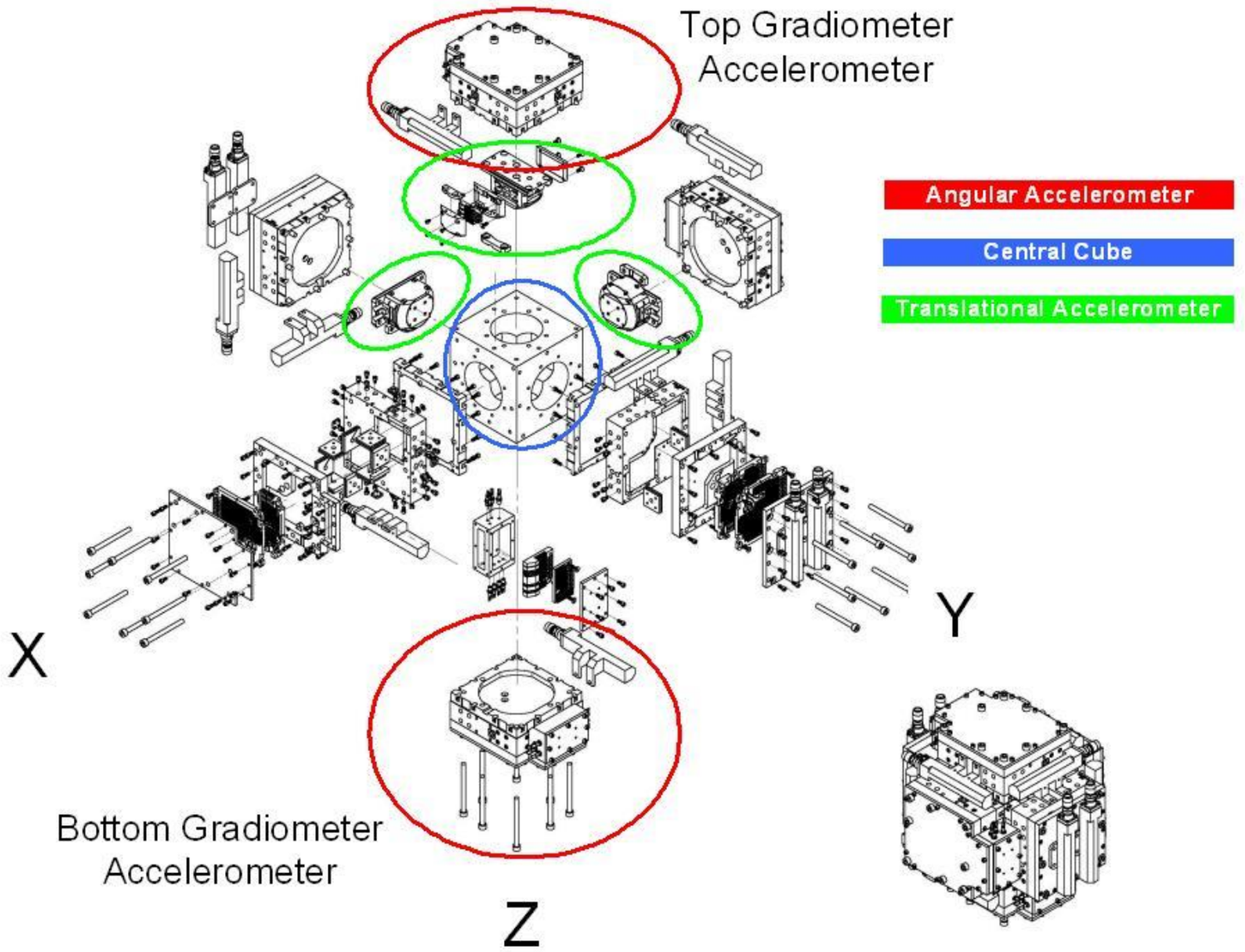
Geophysical Processing & Imaging Software



