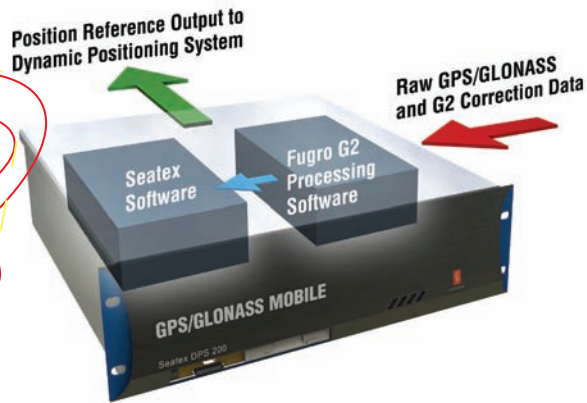


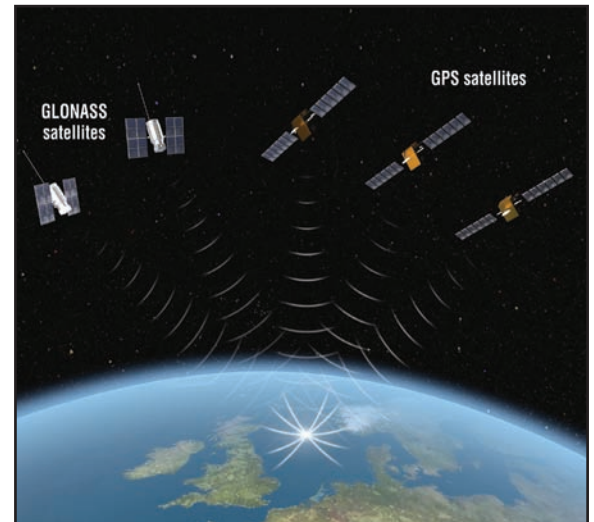
## SeaSTAR G2 - Dual System Positioning for DP Applications

**Dual System Operation** – based upon the use of its world wide network of reference stations, Fugro is now able to calculate corrections to orbit and satellite clock values, for navigation satellites of both the American GPS constellation and the Russian GLONASS constellation, to provide reliable, decimetre level positioning worldwide.

**Embedded G2 Engine** – position processing software, embedded in compatible receivers such as the Kongsberg Seatex DPS232, uses all available satellites to produce a composite GPS/GLONASS position solution.



