

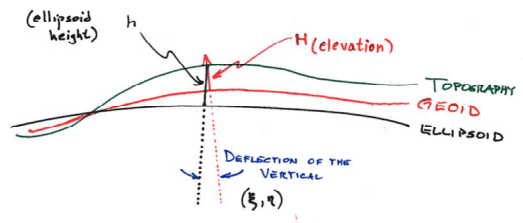
# Geoid Enhancement in the Gulf Coast Region: Physical Geodesy & Real-Time Network Observations



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LSU Center for Geoinformatics

**APSG 40 Fall Meeting**  
Friday, 9 November 2018  
Anadarko | The Woodlands, TX

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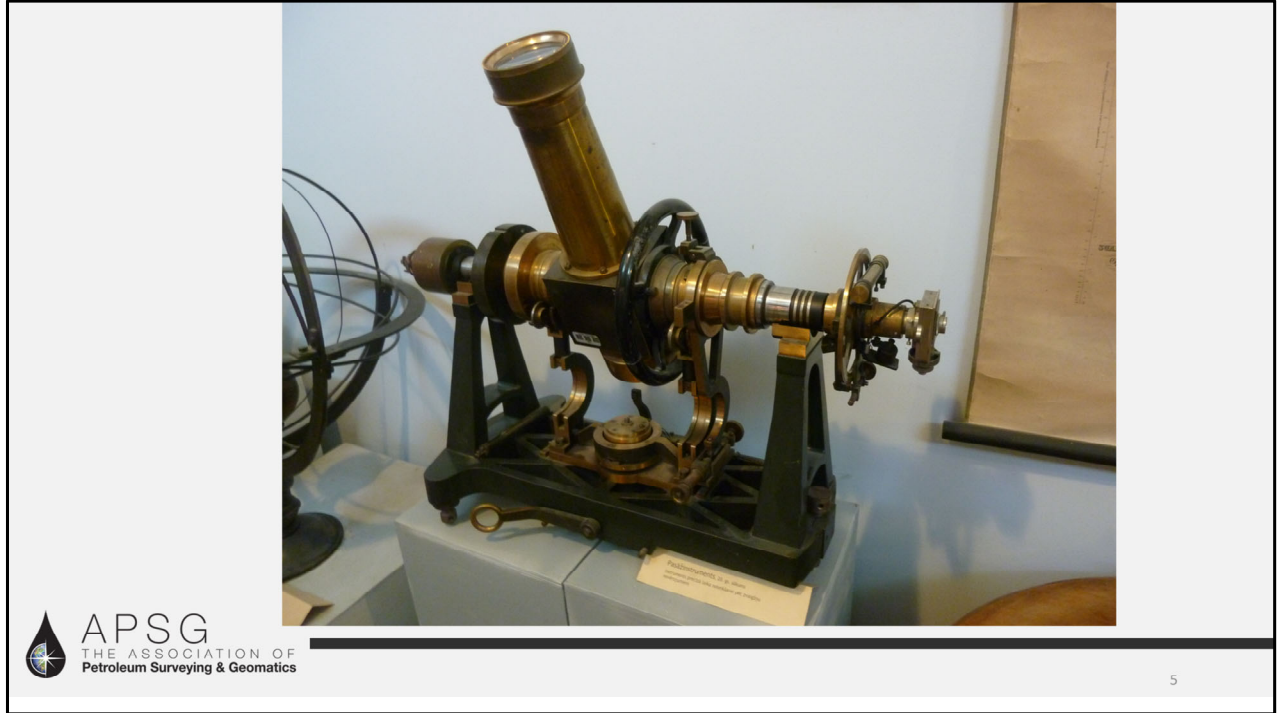


# Gravity – the “old way”

SUBTITLE



Broken elbow astronomical theodolite at the University of Latvia. Used as a Transit Telescope, (c.a. 1860s)



Broken elbow astronomical theodolite at the University of Latvia. Used as a Transit Telescope, (c.a. 1830s)



## BC-4 Ballistic Camera/Photo-theodolite



This is of interest in that the star field is used as control in the BC-4 Camera Network as well as for Calibration.

## T-4 Astronomical Theodolite



Used for observation of Astronomical Latitude & Longitude, Azimuth, and Deflection of the Vertical. (Note the Horrobow-Talcott Levels on the trunion axis to the left of the observer's head. Also note the hanging Striding Level. The Striding Level is chambered in order to allow adjustment of the length of the bubble as evening temperatures cool.)



## DKM-3A Astronomical Theodolite



The Kern DKM-3A is also used for observation of Astronomical Latitude & Longitude, Azimuth, and Deflection of the Vertical. (Note the Horrobow-Talcott Levels on the trunion axis to the left of the observer's head. Also note the hanging Striding Level. The Striding Level is chambered in order to allow adjustment of the length of the bubble as evening temperatures cool.)

