The AGI Foresight Study - The UK Geospatial Industry in 2015

An Expert Paper

Aerial Photography

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Scope

There are perhaps few elements of the geospatial market that have experienced such rapid change in the last 10 years as the aerial photography market. This document provides a reminder of that change as a foundation for a view of the future. Most of the commentary focuses on the Unite Kingdom; however, a similar situation is evident across Europe.

Background and current position

Less than 10 years ago, the aerial photography market was a very different prospect. All capture was undertaken on a project-funded basis with clients paying £60-£100 per sq km. The process itself was "wet-film" based with rolls of film over 200ft long being exposed frame by frame and then having to be processed, scanned, corrected and then manually edge-matched and mosaiced. The market was dominated by engineering companies, local government and some parts of national government. Capture was fragmented and undertaken by a wide range of organisations. Resolutions of the data varied from 10cm to 1m and mainly consisted of RGB (Red-Green-Blue). Colour-Infra-Red (CIR) was extremely expensive and required a specific type of film. As for oblique imagery, this was focussed on a small area or building basis and was mostly used for visualisation. Finally, many commercial organisations did not believe there was a market for national coverage as the size of the data layer would be over 10 TB in size, limiting viability of use.

Compare this with the position now:

1) National coverage provided as a single layer by 2 to 3 companies (including the national mapping agency) at 25cm resolution;

2) 5cm resolution data being captured for major urban areas;

3) Commercial pricing per sq km ranging between £1 and £20;

4) Inclusion in the Ordnance Survey Pan-Government Agreement;

5) UK national Aerial photography available on the web (Google and Microsoft) and now being provided with software "free-of-charge";

6) Digitally captured thereby removing 70% of the processing flowline;

7) Automatic processing flowlines taking the stream from the sensor and generating Digital Terrain Models, Digital Surface Models, RGB imagery and CIR Imagery ;

8) Oblique imagery being placed on the shelf as product;

9) Compression technology (Jpg, Jpg2000, ECW, Mr Sid) all aiding the use of the data across the market;

10) Web Map Service (WMS) technology delivering the imagery to desktops across an organisation with minimal effect on the core IT requirement.

In summary, aerial photography has been accepted as a "standard" layer, has been viewed by most of the UK population and is now a standard tool in 90% of Local Authorities and over 50% of central government – all in 10 years.

It used to be difficult explaining my job. Not so now – usually, saying "have you seen Google /Bing" does the job. It is difficult to think of other aspects of the market have seen a revolution in coverage, quality, market, price, technology and processing quite on the scale experienced.

Anticipated Changes

The product, market and application are in an interesting phase of development. From one perspective, major web actors are driving the need for data to be refreshed; however, the needs of these organisations are very different from the traditional client base. Their current interests are driving traffic to web sites thus creating the potential for advertising. Aerial photography is a commodity and should it not generate the required interest (or something better is made available), then their interest will wane as fast as it rose.

Whilst term-based programmes, such as the Pan-Government Agreement, offer some stable requirement within the market, requirement elsewhere is fluid.

From an urban environment perspective, change is already occurring. The emergence of oblique imagery in a form suitable for intelligent information extraction is fast becoming part of the recent emergence of high quality 3D visualisation.

It is also worth noting that this exemplifies an increasing trend of imagery being used in conjunction with other information. This merge of imagery, building models, CAD information, modelling output and databases are providing a level of "interaction with the environment" previously unthought-of. Taking this one step further, with their Street View product, Google are now providing detailed street view photography, using ground based capture techniques.

From a rural perspective, change is also afoot. Imagery has been used for many years as a means for map update and the frequency of map update drove the photo capture. In the future, imagery may well become the most up-to-date layer for large-scale analysis of the landscape and for some clients such as the Rural Payments Agency, Scottish Executive Environment and Rural Affairs Department (SEERAD) and Welsh Assembly Government (WAG), this may be critical to meet EU Directives and Policy.

The continued impact of the web actors combined with the cost of maintaining product and probable government budget reductions make it clear that the future will be challenging for those acquiring imagery and selling it. However, with the increasing impact of technology, other avenues are beginning to open. As referenced earlier, current production techniques provide additional layers above and beyond the traditional imagery. Historically, imagery has been mainly used for visual interpretation. However, noting the challenges above, it is clear that further use of the imagery to create additional revenue sources may be one way of developing a stronger future market position. This is already developing within the market with a range of companies producing by-products from the data and marketing these as solutions to specific issues (land cover, hi-resolution mapping etc.)

Impact of Changes upon the geospatial industry and upon customers

Positive:

1) Web actors may drive open access to layers at minimal or no cost;

2) The challenges of the market may drive innovation, thus creating additional capability accessible by the market;

3) Developments in web / distribution technology will continue to drive "cost of use" down and increase usage across an organisation;

4) Imagery is likely to be integrated with additional information merging the benefits of visualization with the applicability of modelling, geo-spatial analysis and database connectivity.

Negative:

1) The needs of the major players may not suit all;

2) Removal of major financial elements of the market may drive prices up for the quality and timeliness of the data required by specific clients

Scenarios

1) Imagery becomes a commodity, viewed and distributed on the web almost for free. Mass market removed and specialist capture returns. Providers are sub-contractors;

2) The range of benefits from information derived from imagery will maintain the need to capture high quality input on a regular basis;

3) Technology continues to develop to a point where cost of capture and value is maintained.

Summary of 5 key points

1) If change equivalent to that experienced in the last 10 years continues, attempting to guess what may happen in the future is challenging;

2) External influences outside of the industry such as the web actors may both positively affect consumer access (availability / price) and negatively affect consumer access (quality, updates);

3) Providers will have to look for more value from the initial investment of capture to maintain profitability;

4) In future, those requiring guarantees of quality and timeliness may end up paying more;

5) Delivery and access technology will increase the user's likely return on investment and reduce cost of ownership.