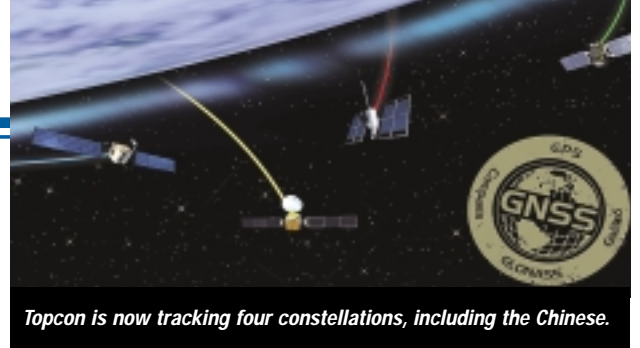


China's entry onto the GNSS scene



The heavens are becoming crowded, and it's all potentially good news for the users of GNSS equipment.

Topcon tells us that they're the first to track the new Chinese *Beidou*, a.k.a. *Compass*, satellites. As they point out, this gives their users potential access to four different satellite constellations—the original American GPS; the Russian GLONASS signals that they cracked several years ago; Europe's Galileo; and now China's *Beidou*.

Other prominent suppliers of equipment to the civil construction industry, Trimble Navigation and Leica Geosystems, have launched new GNSS receivers with multi-constellation capabilities.

The great benefit to users is, of course, that the more satellites 'in view' to a GNSS receiver at any given time, the better the positioning data available. More satellites means less likelihood of signal dropout interrupting production. It also promises a better spread of signals, aiding the geometry involved in resolving positions—in short, better accuracy. The issue of shading by trees and tall buildings will not disappear, but it will be less significant than it is today, and GNSS systems will become more viable in urban 'canyon' environments.

China—a new Dimension

The arrival of the Chinese adds a new dimension to the world of GNSS. Four satellites out of a planned five have been placed in geostationary orbit, and in April 2007 China launched the first of its MEO (Middle Earth Orbit) constellation that will progressively be expanded to thirty.

Beidou M-1, the first MEO bird, broadcasts in L-band, using signal structures similar to other GNSS systems and sharing frequencies near to or overlapping those of GPS, Galileo, and GLONASS.

Until late in 2006, it appeared that *Beidou/Compass* would remain a regional system, augmenting full-fledged GNSSes. That is, the orbits of

the *Beidou* satellites would be such as to focus their chief effect on enhancing signal availability in East Asia. An agreement in 2003 committed China to investing 200 million Euros in co-operative development of the European Union's Galileo system.

In October 2006, however, China announced that it would build a full-fledged GNSS system that would transmit signals in the L1 band where GPS and Galileo military and public safety services are located.

This contrasts with Japanese intentions, which are to create a mini-GNSS system as the Chinese had originally intended, of primary benefit in proximity to Japan itself.

Given the rapid growth of the Chinese economy, soon to pass that of the U.S., it's not surprising that independence from Europe and the USA had risen up the ladder of Chinese priorities. Who can say whether the prospects of possible worldwide military activity by Chinese forces influenced the decision?

Beidou will be providing a regional service over the east Asia region by 2009 and a global service at a date soon to be announced. According to government statements, *Beidou's* open services will be offered without "entrance or authorization fees."

Galileo Delayed

China's arrival as a GNSS player fills a temporary vacuum created by delays to the European Galileo program, which is now estimated to be running up to four years late.

As we reported in our last issue, the funding difficulties that had plagued Galileo, do appear to have finally been overcome—but only quite recently. To the extent that these two new GNSS constellations involve a race for customers' dollars—and the Europeans have emphasised the profit-making potential they see in Galileo—it's now clear that the Chinese are moving much faster.

In the Galileo program, the private/public partnership that was initially postulated has so far come to nothing, through a lack of companies coming forward with money.

With twenty-something European countries to be consulted and cajoled, Galileo has to be classified as 'hopeful', rather than fully sorted out.

Meanwhile, the Russian Bear lumbers forward...

The Russians continue to assert that they are moving towards their target of a full complement of twenty-four GLONASS satellites by 2011, recently claiming that they had thirteen operational in a healthy state. Industry sources disputed this at the time, stating that only nine were healthy, with one being readied for commissioning and one 'in maintenance status'.

Whether 'healthy' or not points to other technical issues with GLONASS, related to accuracy and stability of orbit, and synchronisation.

In Summary...

American GPS positioning technology has always been offered on the basis of 'no guarantees'. Until Bill Clinton ordered otherwise, its signals were deliberately distorted, and users were aware that for whatever reason—military necessity, perhaps—the system could be shut down for however long it suited its military masters.

The same could conceivably be true of the Chinese *Beidou* system, for similar reasons, always assuming that the Chinese achieve technical mastery of what's a complex and demanding science.

For these reasons it's to be hoped that Galileo moves forward, providing in the fullness of time a fourth leg to the stool of choice, and a huge combined constellation from which all will benefit. 