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The global imagery market – impacts and influences on the UK market

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Imagery in the form of aerial photography has long been accepted by many industries as a valuable information 'tool' providing a complementary data source to conventional mapping Its younger sibling, satellite derived imagery has, in terms of resolution and accessibility always played catch up, with its promise of global coverage and high quality imagery being touted as the panacea to all our mapping needs.

Figure 1

World Cup football final stadium, Yokohama Japan, from Space Imaging's 1m resolution IKONOS satellite, © spaceimaging.com

Glasgow Airport, Scotland, 12.5cm resolution ortho photo from Cities Revealed © The GeoInformation Group 2002.

Satellite and Aerial sensors

However in recent years advances in technology coupled with some significant backing from the financial markets has now brought satellite-based imagery to a near par with the high resolution imagery currently available from aerial sensors (see Figure 1). However in this never ending quest for improvement, there have been significant advances in technology in both the sensor market and the distribution market. Digital sensor arrays now capture images at a resolution identical to traditional film based sensors, and we can now share terabytes of this digital data easily and frequently over the Internet.

This, along with the quests by commercial companies to gain an increasing share of the world information market has led to a surge in the number of imagery products offered in the market. We are now at a point whereby we are swamped by images and can gain access to global and national imagery databases with a credit card and internet connection. With over 500 satellites, (See Figure 2) that are declassified and that we know about spinning above our earth there is a never ending stream of information being gather, transmitted and processed around our heads. Much of this involves Earth Observing satellites and much of this data we can access for our mapping and geographic data needs.

Figure 2 Near earth, sun synchrous satellites, some of the 500 Earth circling satellites currently operational see http://liftoff.msfc.nasa.gov/RealTime/JTrack/3D/JTrack3D.html

Of course these advances bring with them challenges, over the past year security fears brought on by the terrorist attacks of September 11th and stock market crashes have all led to reassessment of the value of imagery and the means by which is made available. The markets and the environment into which imagery has been provided has because of this undergone a catastrophic change. Such challenges have for many imagery providers left them unprepared when faced with difficult market conditions into which they must attempt to sell their imagery products.

Remote sensing market predictions

That said, one thing is certain, the global imagery market it is buoyant. Recent surveys in the US show a strong market with solid growth and good prospects for the future. A recent survey released in early 2002, of US based imaging professionals, by the American Society for Photogrammetry and Remote Sensing, showed strong growth of an industry conservatively estimated at $2.2bn. The survey goes on to project future growth at between 10-15% per year for the next five years (www.asprs.org). It goes on to say that so far even with September 11th the industry has maintained strong growth; although what is not certain is if there is any latency effect through the industry.

The portion of the market attributed to satellite data is somewhat higher than the aerial (46% versus 30%), although in the US there is strong Federal spending on satellite imagery which could distort the figures.

Data acquisition and processing contributed to 46% of the total, showing that value added services provide the significant portion of the market. Another survey by Frost and Sullivan (www.frost.com) of the European markets show a market half the size of the US at $1.1bn with a similar growth rate to the US projected at being $1.7bn in 2006 (compared to the US of $3.5bn by 2006). It predicts that much of this growth will come from new vertical markets particularly in the environmental and agricultural sectors, traditional government markets will continue to dominate.

Here in the UK a similar if slightly unqualified picture could be determined based on a recent industry survey (UK Vertical Aerial Photography, Business Research Centre, 2001), performances of the incumbent imagery players and new entrants in the form of a Government agency, Ordnance Survey and an overseas company. The UK market is buoyant and there are more imagery products available now than there have ever been, from new LIDAR data though to 12.5cm high resolution imagery and 1m IKONOS satellite data.

In Europe, national programs by both government mapping agencies and commercial companies are starting or are in progress, e.g. Germany, Sweden, France, Spain. In Africa, aid programs support many imagery programs but commercial companies are also strong in creating databases for general market use, e.g. Cities Revealed has over 12 different imagery databases for South Africa alone and in some counties government agencies are setting up data partnerships with some of the global imagery suppliers. Why? Well not only does this partnership lead to revenue generation but it also leads to a greater sense of security knowing what others can see of your country, unrestrictive of course, and a greater ability to respond in the event of a national disaster.

