Gaps

High performance USBL positioning system

Gaps is a high performance Ultra Short Baseline positioning system for locating subsea assets. It combines an USBL antenna and a fiber-optic inertial navigation system (INS) in the same housing. USBL calibration on the field is not required anymore. Advanced acoustic techniques including wideband signals ensure maximum performance in most difficult conditions. Its unique 3D acoustic array enables tracking from the deep sea to extremely shallow water, and even at angles above horizontal.

FEATURES

- Compact, all-in-one INS and USBL solution
- High grade INS for ultimate performance
- Provide absolute georeferenced position for the beacon
- Compatible with all major navigation suites
- Easy interface with subsea INS (iXblue and third party)
- DP mode : L/USBL/INS (PRS, MRU & Gyro in one equipment)
- More than 500 available acoustic channels
- Unified iXblue web interface
- 3D display software included (DELPH RoadMap)
- 3D acoustic array geometry
- Wideband modulation
- Acoustic communication (NEW)

BENEFITS

- Rapid deployment
- Operational cost savings
- Pre-calibrated
- Easy to install
- Easy to operate
- Accurate positioning
- Robust performance
- Flexible deployment operations
- Horizontal tracking
- Wireless subsea communication with beacons

APPLICATIONS

Oil & Gas

Structure placement, ROV navigation, AUV & glider operations, towfish tracking, cable/pipe laying, diver tracking, exploration, drilling, mining, DP, seabed crawler, touch down positioning, mattress lay, plough/trench positioning, Out Of Straightness, BSR positioning, seismic (streamer, nodes, OBC), rig move, anchor positioning, riser positioning

Defence

Diver tracking, AUV tracking, underhull inspection, imagery, mine counter measure

Scientists

ROV, AUV, gliders and towfish tracking

2017-03-DS-Gaps

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GAPS TECHNICAL SPECIFICATIONS

Positioning Accuracy [1]

	CEP50
[2] SNR = 0 dB	0.53% x Slant range
[2] SNR = 10 dB	0.17% x Slant range
[2] SNR = 20 dB	0.06% x Slant range

Range / Bearing Accuracy [3]

	RMS / STD DEV / 1 sigma (68%)
SNR = 0 dB	0.02 m / 0.30°
SNR = 10 dB	0.02 m / 0.09°
SNR = 20 dB	0.02 m / 0.03°

Performance [4]

Operating range	> 4000 m
Coverage	200 deg below acoustic array
Operating frequency	21.5 kHz to 30.5 kHz MFSK (chirp)
Position refresh rate	1 to 15 s (depends on range) - 10 Hz with predictive filter
Nb of channels	> 500

Mechanical

Housing	Carbon fiber painted
Weight in air / water	16 kg / -7 kg (positive buoyancy)
Overal dimension HxØ	638 mm x 296 mm - min gate valve required: 300 mm / 12’
Depth rate	25 m standard / 100 m non destructive

Environments [5]

Operating and Storage temperatures	-5 °C / +35 °C -40 °C / +70 °C
EMC	89 / 336 / EEC – EN 60945

Interfaces

Power supply range	100 to 240 VAC / 50~60Hz or 24/36 VDC - 30 W
Control / command	Ethernet with WEB-based user interface
Input / output ports	4 Ethernet and 4 serial (232 / 422 / 485)
Synchronisation IN	1 PPS and 1 external trigger
Synchronisation OUT	2 triggers
Display	Delph RoadMap 3D display software provided - Compatible with most of navigation software

(1) In vertical conditions. Including GPS error of 0.1 m. Sound velocity profile compensated. Transponder transmit level=191 dB ref µPa @ 1 m. Slant range of 1 000 m.
(2) SNR is input signal to noise ratio
(3) In vertical conditions. Responder mode.
(4) For a surface noise level below 67dB ref µPa/Transponder transmit level = 191dB ref µPa @ 1 m / vertical conditions.
(5): NF X10-812

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Acoustic Communication (NEW)

Data link for AUVs and ROVs	
Simultaneous positioning and communication	
Half-duplex (Gaps head to beacon / beacon to Gaps head)	
Data rate	500 bits/s (burst)
Doppler	+/- 6 knots

GAPS BOX TECHNICAL SPECIFICATIONS

Dimensions	233 mm x 330 mm x 94 mm
Weight	4.6 kg
Operating and Storage temperatures	-5°C to +50°C -40°C to +80°C

