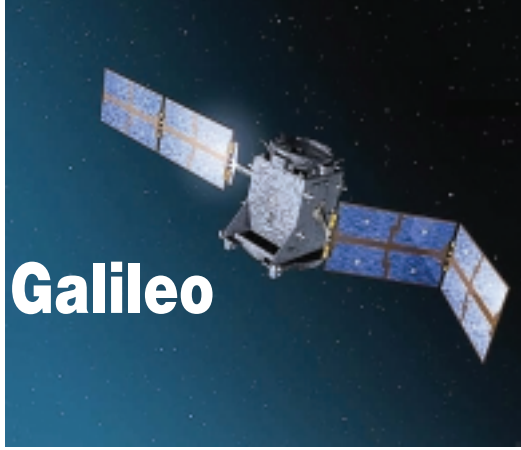


# Here Comes Galileo



**The Galileo roadshow descended upon Brisbane mid-March with great fanfare, en route to New Zealand. The red carpet was rolled out for this high-powered delegation from the European Union, lavishly welcomed by the Commonwealth Government, the deputy premier of Queensland, the Ambassador for the EU, and a rich assortment of industry and academic heavyweights who gathered for what was termed the Brisbane Galileo Forum.**

The objective was to showcase the new European satellite system, Galileo—Europe’s answer to GPS. The first bird was launched on December 31st, with twenty-five more to follow between now and 2010, when the full constellation will be in operation at a cost of 3.7 billion Euros.

The launch of Galileo requires us to re-name this field of scientific endeavour. ‘GNSS’ (Global Navigation Satellite Systems) is what people are talking about these days because Galileo is now the third deployment (the second was GLONASS, the Russian system) and the term GPS strictly refers to the original American NavStar satellites placed in orbit over twenty years ago for military purposes.

Galileo will have profound implications for machine control in the earthmoving industry. To sum up in simple terms the message presented at the Galileo Forum, today’s GPS technology will be ranked with Henry Ford’s T-Model when we look back in five years.

There are several reasons why Galileo is significant, both technical and commercial.

On the technical side, the European satellites will provide more accuracy, which is not to impugn the American technology—at the time it was remarkable, and plans are well advanced for a second generation. The first Galileo satellite is testing two new atomic clocks, the most accurate yet sent in to space. Time signals

broadcast by each satellite are critical to accurate positioning on the ground, so this in itself will enhance accuracy. Other technical advances will help, too.

## **It’s not a Question of ‘Either/Or’**

Important agreements have been signed with the U.S. that enshrine the basic philosophy of Galileo, that the new system has a transparent design aimed at making it easy for the next generation of GNSS receivers to utilise signals from both constellations at the same time. Signal bandwidths and time checks have been coordinated.

This is a radical departure from the Russian GLONASS system, where cooperation with the Americans was naturally the lowest issue on their priority list. Nevertheless Topcon have been offering a ‘GLONASS capable’ receiver for some time—more recently Trimble and Caterpillar cracked this difficult nut.

## **Three are Better than One**

So what’s in store for us within a few short years is equipment capable of harnessing signals from all three systems. The more satellites that a GNSS receiver can lock on to at any one time, the better it can resolve the geometry of its terrestrial position, and the more quickly it can re-acquire lock if it loses it. Galileo adds 26 satellites to the original American 26, and a dozen or so Russian.

This, together with the greater accuracy of the new signals, is a tremendous advance. Don’t throw out your laser gear yet, but it’s our view that in due course GNSS will be in a position to perform many of today’s laser operations with equal accuracy and perhaps better reliability. Not all, but many.

A greater concentration of satellites at our latitudes is one of the reasons why Australia has been a leader in implementing this technology and

Europe has lagged. The same principle applies to operations in difficult sites such as mountainous regions and the bottom of open cut mines. More satellites overall will mean more ‘in sight’ to GNSS receivers at any given time within a restricted horizon.

Galileo offers another important option. Apart from the ‘free to air’ signals currently being used from GPS and GLONASS satellites without any guarantees as to availability or accuracy by the Americans or Russians, Galileo will feature a range of extra encrypted frequencies on a ‘user pays’ basis, offering guaranteed performance. This will herald the emergence of at least two classes of GNSS receivers—mass market models working on ‘free to air’ frequencies, and Rolls Royce models at higher prices giving superior performance. Something like pay-TV in the heavens.

## **The Commercial Aspects**

Departing from its original stance of obstruction, the U.S. now understands that Galileo is mainly driven by commercial factors—the huge worldwide market for GNSS technology across dozens of industries. In fact they saw themselves missing out, so in recent months the GPS system has been partly removed from military control and its administration is now shared by the U.S. Department of Commerce. Observers expect this to gradually change further, to a private/public partnership.

Galileo is a collaborative project between the twenty-five members of the European Union, but they seek to further internationalise it. Australia is actively collaborating in a range of scientific and commercial initiatives, and the Galileo organisation has negotiated deals or is in discussions with countries as diverse as Argentina and the Ukraine. 