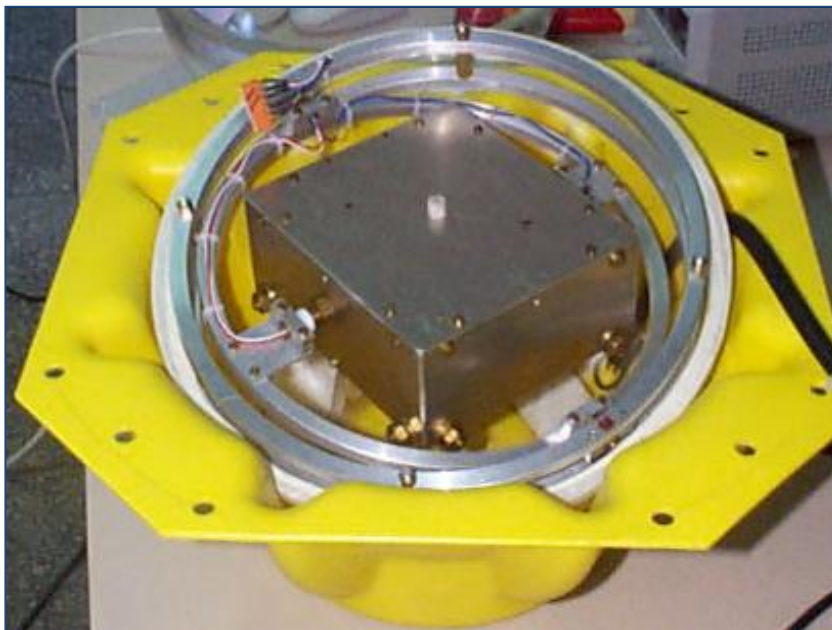


OCEAN BOTTOM SEISMOMETER TRITON CLASS

SYSTEM OVERVIEW

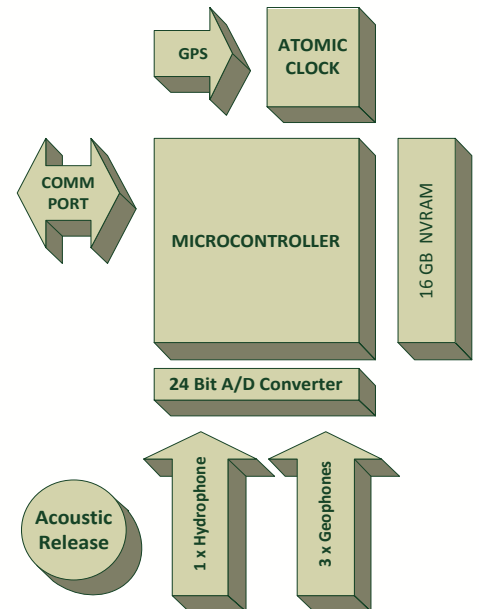
STATE OF ART OBS WITH RUBIDIUM ATOMIC CLOCK

Triton Class Ocean Bottom Seismometers are low cost devices for seismic refraction, composed of a 17" glass sphere certified up to 6700mwd containing three geophones (two horizontal and one vertical), a rubidium miniaturized atomic clock, a high resolution digitizer to collect data and the battery pack to supply all the electronic devices.



TRITON CLASS TECHNICAL DESCRIPTION

The digitizer logs the geophones and hydrophone data in its flash memory in compressed format. A good correlation of the OBS acquired data with external events is provided by an atomic clock, with a very low drift. For autonomous acquisition periods of 2-12 weeks the time synchronization (executed before the deployment at sea) with the GPS pulse per second is basically maintained. The whole system integrated in the glass sphere is mounted on a plastic case with a hard base equipped with a "burn wire" release mechanism allowing the free fall installation and the pop up recovery. The base is mounted on a metal ballast of 40kg to get a deployment speed of 0.7-0.8m/s in free fall condition. At the reception of a coded acoustic command (sent from the surface commander unit) by means of the acoustic transducer on the top of Triton 6000, a dedicated internal switch close a circuit generating a current through the external metal wire connecting Triton to its ballast: the seawater acting as electrolyte starts a quick corrosion of the wire and in less than 4 minutes the OBS leave its ballast to return on surface. The identification of the Triton on sea surface is facilitated by an amber or red flasher light and by a flag or radar reflector (depending on user request). The geophones convert very small motions of the ground into electrical signals, which are recorded digitally. They consists of a mass, containing electrical coil, that are suspended by a spring between the poles of a magnet. When the ground moves, the magnet and spring support move with it. The mass tends to remain stationary, so its motion will lag behind that of the magnet. To assure good quality measurement also in case of tilted installation up to 15°, the three geophones are mounted in a gimbal submerged by a high viscosity gel that allows correct levelling without introduction of filtering effects in the signals. Triton devices integrate also an hydrophone in seawater that provides information that is similar to the vertical geophone, and under certain conditions can have a better signal/noise ratio. All collected data are referred to absolute time obtained by a miniature Rubidium Atomic Clock.



