



ASHTECH 3-DIMENSIONAL DIRECTION FINDING

A revolutionary new capability! The Ashtech 3DF Three-Dimensional Direction Finding receiver system determines attitude angles using GPS satellites. Combinations of azimuth and elevation, or azimuth, roll and yaw angles are provided in real-time along with three-dimensional position and velocity for static or dynamic platforms.

The 24 channels of the ruggedized Ashtech 3DF are configured as four 6-channel groups with each group receiving GPS signals from a separate antenna. The small antenna size and flexible geometry permit installation on a variety of platforms. Other configurations of three 8-channel, two 12-channel or a single 24-channel are available for special applications.

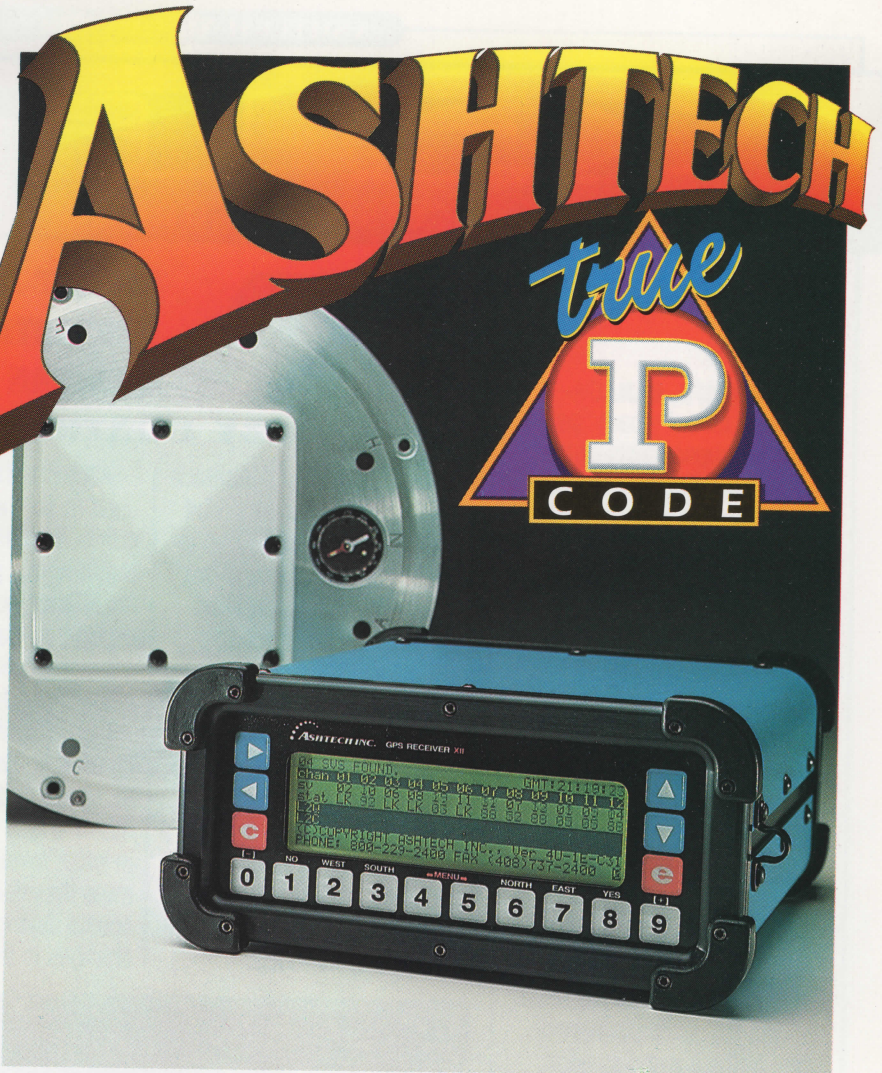
In addition to its small size, the all-in-one 3DF receiver provides significant advantages over separate receivers for obtaining accurate angular measurements. The 3DF has a common measurement clock and has been carefully designed to isolate each section for the ultimate in carrier phase measurements. Utilizing Ashtech's advanced technology which can measure GPS satellite signals in static and dynamic environments, the built-in processor and data logger offer an exciting new dimension in exploiting GPS technology in a multitude of applications.

The Ashtech 3DF displays attitude angles, position and velocity—recording data, along with carrier phase measurements in internal memory. Two high speed RS-232 ports provide easy interface with other systems.

The 3DF system is ideal for many "pointing" applications. In aerial photogrammetry, where aircraft heading, attitude and GPS data are required, the Ashtech 3DF removes the need for INS.

The Ashtech 3DF is self-contained and not affected by magnetic fields or Schuller effects; it operates anywhere in the world, including the polar regions, with an accuracy of about 1 milliradian (3.5 arc-minutes).





"TRUE" P-CODE GPS TRACKING CORRELATION

GPS receivers must generate matched codes in order to track the satellites. The L1 frequency includes both C/A and P-Code components while L2 includes only P-Code information.

Ashtech's P-Code module offers 12 independent "True P-Code" channels engineered to fully utilize the advantages of the P-code component: complete processing gain, full-length (25cm) L2 carrier phase and inherent immunity from jamming.

Ashtech's P-Code tracking is based on correlating satellite information with a receiver-generated P-Code instead of a "pseudo-correlation" approach.

During those rare occasions when P-Codes may be scrambled (Anti-Spoof or Y-Code) by the GPS Control Segment, Ashtech XII receivers automatically switch to "codeless" L2 tracking.

The 12-channel P-code module added to the enhanced Ashtech codeless L2 option provides the ultimate in GPS survey performance.

The Ashtech "true P-Code" tracking module is now available for all current Ashtech XII receivers equipped for dual-frequency operation.