In Asia multinational conglomerates in the form of Mitsubishi amongst others are already partners in the new satellite data programs and are busy creating national imagery databases on which a whole array of mapping products can be based. Asia has been one of the first global markets to take on board some of the new colour digital imaging sensors for aerial platforms, demonstrating considerable faith in the advances such technology will provide these companies in this market place.

Market tornadoes

The imagery markets has come along way since the days when aerial photography was taken for national mapping programs and the early days of commercial remote sensing. It has seem over the past 3 years miniature tornadoes of change sweep through it, each country seeing those changes at slightly different changes, and some have yet to see them all.

All industries at one time or another are effected by some technological revolution, some market phenomena, or cultural change that forces them to reassess the way in which they do business or provide products, services or solution to that market. The sweeping changes can happen overnight or may take many months but are so significant in changing the status quo that they are likened to tornadoes.

Image resolution

One of the greatest tornadoes in recent years to sweep through the industry has been high resolution satellite data. With two notable entries over the past 3 years bringing 1m resolution imagery and less to the market place, early predictions were for the end (or at least a shrinking) of aerial imagery sales and a new force in global imagery to take over. Instead what we have seen has been quite the opposite, a growth in the aerial imagery market spurred on by increased awareness of imagery due in part to the marketing and hype activities of the satellite companies. Whilst there are many notable mapping programs that have utilised satellite imagery we have also seen many more utilise imagery and imagery at higher resolutions than that achievable by satellite. The squeeze effected in the market place by the satellite imagery companies has pushed the aerial imagery companies to offer even greater levels of resolution, update more frequently (than previous aerial surveys) and at prices significantly lower that the satellite companies. It has also resulted in many more aerial companies moving to a product model to realise greater revenues needed due to lower sale prices for data. Now whilst the satellite companies were not the first to bring multi sale models to the market, their presence has stirred existing companies in to re-evaluating how they do business with the pixels they hold.

Here in the UK we have an extremely competitive market and one that sees extremely high resolution imagery readily available (see Cities Revealed in figure 1). The existence of a number of highly competitive aerial companies, along with archives or services providing 25cm or less imagery, coupled with our unpredictable weather patterns has resulted in a limited place for satellite imagery in the UK market. In France whilst SPOT is dominant and will continue to be so with its new HRG 2.5m resolution sensor, aerial programs providing 12.5cm data are in demand and growing. Similar patterns of aerial and satellite imagery mixes are evident in other European counties.

Security

One of the greatest arguments in the face of the sceptical opinions over the success and rational for satellite imagery and aerial imagery has been its open skies factor. The open skies policy recognizes the right of a sensed State to have access to data concerning the territory under its jurisdiction on a nondiscriminatory basis. Therefore we all know what each other is doing and in so doing create a greater sense of security. Satellite and airborne imagery has been used on a number of occasions, e.g. Iraq's purchase of high resolution imagery prior to it invasion of Kuwait is just one example (http://www.fas.org/news/iraq/1991/910226-174017.htm), others include the Cuban missile crisis, Kosovo and Bosnia (http://www.fas.org/irp/imint/).

