

The Relevance of Geospatial Intelligence Systems in the 21st Century

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Geospatial intelligence systems have been around for centuries, at least since the 21st of November 1783, when two men rose to a height of 900m and covered a distance of 10km in the first untethered flight of a Montgolfier hot air balloon. Or perhaps even earlier, when a caveman decided to climb to the top of a tall tree or ascend a nearby hill to detect the whereabouts of his intended prey. Geospatial is merely the process of working out where something or somebody is located geographically – in short, where in the world it is.

During the first part of the Twentieth Century, photographic intelligence became commonplace, although the men who manned the tethered observation balloons often had very short lives.

In the Cold War, geospatial intelligence came into its own with sophisticated satellite imagery designed to reduce reliance on piloted aircraft imagery systems. This form of information gathering proved politically highly embarrassing when US airman Gary Powers was

shot down in a U2 aircraft over the Soviet Union. The recovery of these photographs in the early days was slightly hair-raising, with aircraft catching the film as it dropped through the Earth's atmosphere! Technology and communications rapidly improved to give near real-time recovery of images from highly classified satellite systems. When the Soviet Union collapsed, many such images were offered on the commercial market and the general public became aware of the possibilities of space-based imagery systems. At the same time, the US GPS system was being offered to commercial users and the concept of knowing where, exactly, on the Earth you were located became more familiar to members of the general public.

Despite the rapid acceptance of such concepts, it was still confined to a relatively select group who had real reasons to 'need know' their locations accurately. Over the past ten years, however, there has been a real shift in our overall perception of GIS, and not just amongst the cognoscenti. Indeed, it is almost despite them that GIS is now in the mainstream of applications technology for mobile phones and 3G devices. The catalyst for this dramatic change, and dramatic it certainly has been, was the development of Google Earth. Just as was the case with text messaging, the ability for everyone to have a piece of technology that could tell them where they were and where the

nearest post office might be came as a great surprise to everyone and it rapidly became a 'must have' technology.

We can now log onto our phone to enquire where in the world we might be, to find our exact location to seek directions to our destination, and to find the whereabouts of that niche Indian restaurant on the way! We tend to take it all for granted. It is seamless, it is easy and, especially for the current young generation, completely intuitive. That is, of course, the whole nub of the technologies' success. Despite the complexity of the systems and technologies underpinning their capability, we do not have to worry ourselves with their operation since it does what we want it to do, when we want it to be done. This has been described as the 'Illusion of Simplicity' whereby highly complex technologies are transparent to the customer but are highly intuitive to use. This is also very true of the modern satellite television systems where a myriad of channels are available at the touch of a button; and the text messaging capability that made a commercial success out of something designed for telephone engineers to maintain the system.

The exponential growth of these capabilities shows no sign of abating and demonstrates the true power of the consumer market which, having adopted new technologies, keeps striving to make them better or adapt them to additional

markets. A US Navy report suggests that recruits today come from a generation that will have had in excess of 10,000 hours of video gaming by the time they graduate! These people are technically savvy and 'screen-literate' and, in addition, expect facts to be at their finger tips once their fingers have danced across the keys.

The recent eruption of Iceland's Eyjafjallajokull volcano spewed millions of tonnes of volcanic ash into the atmosphere, causing severe disruption to European airspace. The ash is extremely corrosive but difficult to see with the naked eye. The infra-red satellite pictures showing the ash plume were a critical tool to determine whether or not it was safe to fly. And, increasingly among airline passengers, whether or not there are likely to be flight disruptions and the requirement to make alternative arrangements. The key thing, however, is that we now take it in our stride that these images are freely available and have relevance to our everyday lives.

The downside to this incredible capability is the need for more and more data and for highly effective data management systems. The new data centre at the US National Geospatial-Intelligence Agency (NGA) HQ in Virginia will have an ability to store some 10 petabytes (10 million gigabytes) of data. The challenge we have to face is how we sort, assess, manipulate, analyse, store and retrieve information from this

huge mountain of data to be able to give real, useable, and reliable intelligence upon which those who are tasked with making decisions can do so with some confidence that they will be the right ones! In the geospatial world, these problems are magnified partly because we live in a three dimensional world with an important fourth dimension, namely time. Mapping in three dimensions and allowing for time lapses can give rise to ambiguities as things change over time and move across the surface of the Earth. This can demand very rapid, real-time updates while maintaining the accuracy and precision of the presented data. Challenges indeed!

In the future, these technologies will influence our lives more and more. Increasingly they will be available in real-time rather than at the beck and call of our fingers. Better fusion of information will allow for updated maps or world views showing images of road congestion, the user's immediate area, the whereabouts of people who are emailing, texting or telephoning us, or the location of shops which still have available stocks of that 'must have' item on sale. For the emergency services, we will be able to highlight fire hydrants that are inoperable and show bed availability at the local accident and emergency facility. The police command and control system or the operational military commander, will enjoy a real-time view of the tactical operation. For the civilian, it will allow

the deployment of autonomous cars where the user can inform the car's command system where he or she might want to go and the car will automatically take them there with little or no additional input from the humans riding in it. The overall ride will be safer and more economical than with the conventional driver.

These developments may well come at a price and we will see the issue of privacy becoming even more of a concern over the next few years. Already in the UK, the police have deployed a national network of cameras designed to provide automatic number plate recognition (ANPR). This allows for the near real-time collection of some 14 million images a day across the UK which, when linked to vehicle records, can provide details of vehicle, owner, driver and any front seat passenger. These records, when linked, can allow the tracking of individuals across the main UK road networks. As the number of cameras increases, the local CCTV images are able to be integrated into the database and satellite images become cheaper and more pervasive. We might be said to be walking into the nightmare of George Orwell's '1984'.

We will have a major, social conundrum. The services provided by integrated geospatial information systems will support innumerable applications that will improve our individual lives. They will allow us to do more with less and generally provide society with a wealth of

tools set against the very real requirement to grant privacy to the general public. That is, that the technology is not seen to be ‘spying’ on the private lives of citizens, or, putting individual lives at risk. The establishment will say that if a person has done nothing illegal then they will have nothing to fear; but we all know the reality – the technology can be used increasingly to pry into all sorts of activities, legal and illegal, moral and immoral, social and anti-social. A society with such an all-powerful eye fixed on its citizens will soon lose the mutual trust that underpins our civilization. Or will it?

Views expressed in this article are not necessarily those of SAGE International



Big Brother image:

<http://inconvenientbody.wordpress.com/2009/07/27/the-stories-that-fill-up-the-dark/>

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