WHAT IS SEISMIC REFRACTION

Seismic refraction is a geophysical principle used in the fields of engineering geology, geotechnical engineering and exploration geophysics. The seismic refraction method utilizes the refraction of seismic waves on geologic layers and rock/soil units in order to characterize the subsurface geologic conditions and geologic structure..

WHAT IS AN ATOMIC CLOCK

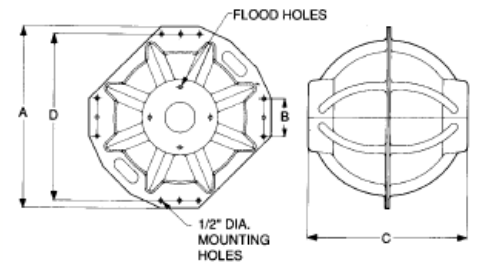
An atomic clock is a clock that uses an electronic transition frequency, in the microwave, optical, or ultraviolet region of the electromagnetic spectrum of atoms, as a frequency standard for its timekeeping element. Atomic clocks are the most accurate time and frequency standards known.



Envirtech is a private Italian company that is completely owned by its management. It invests more than 30% of annual revenue in research. Envirtech manufactures according to strict standards of quality control and is ISO9001-2000 certified.

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GENERAL INFORMATION	
Frame Shape	Glass sphere 17" diameter, with protective polyethylene hard hats
Measures	A = 610 mm C=533 mm
Weight in air	24.5 Kg
Weight in water	5.9 Kg
Ballast	50.0 Kg
Operational Temperature	-4°C +45°C (standard)
Extended Operational Temperature	-20°C +70°C (optional)
Operational maximum Depth	6,000 meters water depth



STANDARD FEATURES	
Instrumentation	
Geophones	1 vertical, 2 horizontal gimbal mounted to ensure that the sensor are leveled (they must be leveled to operate efficiently). Natural undamped frequency 4.5Hz. Sensitivity: 78V/(m/s)
Hydrophone	Sensitivity: -186 dB re: 1V/uPa, 50.1 V/bar Frequency range: 2Hz..20KHz
Digitizer	
CPU	RISC 32bit processor
Analog inputs	4 (expandable to 16) channels @24bit 4 channel @12bit Sampling frequencies: 50, 60, 120, 200, 300, 500 sps
Memory	32MB SRAM 16 GB flash expandable up to 32GB
Atomic Clock	Rubidium – Accuracy in factory: $\pm 5E-11$ Daily time drift < 7 μ S, Monthly Stability $\pm 1E-10$
Digital Interface	2 RS232 ports, 1 RS485 port 2 USB ports, 1 Ethernet 10/100Mbps BaseT
Acoustic Release	
Burn wire mechanism	Able to support a max ballast of 50kg. Slant range of 8000m. Bidirectional link providing slant distance, and feedback of received release command
Battery Pack	
Independent Battery packs to assure high reliability	<ul style="list-style-type: none"> 65Ah Primary Lithium battery pack for the digitizer (for 25 days of system in full operations) 10Ah Primary Lithium battery pack for the acoustic link (for 500 release) 5Ah Alkaline battery pack for the burn wire release (for 40 release)
Signaling System	
Light/beacon/Flag	Flashing amber or red light (1Hz), optional beacon VHF or Inmarsat, Optional Flag and/or radar reflector
<i>Specifications can change without notice</i>	

