GIM INTERNATIONAL INTERVIEWS JOHANNES KEBECK, TECHNOLOGY SPECIALIST, MICROSOFT VIRTUAL EARTH BUSINESS UNIT

Integrating GIS and Earth Viewers

Microsoft's MapPoint Business Unit was formed in 1995. The Virtual Earth platform was launched in 2005 as an integrated set of services combining imagery with mapping, location and search functionality. In May 2006 the company acquired photogrammetric firm Vexcel. This month's interviewee, Johannes Kebeck, talks about Microsoft's aims and ambitions in the field of geomatics. Ã¢â‚¬Å“There will still be a need for traditional GIS [Ã¢â‚¬Â¦] we will likely see tight integration between the traditional GIS and so-called Earth Viewers.

Howbig is the geospatial division of Microsoft in terms of number of employees and share in turnover? What sort of customers do you target and howis your customer-base distributed over the continents?

Whilst we can't disclose financial figures, the Virtual Earth Business Unit has several hundred employees, supports over a thousand enterprise customers worldwide, and has a global network of several hundreds of partners and resellers. Virtual Earth is available as an enterprise service and consumer offering, the latter being available through Windows Live Search Maps and an API. This free service will be financed by advertising and is frequently used in so-called "mash-ups". The enterprise service is being used in all industries and, while the most frequent applications are certainly in locating and tracking, we are seeing an increasing number of applications for geographic analysis and visualisation. This may be as simple as a colour-coded map or as complex as British Petroleum's Hurricane Management System.

For providers of web-based search engines such as Google, going geospatial seemed a natural step: searching by location rather than keyword. What is Microsoft's motivation to do so?

Microsoft's interest in developing geospatial services dates back over a decade. In a sense, Virtual Earth represents a natural evolution in Microsoft's commitment to delivering geospatial services as an ingredient. In other words, putting the power of location and mapping information in the hands of any developer. We also recognise that providing those consumers searching for information with an immersing visual experience, "what it's like to be there", is a key strategy in enhancing the search experience.

Could you elaborate on these ideas, especially in the context of Microsoft's purchase of the Vexcel Corporation, announced a year ago?

Microsoft acquired Vexcel in May 2006. Vexcel was headquartered in Boulder, Colorado and had subsidiaries in Australia, Austria, Canada, the Netherlands and the UK. It specialised in photogrammetry and advanced radar technologies, but most importantly had deep domain experience in image processing. This knowledge and the tools developed by the company have

been used to improve the image-processing pipeline and automate the process of generating 3D-models from stereo-aerial images created with the Vexcel UltraCam. Today Virtual Earth has over a hundred cities in fully textured 3D-model, and monthly data updates are growing significantly; for example, we added and updated 26 terabytes of data in July. In the UK, for instance, we have 3D-models of Brighton, Bristol, Cardiff, Eastbourne, Gloucester, Northampton, Plymouth, Swindon and Wolverhampton.

In contrast to Google Earth, you also provide bird's-eye images on Virtual Earth. What do you consider to be the value-added features of such imagery compared to maps and vertical satellite and aerial imagery?

The Virtual Earth platform was launched in 2005 and is an integrated set of services that combines bird's-eye, aerial and 3D imagery with mapping, location and search functionality. Bird's-eye images are oblique aerial images taken from a low-flying plane using Pictometry's patented camera technology, which allows you to look at a point of interest or landscape from four different directions. Figure 1 is a great example of how much more information is retrieved from these images as compared to traditional aerial or satellite imagery. The benefits of this imagery are apparent in a number of business scenarios, such as real-estate transactions, where bird's-eye imagery enhances identification of a property and its surroundings prior to physically going and visiting it. This saves customers time and resources and expedites the buying process. There is widespread interest in this imagery across numerous vertical markets. In the mid-term we want to use bird's-eye imagery to enhance texture in our 3D-models, as announced and demonstrated by Stephen Lawler, Virtual Earth general manager, earlier this year (www.ted.com/index.php/talks/view/id/139).

Historically there has always been a close relationship between mapmakers and the military. Howdo you see your role within the context of homeland security?

Our high-resolution aerial images are taken from airborne sensors and therefore national laws apply to data acquisition and publishing. Thus you will find that some regions are intentionally blurred or even, depending on national requirements, masked. While this is mandatory for public-interfacing applications, authorities engaged in homeland security also need data that is as detailed and up-to-date as possible. They may also need to add their own data, like architecture blueprints or imagery from their own sensors. Further, we need to distinguish between information made available to the public, the internet being a perfect medium of transport, and those systems that hold confidential data or that must be available even if the communication infrastructure is not. Virtual Earth can be an important tool where the public needs to be informed. For example, in sudden disaster scenarios the scalability and availability of Virtual Earth is a great plus and it is, of course, possible to add custom raster and vector data in these scenarios. Figure 2 shows an example in which Pictometry and the Virtual Earth Business Unit worked together with MSNBC to inform the public about the devastation caused by Hurricane Katrina.