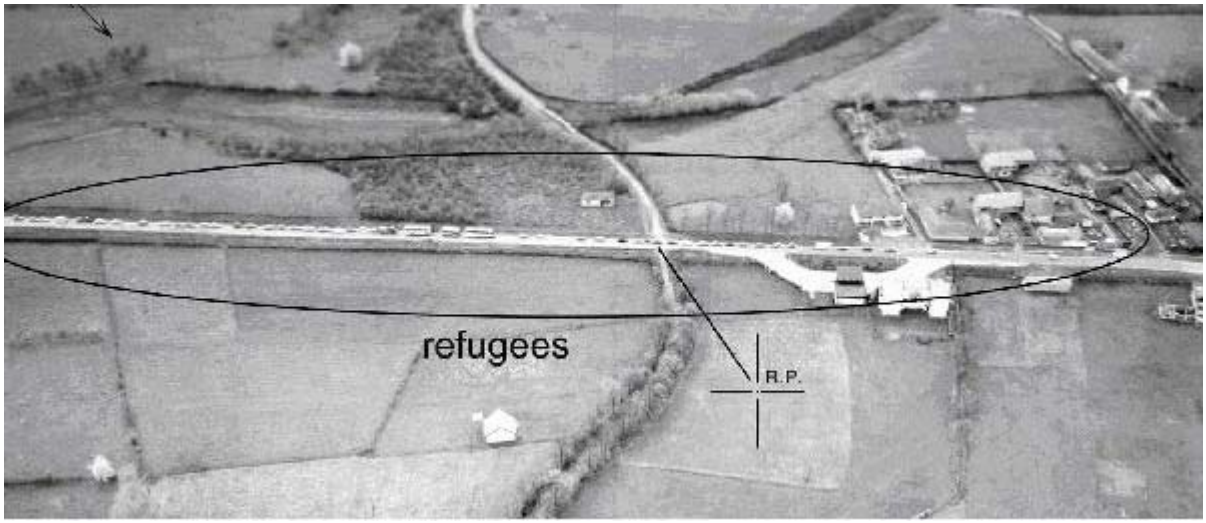

Figure 3 Refugee convoy, Kosovo, imaged with the CL 289 Unmanned Aerial Vehicle, 15th May 1999.

Figure 4 ICBM missile site, Cuba, photographed by the USAF US spy plane

What this clearly shows is the value imagery has in times of conflict and the vast amount of information that can be gathered from a image. Whilst the classified material is easy to keep under control, the material obtained from commercial sensors and platforms is not. Often open to all with a credit card or those with a big enough cheque book. For example in the recent Afghanistan crisis the US department of defense purchased outright all the imagery take from Space Imaging's IKONOS satellite at a multi million

dollar cost. In a way this represented a form of censorship, preventing others from seeing what they could through legitimate means. Following September the 11th the US has sought to re-evaluate it information policy and specifically its Freedom of Information Act which has granted access to government information without restriction. Security concerns over the information contained in the data collected on the recent Shuttle radar Topography Mission has led to a restriction of this data and some of it will not be made available free of charge (GIS User, Issue 51, Apr – May 2002).

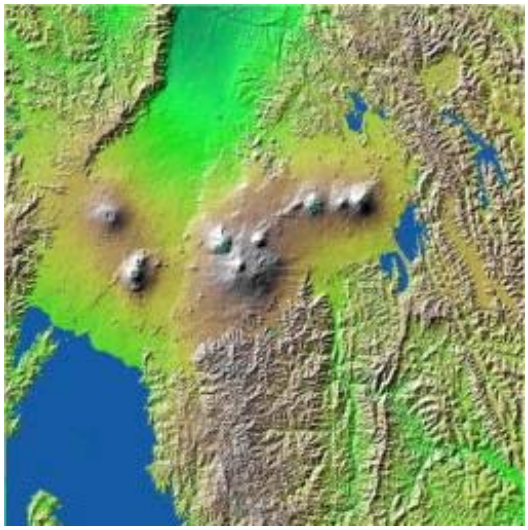

Figure 5 Shaded Relief with Height as Color, Virunga and Nyiragongo Volcanoes and the East African Rift Valley, taken by the C Band Interferometric Radar, on board the Shuttle SRTM, February 2000.

Should this continue it will cause significant shock waves through the geographic community as governments both at the Federal and local levels reassess their data policies. We have already seem small shock waves reach us here in the UK with questions raised over the security implications of the Getmapping's archive on the web. This is one area that will resurface and may lead to significant changes in our data policy, however as yet it is difficult to determine if that will be for the best.

Data value

One of the ways that a subliminal censorship has been applied is through charging for data, in the US this has been applied at the Federal level and state level. This charging brings about a call for what the value of data is, a question that vexes all involved in any aspect of geographic data. The matching of value with cost is a task that many companies and government organization both here in the UK and continental Europe and more recently in South Africa, Japan have been trying to do. The recent reviews of the UK's Ordnance Survey have raised such questions over value and cost and answers have been hard to come by.

The value pyramid, shown below shows the typical position a data supplier faces, when trying to balance high value data products with low value market applications. Or more, customers for whom high quality data is required, but for only a small proportion of their transaction and thus only commands a low value.