## DKM-3A Astronomical Theodolite



Used for observation of Astronomical Latitude & Longitude, Azimuth, and Deflection of the Vertical. In this case also, the Striding Level is chambered in order to allow adjustment of the length of the bubble as evening temperatures cool. However, note the precision of one "Par," a limiting factor to precision.

**TM 5-237**

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

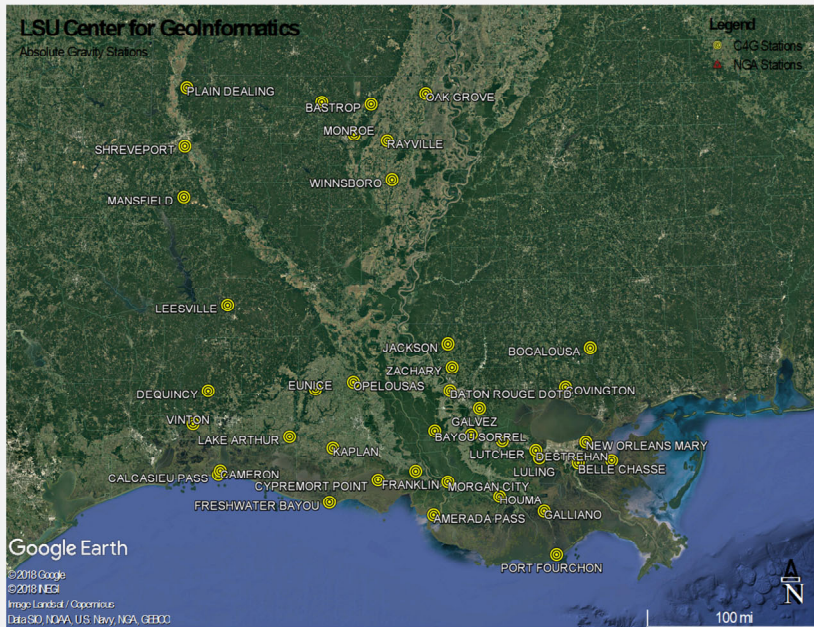
**SURVEYING  
COMPUTER'S  
MANUAL**

HEADQUARTERS, DEPARTMENT OF THE ARMY  
OCTOBER 1964

# Gravity – the “new way”

SUBTITLE







NGA's FG5 Absolute Gravity Meter. (Observing time about 1 day – only indoors.)



NGA's Absolute Gravity Meters (A-10) used for observations outdoors. (Observing time under 1 hour.)