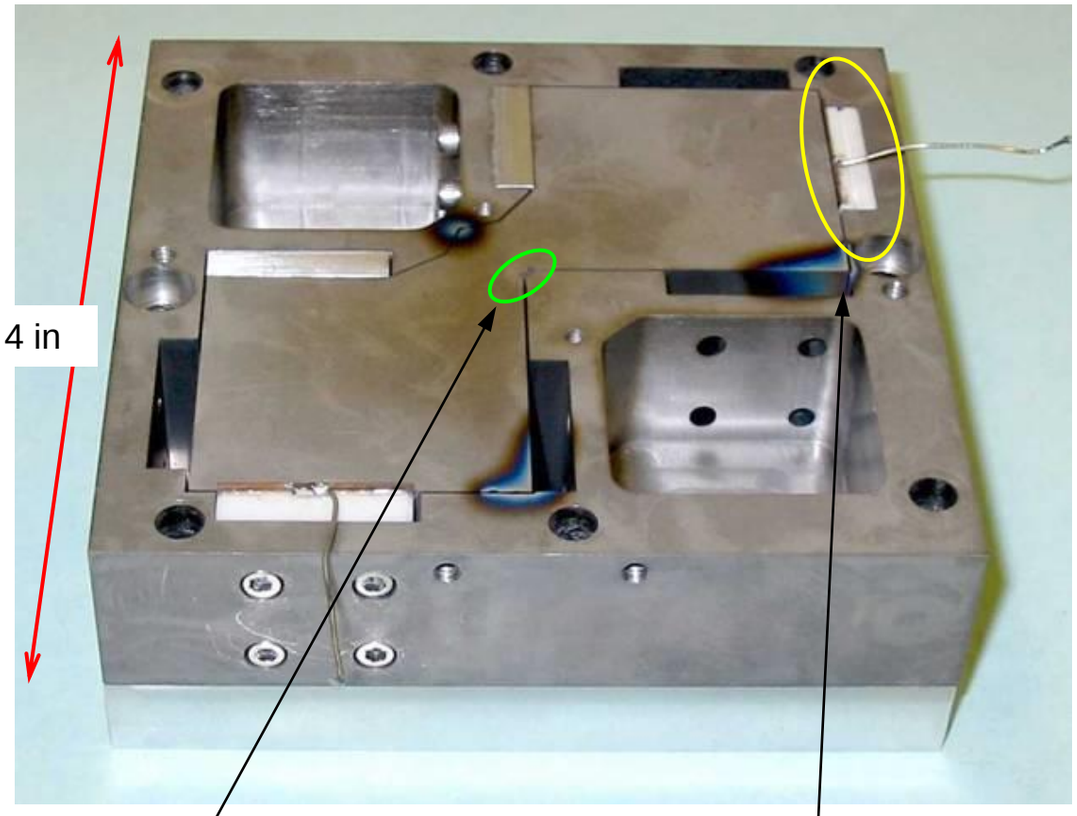
Geological Analysis Software

Discoveries

HD-AGG® Sensor

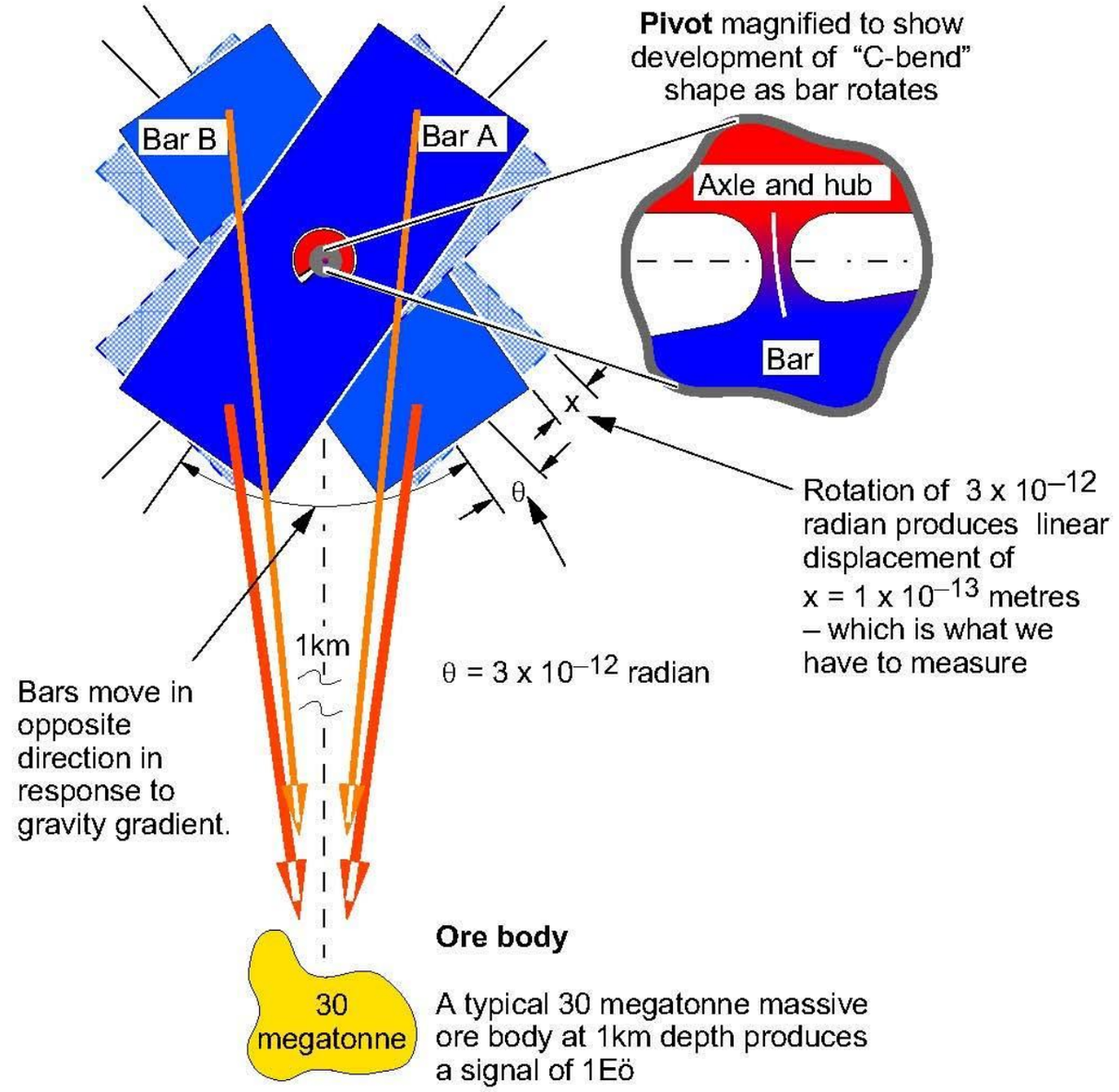


