GeoWatch

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Introduction

GeoSIG announces the birth of a new seismic instrument: GMS-18. The GMS-18 encompasses many new technologies and encompasses several needs of modern earthquake monitoring networks. Following this introduction, more detailed technical information will be provided in the following issues of GeoWatch. Our GSR-xxLFDC strong motion instruments succesfuly serve in several metropols around the world as seismic building monitoring systems as enforced by local building codes. An example from the City of Los Angeles is given in this issue, followed by the news from our staff and our direct marketing activities.

NEW GeoSIG Measuring System GMS

The GMS-18 is the ground breaking second generation of the GeoSIG Measuring Systems with extended connectivity capability and flexibility. It includes an Ethernet connection and optionaly a Wifi module to insure fast and reliable data transfer.

Its design and efficiency makes it the first choice for any application requiring seismic instruments. With its optimized installation, operation and maintenance philosophy, the GMS-18 offers the real possibility to implement such as high density arrays with total operating costs at a small fraction of conventional strong-motion seismograph networks.

The instrument's software processes data in real time. If triggered by a seismic event, GMS-18 calculates Peak Ground Acceleration (PGA), Peak Ground Velocity (PGV), Peak Ground Displacement (PGD) and Response Spectrum (RSA) at various frequencies of the event. GMS-18 can report these parameters, which are related to the strength of shaking, to a data centre where a synopsis (such as a shakemap) for disaster management facilities can be generated in almost real time over the Internet. An event file is also recorded in the memory, which is also securely accessible over the Internet.

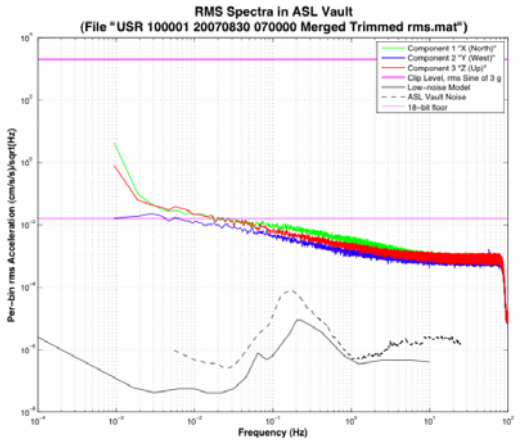


Figure 1. Noise Performance of the GMS-18 with AC-63

GMS-18 is self-contained and is equipped with an uninterruptable power-supply, which provides for more than 24 hours emergency operation without external power. Since the battery and power management are critical components in applications, excessive care has been taken in the charger design and the GMS-18 is released as the first unit that can warn of a faulty battery before it is detected by a lack of communication during an AC power loss.

Figure 2. GMS-18 with WLAN

Various GeoSIG sensors as well as any other custom sensors can be housed internally or connected externally to the unit. In case of internal sensor, the levelling is done on the base plate of the GMS-18 via three levelling screws. The base plate is mounted using a single bolt during installation.

Several "Trigger set"s can be defined in the instrument with each one freely defined regarding the source of trigger, trigger processing and selected channels for storage. For each trigger a "Minimum exceedance duration" can be defined to insure that the unit will not trigger on spikes.

The GMS-18 uses an intelligent "Real Time Clock" (RTC) with self-learning temperature compensation at a fraction of power and thus cost of a TCXO. The RTC is able to synchronize with GPS or NTP (Network Time Protocol based on Internet UTC timing) to provide high timing accuracy.

The instrument can be locally connected to a laptop through its ports for configuration, testing or data retrieval. The internal memory card can also be simply exchanged to retrieve the data. Several advanced communication options exist such as for connection over the Internet; it can utilize a list of servers where the communication is based on a simple but highly secure file exchange.

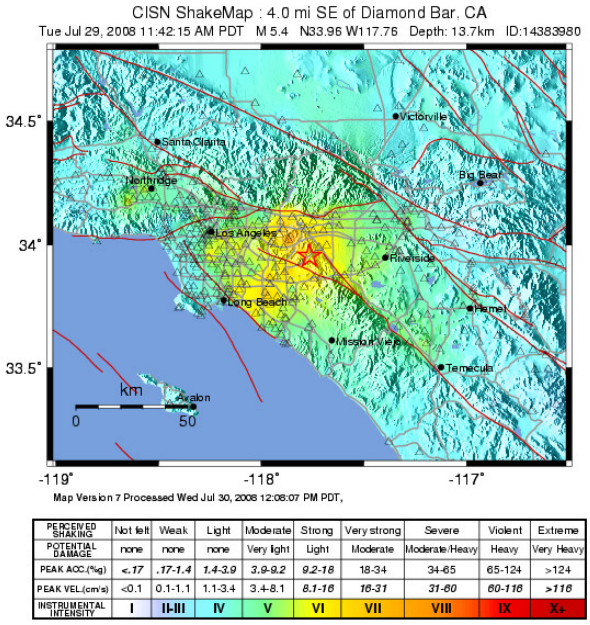
User can request backward from console or remotely from server for portion of the buffer as start time/date and duration.

Instrument setup is based on a configuration file in XML format. The configuration can be edited on site through the instrument console, exchanged by replacing the memory card or remotely from a server. Even if the configuration file can be manually edited at any time, a tool is provided to edit it securely.

A comprehensive and scientific product announcement and test results can be streamed from the USGS link: mms://video.wr.usgs.gov/ehz/2008/20080924.wmv, which outlines the NetQuakes Project in which GMS is used.

