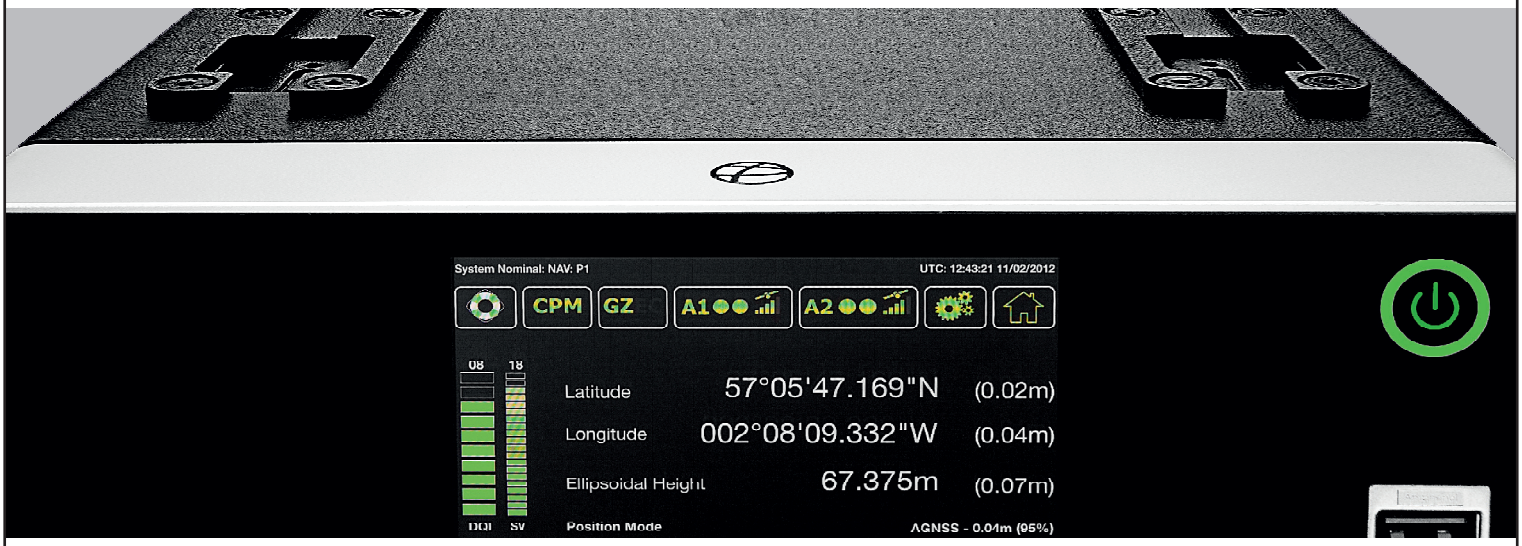
POSITIONEERING®

pioneering precision



CPM - Core Positioning Module

The Ultimate Integrated Marine Positioning System

Concept and Philosophies

The Positioneering goal is to provide precise positioning solutions, primarily to the marine sector of the offshore oil and gas industry, with the aim of delivering radical positive change by embracing innovation, optimum technologies and techniques for each and every aspect.

Each and every aspect of the positioning solution is equally important to the final result including the user hardware component. The Core Positioning Module or CPM is therefore a critical component and portal into providing the best possible position solution.

Most user applications depend upon precise positioning to be able to conduct their core operation, which is usually continuous, 24 hours per day and often in the harshest of environmental and operating conditions. The CPM is a new departure in concept and has been designed to be functionally robust, resilient whilst continuing to provide the best positioning under all such circumstances.

Background

Precise positioning hardware evolved over time from a combination of separate GNSS and augmentation receiver (demodulator) equipment into highly integrated units aiming to carry out all possible functionality – of course it is inevitable that when trying to be all things to all applications there will be some compromise.

Originally the position solution was derived directly within the GNSS receiver hardware with limited documentation relating to the algorithms and related integrity assessment. This lead to the development integrated hardware but with separate external position and QC generation software packages that was often complex and for 'experts only'.

The result of this was that providers made a move towards tighter integration including adding the external QC application into the box. The result of this has been that processors responsible for producing the “critical” real-time position solution then had to carry out additional onerous and ever increasing tasks, potentially seriously compromising the main purpose of the system. With such systems many users have little or no choice but to adopt the software which is complex, expensive and usually provides many superfluous features they do not need.