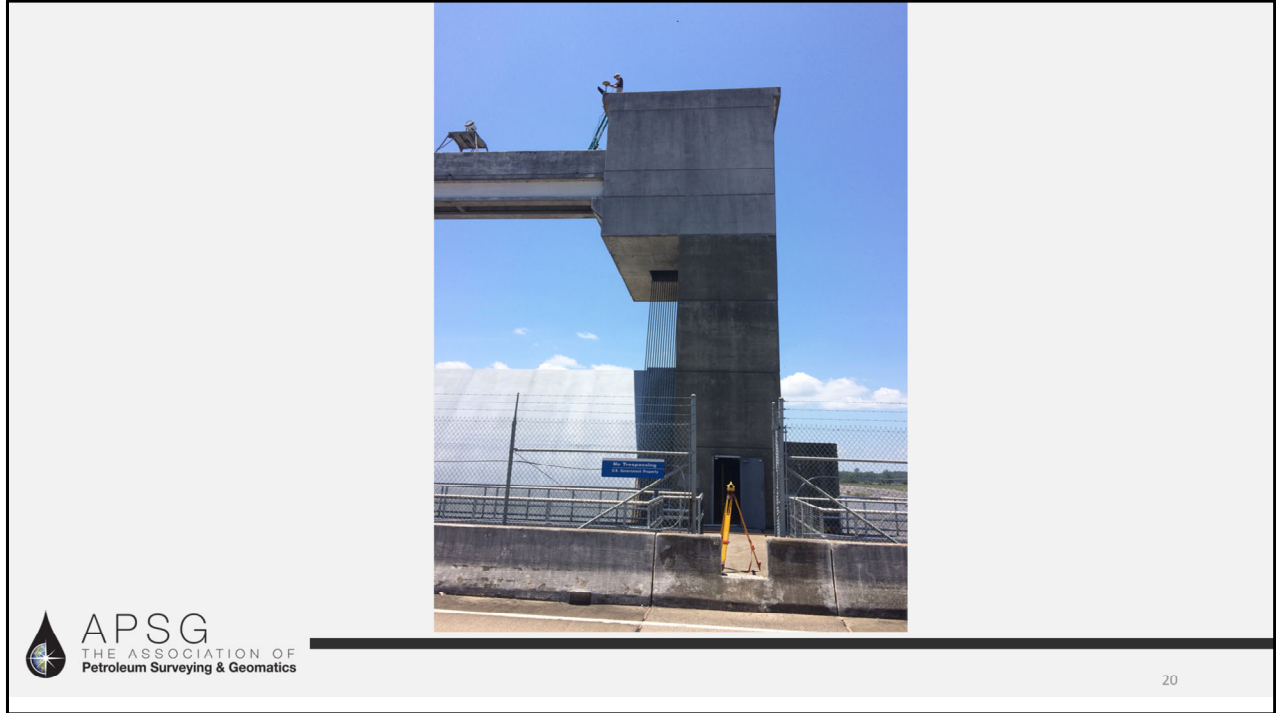
LSU's CG5-X Absolute Gravity Meter



Scintrex CG5 and a LaCoste & Romberg G-meter (Relative Gravity Meters)



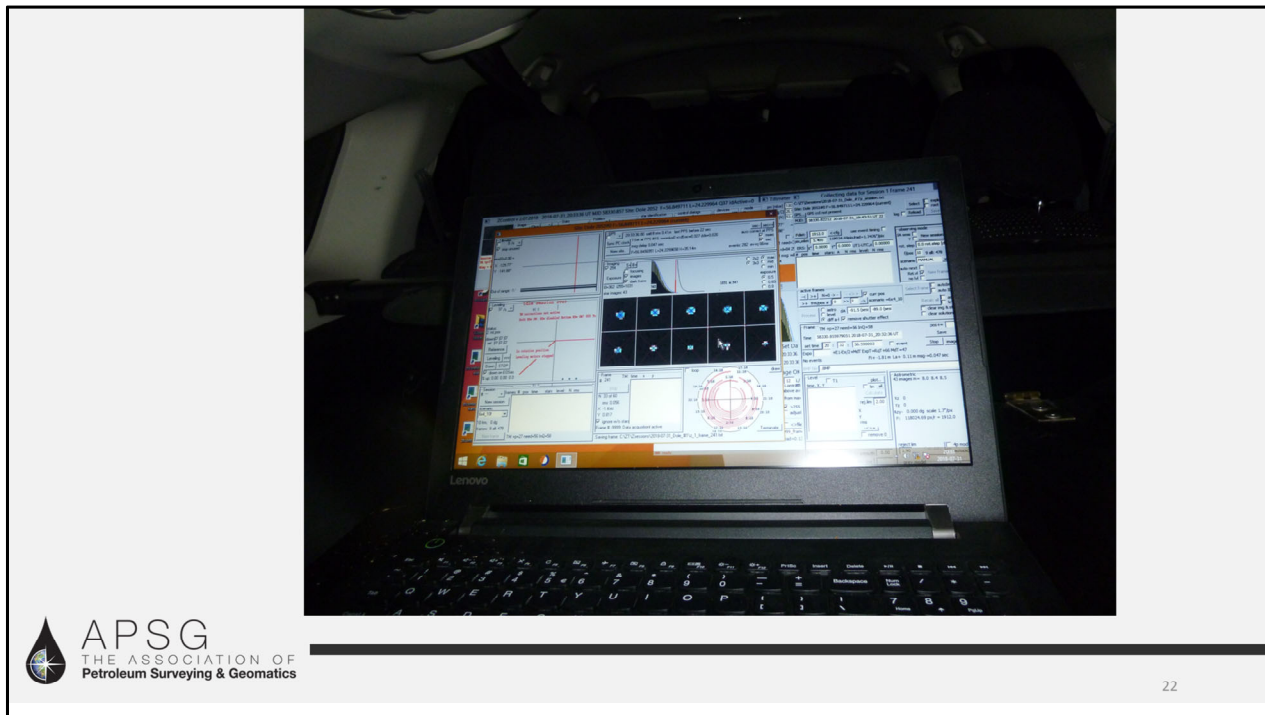
Relative Gravity observation with a Scintrex CG5.



Spirit Leveling (INVAR Bar Code) and Trig Leveling between surface monuments and GPS Antenna Reference Points (ARPs).  
The site is the Old River Control Structure near Simmsport, Louisiana.



Latvian Digital Zenith Camera (DZC). (This is serial #2 – LSU instrument will be #3.)



Screen shot of Latvian DZC Astrometric & Controller Software. R.M.S. in one hour's observation less than 0.1 arc seconds!



Packing up Latvian Digital Zenith Camera into a Station Wagon (1-man job)

# CONCLUSION / THANKS

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