

# MODEL SISMODATA-7300

Remote Event Accelerometer with Internet Communication

## Features

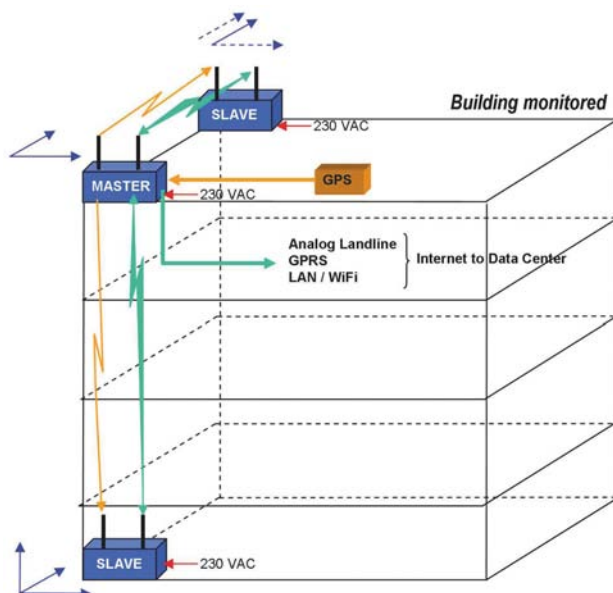
- ❑ Second generation Recorder
- ❑ 3 or 6 channels, up to 1000 sps sampling rate
- ❑ Low noise individual 24-bit  $\Delta-\Sigma$  ADC per channel
- ❑ Internal built-in and/or external sensors
- ❑ Wired Ethernet, Wi-Fi and Serial links
- ❑ Smart NTP timing, GPS time base, or time synchronisation via radio channel or cable
- ❑ Enhanced connectivity via landline modems, 3G cellular devices and satellite links
- ❑ Recording to SD or CF cards, up to 128 GByte
- ❑ USB interface for external storage and communication devices
- ❑ Continuous data recording to ringbuffers
- ❑ Flexible configuration of multiple triggers
- ❑ Simultaneous data streaming to several clients
- ❑ On board data processing and evaluation
- ❑ Rugged aluminium housing with levelling base plate for easy installation
- ❑ Configuration and status monitoring via Web Interface compatible with Smartphones
- ❑ Simple and secure communication over Internet with full remote management
- ❑ Internal battery, low power consumption
- ❑ Alarm output with up to 4 relays flexibly configurable for different types of events
- ❑ Easily configurable interconnected networks with common timing and triggering

## Applications

- ❑ Broadband Seismic, Earthquake and Structural measuring and monitoring
- ❑ Real-time Seismology for Freefield and Urban Areas
- ❑ High Density Earthquake Monitoring Networks
- ❑ Shake / Hazard Mapping based on Instrumental Data
- ❑ Earthquake Early Warning and Rapid Response
- ❑ Damage Estimation, Disaster Management
- ❑ Seismic Alarm and Safe Shutdown
- ❑ Ambient Vibration Testing (optionally fully wireless)
- ❑ Induced Vibration Monitoring and Notification
- ❑ Building Code Compliant Instrumentation



## Connectivity



- ❑ Wireless Time Synchronisation and Data Communication
- ❑ No cabling between the Stations: Very fast Installation Time
- ❑ For permanent and temporary Installations
- ❑ Network Triggering
- ❑ Automatic Event Report Creation
- ❑ Data Upload over LAN, WiFi, GPRS or Analog Landline
- ❑ Ring Buffer Continuous Recording

Using SISMODATA-7300 Remote Event Accelerometer, it is possible to achieve a denser and more uniform spacing of accelerometers in select urban areas to provide better measurements of ground motion during earthquakes. These measurements improve your ability to make rapid post-earthquake assessments of expected damage and contribute to the continuing development of engineering standards for construction.

To accomplish this, SISMODATA-7300 is a new type of digital accelerometer that communicates its data to the Data Receiving Center (DRC) via the Internet. The seismographs connect to the DRC by means of GPRS / 3G cellular network or using a local network via Wi-Fi to re-use existing broadband connections to transmit data after an earthquake. The instruments are designed to be installed in private homes, businesses, public buildings and schools with an existing broadband connection to the Internet.



