



# Full-Waver

## DISTRIBUTED SYSTEM FOR RESISTIVITY & INDUCED POLARISATION 3D SURVEYS in Deep Mineral Exploration

### *The FULL-WAVER distributed IP system concept:*

- A set of receiving nodes (typ. 15 to 50 V-Full-Wavers) are placed in the field, each one measuring two orthogonal components of the electric field. They record during the whole day time stamped raw data, GPS synchronized. There are no cables between nodes.
- The current electrodes are moved inside and outside the receiving nodes set up, with any type of electrode array configuration (pole, dipole, gradient, ...), in any direction with respect to the receiving nodes.
- An I-Full-Waver unit connected in series with the transmitter, also records during the whole day time stamped samples of the current transmitted (A,B), GPS synchronized.
- At the end of the day, time series data are downloaded from the V & I-Full-Wavers to USB stick for further processing on PC.
- The Full Wave Viewer PC software makes files where I and V time series are merged for each set of A, B, M, N electrode positions before processing the signals and reducing noise effects.
- Processed data are sent to a 3D resistivity / IP inversion software (ERTLab) for a high resolution interpretation thanks to the many receiver nodes locations and many current electrode positions.

### GEOMETRY FREE ARRAYS:

no cable between receivers, no fix or preset positions of electrodes to respect

### FULL WAVEFORM RECORDING:

post processing of raw data available for improving signal / noise ratio

### HIGH RESOLUTION DATA:

several directions of the transmitting line give real 3D data which can be interpreted with 3D resistivity / IP inversion software

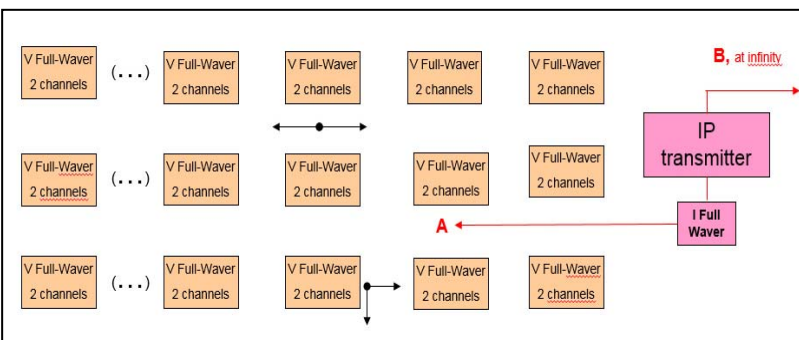
**SAVING ACQUISITION TIME:** quick set up in the field, no movement of receiver nodes for many positions of the current electrodes

### EASILY EXPANDABLE SYSTEM:

more V-Full-Waver nodes permit to cover larger areas and /or increase resolution, no wire between nodes

### REMOTE REFERENCE CAPABILITY:

using a remote V-Full-Waver unit



V & I-Full-Waver units, tested in the field with VIP 4000 transmitter



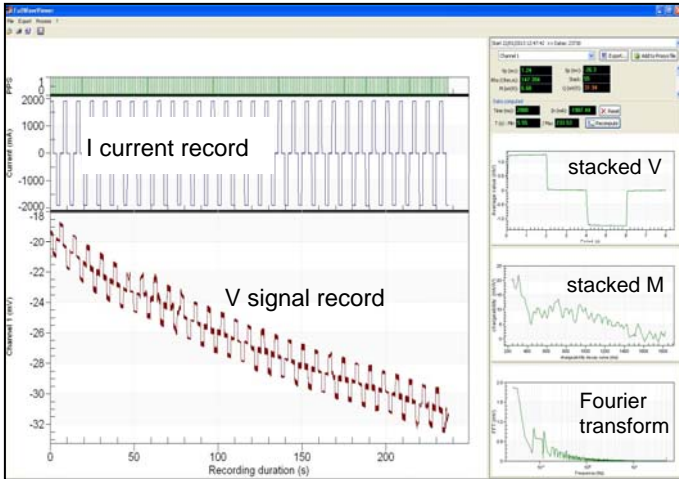
### V-FULL-Waver SPECIFICATIONS:

- Two channel signal (voltage) recorder
- Input range: +/- 15 V
- Continuous graphic display of voltage waveform for signal control
- Raw data storage in internal memory
- Several weeks data storage autonomy
- USB port for high speed data download
- Sampling rate: 10 ms
- GPS synchronization
- Internal & external battery

