

ORCUS

CABLED, REAL-TIME, MULTIDISCIPLINARY OCEAN BOTTOM OBSERVATORY WITH SEISMOMETER AND ACCELEROMETER



A multidisciplinary observatory for real-time monitoring of offshore seismic events and other environmental parameters.

KEY FEATURES

- > Titanium sphere housing
- > Instrumented with a 3T seismometer, a Fortis accelerometer and the Affinity 31-bit ADC digitiser
- > Suitable for depths of up to 6000 m (19,685 ft)
- > Robust self-levelling system (Gimbals)
- > Includes pressure, temperature and current sensors with capacity for two additional environmental sensors

APPLICATIONS

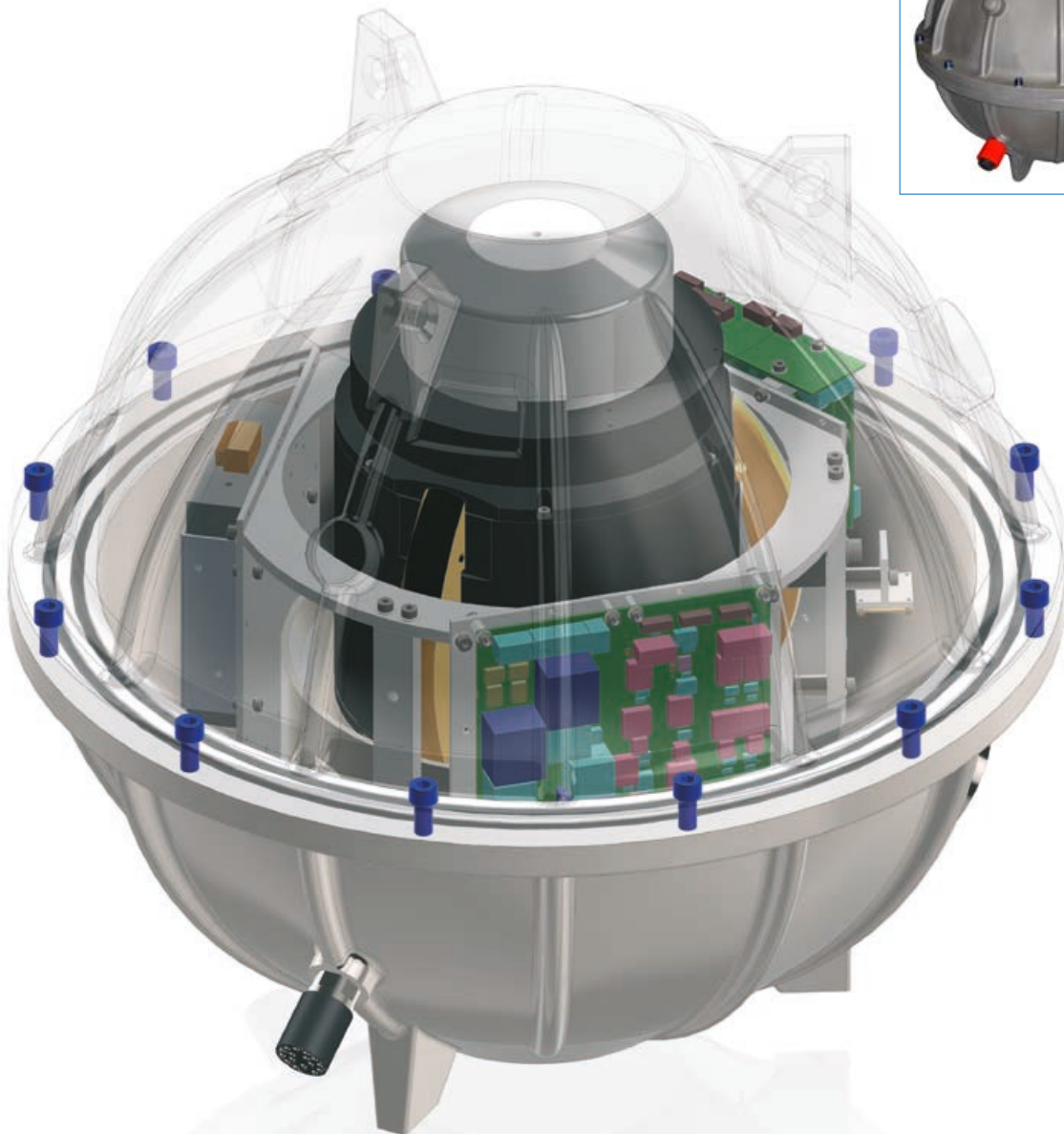
- > Permanent ocean observatory
- > Earthquake and Tsunami Early Warning systems
- > Long-term reservoir monitoring
- > Plate tectonic studies

Orcus

The Orcus is designed for depths of up to 6000 m or 19,685 ft and is suitable for cable-to-shore or cable-to-buoy systems for real-time data streaming.

