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Keynote:

Scope:

On this issue of GeoWatch, we focus on the GBV-X16, Seismic Recorder and the TEL-WLx.xX, Wireless LAN Communication System. GBV-X16 operated with GeoDAS Data Analysis Package and SEISAN, provide dedicated acquisition and analysis tools for the earthquake and civil engineers as well as for the seismologists. TEL-WLx.xX allows combining several number of field stations to one single network, which feature easy data acquisition and maintenance. Check this issue for more details on these products.

There is also a reminder for EVACES'07. Don't forget to visit the GeoSIG exhibition boot.

Remarkable Performance from GBV-X16 - Seismic Recorder

Under the framework of the SESAME Project (Site Effects Assessment Using Ambient Excitations – Task A (H/V technique)), the influence of different instruments (that are currently in use in the participating institutions) in estimating the local site response using H/V technique on microtremor data was investigated.

The GBV is reported as "**exceptionally good**" in the stability test, which was performed to investigate the stability of the digitizer after a cold start. H/V ratios were computed on two windows of 1-minute duration at the beginning and at the end of each of the cold and warm 10-minute data. Most of the other digitizers showed ca. 10 minutes of drift time before stabilization.

In the laboratory, simultaneous measurements were done on the concrete piers, which are coupled directly to the bedrock. Comparisons were made for different instruments on the market with a reference system. It was reported that the GBV performs better than the others, probably due to the low noise digitizer in the GBV (Figure 1).

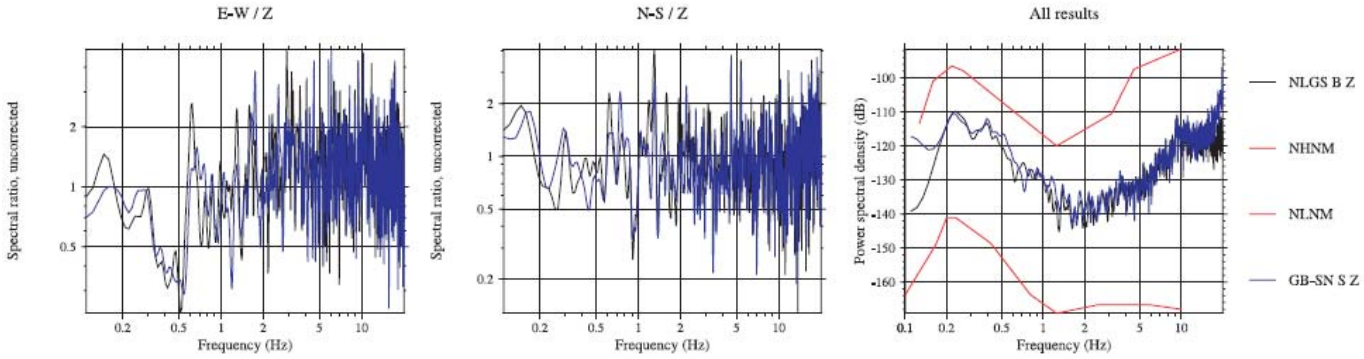

Figure 1. The H/V ratios for the GBV (here GB-SN S Z) with 4.5 Hz internal sensor show a remarkable resemblance to the reference system, particularly within 0.2 to 4.5 Hz. It Is also suggested that to get accurate ground displacement can be problematic at 0.1 Hz considering that the output is very small and small errors in specification of damping and free period will affect response at low frequencies significantly. (SESAME)

The GBV-316 and GBV-116 is a 3 or 1 channel seismic data recorder (Figure 2). Based on the gained experience in the field of recorders, GeoSIG and Bergen University have worked together to offer a high performance instrument for an attractive price. Additionally to the standard features, full compatibility with both the Bergen University SEISLOG logging software as well as with the SEISAN analysis software is added.

The standard GBV uses a 4.5 Hz geophone in order to achieve low weight, low cost and portability. The 4.5 Hz sensor combined with the high gain amplifier will, with an average seismic background noise, give the same sensitivity to earthquake signals for frequencies above 0.2 Hz as a recorder with a standard 1 Hz seismometer.

The GBV is well suited for all typical microseismicity studies that require recording of signals above 0.2 Hz as well as for refraction seismology experiments. With the maximum sensitivity, the GBV will approximately record an earthquake of magnitude 4.0 at 100 km distance without clipping.

The GBV can be used as a field station in low cost permanent micro-earthquake networks by connecting it directly to a digital radio and recording the signals centrally with a SEISLOG system.

STA/LTA or Level Trigger conditions can be selected to start data capture into the non-volatile data memory for later analysis. Recorded data can be conveniently transferred to the central station using the serial interface. Transferring data to

PC while recording is possible and also can be done via modem.