## Specifications SISMODATA-7300

### Set-up and Configuration

An intuitive web interface is available for easy configuration with any web browser. Alternatively the configuration file in XML format can be edited on site through the instrument console, exchanged by replacing the memory card, remotely from a server or through SSH. Even if the configuration file can be manually edited at any time, a tool is provided to edit it securely.

### Data Analysis

The analysis software provides basic data evaluation in the field meeting the requirements of most scientific and engineering applications. Optionally SISMODATA-7300 can perform certain analyses onboard.

### Sensor

Various SISMODATA-7300 sensors as well as a number of other third party 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 SISMODATA-7300 via its three levelling screws. The base plate is mounted using a single bolt during installation.

### Digitizer

Channels: 3 or 6  
 A/D conversion: 24 bit  $\Delta$ - $\Sigma$  converters individual for each channel  
 DSP: 32 bit output word length  
 Dynamic range: 146 dB (per bin @ 1 Hz rel. full scale rms)  
 137 dB @ 50 sps  
 Sampling rate: 1000, 500, 250, 200, 100, 50 sps per channel  
 Max. bandwidth: DC to 250 Hz  
 Anti Aliasing Filter: Analog and digital FIR (finite impulse response)

### CPU

Processor: ARM 400 MHz  
 RAM: 64 MByte  
 Operating System: GNU/Linux

### Triggering

Several Trigger Sets can be defined in the instrument. Each set can be flexibly configured regarding the source of trigger, main and advanced trigger parameters, trigger processing and selected channels for storage. A voting logic based on the monitored channels can be defined.

### Trigger Filter

Fully independent high-, low- or bandpass trigger filters can be configured.<sup>±</sup>

### Level Triggering

User adjustable threshold.<sup>±</sup>

### STA/LTA Triggering

User adjustable STA / LTA values and STA/LTA trigger and detrigger ratio.

### Event Recording

Pre-event memory: 1 to 720 seconds, typical  
 Post-event duration: 1 to 7200 seconds, typical

### Event Summary and Parameters

Content: PGA, PGV, PGD, SA (at 0.3, 1, 3 Hz)  
 Transmission delay: User defined from trigger time

### Ring Buffer

Usage: User can request an event from any period of the ring buffer by specifying the start time/date and the duration from the console or remotely from a server.

Method: Ringbuffer files with configurable duration which can be uploaded automatically to data server.

### Data Stream

Protocol/Compatibility: GSBUS, SeedLink (Earthworm compatible)

### Storage Memory

Size and Type: 8 GByte Removable SD Card, Optionally Compact Flash Card higher capacity up to 128 GByte on request FAT32 or EXT4 formatted  
 Management: Intelligent management of memory card capacity using policies as per file type and ring buffer capacity specification.  
 Recording format: miniSEED with extended information encapsulated into blockette 2000  
 Estimated Capacity: Sampling rate [sps] x 0.4 [MB / day / 3 channel] (example: 40 MByte / day / 3 channel @ 100 sps) typical, since the data is compressed, capacity depends on the context of the data.

### Self Test

- Permanent self monitoring of hardware and software components without affecting their normal operation.
- User-configurable periodical state of health (SOH) report based on comprehensive test of instrument, which can be requested at any time.
- User-configurable periodical sensor test.

### Time Base

Internal: Intelligent Adaptive Real Time Clock (IARTC)  
 External: NTP, optionally GPS, Wired or Wireless Interconnection  
 Standard TCXO accuracy:  $\pm 0.5$  ppm (15 s/year) @ +25 °C  
 $\pm 2.5$  ppm (75 s/year) @ -10 to +50 °C  
 Optionally higher accuracy TXCO's available.  
 Accuracy after learn: <  $\pm 0.5$  ppm (15 s/year or 2 ms/h)  
 Accuracy with NTP: <  $\pm 4$  ms typical, assuming reasonable access to NTP servers

### Power Supply

Input voltage: 90 – 260 VAC / 50 – 60 Hz  
 Type: Switched external UL approved power supply screw mountable on any surface (e.g. wall)  
 Internal battery: 12 VDC, 7.2 Ah, Rechargeable Lead-Acid  
 Power consumption: 130 mA @ 12 VDC for 3 channels  
 200 mA @ 12 VDC for 6 channels  
 Autonomy: > 1 day, higher autonomy is optionally available with external batteries.  
 Battery charger: Temperature compensated with optional battery fault detection.

