

Advanced Geophysical Technologies S.A. (AGT)

is an independent company registered in Chile currently dedicated to the development of the **gDAS-32** Distributed Array System designed as a multi-parameter acquisition system for electromagnetic and seismic survey and monitoring applications.



gDAS-32

The system's design concept has been driven by the requirement for cost efficient high resolution geophysical data acquisition in extremely adverse conditions. With the principal focus on simplicity and flexibility, the gDAS-32 delivers a system customizable to any array structure from detailed project scale to regional survey geometries without the need for intra-array communication.

Each gDAS-32 unit comprises two 32-bit ADC's for acquisition of data from electric-field dipoles, magnetometers, seismometers, etc. with internal filtering and data storage driven by programmable acquisition schedules slaved to GPS timing signals.

Simultaneous acquisition, for example of multiple lines of Offset (3D tomography) IP arrays or of very large distributed arrays of Vector / Recce IP and MT stations, permits both enhanced productivity and data quality with extended coverage for greater depths of investigation compared to more conventional systems. State-of-the-art processing, including telluric cancelation and adaptive filtering techniques, and modeled parameter fitting further enhance survey results even under the most adverse conditions.

Example applications:

Vector Induced Polarization /

Resistivity with Magneto-Tellurics:

A 1km grid pattern of stations covering an area of 50km² with 50 gDAS32 receivers, providing;

- simultaneous acquisition of Tensor Magneto-Telluric soundings at 1km-spaced stations, with dedicated and mutual remote references for a frequency range of 0.001 (and lower) through 10,000Hz. for 1- through 3-D interpretation of deep resistivity structure, and;
- subsequent simultaneous acquisition of very long period Induced Polarization parameters, circumventing inductive electromagnetic coupling effects and increasing target-over-background responses, incorporating telluric cancelation and monitoring of transmitted current variations.

High resolution Induced Polarization /

Resistivity tomography with MT profiling

A continuous array of 100m electric-field dipoles with interspersed magnetometers for EMAP-style MT determinations simultaneously acquiring high resolution step-through (3D tomographic) Pole-Dipole IP and Resistivity data to large (>25) n- levels incorporating telluric cancelation and monitoring of transmitted current variations.

Controlled Source Electromagnetics (CSEM)

Generic CSEM acquisition of E- & H-field data for 3D inversion. Easy add-on to any IP or natural source MT survey and of particular value in areas of severe cultural contamination.

gDAS-32

Technical Specifications

2 input channels

- Independent 32 bit analogue-digital converters
- Input voltage range: +/- 2.5 V
- Maximum continuous input voltage limit: +/- 50 V
- Maximum momentary input voltage limit: +/- 500 V
- Input impedance: 20 M Ω

Maximum number of samples per time series record: 4 million [2²²] samples

Sample rate

- User programmable
 - Maximum fs: 32 kHz, Time series record length = 128 s
 - Minimum fs: 8 Hz, Time series record length = 145 hours
- Typical fs for MT acquisition:
 - 32 kHz, each time series record length = 128 s
 - 2 kHz, each time series record length = 34 mins
 - 128 Hz, each time series record length = 9 hours
- Typical fs for IP acquisition:
 - 512 Hz, each time series record length = 2 hours

GPS synchronization

- Maximum GPS error: 100 ns
- Typical (measured) GPS error: 10 ns

Calibration

- Internal signal generator, +/- 20.48 mV, 0.5Hz for internal calibration and system check

Contact impedance: Measured prior to each acquisition and on user command

Memory

- Internal pen drive: 8 Gb provides for 200 typical time series files
- Typical time series file (2 channels, 4M samples): 35 Mb
- Time series data files: Simple 32-bit binary
- Data download: USB cable or removal of pen drive
- Data available for download during acquisition and turned off

Processors

- Real time acquisition processor Microchip 32-bit 80MHz
- HMI Processors 32bit ARM 200MHz with light Linux kernel

Power source

- External battery: 9 to 22 V
 - Battery type according to application with/without solar panel
- Consumption during acquisition:
 - With Bluetooth on: 200 mA (12V supply)
 - With Bluetooth off: 145 mA (12V supply)
 - With XBee external radios: To be defined

General Specifications

size and weight

- External Pelican case with connectors
 - 215 x 175 x 100 mm, 1.2 kg
- Internal electronics and housing
 - 190 x 124 x 45 mm, 0.4 kg

User interface

- No screen or buttons
- 2 powered RS232 ports, 9600 baud rate
 - Internal port for Bluetooth
 - External port for XBee (or similar) radio
 - Output compatible with typical Terminal Emulator
 - Continual user-friendly real-time text message updated at 1Hz with status information
 - Other comms:
 - User can send real time commands (start acquisition, abort, calibrate, contact resistance, etc.)
 - Receive 3-day history of acquisition and system information
 - Receive a 30s record of binary fs=256 Hz time series data (non-Terminal compatible)
- Schedules (acquisition & communication) and ADC Configuration
 - User updated by copying a text file to the USB and rebooting gDAS

