OXTS

Affordable Precise Positioning

GPS is good for perhaps 70% of surveying needs. Inertial Navigation is the forgotten friend of GPS. Traditionally complex and expensive, Inertial Navigation has become competitive, easy-to-use and cost-effective.

Need position? Use GPS. It's obvious enough. But when you can't use GPS the cost of surveying rapidly increases. Inertial Navigation Systems (INS) are positioning systems alternative or complementary to GPS. They have traditionally been expensive and restricted mainly to military applications. Their use in missile-guidance has induced governments to place export restrictions on them, while specifically military interfaces make most virtually unÂusable to civilians. Anyone trying to purchase a military INS soon found that they were available in quantities of 50,000 on lead times of ten years. In short, this was not a product that surveyors could use to measure position.

INS to All GPS Users

Times have changed. Now there are several commercial companies selling products to improve GPS measurements using cost-effective Inertial Navigation. The price is down, the complexity removed and the effectiveness is phenomenal. Started by two Oxford graduates in 1997, OxTS was created to supply Inertial and GPS solutions and has been growing steadily ever since. Today it is the leading supplier of Inertial+GPS navigation systems to automotive companies for testing vehicle dynamics. We have supplied many systems for land- and aerial-survey applications. These are our next target markets. Our mission is to bring effective inertial technology to all GPS users. In the long term we want to see the cost of inertial components equalling the GPS components, though we will have a hard battle to achieve this. To carry out our mission we are listening to our customers. Our products run some of the most complex real-time algorithms for blending GPS and inertial measurements, leading to spectacular results. To enable us to use low-cost inertial sensors we are investing in precision calibration techniques. Through simple configuration software we are making Inertial Navigation simpler to use.

Three Pillars

In the survey market, price, interface and precision are the three pillars supporting acceptance of INS. With the current price of an INS at €50,000, say ten times higher than professional GPS at €5,000, it is hard to justify upgrading. So we want to offer lower-cost, affordable systems. INS needs to be a "drop-in" replacement or addition to the GPS system. This means to most people just plugging in on a RS232 standard connection and transmitting data according to the NMEA (National Marine Electronics Association) protocol. The gain should be better positioning and the ability to operate in more situations than GPS alone. Customers expect INS to provide better than one-metre positioning accuracy 100% of the time, and really hope that Inertial Navigation can do this. It is a high expectation and differs from what is achievable in reality. With INS the number of places that can be surveyed may increase to 90% or 95%, but you still need to send out a foot soldier to complete the job, or else tolerate some errors larger than one metre. Customers who just want more reliability and accuracy from their current GPS product are served by our latest offering, the Inertial+. Measurements from the current GPS are blended with inertial measurements and the results output in the same format. This is not new; others offer the samen. What is new is that our product is offered for less than €20,000, a price affordable to many.

Market Size

The Inertial+ will be one of the first serious INS systems that can be exported almost worldwide without the need for an export licence. To accomplish this we use a sophisticated model to improve the sensors and obtain high accurÂacy from them. Customer choice is going to play a large part in the success and acceptance of INS. Right now there are fewer than ten serious INS suppliers, all relatively small. Rather than being in a market where a new supplier eats away at the sales of the others, new suppliers tend to increase the size of the market. Our own niche in vehicle testing has not really affected our competitors in survey or military markets. If anything, we have helped our competitors by increasing awareness of the technology benefits. As we launch products onto survey markets we are sure that the market will grow.

GNSS

We hold yet another differing view in relation to GNSS. Adding another satellite-based positioning system to GPS might improve accuracy and reliability. But real improvement is gained by combining satellite-based systems with some other technology. Do we really expect Glonass or Galileo to cure all the problems people have with GPS? Do we expect them to extend the operating conditions of GPS to 100%? We don't think anyone believes this. But Inertial+GPS is not the only solution. Wheel speed, if available, is invaluable for reducing drift in the absense of GPS. Through our involvement in auto-vehicle programmes we believe that vision will also play an important part in reducing drift. In the future we will be moving towards ever more precise positioning systems. Embracing a variety of positioning solutions makes for extra complexity, and it is our role to protect the user from this. Aiming at simple, precise positioning, 100% of the time and at low cost remains our goal.