New Enhanced Dual-Frequency

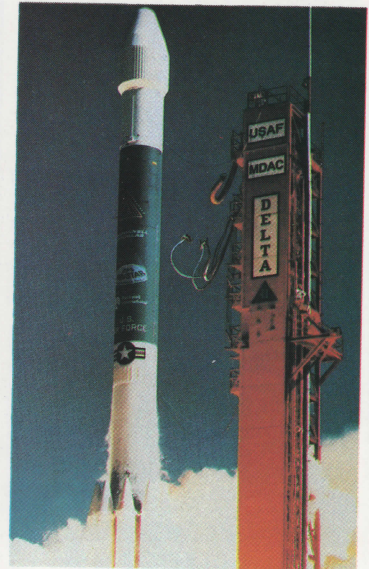
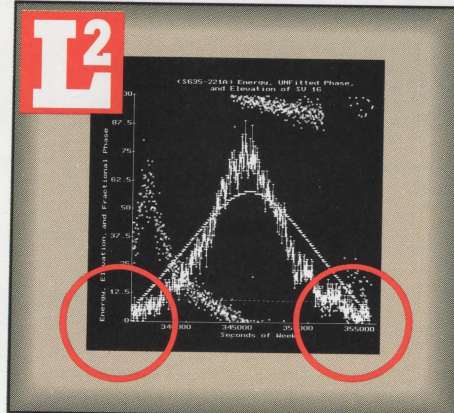
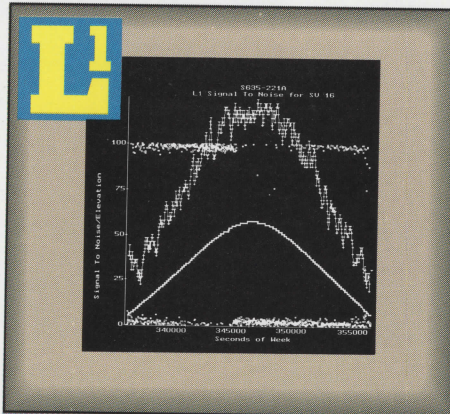
Ashtech's new enhanced L2 codeless tracking provides substantial improvement in L2 signal reception, allowing satellite tracking down to 10° elevation.

Since the tracking geometry of GPS satellites improves at lower elevations, Ashtech's new dual-frequency enhancement will significantly improve results for static, kinematic and pseudo-kinematic surveys.

The two graphs to the right illustrate the tracking signal strength and elevation angle of a satellite for both L1 and L2. In both cases, the closeness of the dots 0 and 1 level indicate confidence in determining the whole number of carrier cycles between carrier phase measurements.

Notice the tight tracking of the L2 carrier below 10°; the dots contain the effect of the ionosphere.

A single antenna cable is now required for both L1 and L2 signals. The enhanced dual-frequency module is available now for all Ashtech XII GPS receivers, including the smaller M-XII.



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GPS

NEWS FOR PRECISION GEODESY & GLOBAL NAVIGATION

LONG BASELINE DUAL FREQUENCY MEASUREMENTS

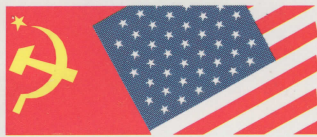
YELLOWKNIFE, CANADA-

Ashtech recently participated in dual frequency tests organized by the University of New Brunswick. The tests took place in Yellowknife in Canada's Northwest Territories, at a latitude of approximately 62 degrees. The tests were to determine the effects of the ionosphere on GPS measurements in high latitudes. All manufacturers of dual frequency receivers were invited to the tests.

Three different sites were occupied at distances of 50, 92 and 109 km with two sessions per day. In the first session, each manufacturer's receiver was set up on permanent sites. In the second session, an antenna splitter was used to send the antenna signal to different manufacturer's receivers. This was repeated over the three day test period.

The data from the Ashtech receivers was processed daily using the standard Ashtech GPPS-2 software. Eighteen baselines were measured and processed for the project. A least squares adjustment was performed with FILLNET with an a priori estimate of 10mm, 15mm \pm 2ppm in the horizontal component. A standard error of unit weight of 0.207 was computed and the baselines ranged from 0.1 to 0.3 ppm.

Considering the latitude, baseline lengths, and atmospheric conditions, the results demonstrate the capability of dual frequency measurements in virtually eliminating the errors due to ionospheric refraction.



SOVIET-AMERICAN EXPEDITION TO THE CASPIAN SEA SETS GPS SURVEY CONTROL POINTS

MOSCOW, USSR- Ashtech recently participated in a joint Soviet-American expedition to study the sea-level rise of the Caspian Sea. The expedition was sponsored by the non-profit organization, Earthwatch, that promotes environmental research. The expedition was the first foreign scientific team to visit the Caspian Basin. The purpose of the expedition was to set up a reference framework of survey control points using GPS and conventional survey methods.

Ashtech XII receivers were used to set the survey control points as well as differentially outlining the perimeters of the islands visited. The joint expedition was considered a wonderful success by the project director.

The GPS reference grid will be used by future expeditions to monitor how the coastline has changed due to the rise in water levels and help determine the effect on the world's coasts during global climate changes in the next century.



ASHTECH RECOGNIZED FOR MOST ADVANCED TECNOLOGY

COLORADO SPRINGS, CO-

The September 1990, 3rd International Technical Meeting of the Institute of Navigation (ION) honored Ashtech with its prestigious "Better Mousetrap Award" for outstanding design and technological innovation using GPS. The selection of the Ashtech 3DF 24 channel receiver was unanimous by the ION awards committee.

Ashtech has received the "Better Mousetrap Award" for two of the three years it has been presented by the ION Satellite Division to recognize significant advances in GPS technology.



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