Optionally the GBV-X16 can be equipped with a GPS for full time accuracy.

Figure 2. GBV-X16 Seismic Recorder

A comprehensive package of advanced, menu-driven analysis software is available. GeoDAS is included with the GBV-X16 and can be used on-site for a first impression of the recorded data. With GeoDAS Data Analysis Package and SEISAN, two dedicated analysis programs for the earthquake and civil engineers as well as for the seismologists are provided.

The GBV-X16 represents a real break through in seismic recording with an optimum price/performance ratio. With the GBV-X16 you get highest performance for lowest price. The installation is quick and it needs minimal maintenance.

GBV-X16 Seismic Recorder is separately available also as Seismic Digitiser System (GDB-X16) only.

GBV Usage in Bulgarian Antarctic Research:

Since 1995 a typical Patagonian house was built up at Livingston Island, Antarctica as a base to host the Bulgarian expeditions. During 2000-2001, complex geological and geophysical investigations were made on the Livingstone Island, Antarctica by Prof. Boyko Ranguelov (Geophysical Institute, Bulgarian Academy of Sciences, Sofia, Bulgaria). The main purpose of the seismological observations was to establish the first Bulgarian seismological station on Antarctica (Figure 3).

The station was equipped by a GVB device. As a result more than 250 records from different sources have been recorded. Natural seismic emissions were reported as generated by ice cracks, icefalls, surf, rockfalls, wind, rock cracks and possibly earthquakes (Figure 4).

Figure 3. GBV operates satisfactorily in extreme temperature conditions.

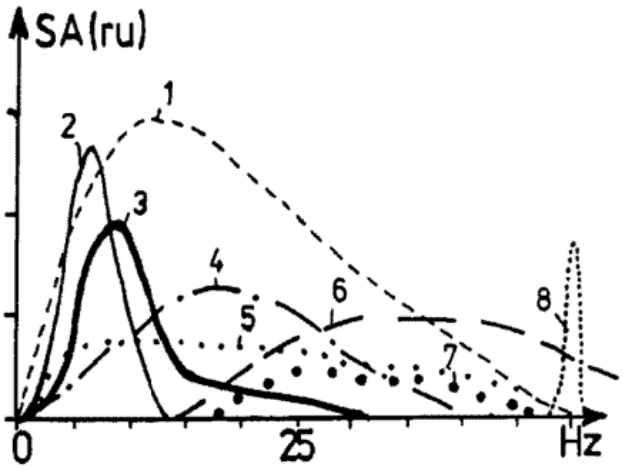

Figure 4. General spectral characteristics of the seismic signals registered on the Livinstone Island.

1 – earthquakes(?); 2 – icefalls; 3 – surf; 4 – artificial signals; 5 – wind microseisms; 6 – rockfalls; 7 – ice cracks; 8 - 50 Hz.

Active experiments have been performed as well. They have been used for investigations of the wave propagation and the amplitude wave attenuation. The results obtained show 2-3 times more amplitudes' attenuation about the sediments widely spread around the Bulgarian Antarctic Base (BAB). (*Ranguelov B., Hristov E., Bliznakov A., "Natural phenomena and ecology problems on the Livingstone Island - Antarctic South Shetlands", 8 th International Conference, "CONSTANTIN BRÂNCUSI" University, Târgu Jiu, May 24-26, 2002).*

TEL-WLx.xX - Wireless LAN Communication System

GeoSIG's TEL-WLx.xX Wireless LAN Communications System offers versatility and ease of use in a variety of locations and applications (Figure 5).

TEL-WLx.xX allows combining several number of field stations to one single network, which feature easy data acquisition and maintenance. The authorized user has access to the data from every node inside the network. Additionally it is possible to change the settings of every field station and the equipment attached to it by remote. At the same time the network is fully protected from unauthorized access by WEP encryption and MAC address identification.

The proprietary wireless protocol is designed to address specific shortcomings of the wireless protocols defined by the 802.11 standards. In mission-critical point-to-multipoint environments, where the wireless network must support numerous interconnected LANs, it is crucial that the wireless bandwidth be used in the most efficient manner. TEL-WLx.xX delivers high-performance broadband wireless connectivity that is not affected by hidden node transmitters, scalability, bandwidth allocation, and excessive packet transmission overhead that standard 802.11 products suffer.

Every wireless module operates either in point to point or point to multipoint mode, selectable by software and by remote. In point to point mode wireless connections up to 100 km are possible. If the distance is shorter the wireless module can be set as a base station, which can connect to 8 other wireless modules. An example for a 10 station network is given in Figure 6.

Figure 5. TEL-WLx.xX - Wireless LAN Communication System.

