# gPHONE GRAVITY METER


MICRO g LACOSTE

A DIVISION OF LRS

## PERFORMANCE SPECIFICATIONS

| | |
|---|---|
| RESOLUTION | 0.1 μGal |
| PRECISION | 1 μGal |
| SYSTEM NOISE | 3 μGal/√Hz |
| RANGE | 7000 milliGals uncalibrated (worldwide) |
| FEEDBACK RANGE (DURING MEASUREMENT) | +/-50 milliGals |
| INSTRUMENT DRIFT | 1.5 milliGals/month, typically <500 μGals/month |

## SYSTEM POWER

| | |
|---|---|
| INPUT TO UPS SYSTEM (Must be selected at purchase time) | 110 or 220 VAC |
| TOTAL SYSTEM POWER (25C) | Steady State Load: 100 Watts<br>Maximum Load: 330 Watts |
| UPS UPTIME IN POWER OUTAGE<br>Conditions:<br>• UPS fully charged prior to blackout<br>• Load on UPS is timing box and meter only<br>• Ambient temperature 27°C<br>• Meter temperature is at steady state at time of the blackout | 4 hours |

## WEIGHT & DIMENSIONS

| COMPONENT | WEIGHT | DIMENSION |
|---|---|---|
| METER HOUSING | 13kg | 31 x 32.5 x 25.2 cm (meter leg height 9cm) |
| ELECTRONICS BOX | 30kg | 42.5 x 51 x 20.5 cm |
| LAPTOP COMPUTER | 3kg | 26.5 x 32.5 x 4 cm |
| CARRYING CASE | 12kg | 48.8 x 51.2 x 48 cm |
| TOTAL | 58kg | |

Micro-g LaCoste is proud to introduce the gPhone gravity meter as the latest member of its land gravity meters. The gPhone gravity meter is based upon the LaCoste and Romberg technology that has dominated land gravity meters since 1939.

The gPhone gravity meter has a low drift so that it can be used to integrate periodic singals (like earth tides) for very long time periods (years). The gPhone also has excellent hight frequency response so they can be used to monitor higher frequency non-periodic events such as earthquakes. The gPhone can be coarse-ranged over 7000 milliGals (worldwide, and has a 100 milliGal dynamic range during measurement.

The versatile gPhone gravity meter has a sophisticated data acquisition system synchronized by a rubidium clock that can be locked to GPS so that arrays of gPhones can be used to give a wider area picture of seismic or long period gravity changes due to subsurface density changes. The instrument can be monitored and controlled via the internet for remote operation.

The principal behind the Micro-g LaCoste's gPhone is the patented L&R zero-length spring suspension system. The gPhone is based upon the G-Meter, but with significant upgrades:

- It has an improved thermal system, a double-oven, for more precise temperature stability.
- It has a true vacuum seal so that it is completely insensitive to buoyancy changes due to atmospheric changes
- It employs the Aliod beam nulling system for precise digital measurement of gravity with 0.1 µGal resolution.

The complete Micro-g LaCoste gPhone System is a light weight, compact system and ships with three major components at a total weight including carrying case of 58 kg.

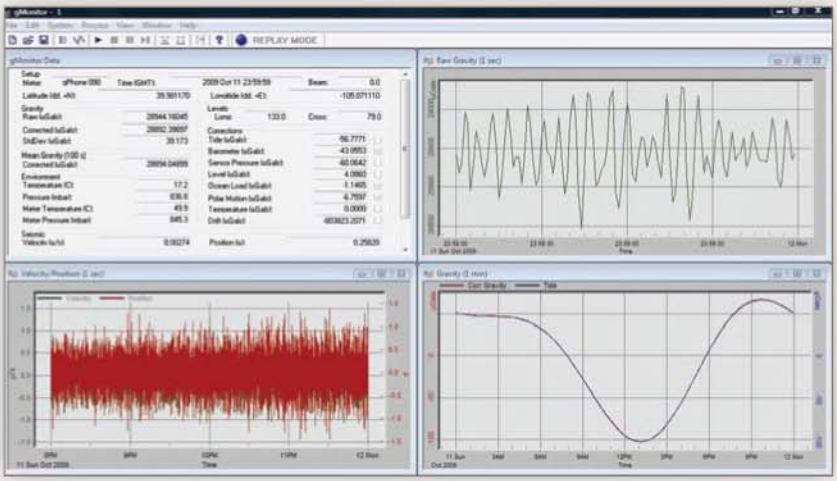
# INSTRUMENT FEATURES

- Aliod Beam Nulling System: Electronic feedback system for precise digital measurement with a resolution of 0.1 µGal.
- Zero Length Spring Tension system ensuring world-wide gravity range.
- Sensor housed in an insulated double-oven ensuring accurate temperature control.
- Pressure and temperature are continuously monitored and can be used to correct gravity data in real time.
- Gravity and Level signals digitized by accurate 24 A/D converters and stable voltage references.
- Synchronizes GPS time with extremely accurate Rubidium timing.
- Uninterruptible Power Supply (UPS) insulates the system from power fluctuations.
- Three sealed chambers isolate the sensor from humidity and pressure changes.
- A built-in internet webserver allows the gPhone data logging screen to be accessed in real-time from the internet and permits authorized users to download data remotely.