DIMENSIONS

NOMINAL OUTER DIAMETER ACROSS THE EQUATOR: 456 MM
HEIGHT: 429 MM



A multidisciplinary observatory for real-time monitoring of offshore seismic events and other environmental parameters.

The Orcus houses a 3T broadband seismometer, a Fortis accelerometer and an Affinity, 31-bit ADC, data acquisition system. The instrumentation is enclosed within a titanium sphere rated for deployment at up to 6000 m depth.

The system provides inputs for two additional environmental sensors (e.g. long period hydrophones) and one sensor with serial output.

The unique hybrid design allows for simultaneous monitoring of both weak or distant seismic events, and near-field, high intensity shaking, in a single system.

The innovative spherical shape of the casing protects the instrument at high pressures, and an underlying metal plate ensures optimum ground coupling.

Key features

Titanium sphere housing containing the seismometer, accelerometer and digitiser

3T broadband triaxial seismometer

Fortis force-feedback triaxial accelerometer

Affinity 31-bit ADC digitiser

Depth up to 6000 m (19,685 ft)

Robust self-levelling system (Gimbals)

Heading and tilt sensors

Optional additional sensors: Hydrophone, pressure sensor, current meter

Timing synchronised with NTP or PTP protocols

Auxiliary Ethernet and power output

Ethernet or fibre optic communications for real-time data streaming

Optional concrete dome to reduce noise and protect against trawling

Range of mating connectors available

Customer power solutions available

Image shows CAD diagram of the Güralp Orcus Ocean Bottom Seismometer

For areas where trawling is prevalent, an optional concrete dome can be supplied that both reduces noise and protects against disturbance.



Applications

- > Permanent ocean observatory
- > Earthquake and Tsunami Early Warning systems
- > Long-term reservoir monitoring
- > Plate tectonic studies

SPECIFICATIONS

| OBS SYSTEM PHYSICAL CHARACTERISTICS | |
|--|--|
| Sphere casing | Titanium - nominal gauge of the area with no ribs: 10 mm |
| Sphere dimensions | Nominal outer diameter across the equator: 456 mm Height: 429 mm |
| Levelling system | Gimballed ($\pm 26^\circ$) |
| Deployment depth | Up to 6000 m |
| Sensor Orientation | Compass, tiltmeter |
| Connectors | SubConn Circular Series (rated 6000 m) Hybrid connector with copper and fibre optics (rated 6000 m). Other options available. |
| Weight with ballast ring and 3 x anodes* | In air: 97.9 Kg Displacement: 45.0 L / 46.1 Kg In water: 51.8 Kg *Actual weight will depend on final specification |

| BROADBAND SEISMOMETER: 3T | |
|---|--|
| Configuration / Topology | Triaxial orthogonal (ZNE) |
| Frequency response | 120 seconds (0.008 Hz) - 50 Hz (option of 360 s (0.0028 Hz) to 50 Hz) |
| Output sensitivity | 1500 V/ms ⁻¹ (2 x 750 V/ms ⁻¹) differential standard output (full-scale clip level of 13 mm/s) Other options available |
| Sensor dynamic range | 167 dB at 1 Hz |
| Self noise below NLNM (New Low Noise Model; Peterson, 1993, USGS) | Crosses the long-period at 166 s (0.006 Hz) and remains below the high frequency limit of the NLNM at 10 Hz |

| STRONG MOTION ACCELEROMETER: Fortis | |
|-------------------------------------|------------------------------------|
| Configuration / Topology | Triaxial orthogonal (ZNE) |
| Frequency response | DC to 100 Hz |
| Sensitivity | $\pm 2g$, other options available |
| Self-noise below NHNM | > 0.6 Hz (< 17 seconds) |
| Self-noise below AHNM | DC to 100 Hz |
| Self-noise below ALNM | 0.8 to 45 Hz |
| Dynamic range | > 160 dB |

| OPTIONS | |
|--------------------|--|
| Additional sensors | Hydrophone, pressure sensor, current meter |

| OCEAN-BOTTOM DIGITISER: AFFINITY | |
|----------------------------------|--|
| Resolution | 31-bit ADC |
| Channels | 8 primary differential (3 for seismometer, 3 for accelerometer, 2 for hydrophones) 16 multiplexed single-ended Serial input (Serial to TCP/IP converter) |
| Dynamic range | 139 dB at 100 sps |
| Sample rate | 4000 sps to 1 sps |
| Clock | Absolute time provided by NTP or PTP |
| Operating system | Platinum (Linux based) |
| Seismic Network Protocols | Scream! (GCF), GDI-link, CD1.0/1.1, SEEDlink and others |

| POWER CONSUMPTION | |
|--|-------|
| Without media converter or compass | 3.5 W |
| With compass but without media converter | 5 W |
| With media converter and compass | 7 W |