INERTIAL NAVIGATION SYSTEM SPECIFICATIONS

Performance [1]

Position accuracy with GPS	Three times better than GPS accuracy
No aiding for 2 min / 5 min	3 m / 20 m (CEP50)
Pure inertial mode	0.6 nm / hour (CEP50)
Heading accuracy	0.01 deg secant latitude RMS
Roll and pitch dynamic accuracy (no aiding)	0.01 deg RMS
Heave accuracy (Smart Heave) [2]	2.5 cm or 2.5 % RMS

(1) Secant latitude = 1 / cosine latitude
(2) Whichever is greater for periods up to 30 seconds. Smart heave is delayed by 100 s fixed value.
Real-time heave accuracy is 5 cm or 5% whichever is greater.

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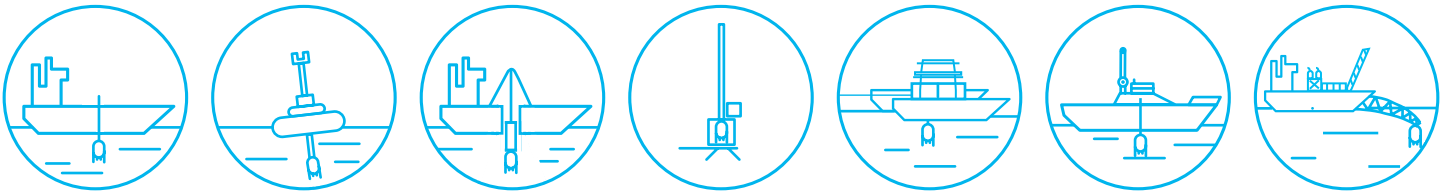
SYSTEM DEPLOYMENT

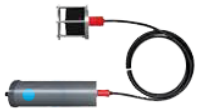


Side pole | Buoy | Moon pool | Hoisting system | Towed platform | Drone (USV) | Pipelay Vessel

Contact iXblue for pole drawings.
iXblue can provide the hoisting system.

COMPATIBLE BEACONS

iXblue MT8x2
Mini beacon
Lithium batteries



iXblue MT9x2
Mini beacon
Rechargeable batteries

iXblue RTAx2
Releasable transponder

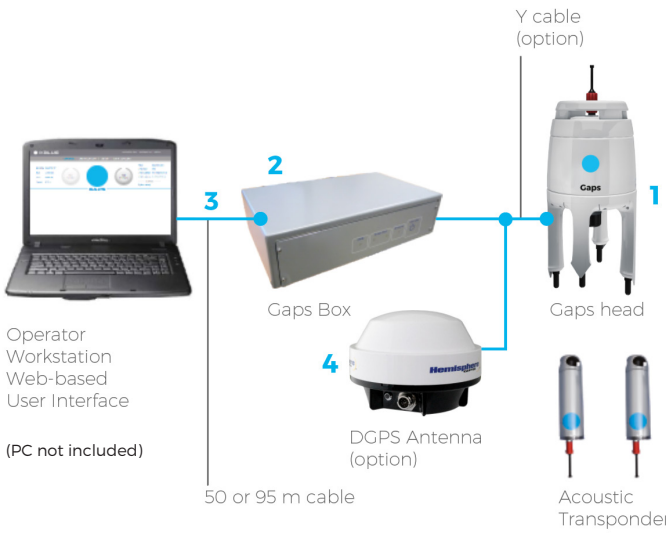
iXblue ZTA02C
Beacon for seismic applications

iXblue Ramses
Acoustic Synthetic Base Line
positioning system

Applied
1000 series
Contact iXblue
for performances

Other modulation :
contact iXblue

COMPONENTS



1 - This is the main part of the Gaps system, which comprises the acoustic array to communicate with the transponder(s) installed on the target(s), the INS for motion compensation and absolute georeferencing, and all electronics and signal processing.

2 - Gaps Box designed to interface between the Gaps head and external peripherals. It includes power supply from mains & 28 Vdc, Ethernet connector, RS422 / 232 input/ output and synchro in/out on BNC.

3 - 50 or 95 m long cable used to communicate with Gaps head. Possible options: ATEX, 95m and greater length using repeater Box.

4 - A complete turnkey solution is available on option, including a GPS receiver.

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