How it Works

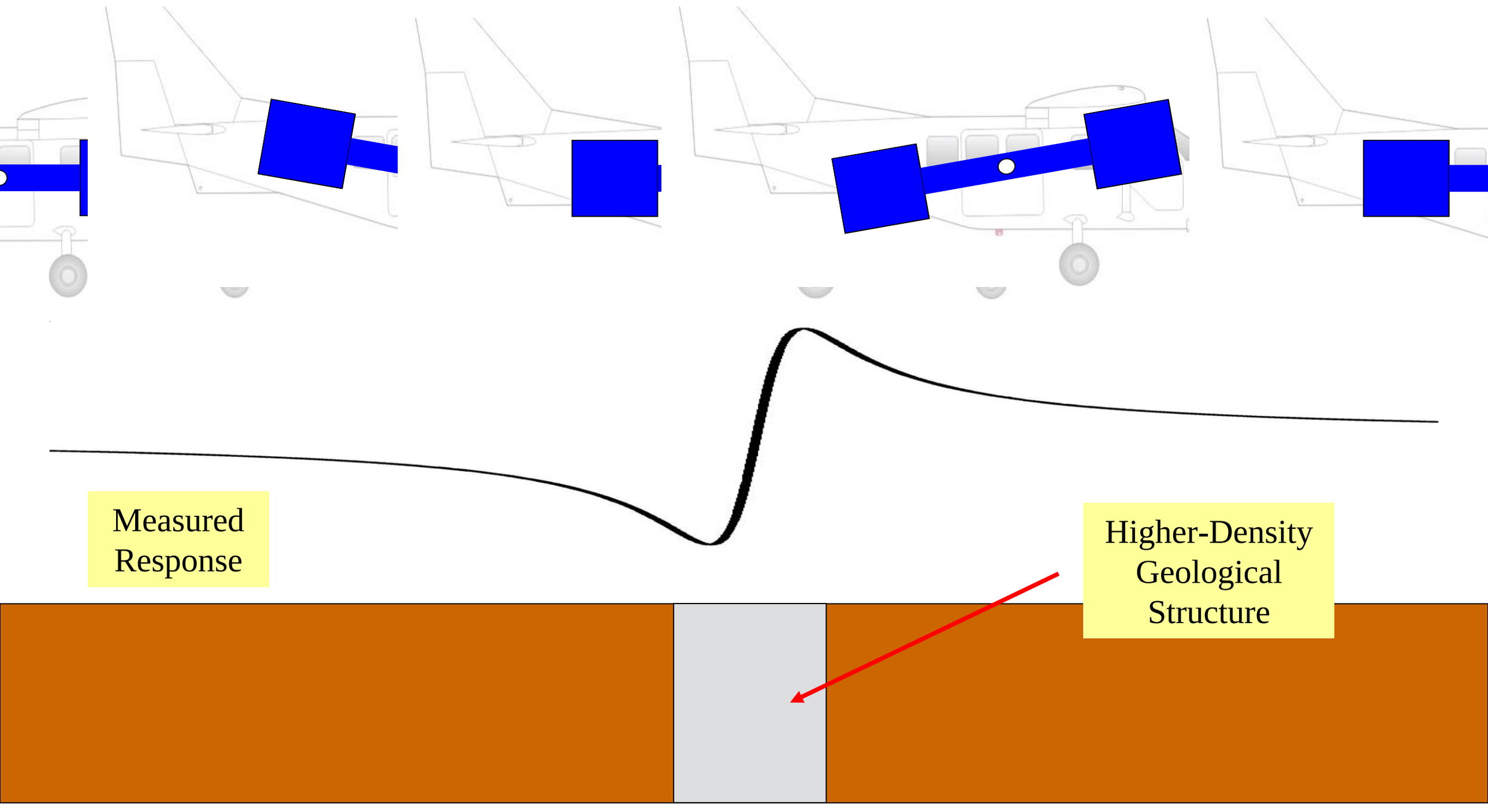


- **Balance to within One Billionth of a Metre**

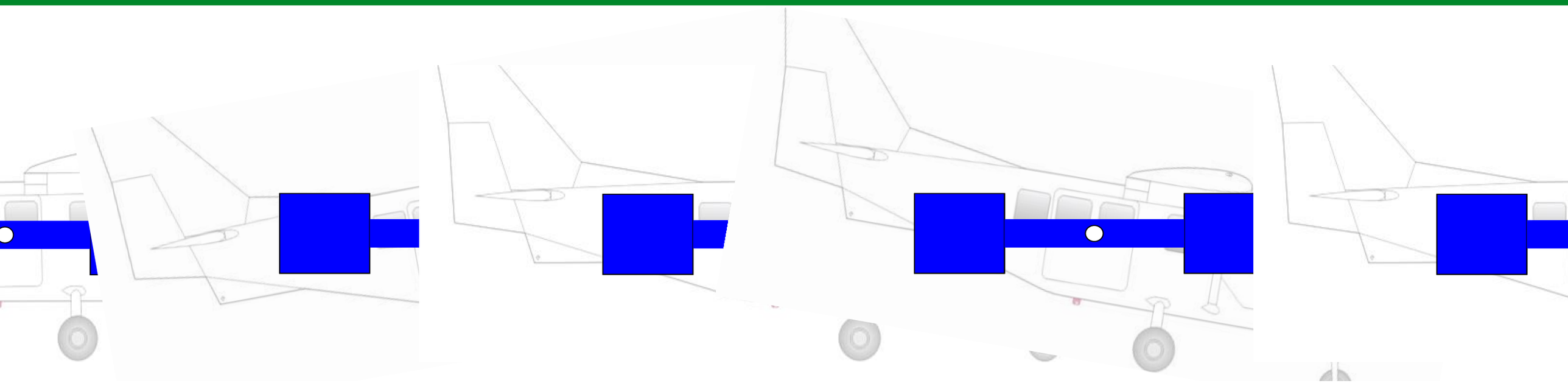
