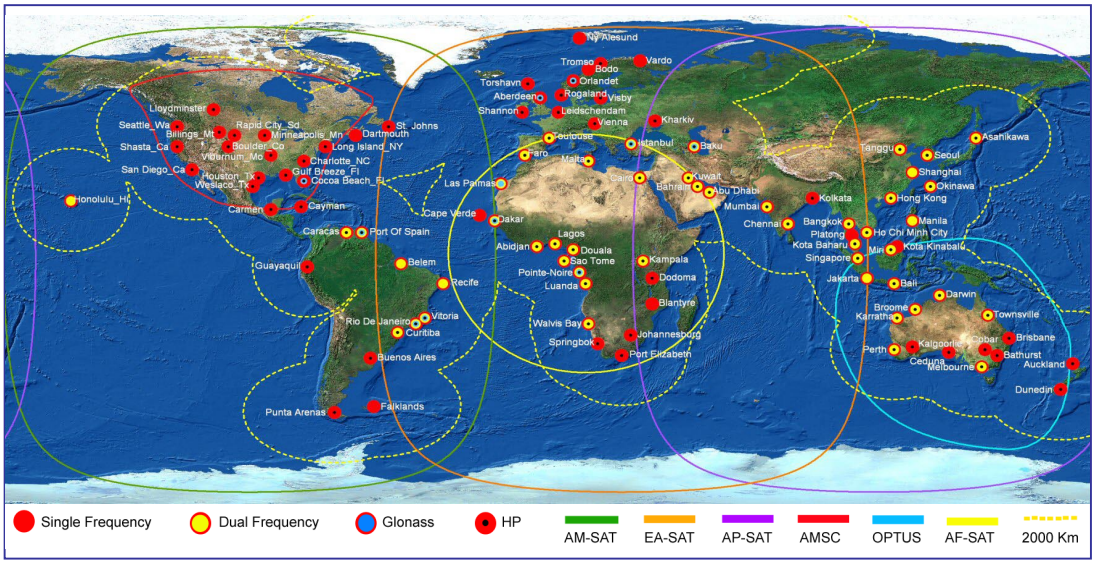
OmniSTAR Worldwide Differential GPS Services



Spotbeam satellite (April 2005)

About OmniSTAR

OmniSTAR is World leader in providing high accuracy DGPS correction data via satellite channels with offices in the Netherlands, Dubai, the USA, Australia, Singapore and South Africa. OmniSTAR is a member of the Fugro Group, a worldwide services and consultancy company with more than 200 offices in over 50 countries. Fugro provides surveying, positioning and geotechnical solutions in both on- and offshore applications.

OmniSTAR provides commercial satellite DGPS services worldwide and is leader in the design and development of Differential GPS positioning technology. The OmniSTAR services, OmniSTAR-VBS ('Virtual Base Station') and OmniSTAR-HP ('High Performance'), have been specifically developed to satisfy the requirement for high accuracy positioning systems and services in land based applications.

With approximately 100 GPS reference stations, 6 high power satellites and 2 global Network Control Centres, OmniSTAR provide consistent and highly reliable positioning services worldwide, 24 hours a day, 365 days a year.

Both OmniSTAR-VBS & HP data services are broadcast by L-Band satellite transmissions from a network of geo-stationery satellites and are accessible for use by subscription. The services are unique in that they automatically provide the optimum position solution at the user's location by means of a network solution. Generating differential corrections based on a network solution is more accurate and more reliable than generating differential corrections based on data from a single GPS reference station.

OmniSTAR-VBS

OmniSTAR-VBS is a single frequency DGPS service that uses a network of reference stations (or base stations) to measure and reduce the errors induced into the GPS signal by atmospheric, timing and orbital effects.

This reference data is gathered at our Network Control Centres, where it is checked for integrity and reliability and is then up-linked to a chain of geo-stationary satellites, which broadcast the data over their coverage area. This procedure ensures that all reference data generated for a given area is quickly available to the user's receiver. The receiver processes the data from all available reference stations to provide the optimum position solution.

Because all data, generated at OmniSTAR reference stations, is available to the user equipment, it is possible to use all this information simultaneously, taking into account the distance between the user's position and the location of each of the OmniSTAR reference stations.

This is done by mathematically weighting the corrections from each reference station as a function of their distance to the user. The result is one set of corrections, optimised for the user's location. These optimised corrections are calculated every time reference information is received from the satellite.

This makes the OmniSTAR-VBS service ideally suited for use over a wide area and it assures that OmniSTAR corrections never rely on the corrections of one single reference station, thus making the solution more consistent, robust and reliable.
OmniSTAR-VBS accuracies have been demonstrated as better than 0,70 meter horizontal (*).

OmniSTAR®
The Global Positioning System

FUGRO

OmniSTAR-HP

OmniSTAR-HP is the latest dual frequency GPS augmentation service in the OmniSTAR family of DGPS solutions. OmniSTAR-HP is available worldwide as a robust and reliable decimetre level DGPS service by using two independent positioning technologies:

- **Network Technology**

The OmniSTAR network of dual frequency reference stations enables us to make measurements that do not contain any errors resulting from signal delays in the ionosphere. Combining these measurements with carrier phase data enables us to create highly accurate positioning results that are valid inside our reference station network/ coverage area.

- **Precise Orbits and Clocks Technology**

A completely separate network of dual frequency reference stations enables us to generate information with regard to precise satellite orbits and satellite clock offset. Correcting these measurements for earth tides, ocean loading and polar motion also allows us to create accurate positioning results that are valid worldwide, also outside our network coverage area.

OmniSTAR-HP combines both technologies and provides an optimized solution for your location. This dual frequency differential correction service is truly worldwide, very robust, reliable and highly accurate. Its accuracies have been demonstrated as better than 10 cm horizontal and 15 cm vertical (*).

OmniSTAR VBS/HP subscription options

VBS/HP Continental: Service available across an entire continent e.g. Europe.
VBS/HP Regional: Service available across a defined region or country.
VBS/HP Local: Service available within a 25 km radius circle (only available in Europe).
OmniSTAR users can buy subscriptions on an annual, a multiple year or on a seasonal basis (minimum 3 months).

OmniSTAR Advantages

- **Worldwide coverage**

The OmniSTAR coverage consists of several overlapping satellite footprints, providing worldwide coverage. This means that user equipment, capable of decoding the OmniSTAR signal, can be used anywhere.

- **Consistent High Accuracy**

Due to the use of Network Technology, OmniSTAR services provide a consistent accuracy over large areas and are not prone to position jumps due to switching from one reference station to another.

- **High reliability**

All reference stations are dual linked to their respective Network Control Centre. The primary connection is by leased line, VSAT or Internet, backed up by a dial up line.

Primary and secondary satellite services cover most of the populated areas in the world. OmniSTAR compatible units are capable of locking onto the secondary service automatically in the unlikely event of a drop out in the primary service being detected.

OmniSTAR corrections are not dependent on any one-reference station, but are weighted by the Network Solution algorithm. Therefore, a non-functioning reference station has only minor influence on overall accuracy.

OmniSTAR-HP is based upon two totally independent positioning technologies. In case of the failure of one of the technologies the other will automatically take over.

Thunderstorms or electrical fields do not affect the OmniSTAR signal.

(*) Actual performance may vary with receiver hardware used and geographical location of the user.

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OmniSTAR B.V. is a member of the Fugro Group, with offices throughout the world.