# gPHONE APPLICATIONS

- Volcanic Monitoring
- Earth Tides
- Ground Water Monitoring
- Earthquake Monitoring
- Ocean Loading Studies

## gMONITOR SOFTWARE SCREENSHOT

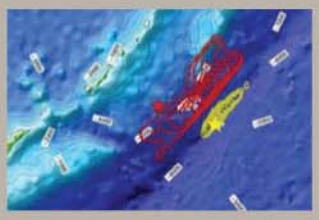


gMonitor main screen

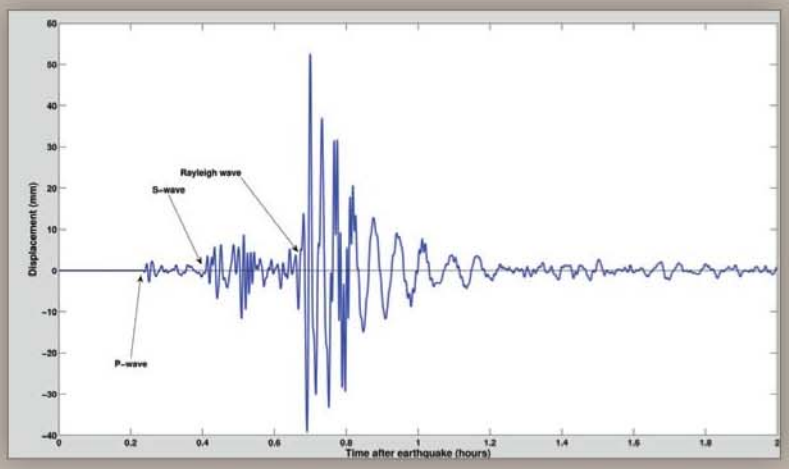
- **Upper Left:** Setup parameters
- **Lower Left:** Integrated acceleration provides velocity and position
- **Upper Right:** Raw Acceleration
- **Lower Right:** Measured earth tide (red line) compared with modeled earthtide (blue line)

gPhone Data Example

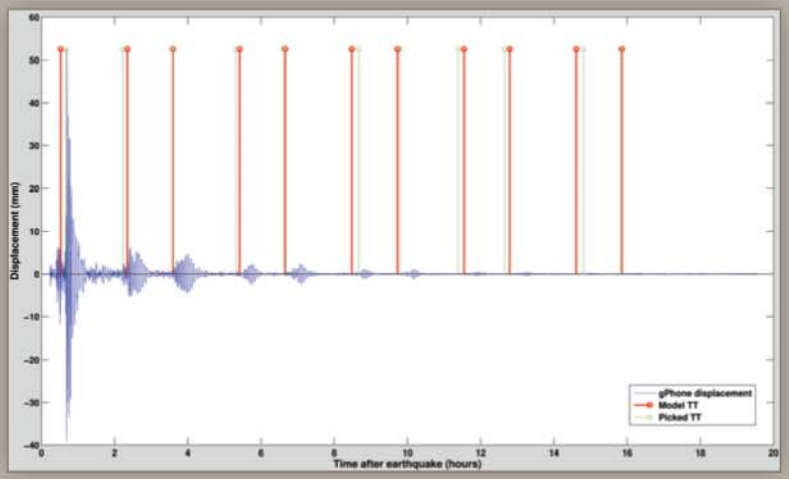
# 2007 KIRIL ISLANDS EARTHQUAKE



The January 13, 2007 earthquake (M8.2) off the coast of the Kiril Islands was detected by the gPhone gravity meter at the Micro-g LaCoste facility in Colorado. These data demonstrate that gPhones are capable of recording extremely precise vertical acceleration, velocity, and displacement during quiet periods as well as during period of high seismic activity.




Kiril Islands earthquake recorded in Lafayette, CO USA. Displacement due to P, S, and Rayleigh waves recorded with gPhone (data sampled at 1s).




The above graph displays repeat wave arrivals as detected by the gPhone. These Rayleigh waves traveled around the globe eleven times after the earthquake.

1401 Horizon Ave. | Lafayette, CO 80026
**PHONE** (303) 828-3499 **FAX** (303) 828-3288
**EMAIL** info@microglacoste.com

**WWW.MICROGLACOSTE.COM**

MICROg LACOSTE
A DIVISION OF LRS