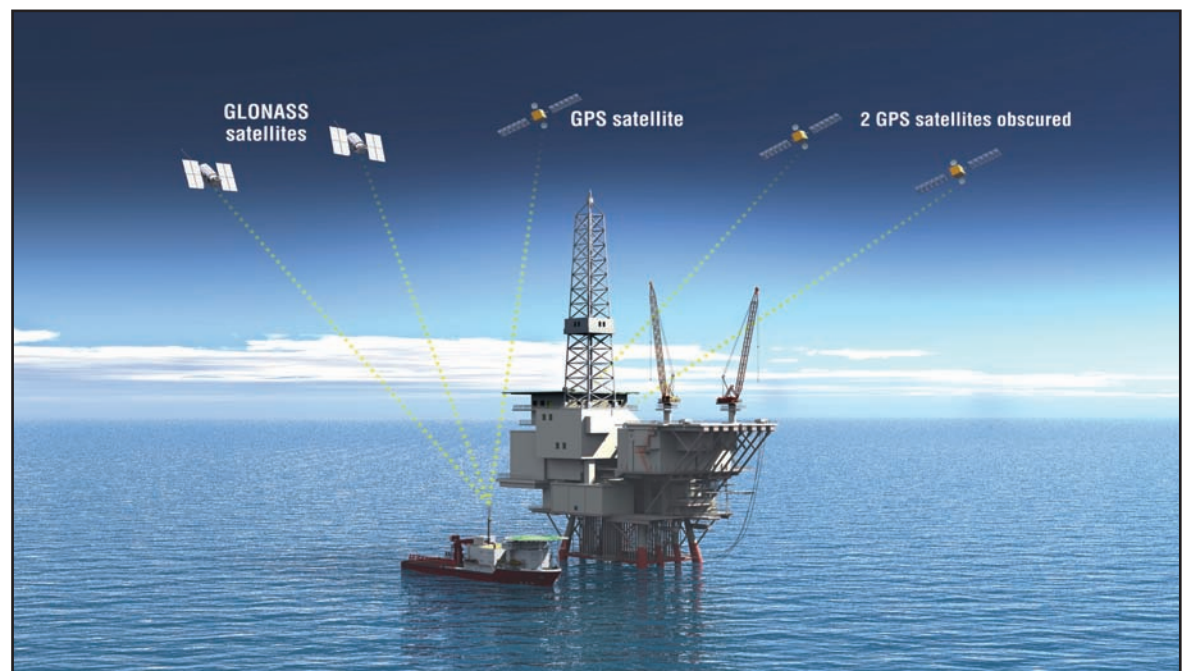
Positioning Processing Software



GPS + GLONASS

**Don't be left in the dark** – any radio navigation system depends upon effective receipt of signals. 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.



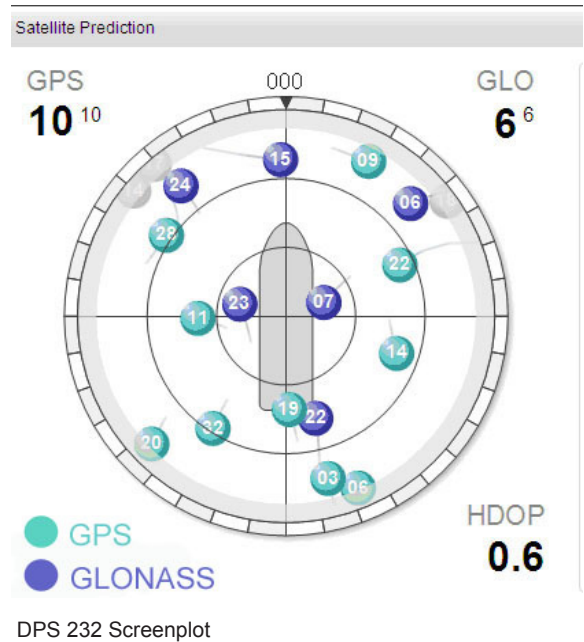
View of 2 GPS Satellites Obscured



**More is better** – the GPS network employs 24+ satellites (32 as of December 2008). GLONASS has 17 satellites as of December 2008, with a full operational constellation of 24+ planned from early 2011. The Fugro G2 software engine inside compatible receivers uses all available satellites to produce a composite position. This approach provides improved reliability:

- 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.
- 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.

"A combined receiver, when compared to either the GPS or GLONASS receiver, offers improved availability, integrity, accuracy and resistance to interference....." IMO Res. MSC.115(73)



**Independent Systems for Decimetre Level Redundancy** – Fugro offers three worldwide coverage, high performance decimetre level services which can be paired for redundancy on DP 2 & DP 3 classified vessels. It is important to emphasise that the HP and G2 services use different Fugro reference stations, whilst the XP service uses the JPL reference station network:

- XP + HP
- G2 + XP
- G2 + HP

Key:

- XP:** GPS satellite Orbit & Clock corrections using the JPL network of reference stations
- HP:** GPS mobile unit position corrections using the Fugro network of regional GPS reference stations
- G2:** GPS and GLONASS satellite Orbit & Clock corrections using the Fugro network of dual system reference stations

### Technical Specifications

Carrier phase based service providing the following accuracy levels when used in conjunction with compatible dual frequency GPS/GLONASS receivers:

Horizontal accuracy: < 10cm to 95% probability

Vertical accuracy: < 20cm to 95% probability

### Further information

Complete technical information on a specific model type or peripheral hardware can be obtained from Fugro Seastar AS:



### Fugro Seastar AS

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