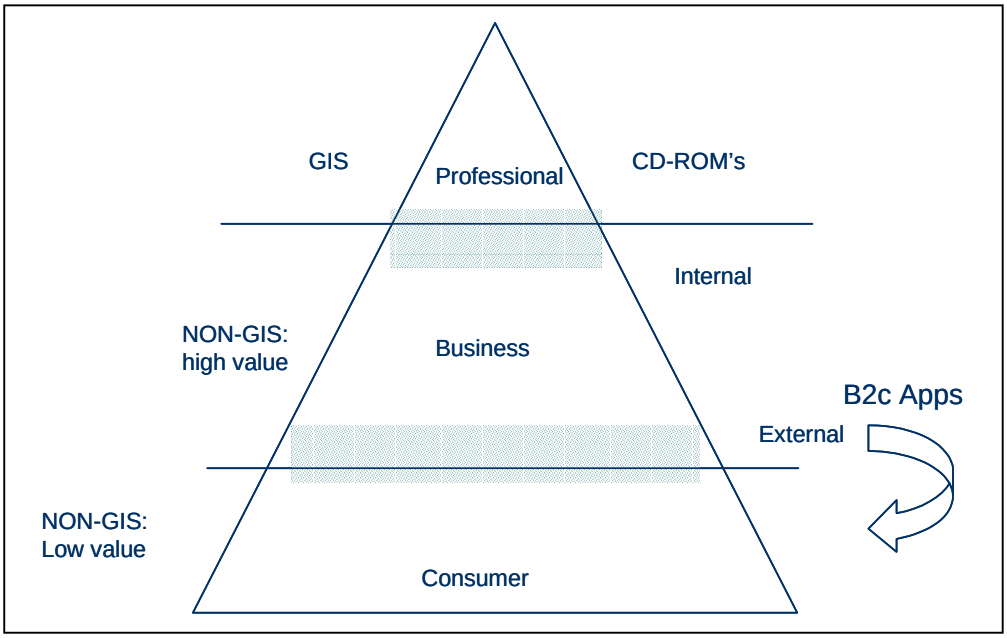

Figure 6 Data value pyramid, showing the relationship between uptake and value. The vertical axis represent value and the horizontal users or uptake. Data value varies by an order of magnitude through each successive layer of the pyramid, resulting in varying channel models to generate revenue significant enough to make the data product viable.

A mass market uptake of the application is the only solution to providing high quality data at low prices, and similar model are being viewed in the location based market and internet market. Whether they are successful or not remains to be seen.

In South Africa for example property information provider 'The Knowledge factor' will be the first to incorporate aerial photography (Cities Revealed) into its property application. Something ground breaking in a market where geographic data has yet to leap from beyond the map book page. In other developments in South Africa the Surveyor General intends to provide free aerial photography for certain areas to provide information to the citizen. If this happens and if it will be viewed as a success, as ultimately there is a cost to the taxpayer for this and whether any maintenance will be provided has yet to be seen.

One vital relationship that we recognise here in the UK is that data quality goes hand in hand with data cost, 'you pay nothing you get nothing' really does apply to geographic data. In the UK we have a very advanced, some may say aggressive, market in terms of commercialisation of geographic data. Our market models for the sales of geographic data are highly advanced and tuned to needs of a wide range of market applications and values. In France for example, the National Mapping Agency, IGN is so dominant, even more so that here in the UK that there is little room for commercial geographic data companies to form let alone flourish; although ISTAR the telecommunications data provider is a notable exception as is Interatlas of Paris who provide aerial imagery.

Data provision in many other countries is controlled, driven and in some cases held back by the National Mapping agencies. We now see that many are realising that there is significant value to their asset and this could drive and underpin significant national business. Yet most are struggling to define an equitable pricing and value policy for their data, often falling into two camps, the freedom of information camp and the revenue generation camp.

Summary

Evidence from the world's imagery markets show, with reasonable confidence, a strong growth. Reports from the US back this up, UK competition, digital camera sales in the far East, increased imagery sales and imagery projects in Africa, National imagery mapping projects in Europe also show evidence of this. Whilst

this growth is centered on just the image itself the true growth and value of the industry will be realised when information is extracted from the image.

For us in the UK we have a strong imagery market and one that is constantly developing its ideas and products. What will be key for the future growth is the development of the image market into something more information lead. As we see the markets already served become more demanding, seeking greater value for the price they pay for their image and new markets open up seeking lower imagery pricing we will see UK companies seeking new business models and developing new image products to stay strong and successful.

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