### I-FULL-Waver SPECIFICATIONS:

- One channel current recorder
- Input range: +/- 25 A
- Continuous display of the value of the current
- Raw data storage in internal memory
- Several weeks data storage autonomy
- USB port for high speed data download
- Sampling rate: 10ms
- GPS synchronization
- Internal & external battery

# Full-Wave Viewer Processing Software



## DATA MANAGEMENT:

- import (V, time) files from V-Full-Waver USB sticks and (I, time) files from I-Full-Waver USB stick
- merge these files into (I, V, time) raw data files
- after processing, export the data to PROSYS program for Resistivity & Chargeability quality control and to 3D inversion program (ERTLab)

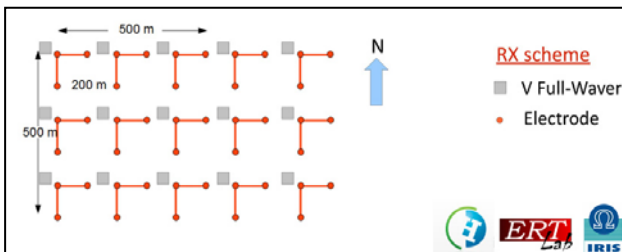
## DATA PROCESSING:

- displaying I and V raw data curves on PC screen
- averaging on selected low noise periods of time
- cancelling SP jumps
- rejecting spikes
- re-synchronizing the V signals, if necessary
- computing Fourier Transform for frequency content analysis

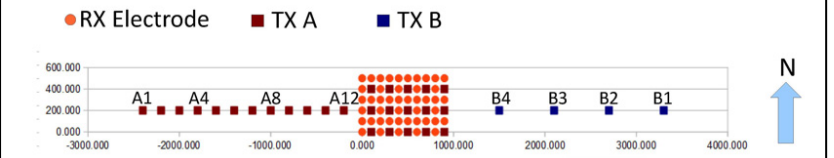
# Full-Waver Field Survey

## Test site in Shandong Province, China

- Institute of Mineral Resources, Beijing, with cooperation of Hengda, Geostudi, IRIS Instruments
- VIP 10 000 transmitter (10 kW, 3 000 V, 20 A)
- 15 Full-Waver nodes, 30 dipoles, MN = 200 m
- Pole-dipole, Wenner, gradient arrays
- 30 (A,B) injections, AB max = 6 km
- 900 data points with resistivity and IP chargeability
- investigation depth greater than 500 m.



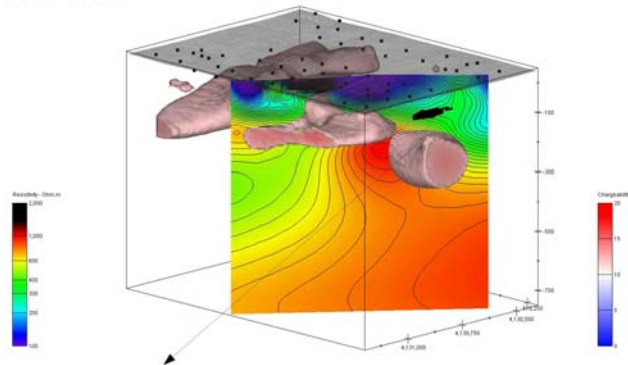
## TX scheme



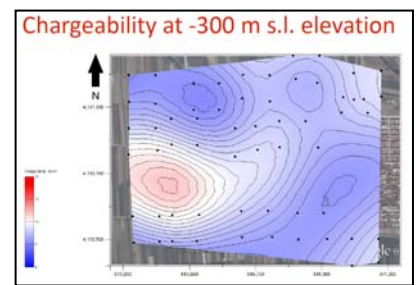
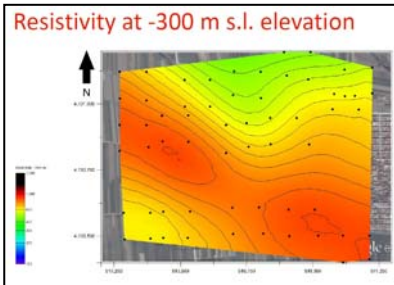
## DATA PROCESSING

Chargeability volumes > 10 mV/V

NW view



High chargeabilities overlap high/low resistivity interface



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