- **Measure Gap-Changes to the Size of the Nucleus of an Atom (femtometer–10^{-14}m)**

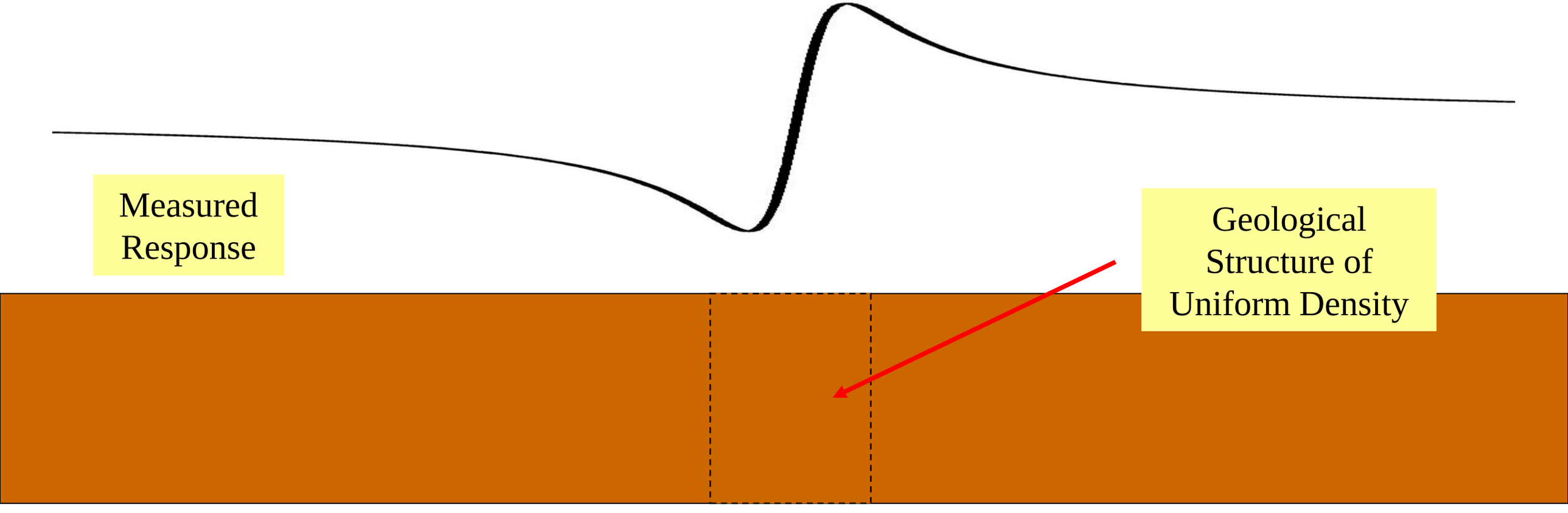


How do We Detect Geology?