Although commercially this is not ideal the biggest issues are; the required faster processor generates more heat to manage, the position generation software is overly complex and subject to crashing and increased position latencies, larger packaging with openings to aid cooling, increased cost, compromised critical and non-critical functionality

Design

The design of the CPM is based upon substantial market and technical research and requirements assessment.

With a large range of different user requirements to satisfy in different operating environments and the constantly changing nature of the industry, Positioneering has chosen to adopt a concept of functionally optimised modules, meaning the core purpose of each will never be compromised.

The core requirements for the CPM are therefore:

1. Sole position generator ensuring solution consistency and relevant QC
2. Total focus on positioning performance and availability including consistent deterministic real-time operation with position latency at the millisecond level
3. Optimised packaging for the operating environment including a completely sealed unit with no moving parts and passive cooling with optimum turkey mounting and installation solutions for all scenarios
4. Optimum communications / interfacing hardware with industry leading connection / interconnection solutions and all with galvanic isolation
5. Configuration flexibility with support of all high-end GNSS hardware and multiple sensor cards
6. Maximum use and reuse of available sensors and data between multiple units
7. Unqualified certification for all user operating scenarios
8. Complete operating transparency and intuitive leading technology user interfaces
9. Total flexibility and visualisation with proprietary fast and efficient interface data formats as well as support of all major industry standard formats
10. Optimum package size for efficient use of rack and other installation space

CPM Specification

Positioning Performance

Accuracy (2DRMS/95%)

Primary	<0.05m (Horizontal)	<15cm (Vertical)
Secondary	<0.25m (Horizontal)	<45cm (Vertical)

Time Accuracy	20 ns RMS
Velocity Accuracy a	0.03 m/s RMS

Inistialisation (95%)

First fix:	<50s (Cold)	<30s (warm)
Primary Convergence:	<600s (Cold)	<300s (warm-reconvergence)
Secondary Convergence:	<300s (Cold)	<100s (warm-reconvergence)

GNSS Measurements

Measurement Rate:	1-20Hz	
Reacquisition:	0.5 s L1 (typical)	1.0 s L2 (typical)

Precision	**GPS**		**GLO**	
	Code	Carrier	Code	Carrier
L1 C/A	4.0 cm	0.5 mm	8.0 cm	1.0 mm
L2 P(Y) (see note 1)	8.0 cm	1.0 mm	8.0 cm	1.0 mm
L2 C (see note 2)	8.0 cm	0.5 mm	8.0 cm	1.0 mm
L5	3.0 cm	0.5 mm	-	-

Notes: 1. L2 P for GLONASS 2. L2 C/A for GLONASS

Dynamics

Velocity	514 m/s

Heading (2DRMS / 95%)

Baseline	1.00m	Accuracy	0.10
Baseline	2.00m	Accuracy	0.04
Baseline	2.50m	Accuracy	0.02

Physical

Size (L x W x H):	280 x 218 x 68mm
Weight:	3.3Kg
Power:	24 VDC (9.0V to 28VDC)
Consumption:	Nominal 60W at 24 VDC
Display:	High-resolution TFT
User-Interface:	Projected Capacitive touch Capacitive Touch Onboard web-server

Installation

Single below-decks unit
Single combined GNSS / Augmentation Antenna
Single RF cable

Optional

Up to 5 separate antennas with dedicated, configurable power feeds
- 2 x GNSS,
- 1 x L-Band
- 1 x Combined GNSS & L-Band
- 1 x IALA

Environmental

Temperature

Operating:	-15C to + 55C
Storage:	-25C to + 55C
Humidity:	95% non-condensing
Ingress Protection	IP64 (Dust proof, Splash proof)

Regulatory Approvals

Environmental	IEC 60945 (Protected)
Shock	IEC 60945: 8.6
Vibration	IEC 60945: 8.7
FCC	Part 15 Class A/Class B compliant
CE mark	compliant
RoHS	compliant
WEEE	compliant

Unit Configuration

GNSS

Receivers:	1 or 2 GNSS receivers
Constellations:	GPS, GLONASS, COMPASS, GALILEO, SBAS

