SEASTAR™ DP
MORE IS SAFER - COUNT ON FUGRO

Seastar™ products and services are designed specifically for Position Reference for Dynamic Positioning Systems and provide your vessel or rig with the highest standards of reliability, availability and coverage for safe operation.

RELIABLE DGNSS FOR DYNAMIC POSITIONING (DP) APPLICATIONS
Fugro Satellite Positioning offers high performance positioning services, primarily to the offshore oil and gas industry. The users of our services are vessels and rigs equipped with dynamic positioning which requires high availability and integrity in operations, and other marine users who have special demands for navigation requirements. Fugro is viewed to be a market leader within our field of expertise today.

- Worldwide solutions, using a small omni-directional antenna or Inmarsat terminal
- Highest levels of signal reliability to ensure continuous signal reception
- Dual independent links in all Inmarsat ocean regions
- Sub metre and decimetre level accuracy services
- Global Navigation Satellite Systems (GNSS) capability using GPS, GLONASS, BeiDou and Galileo
- Compatible with Kongsberg Seatex DPS/DARPS systems

G4 - MORE IS SAFER
For a satellite based system this means an unobstructed view of the satellites. But when operating close to large structures, satellites can easily be obscured leading to reduced performance – just when it is most necessary.

The ability to use a wide range of satellites gives more choice and therefore higher probability of a good position solution.

Based upon the use of its worldwide network of reference stations, Fugro is able to calculate corrections to orbit and satellite clock values, for all available GNSS systems (GPS, GLONASS, BeiDou and Galileo).

Access to multiple lines of position, derived from a mix of satellites, means that any satellite with an inconsistent measurement can be treated as an ‘outlier’ and therefore ignored in the position calculation. Additional satellites confirming the calculated position build confidence and reliability.
A RANGE OF SERVICES
A choice of services are provided, ranging from the Seastar™ standard L1 sub metre level, GPS only, single frequency service to the Seastar™ G4 decimetre level, integrated GPS/GLONASS/BeiDou/Galileo, dual frequency service.

Seastar™ G2:
10cm accuracy phase based service using orbit/clock data valid worldwide, based on GPS and GLONASS L1 and L2 frequencies.

Seastar™ G4:
Extension of G2 using the Chinese BeiDou system and ready for the European Galileo system.

Seastar™ XP2:
Accuracy phase based service, using orbit/clock data valid worldwide, based on GPS and GLONASS L1 and L2 frequencies, Independent of G2/G4.

Seastar™ XP:
Accuracy phase based service, using orbit/clock data valid worldwide, based on GPS L1 and L2 frequencies.

Seastar™ SGG:
Integrated DGPS/DGLONASS, sub metre level, code based service using orbit/clock data based on GPS and GLONASS L1 and L2 frequencies.

Seastar™ Std. L1:
Sub metre level, code based service based on GPS L1 frequency (GLONASS optional).

FUGRO DATA NETWORK
Fugro operates a fully duplicated network for the production and delivery of high performance Global Navigation Satellite System (GNSS) augmentation services.

The network includes:
- Independent Network Control Centres (NCC) in Perth, Australia and Houston, USA
- Back up NCC in Australia and USA
- Dual satellite broadcast data links in all ocean regions

The Seastar™-NTRIP DGNSS data delivery option provides a backup to satellite broadcast delivery.

Fugro Satellite Positioning DGNSS services are delivered over dual independent delivery paths. To complement the standard satellite broadcast delivery channels, we offer Internet delivery of correction data using the NTRIP protocol, (Networked Transport of RTCM over Internet Protocol).

“MORE IS SAFER”
Use of a wider range of satellites gives more resistance to ionospheric scintillation effects which tend to be localised in a particular part of the sky. Any radio navigation system depends upon effective receipt of signals.

ONBOARD EQUIPMENT
Reception is either via a small dedicated omni-directional antenna or alternatively a connection is made to a compatible existing Inmarsat system. This connection has no impact on use for normal two-way communications, and does not affect equipment approvals.
INTEGRATED SYSTEMS

DPS 700 with Seastar™ HP/XP engine:
Combination of DPS 132/232. DPS 700 also includes UHF and HF IALA receivers. Made by Kongsberg Seatex AS.

DPS 432 with Seastar™ HP/XP/G4 engine:
A multi-constellation GPS/GLONASS/Beidou/Galileo receiver, multi frequency sensor, 4 RTCM inputs, with display and extended QC capabilities. Including graphs. Made by Kongsberg Seatex AS.

DPS 232 with Seastar™ HP/XP/G2 engine:
GPS and GLONASS multi frequency sensor, 4 RTCM inputs, with display and extended QC capabilities. Including graphs. Made by Kongsberg Seatex AS.

DPS 132 with Seastar™ HP/XP engine:
GPS multi frequency sensor, 4 RTCM inputs, with display and extended QC capabilities, including graphs. Both code and phase based positioning. Made by Kongsberg Seatex AS.

DPS 112 with Seastar™ SGG engine:
Integrated GPS/GLONASS sensor and L-Band receiver/demodulator, with IALA beacon receiver; 3 x RS 232/RS 422 serial ports, 2 x LAN & 1 x USB port and built-in display. Made by Kongsberg Seatex AS.

DPS 110 with Seastar™ SGG engine:
Integrated GPS sensor and L-Band receiver/demodulator, with IALA beacon receiver; 3 x RS 232/RS 422 serial ports, 2 x LAN & 1 x USB port and built-in display. Made by Kongsberg Seatex AS.

DPS 200:
GPS and GLONASS L1 sensor, with display and extended QC capabilities. Made by Kongsberg Seatex AS.

Seastar™ 9205 GNSS receiver:
The Seastar™ 9205 GNSS receiver is a multi-constellation GPS/GLONASS/Beidou/Galileo receiver with integral L-Band demodulator for receipt of Fugro DGNSS corrections over a single antenna.

DEMULATORS
Seastar™ 3610/ Kongsberg 3710 DGNSS receiver:
Internet compatible receiver capable of receiving Fugro broadcasts. No GNSS sensor. Includes simultaneous dual broadcast satellite tracking capability.

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<th>Receivers</th>
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Fugro high performance satellite navigation augmentation services can be delivered beyond normal coverage limits. The combination of our unique purpose-made L-Band antenna for low elevation satellites (AD-493 receives corrections up to 75° North) and our NTRIP solution delivered over VSAT, ensures that you obtain the right corrections for maintaining reliable and safe operations in the Arctic.

Fugro NTRIP (Network Transport of RTCM over Internet Protocol) service is available as a back-up method over data delivery for all users.

OFFSHORE APPLICATIONS
Seastar® DP is designed for Dynamic Positioning applications operating worldwide, users include:
- Offshore support vessels
- Drilling ships and rigs
- Floating production units
- Shuttle tankers
- Service vessels
- Offshore loading

GOING NORTH
Operating in rough waters and in areas far away from other infrastructure and resources, like in the Arctic, requires the very best setup to ensure safe operations.

The standard method of correction data delivery is by broadcast over the Fugro network of L-Band geostationary communication satellites. This is an extremely reliable and robust system, but geostationary satellites, located above the equator, have a coverage footprint which is limited to around 70° North using standard spot beam antennas.