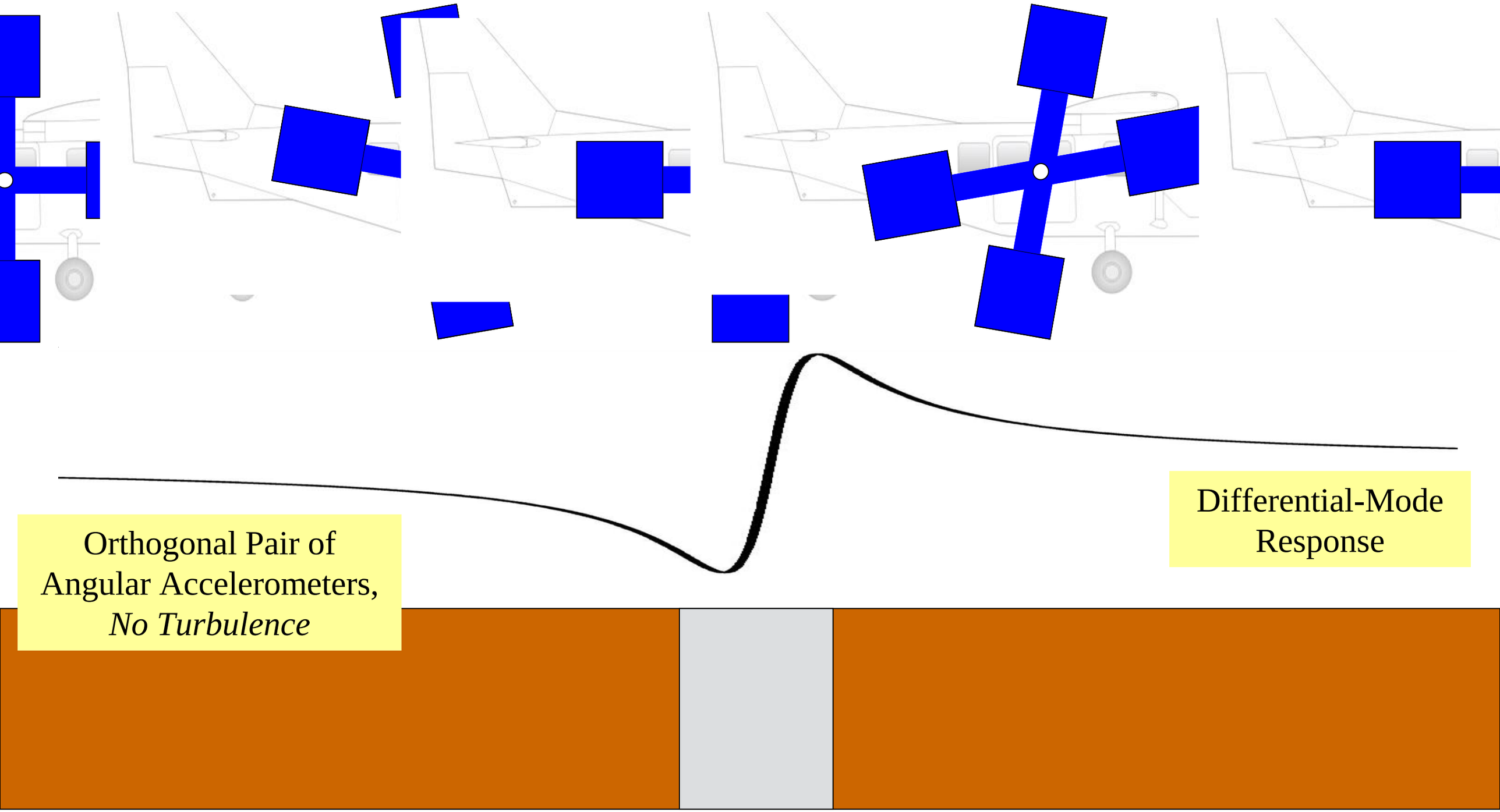


Singular Accelerometer Issue

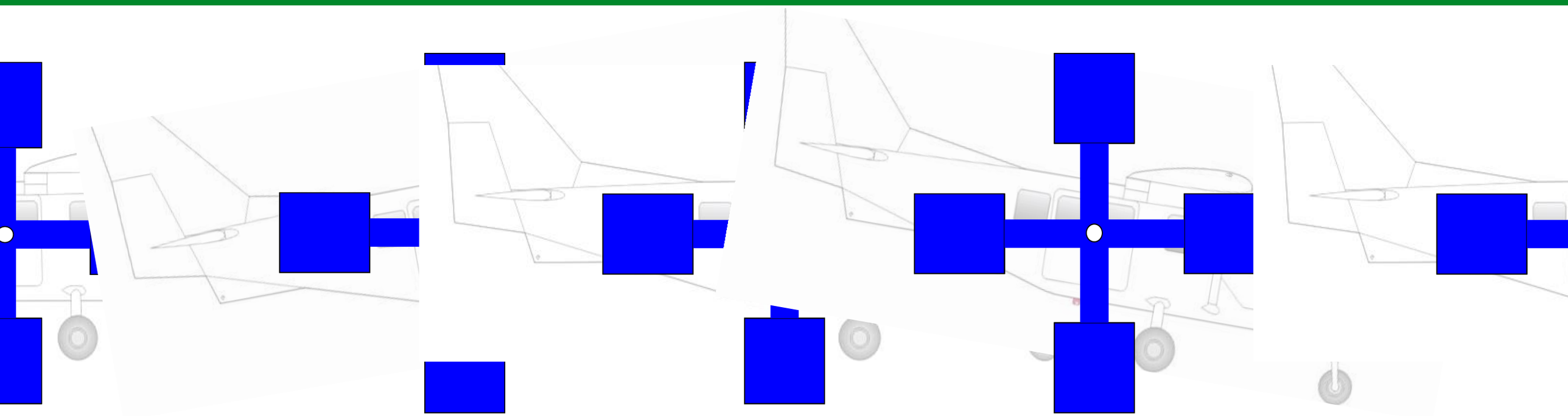




Differential Mode: Gradiometer



