

RT3

250,000+ Seismic Channels – RealTIME & CableFREE

RT3 is SAExploration's next-generation land seismic acquisition system that delivers full, real-time data transmission for seismic surveys scaling to over 250,000+ channels. RT3 is focused on delivering better-quality subsurface data, while lowering capital and operating expenses. These goals are achieved via increased system automation, lower equipment costs, and significantly reduced system weight, resulting in reduced cycle times, less crew personnel, and lower HSE exposure hours.

RT3 features a new, two-tier radio telemetry architecture that scales RT3 to much higher channel counts than conventional acquisition systems. RT3 supports totally flexible layout geometries, so that survey designs are no longer constrained to the "multiple 2D line" geometries that previously have been required by traditional cabled systems. A fully automated deployment capability means that the RT3 radio network forms and organizes itself, with minimal user intervention needed.

RT3 consists of ultra-light recording units (Motes) and high-throughput Ground Relay Units (GRUs) that are all controlled by an automated and intuitive central recording system. Also, RT3 fully supports SAExploration's Hybrid Radio Telemetry system, which enables your seismic data acquisition project to continue, uninterrupted, even if radio connectivity is temporarily lost for portions of the spread.

The Mote

The Mote is the RT3 acquisition unit. It is available with an external connector, for attaching a geophone string, or with an internal single-point receiver (SPR). The on-board LED quickly lets the user know the state of the deployed Mote. Each Mote automatically communicates with a GRU, based on the best radio connectivity. Motes switch to an ultra-low power state, when not in use. The entire spread can be woken up quickly from a sleeping state into continuous data collection mode, with a single command. The Mote has the same outstanding analog-to-digital performance as SAExploration's field-proven RT2 system.

The Mote battery charger is specifically designed to provide high-density charging with a small physical footprint. The charger includes 10 self-contained charging drawers, each with its own power supply to charge the Motes. One station can charge 50 Motes in less than three hours.

The GRU

The Ground Relay Unit (GRU) collects the seismic data from each of the Motes that are communicating with it, in a TDMA-type protocol. The GRU then relays this data from GRU to GRU, back to the central recording system, using ultra-high performance radios. The GRU is a full duplex transceiver, which significantly reduces communications latency and allows RT3 to scale to over 250,000+ channels, with full real-time data transmission. The sustained throughput of the GRU sub-system is approximately 20+ Mbps with a "burst" rate of up to 55 Mbps. Cabled systems have historically operated at 8 or 16 Mbps.

The GRU radio network is a fully automated formation sub-system, such that the GRUs self-organize with adjacent GRUs. A GRU is typically mounted on a tripod and, depending on the terrain and user-selected height, the distance separating the GRUs is usually between 100-400 meters.

The Central Recording System

A newly designed central recording system scales in a modular fashion to over 250,000+ channels. The new spread manager provides three independent views of the spread, including a continuous seismic energy activity display. A new parameter manager simplifies operations—automation being a key design driver of the new central application. The spread health dashboard provides the user with a quick and consolidated means of identifying and fixing any user-addressable system problems. The system automatically "arms" the Motes required in each acquisition template, while leaving other parts of the spread in a monitored, low-power state.

Mote Features & Specifications



External connector



Internal geophone

- Multiplexed radio network
- Built-in self tests
- GPS receiver module with concurrent GLONASS and GPS positioning
- License-free, 2.4 GHz ISM band (and sub-GHZ ISM, where available)
- Flash memory (8 Gb) for Hybrid Radio Telemetry
- Continuous and real-time data collection
- Ultra low power radio and electronics
- Approximately 27 days of operation per charge
- Weighs <1 Kg, including battery
- SPR model with internal geophone weighs 1 Kg
- Stackable, rugged enclosure (spike must be removed to stack)
- Mote clock disciplined from GRU radio beacon
- Operating temperature: -40° C to +75° C
- Humidity: 0 to 100%
- Rating: IP67
- Sample Interval: ½, 1, 2, 4 milliseconds
- Gain Selections: x1, x4, x16, x32
- Anti-alias filter:
 - » Passband edge (0.01dB ripple) 0.75 Nyquist
 - » Stop band attenuation: >120 dB at Nyquist
 - » -3dB point is at 0.8 Nyquist
 - » Linear or minimum phase
- Common Mode Rejection: >100 dB
- Equivalent Input Noise @ 2 msec:
 - » 0.93 µV @ x1 gain
 - » 0.27 µV @ x4 gain
 - » 0.14 µV @ x16 gain
 - » 0.13 µV @ x32 gain
- Total Harmonic Distortion @ 2 msec: 0.0002% @ 15.625 Hz

All specifications are typical at 25°C. All specifications are subject to change without prior notice.