GSR-xxLFDC Based Building Monitoring Systems Detected the Chino Earthquake

A magnitude 5.4 earthquake happened clos to Chino Hills, CA, USA on Tuesday, July 29, 2008 at 18:42:15 UTC. According to the USGS, the earthquake was felt throughout the Los Angeles Basin area and in much of southern California and as far away as Las Vegas, Nevada and Yuma, Arizona.



PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	<.17	.17-1.4	1.4-3.9	3.9-9.2	9.2-18	18-34	34-65	65-124	>124
PEAK VEL.(cm/s)	<0.1	0.1-1.1	1.1-3.4	3.4-8.1	8.1-16	16-31	31-60	60-116	>116
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

Figure 3. CISN Shakemap for the Chino Earthquake

Several GeoSIG GSR-xxLFDC instruments have been deployed in Building Monitoring Systems in numerous high-rise buildings, as required by the Building Code of the City of Los Angeles. Thus these systems have detected the earthquake successfully. Here we present a short summary of these records.

One can immediately see how the horizontal accelerations increase in a high-rise building at higher floors looking at the records presented in Figure 4. In this particular example the GSR-xxLFDC instruments were deployed as an interconnected (common time and common trigger) network, one station at the first floor and the other two at the mid height and top of the building.

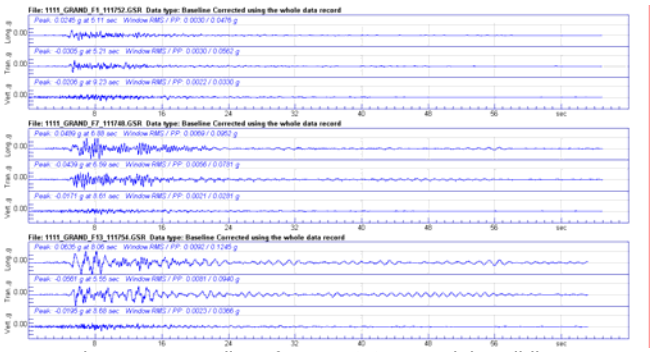


Figure 4. Recordings from a 13 Storey High Building

The recordings enable one to understand the behaviour of the particular structure as well as can be used to create a shakemap as a rapid response tool to portray the extent and variation of ground shaking throughout the affected region immediately following significant earthquakes.

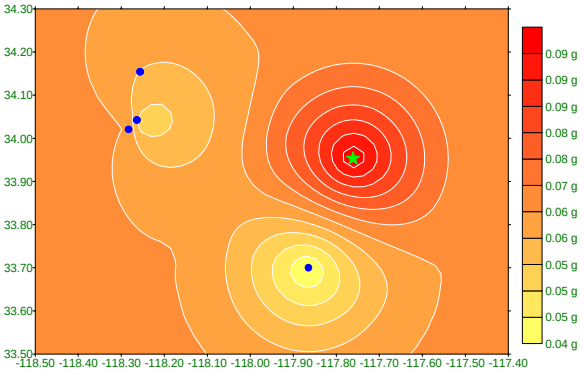


Figure 5. Simple Shakemap Generated Using GSR Data

Ground motion data used in the creation the shakemap are direct measurements only at the location of seismic stations; all other data are interpolated.

The presented shakemap is created by contouring software tools not provided by GeoSIG, however, GeoSIG supplies customised shakemap solutions operating close to real-time for clients who are projecting to deploy enhanced rapid response systems based on several distributed stations.

News from GeoSIG Staff

Thomas Linder joined in our team as a Service Department Manager. He is managing all the repairs and service cases.

Thomas is an electrical technician who has worked for several years in servicing and repairing. He managed his own music instrument store for 14 years before he decided to move away and looking for a new challenge.

We warmly welcome Thomas to the GeoSIG Family.

10 Years with GeoSIG

Michel Dufaux started in GeoSIG on February 1998 as electronic technician and since then have been the driving force in the sensor production department.

With his experience and expertise in GeoSIG sensors Michel is one of the senior staff and a valuable professional technician performing in the GeoSIG Family. We highly appreciate Michel's valuable contributions to GeoSIG over 10 years.

10 Years with GeoSIG

Ricardo Araujo started his apprenticeship on August 1998 and thereafter was employed as electronic technician in GeoSIG, then he gradually developed himself and became one of the key staff in the company. His proficiency is mostly on Numerical and Analog electronics, micro-controller programming, CAD, Linux computing and project management.

Ricardo has served in various important positions in GeoSIG over the years such as production department management, technical department management as well as currently electronic engineering with his extensive knowledge on GeoSIG instruments.

Ricardo has contributed significantly in many accomplishments GeoSIG has achieved. His invaluable contributions and hardworking efforts since the past 10 successful years are most appreciated.

GeoSIG Attended the 14th WCEE, 7th USMCA and GeoProtecta

GeoSIG demonstrated the latest instruments and industry standard solutions as well as met once again with many partners, existing users and potential customers in the 14th World Conference on Earthquake Engineering in Beijing, China between 12-17 October 2008.

The 7th International Symposium on New Technologies for Urban Safety Of Mega Cities In Asia, took place in Beijing, China between 21-22 October 2008, where GeoSIG was participating as well.

GeoProtecta, Swiss Trade Fair for Integrated Management of Natural Hazards and Climate Impacts, in St. Gallen, Switzerland, between 13-15 November 2008, was one of the latest happenings where GeoSIG was present for demonstration of the relevant instrumentation.

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We would like to take this opportunity to announce that our annual winter holiday will be from the 22nd December 2008 until 5th January 2009,
And Wish You a Happy and Prosperous New Year