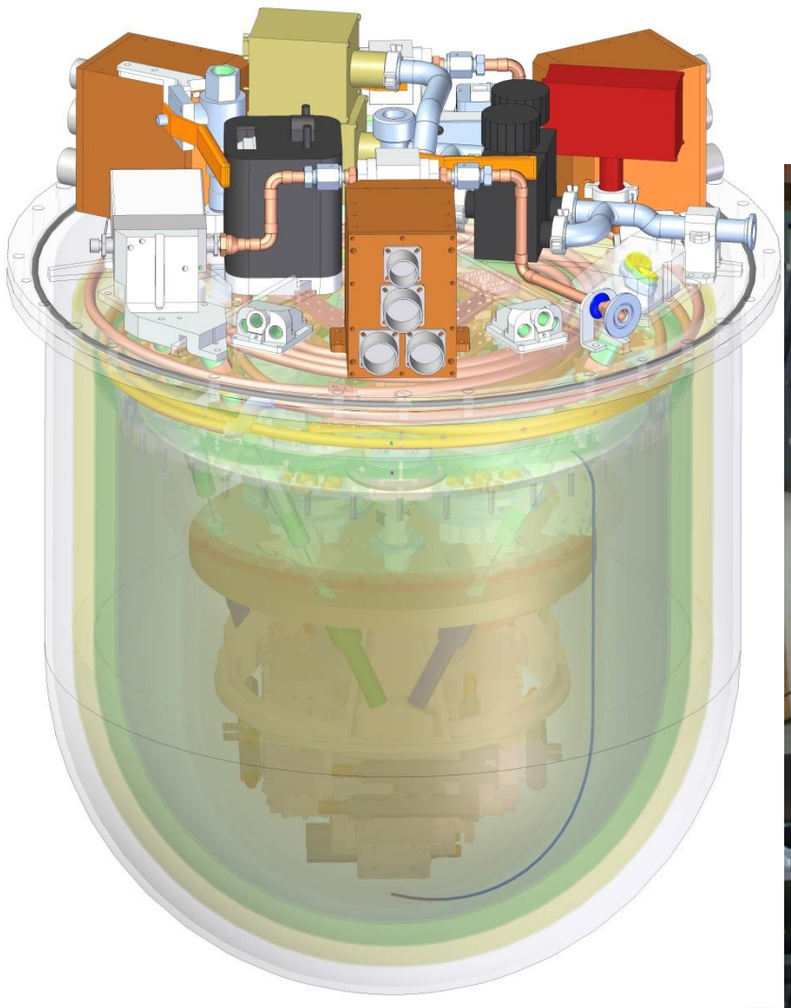
Common Mode (Reject): A/C Acc'n



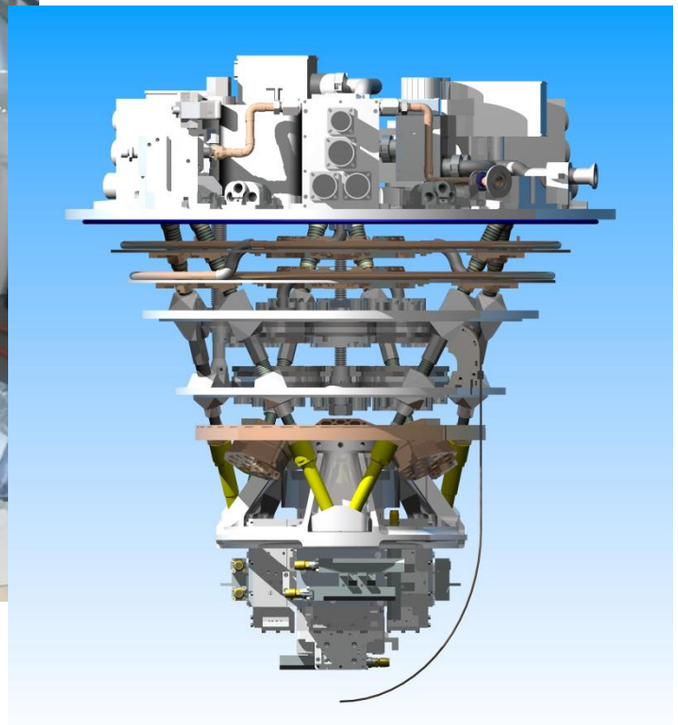
Orthogonal Pair of Angular Accelerometers, *Turbulence*