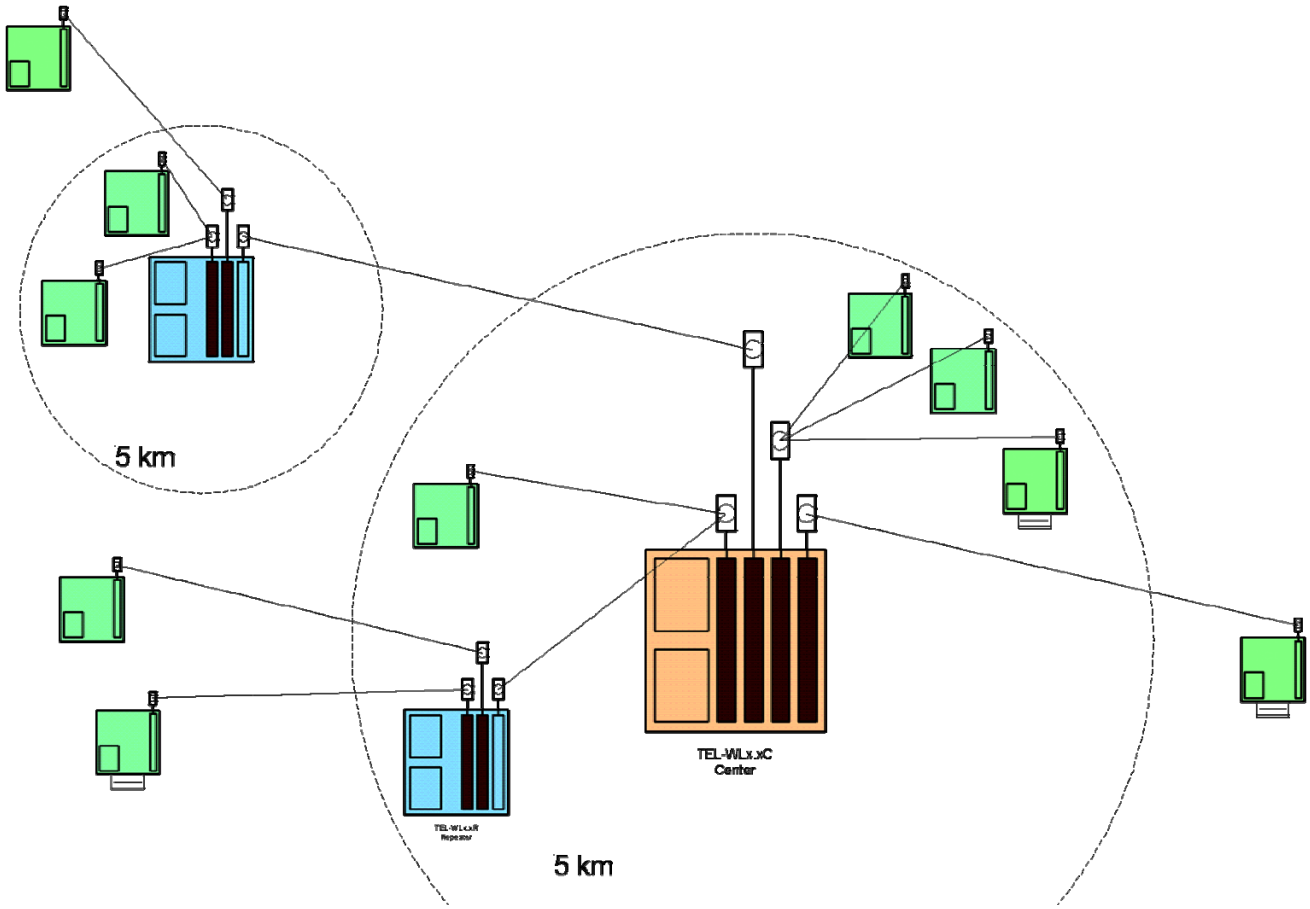

Figure 6. Example 10 Station Network

GeoSIG is able to assist its customers in finding the right equipment for their project as well as in the evaluation of potential telemetry links. Global Terrain Data allows GeoSIG to calculate line of sight profiles anywhere around the world (Figure 7).

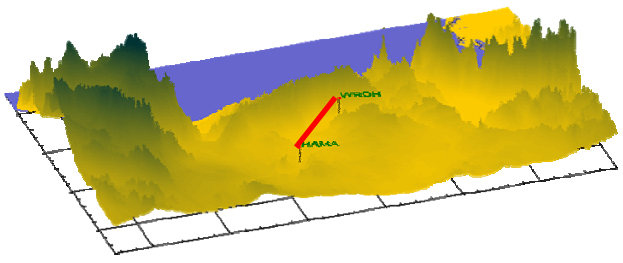

Figure 7. Line of Sight check from Global Terrain Data.

