

Intelligent Mis-positioning: Beware of the Geodetic Terrorist

I recently leafed through a book with the interesting title *Intelligent Positioning* (by Taylor and Blewitt, Wiley, 2006). It did not tell me where to go to hide from my mother-in-law, but it did explain how GIS and GPS can augment each other, through complex mathematics, to produce powerful results, for example in navigation. To my mind, it's a bit like drinking wine with pizza to enhance the taste of both.

The book also reminded me of how people can be lured into a false sense of security by today's mainstream, location-based technology. The apparently simple yet intelligent devices hide away all the complexity, including geodesy. The risks are understood by only a few people. But often it is the simplest mistakes that have the greatest consequences.

Recently a squadron of brand new F-22 jet fighters lost their avionics systems en route to Japan from Hawaii. Rumour has it that the planes had suddenly accelerated to the speed of light, crashing all onboard computers. It turned out that somewhere near the dateline, an unknown force had instantaneously propelled the jets from -180° to $+180^\circ$ longitude. This was a phenomenon unknown to the onboard navigation systems, so the \$100 million planes had to be escorted back to base by old tankers which did not have this problem.

A couple of years ago, an Asian oil company dispatched a rig to the Indian Ocean to drill a well at a given location near the equator. It should be noted that these are high-tech operations that push the envelopes of engineering, logistics, and economics. But somehow along the way, latitude north turned into south, and they ended up drilling 400 kilometers off-target. Expensive mistake: they could have bought an F-22 for the same money. Not that it would have made any difference.

There are many more examples like these, and the fun really begins when datum shifts get involved. These mysteriously move targets by tens or hundreds of meters – a difference often small enough to remain undetected, yet big enough to cause disaster. Tourists standing on the Prime Meridian in Greenwich might only suffer bemused head-scratching when their GPS tells them they are 100 meters off 0° longitude. But it

becomes a different story altogether when you fall off a cliff which strangely misplaced itself in thick fog. Or you find yourself at the wrong side of a sensitive maritime boundary, or the victim of a smart bomb targeting the right coordinates in the wrong reference system. The list is endless.

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With GIS and GPS now hidden in mainstream applications, and interoperability growing exponentially, a small geodetic mistake can produce huge consequences. For example, if left unchecked, the INSPIRE directive could turn Europe into the world's tectonically most active region, with geological fault lines suspiciously coincident with national boundaries. This brings back early memories from when I had to make a map of North Sea operations with data from all the adjoining countries. To my relief, the pipelines did connect at national borders. But only if I didn't zoom in too much.

Most geodetic mistakes, one would assume, have so far been committed in good faith. It may only be a matter of time until someone with less honorable intentions goes to the trouble of actually understanding geodesy. Simple: Deliberately insert a few subtle mistakes at the right places and right times, and wait for the chain reaction to happen. Intelligent mis-positioning by a geodetic terrorist.

Make sure you don't become a suspect.



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