Precise Point Positioning (PPP)

WHO NEEDS A BASE STATION WHEN YOU HAVE STARFIRE?

- - The StarFire Network is the world's first Global Satel- lite Based Augmentation System (GSBAS)
- - Performance is no longer a function of your distance from a reference station, so you have the freedom to use StarFire anywhere in the world.
- - Real-time Five Centimeter Global Accuracy
- - Worldwide Coverage
- - No Base Station Necessary
- - Fully Redundant, Global, Geo-Stationary Satellite Coverage

The StarFireTM Network is a global system for the dis- tribution of SBAS corrections that gives users the ability to measure their position anywhere in the world with ex- ceptional reliability and unprecedented accuracy of better than 5 cm (2 inches). Because the SBAS corrections are broadcast via INMARSAT geostation- ary satellites, users need no local reference stations or postprocessing to get this exceptional accuracy. Furthermore, the same accuracy is available virtually anywhere on the Earth's surface, on land or sea, with a look angle of 10° to the satellite, due to the worldwide coverage of these geo-stationary satellites.

APPLICATIONS

StarFire receivers are available as fully integrated units or modular systems. Applications that can benefit from StarFire performance, accuracy and availability include:

• Land Survey

• Offshore Positioning

• Precision Agriculture

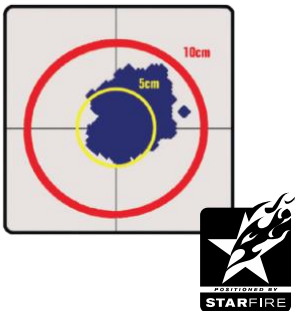
• UAV Aerial Photogrammetry and LIDAR

• GIS and Asset Mapping

• Machine Control

• **Unmanned Vehicles**

• **Government & Military**



StarFire network coverage area

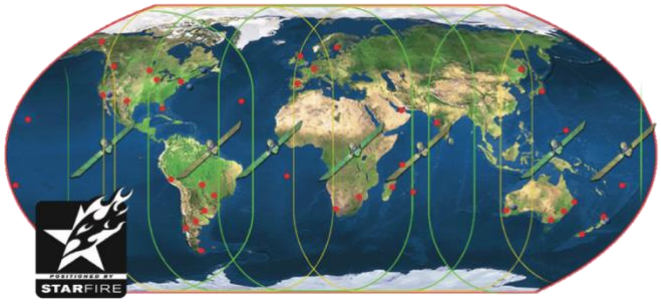
RELIABILITY

- 99.999% availability
- Extensive monitoring through internal checks
- Real-time monitoring of global positioning results
- Redundancy throughout all segments of the system Redundant data links, geographically separated process- ing hubs and dual satellite uplink equipment ensure continuous reliable positioning. The system is inherently robust with the ability to calculate a full set of correc- tions even if multiple reference stations were to become unavailable.

PERFORMANCE

Using Falcon SF StarFire GNSS receiver provides better than 5 cm horizontal and 10 cm vertical accuracy (1 sigma).

Unlike DGPS positions that are relative to the reference station location, StarFire produces absolute, ITRF positions anywhere, any time. StarFire accuracy is independent of the distance to the nearest reference station.



METHODOLOGY

The StarFire Network is a major advance from earlier ground based augmentation systems because it considers each of the GNSS satellite signal error sources independently. GNSS satellite orbit and clock corrections are calculated from a global tracking network of dual frequency receivers. These corrections are transmitted via geo-stationary satellite links direct to StarFire receivers, resulting in minimal data latency and worldwide operation.

All StarFire receivers use a multi frequency GNSS receiver that measures the ionospheric delay for each satellite. Trop- ospheric zenith delays are calculated from a multi-state time and position model aided by redundant satellite observables.

SYSTEM INTEGRITY

A global network of multi frequency GNSS receivers provide raw data every second via reliable redundant data links to two network processing centers located in California, (S.W., USA) and Illinois, (N.E., USA). These receivers are tied to the latest realization of the International Terrestrial Reference Frame (ITRF) coordinate system. StarFire's pri- mary time reference is coupled to the International Atomic Time standard.

The network is a fully automated continuously self-moni- toring system overseen around the clock by StarFire Network operators. Orbit and clock corrections from both processing centers are distributed via dedicated circuits with multiple communication backups to three geostationary satellite uplink stations. An independent network of StarFire user equipment continuously monitors system accuracy to ensure maximum reliability.

Starfire for Life

StarFire is a global satellite-based augmentation system (GSBAS) which provides five centimeter positioning accuracy on a worldwide basis. AIOS GNSS includes a free lifetime license for StarFire. Aside from giving excellent accuracy StarFire also makes Falcon extremely easy to use because there is no need for base stations, sim cards, or any other communications, its just press the on button and go.