### Indicators

● Green: Active Charge LED  
 ● Green: Run/Stop LED  
 ● Yellow: Event/Memory LED  
 ● Blue: Network link/Traffic LED  
 ● Red: Warning/Error LED

### Communication

Configuration, Data Retrieval: Via Ethernet, Wi-Fi, Serial line, Console, or directly via removable memory card.  
 Network requirements: Fixed or Dynamic IP on Ethernet LAN and/or Internet connection with Ethernet interface. Wi-Fi (b/g/n) network with WEP, WPA, WPA2 security and Enterprise Mode  
 Security: Proprietary protocol over SSL  
 Checksum and software handshaking  
 Serial ports: 2 ports standard, + 3 ports optional  
 Baud rates: Console: 115200 baud  
 Serial Stream: 38400, 57600, 115200 baud

### Alarm / Seismic Switch / Warning / Notification Option

Alarms: 3 independent or 4 common relay contacts for trigger alarm and/or error  
 SMS notification is optionally available  
 Alarm levels: Configurable based on event triggers (NO or NC selectable during order)  
 Relay Hold-On: 1 to 60 seconds (User programmable)  
 Capacity: The contacts are suitable for a low voltage control. In case large load must be switched then external relays should be implemented.  
 Max voltage: 125 V / 250 mA

### Interconnected Network Option

Wired (Common Time and Trigger) or Wireless (Common Time) Interconnection providing synchronisation among several units is optionally available. Common Time and Trigger alternatively can be performed over the Wired/Wi-Fi network.

### Modem Option

Internal or external modems of different types, including cellular 3G modems, are available optionally.

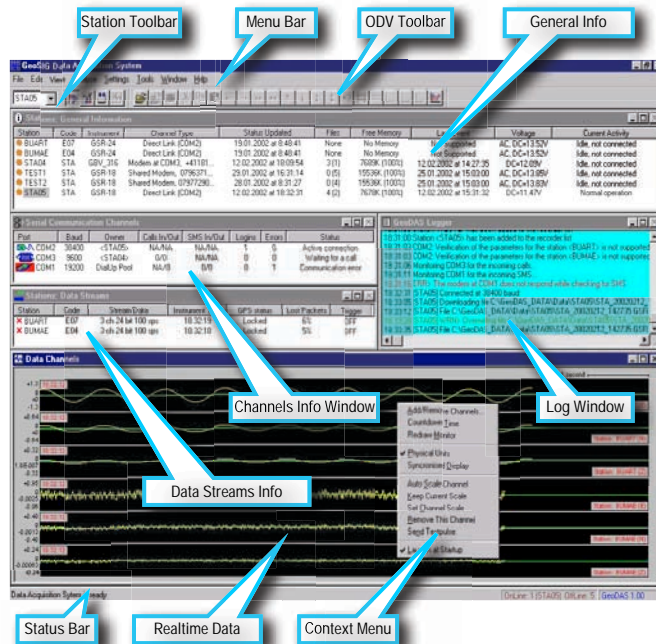
### Environment

Operational temperature: -20 to +70 °C  
 Storage temperature: -40 to +85 °C  
 Humidity: 0 to 100 % RH (non condensing)

### Housing

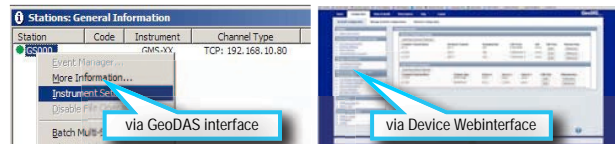
Type: Cast aluminium housing  
 Size: 296 x 175 x 140 mm (W x D x H)  
 Size with base plate: 296 x 225 x 156 mm (W x D x H)  
 Weight: 4.7 kg (optional < 4 kg) excl. sensor, battery, etc  
 0.3 kg internal sensor, 2.6 kg battery, 1.3 kg base plate, ask for other options  
 Protection: IP65 (NEMA 12), optionally IP67  
 Mounting: Base plate with single bolt, surface mount.  
 When base plate levelled and fixed, SISMODATA-7300 can be replaced without re-levelling.