Differential-Mode Response

Flight Cryostat



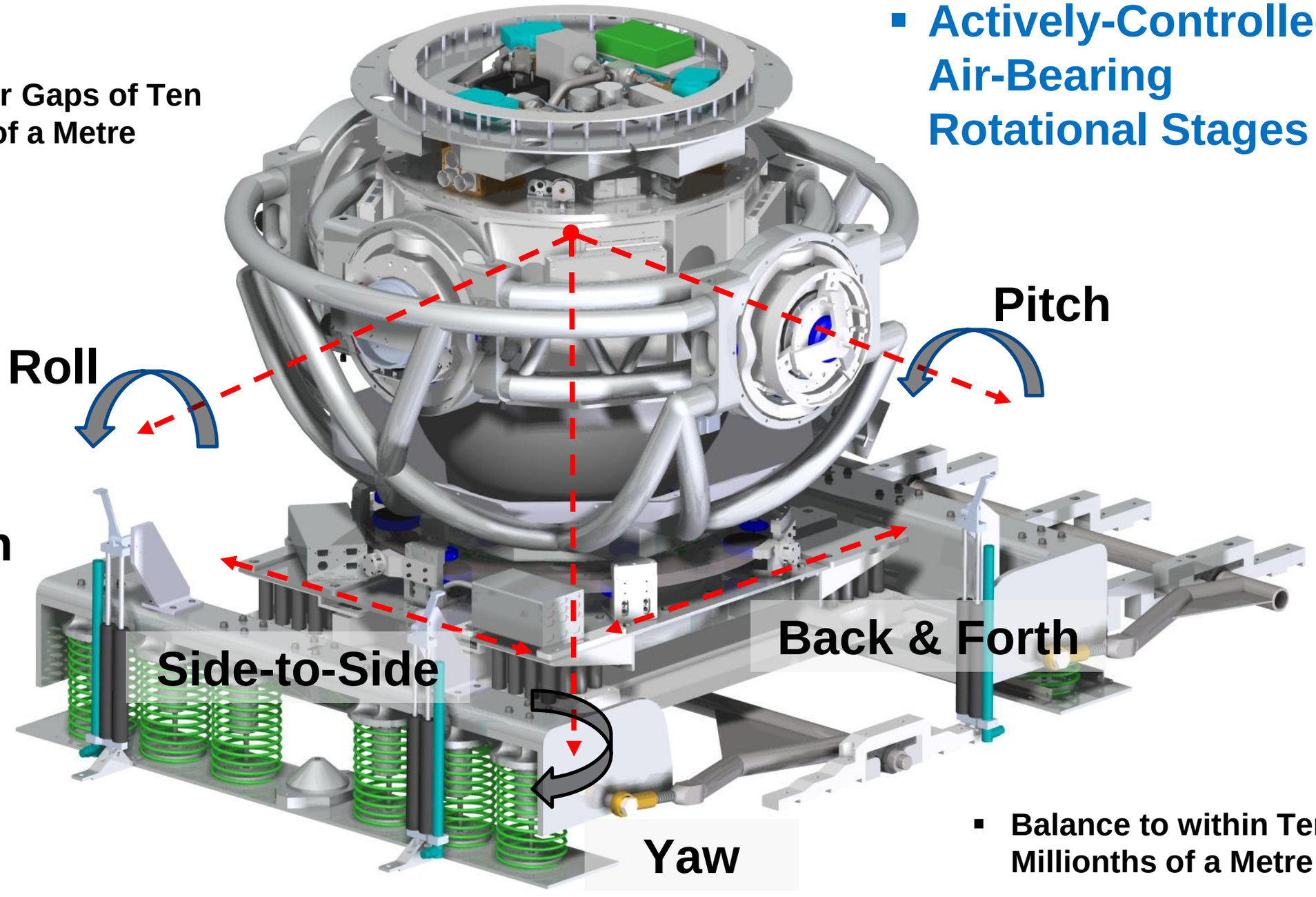
- **Temperature Kept Constant to within a Millionth of a Degree**
- **Pressure Kept Constant to within 10 Millionths of an Atmosphere**
- **Interior Temperature 4 Degrees above Absolute Zero**



