



Thales Navigation's Position on GPS Modernization and Galileo

Advantages of Thales Navigation

1. The right cost-performance benefit

Because Thales Navigation products meet your current needs, why pay more for technology that doesn't currently increase your benefits in efficiency or productivity?

2. Customer focused

Our focus is on providing customers the solutions they need – not selling them more technology than what really benefits them.

Q&A

What is GPS Modernization?

GPS (Global Positioning System) modernization is the program to upgrade the GPS signals with a clear civil code on L2 and a new L5 frequency. For an overview, see <http://www.navcen.uscg.gov/gps/modernization/default.htm>. The program is to be completed gradually, beginning in March 2005 with the launch of the first L2-CS capable satellite. Current plans indicate twelve L2C-capable satellites will be available in 2008, and a full L2-CS capability is not expected before 2010 at best. The launch of the first L5-capable satellite is scheduled for September 2007, with eight L5-capable satellites in 2010 and a full capability later.

Note that these dates are the best estimate given by the GPS Joint Program Office (JPO) in April 2004 at the Position Location and Navigation Symposium (PLANS) conference, and are probably quite accurate for the first launch dates but less so for the full capability.

What is Galileo?

Galileo is a constellation of 30 satellites being created by the European Union (see http://europa.eu.int/comm/dgs/energy_transport/galileo/index_en.htm for an overview of Galileo). It is being designed to complement GPS. The first satellites will be launched in 2005, and the full operational capability is expected in 2008. This means that *if* both current GPS and Galileo schedules were maintained, Galileo would be fully deployed before L2-CS.

What is the role of Thales Navigation in Galileo?

Thales Navigation has a contract to develop user equipment for the Galileo project. This contract gives us a head start on the development of Galileo systems for surveying, and for dual systems combining Galileo and GPS. Thales Navigation (then Ashtech, Inc.) introduced the first combined GPS and GLONASS for surveying in 1997. We stopped selling the combined GPS + GLONASS product when the constellation declined and became of minimal value as an adjunct to GPS. We are closely studying the benefits of the combined GPS and Galileo systems for surveying, which would provide access to signals from a combined constellation of 59 satellites.

**What are the advantages of L2-CS today?**

There is no advantage of L2-CS today since there are no satellites in space with this signal capability. Furthermore, a sufficient number of L2-CS signals is not planned to be available until 2010, and these dates have historically slipped. Last but not least, any difference to the customer between the signal acquisition and measurement quality currently provided by Thales Navigation Z-Tracking products, and that which will be provided when L2-CS signals are available remains to be seen.

Why spend more money now on unproven technology with questionable benefit, which won't be available for at least six years?

Will you incorporate L2-CS or L5 into your products?

Our focus is on providing the optimum performance needed by our customers at price points that make it easy for them to adopt GPS on their terms and with tremendous flexibility. If we should find at some point that there is significant value to the customer that makes the added cost worthwhile, we will certainly investigate adding L2-CS or L5 to our products.

If you don't incorporate L2-CS into your products, won't their life be shortened and therefore end up costing customers more?

We don't believe that to be the case at all. It is first important to note that our current solutions provide superior performance even when L2-code is encrypted. We do this through our patented Z-Tracking technology, which provides great performance at lower prices to the customer, and results in essential productivity gains that customers can take advantage of today.

When L2-CS code becomes available, our solutions will still provide the same level of performance relevant to the efficiency and productivity needs of the customer. This includes instant RTK over 20 km baseline, Long Range Kinematic (LRK), the lowest noise phase measurements, etc.

Will you have a Galileo survey system or a combined GPS + Galileo survey system?

We are moving forward under contract with development of a Galileo receiver, which could become the basis of a new survey product. The time frame of the launch of such a product is proprietary, but we do expect to provide a system as soon as it is of any benefit to our customers. Note that this question and its answer are similar to that on L2-CS and L5: value for the customer is our driver, not technology only. However, there is no doubt that receiving twice as many satellites using a GPS + Galileo receiver system will bring significant value to our customers.

How does your RTK compare to Trimble's?

RTK from Thales Navigation already provides the best performance on the market today. By combining Long Range RTK and Instant RTK, the Thales Navigation ADAPT RTK algorithm provides initialization times of 2 seconds up to 7 km while also offering centimeter-accurate RTK at distances of up to 50 km. Trimble's RTK in contrast initializes in 30 to 60 seconds and operates at a maximum range of 20 km. The Thales



Navigation ADAPT RTK will retain this performance as the L2C constellation is increased over the next 6 to 10 years, whereas the Trimble RTK performance may never approach this level of performance.

What is the price difference for customers to take advantage of Trimble's "forward-looking" technology?

Trimble's list pricing for L2C is 10% higher than that for their standard RTK systems. Their list pricing on their standard RTK systems is 20% higher than the list pricing on our RTK systems.