Field Station / Repeater Station

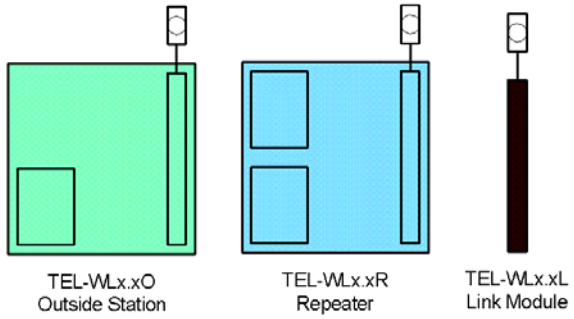

Figure 8. Schemas for the Field Station, Repeater Station and the Telemetry Link Module.

The Field Station TEL_WLx.xO and Repeater Station TEL_WLx.xR convert the incoming data from RS-232 to the Ethernet and forward them to the Central Station (Figure 8).

Additionally the Field Station and Repeater Station supervise the connected equipment, the Telemetry Link Modules and the power supply via a watchdog, which also protects the batteries from deep discharge. The strong steel housing and the over voltage and lightning-protection guarantee the best protection also under rough conditions.

Central Station

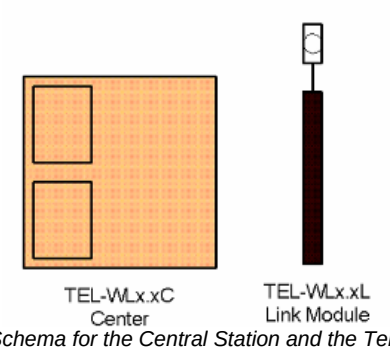

Figure 9. Schema for the Central Station and the Telemetry Link Module.

The Central Station TEL_WLx.xC can accommodate up to 8 TEL WLx.xL Link Modules. Each Module can separately set for point to point or point to multipoint operation, therefore data from 64 Field Stations and more can be received and analysed.

To achieve this each Field Station has its dedicated digital channel to the TEL_WLx.xC, which is established by a telemetry link directly or via a Repeater Station (Figure 10).

The Central Station collects all necessary data and controls related system components.

Analysing of the data can be optionally done right on the Central Station itself using an optional Central Acquisition and Processing Computer TEL_WLCAPC. This computer can also buffer and forward the data to a network, such as to a leased line.

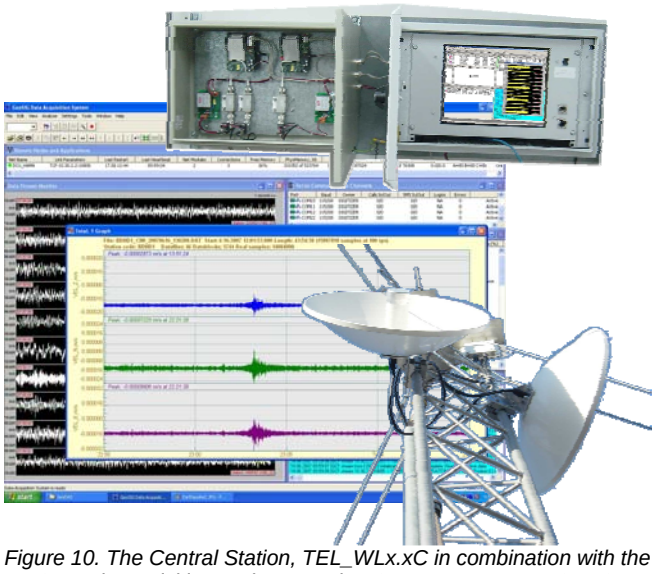

Figure 10. The Central Station, TEL_WLx.xC in combination with the Central Acquisition and Processing Computer TEL_WLCAPC.

The system is supervised by a watchdog, which resets the system in case of a hang up. Additionally it measures the supply voltage and shut down the system to protect the batteries from deep discharge.

All in- and outputs are protected against over-voltage and lightning.

EVACES'07 – Experimental Vibration Analysis for Civil Engineering Structures 24-26 October 2007, Porto, Portugal

The 1st International Conference on Experimental Vibration Analysis for Civil Engineering Structures (EVACES'05), October 26-28, 2005, at Bordeaux (France), was promoted by Laboratoire Central des Ponts et Chaussées (LCPC). This time LCPC and the Faculty of Engineering of the University of Porto (FEUP) have decided to announce the organization of a second edition of the conference that will be held at the Campus of FEUP from October 24-26, 2007.

GeoSIG Ltd. welcomes you in the exhibition area that is reserved for GeoSIG.

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