## GeoDAS Software



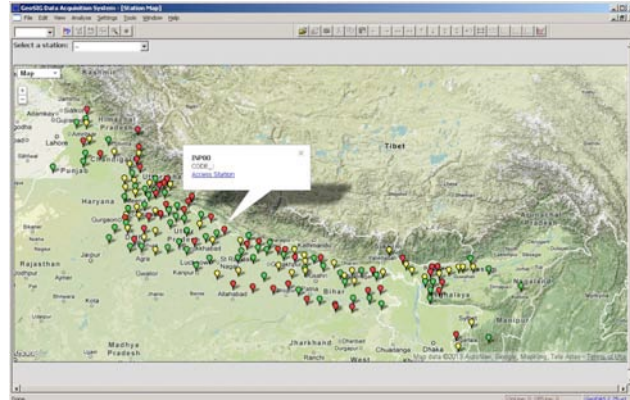
GeoDAS has been designed to meet requirements with respect to almost every possible application and can integrate/interact with many other software.

### Versatile Instrument Setup



### Station Map (OPTIONAL)

GeoDAS can display the configured stations on a googlemap or on a built in fixed image with associated coordinates. If configured and available, each station's setup / web interface is directly accessible from this map screen. The state of health of the associated station can also be displayed in a colour code.



GeoDAS software is a graphical Microsoft Windows-based application running under Windows 98 / NT4 / 2000 / XP / Vista / 7 / 8. Special wrapper applications can be used to enable many features of the GeoDAS to run under Linux, MAC OS, Unix and other operating systems as well.

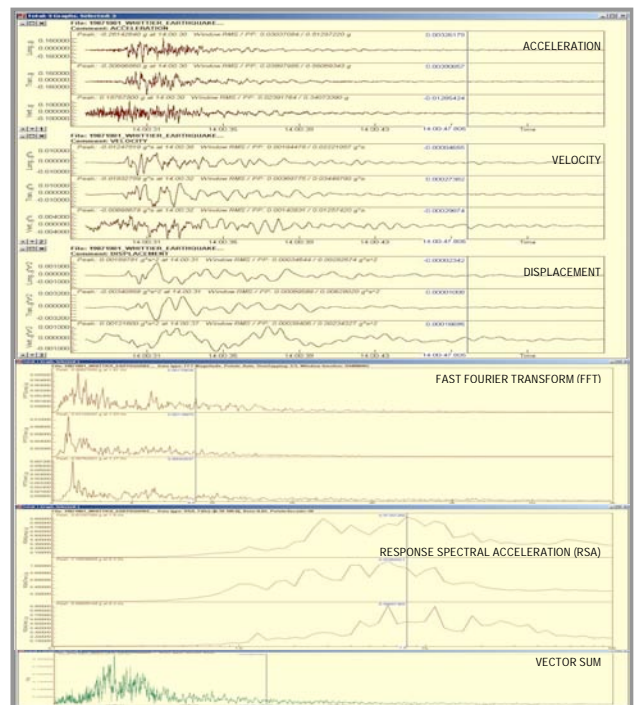
GeoDAS, when compared to any similar application, provides the most comprehensive, intuitive and versatile features available in the earthquake, seismic, structural, dynamic and static monitoring and measuring industry.

### General Tasks

- Instrument, Network and System setup
- State of Health (SOH), logging and permanent or periodical monitoring of instrument/system status
- Communication links administration and monitoring supporting SEEDlink and GSBUS datastreams
- Real-time data viewer and recorder
- File manipulation and format conversion into ASCII, SUDS, SAC, SEISAN, ARTeMIS, MATLAB
- Off-line data viewer, basic data analysis

### Data Analysis (OPTIONAL)

- Lowpass Filter
- Highpass Filter
- Baseline correction
- Integration
- Differentiation
- Vector Sum
- Cumulative Absolute Velocity (CAV)
- Time-domain Filtering
- Effective Values
- Damping
- Power Spectra
- FFT Magnitude
- Terzband Spectra
- Response Spectra
- JMA Intensity
- STA/LTA Ratio
- Signal Characteristics
- Analysis Templates



### Other Capabilities

GeoDAS offers also special functions, which is required for particular applications or be activated in special cases

- Strong Motion Data Processing
- OBE / SSE Event Checks & Reports
- Support for ADC Boards
- Post-processing, reporting, notification
- Static Measurements, Rainflow counting
- Automatic Event Processing
- Automatic File Conversion to special formats
- Customer specific file and stream handling