Augmentation

Satellite Channel 1:	Positioneering SDTS (L-band) Positioneering Service-A1 / Service-A2
Satellite Channel 2:	Positioneering SDTS (L-Band) Positioneering Service-A1 / Service-A2
IALA:	2 x channels IALA MF
External:	RTCM V2 / V3

Communications & Data

Independence:	All communications ports are electrically isolated and independent from each other
Serial	4 x RS232/RS422/RS484 (Configurable via User-Interface) Data rates configurable from 300baud-921,600 baud
Ethernet:	2 x fully independent 100M Ethernet 1 x Hub connection off 2nd Ethernet
Utility	1 x utility port with: 1PPS output 1 x Utility port with - Event-in - Alarm out
USB	1 x USB Ver. 2.0, Type-A reciprocal 1 (Rated IP67)
SMC	Service Management Channel connection (Power out / data I/O)

Data outputs

NMEA-0183	Sentences: GGA, GGA High precision, GGA (Converteam) GBS, GLL, GNS, GRS, GSA, GST, GSV, HDG, HDT, ROT, RMC, VTG, ZDA
IMCA	$DPGGA
POST	POsitioneering Standard Transfer (Proprietary)
RAW	GNSS, Augmentation
UKOOA	P2/94
Output rate	1Hz - 20Hz

Data Logging

Internal Logging

Capacity	8GB
Onboard automated logging:	48 hours of GNSS and Augmentation data 6 months of diagnostics data 5 years of usage data

RoHS 2002/95/EC

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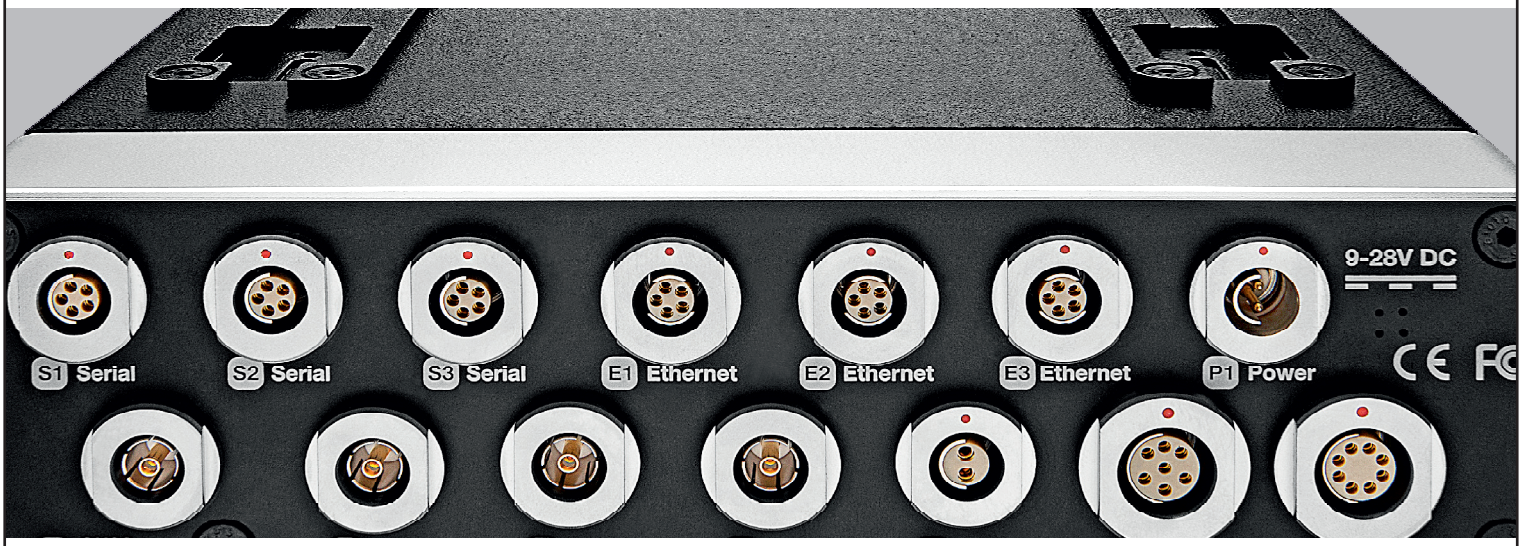

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