Isolation Mount

- **Maintain Air Gaps of Ten Millionths of a Metre**

- **Actively-Controlled Air-Bearing Rotational Stages**

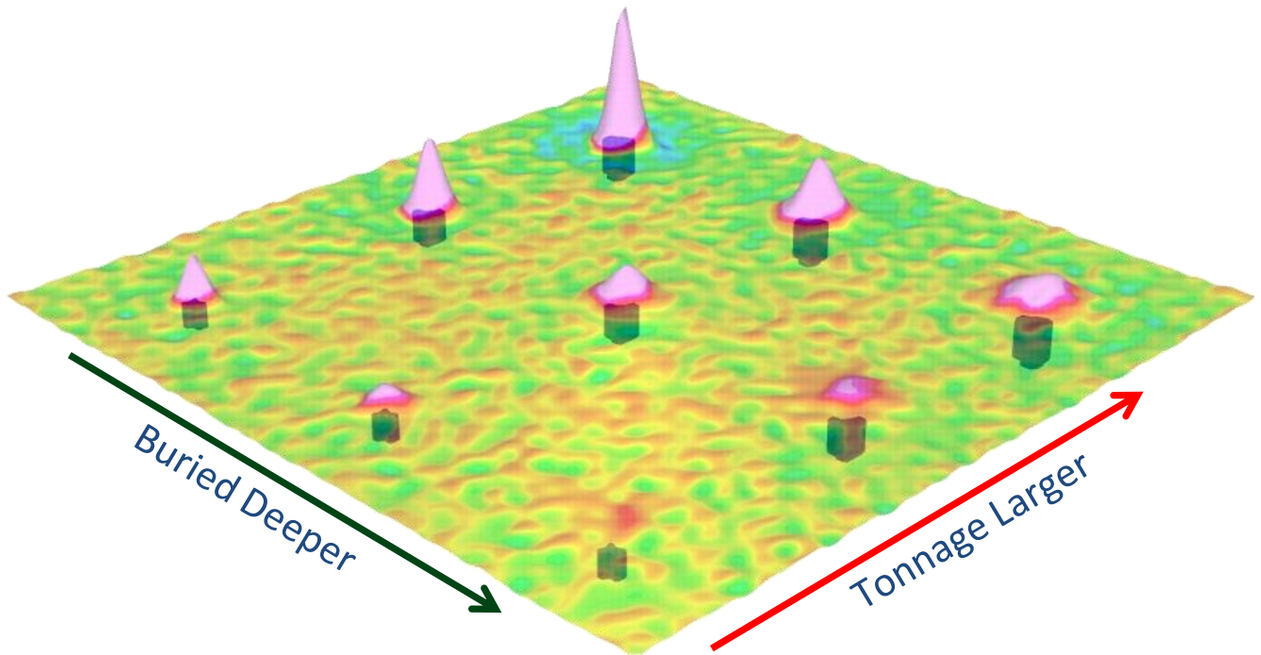


- **Balance to within Ten Millionths of a Metre**

- **Passive Mechanical Stiffness Translational Stages**

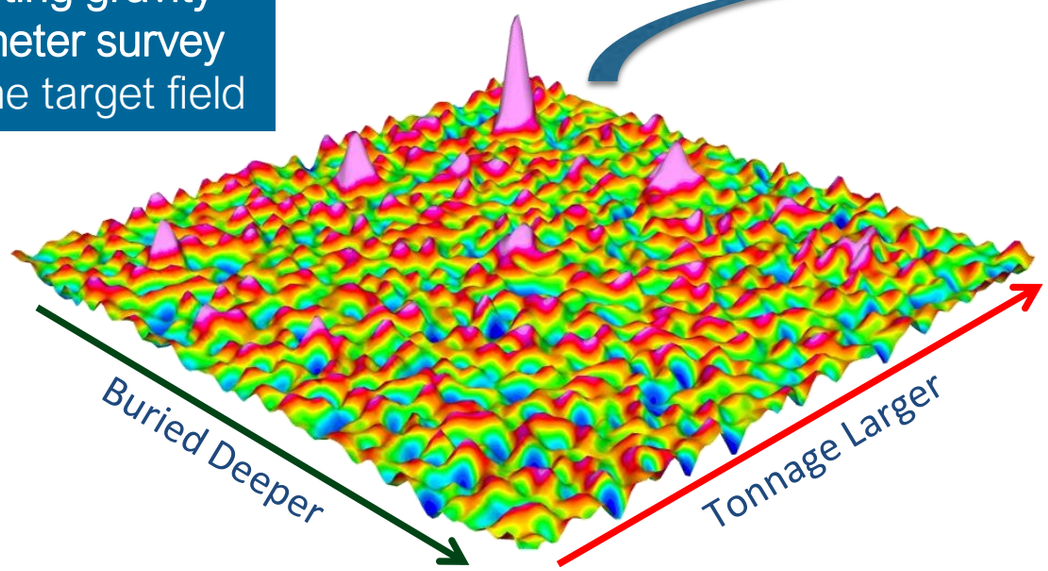
The Gedex Advantage

GEDEX HD-AGG™ survey over field of simulated targets of various sizes arranged at various depths

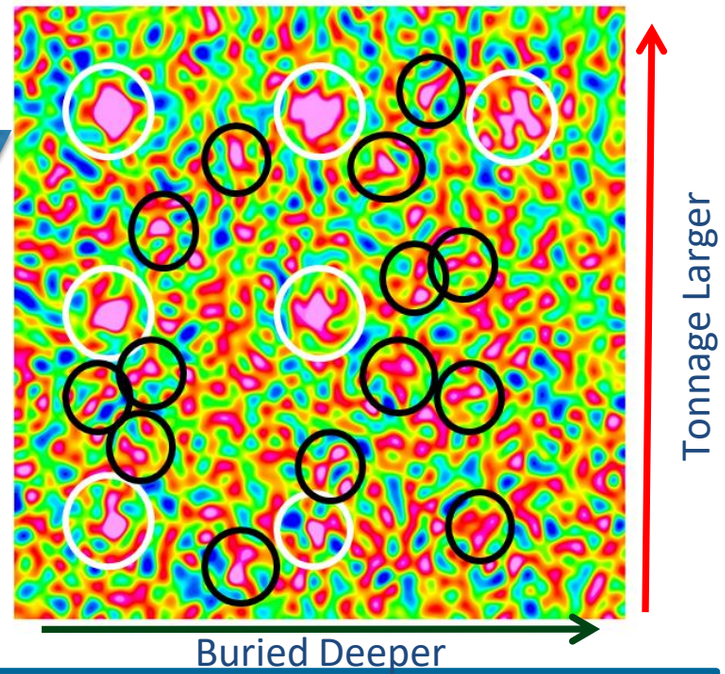


The low-noise, high-resolution Gedex system images all of the deposit responses = **DISCOVERY**

Competing gravity gradiometer survey over same target field



Viewed from above



Competitors' high-noise, low resolution gradiometer systems will see **only some** of the deposits – primarily the biggest and closest to surface and most of those have already been discovered
Missed Discoveries = Lost Opportunities

Noisy data also generates a large number of false targets (*shown as black circles*)
False Targets = Higher Drilling Costs