Howdo you co-operate with major data providers, universities and research institutions to improve and innovate in terms of your products?

The Virtual Earth Business Unit sees the importance of collaborating with academia and we provide access to Virtual Earth technology and image assets (bird's-eye, street-side and models) in a form tailored to the needs of academic researchers, enabling them to pursue research beyond their own resources. Earlier this year Microsoft Virtual Earth ran a competition asking for "Request for Proposal" programmes and in April announced 21 winners of the Virtual Earth and SensorMap competition; funding totalling more than one million USD is involved to help academic researchers innovate advanced mapping and location-based search technologies.

Can you tell us something about your investment plans concerning Virtual Earth and MapPoint over the coming five years?

We are constantly adding new imagery, features and data, depending on customer requirements. There are many plans for technological development and additional imagery. For example, we will add street-level imagery to the 3D-model, as demonstrated by Stephen Lawler earlier this year. We will also expand our geographical coverage. Today we have major roads worldwide and street-level roadmaps in 68 regions (those mentioned at www.microsoft.com/mappoint/products/webservice/regional.mspx plus Japan); 15m satellite images are available worldwide and we have high-resolution satellite aerial images of Australia, Canada, France, Germany, Italy, Japan, Monaco, the UK, US, Vatican City and some other smaller regions. We plan to expand across Australia, Eastern Europe, India and China. Bird's-eye images are currently available in Belgium, Denmark, Finland, France, Germany, Italy, Monaco, the Netherlands, Norway, Spain, Switzerland, the UK, the US and Vatican City. The ultimate goal is to cover at least 80% of populated area in each country.

Does Microsoft's MapPoint compete with or complement the detailed street-level maps from Tele Atlas and Navteq?

We don't create any road maps or imagery ourselves but collaborate with several different data providers, one Navteq, which provides detailed road data for many regions in MapPoint and Virtual Earth. Other data providers for road maps are Map Data Science and Automotive Navigation Data (AND). We have various data providers for vertical satellite and aerial images and work with Pictometry and Blom to provide oblique aerial images.

How do you see the prospects for Virtual Earth and MapPoint in the rapidly emerging economies of China and India? What are the prospects for Africa and South America?

Yes, we see China and India as key markets for Virtual Earth in the years ahead. We are also reviewing key data for some South American countries and various African markets.

Growth means an expanding workforce. What are your requirements with respect to the skills and knowledge held by young geospatial professional college leavers?

The Virtual Earth Business Unit actively recruits from top universities across North America, Europe and Asia in an effort to expand our workforce with the appropriate skills and knowledge in the years ahead.

Technology, society and business models are in the process of rapid change. How do you see the future of Microsoft's geospatial products over, say, the next five years?

From a data acquisition perspective, Microsoft will continue to support and further develop the UltraCam, which is key to creating the high-resolution 3D-models we exhibit in Virtual Earth. In the context of data management, we are to spatially enable our SQL Server database with the next release. A public-community technology preview of the SQL Server spatial engine is planned for the end of this year. I also envision the Virtual Earth Platform and the MapPoint Web Service being combined into one platform in the years ahead. Additionally, we will remain committed to expanding our geographic coverage globally and to increasing the rate of imagery deployed in the service. Moreover, Virtual Earth will be more open to supporting user-added content and thus grow through local knowledge. Eventually, with the growing 'sensorweb' we will see more and more real-time information. Mobile applications will gain in importance and we will see a strong growth in location-based advertising. On the business side we expect to see location intelligence becoming an integral part of business intelligence. That said there will still be a need for the traditional GIS. Virtual Earth is not a data editor but a visualisation component, and thus we will likely see tight integration between the traditional GIS and so-called ‘Earth Viewers'.

Microsoft and Mapping
Microsoft has a long history of developing innovative mapping products and services to support and enable enterprise and consumer productivity. The company's MapPoint Business Unit was formed in 1995 and has produced mapping software such as Streets & Trips, Autoroute, Encarta and MapPoint. In 2001 Microsoft released the MapPoint Web Service as a standard-compliant Simple Object Access Protocol (SOAP) Web Service, and quickly expanded the service to include street-level coverage in 67 regions. Today the MapPoint Web Service provides a host of geospatial capabilities including geocoding, routing and proximity searching. MapPoint Web Service may be considÂered the business layer behind Virtual Earth.