APPLIED IMAGERY LLC

Lidar Data in Unwieldy Volumes

Lidar and other 3D-terrain data are increasingly available and trusted but still generate unwieldy volumes of data. Established in 2004, Applied Imagery provides powerful and simple software tools for visualising, modelling and analysing enormous 3D-terrain datasets on standard PCs and laptops. Applied Imagery LLC produces 3D-terrain exploitation software called QT Modeler that can create, edit and analyse large 3D-terrain models. The data from which these models are constructed is usually collected using Light Detection and Ranging (Lidar), increasingly seen as the fastest, most economical and accurate way to map terrain.

Huge Point Clouds

High demands on resolution require Lidar sensors to collect millions upon millions of â€˜pointsâ€™ to represent a terrain. This massive volume of data makes Lidar difficult to visualise and exploit in many software applications. There was previously no commercially available solution for this problem. At the Johns Hopkins Universityâ€™s Applied Physics Laboratory (APL) in the US the problem of how to visualise models consisting of tens of millions of discrete data points and then exploit the data was solved with the creation of a software package called QT Viewer. This is capable of visualising, modelling and analysing enormous 3D-terrain datasets on standard PCs and laptops.

In 2004 Chris Parker formed Applied Imagery LLC to commercialise the QT Viewer software. APL licensed the core QT Viewer technology to Applied Imagery, retaining a minority stake in ownership, and the first licence for the software was sold within a month of signing the agreement. Since then the company has enhanced the original software to broaden its appeal for the wide variety of Lidar users in the world, thus expanding beyond an original user base that was largely US and defence-related. Today the company consists of three employees at headquarters in Silver Spring, MD, off-site developers, and a remote sales office in California. Our developers are experts in terrain and imagery exploitation and revenues grew 200% in 2005 and are projected to grow 100% in 2006.

Different Emphasis

Our mission is to provide geospatial professionals with tools that enable the rapid exploitation of 3D-terrain models. One way to imagine this is by breaking down user activity into four basic tasks: data visualisation, fusion, analysis and distribution. Different users place differing emphasis on each of these tasks. For example, an engineer responsible for quality assurance of a Lidar survey will initially be interested in visualisation of data to ensure that the target survey area has received complete coverage. This same engineer may then shift to analysis to ensure that certain quality metrics, such as vertical accuracy, have been achieved. After quality checks, the engineer will divide the data up into smaller pieces and distribute it to the customer and/or end user. These end users will probably fuse different types and sources of data, such as aerial photographs and GIS layers, with the high-resolution Lidar data. QT Modeler provides many tools for this wide variety of applications and users.

Product Philosophy

We work very closely with our customers to define new tools and features in the QT Modeler software. A diverse customer base means we have a broad cross-section of Lidar and 3D-terrain users to draw upon for new ideas. When adding new tools we strive to adhere to a few simple beliefs in product philosophy. The first is that customers have great ideas: the best come from customers who work on the frontline of Lidar, SAR and 3D-terrain analysis and these experts play a huge part in shaping future products. Secondly, time is money: our customers rely on QT Modelerâ€™s ability to manipulate and render huge volumes of 3D-data very quickly. Any new tool must save users time, remove steps from processes or make QT Modeler more efficient. The third maxim is â€˜keep it simpleâ€™: as a niche software utility the QT Modeler interface must be simple and intuitive, while the learning curve must remain short; most users can begin using the software without formal training and recommended training is just one day. Fourthly we share with others: because QT Modeler exists as one of numerous tools in a geospatial toolbox it must coexist and supplement other software packages and processes; our customers help prioritise new import and export formats that are added. By listening to our customers and constantly upgrading our products we will continue to provide solutions that save customers time and increase user productivity.

Markets

While our more than a hundred customers are distributed over five continents, the bulk of the customer-base is in North America. Our customers can be divided into three basic markets: the US Department of Defense, North American civilian and international markets. While there are functional differences in the respective missions of these organisations, there are many similarities in their software needs. We sell directly to customers in North America but seek partners to help distribute internationally, particularly where language barriers make transacting business difficult.

View of the Future

We see many trends evolving in the 3D-terrain marketplace. Airborne Lidar sensors are improving and can cover terrain faster and at higher resolution. The net result is that more data is available to more users. A second trend is more widespread distribution and availability of Lidar data. Lidar surveys are migrating from the realm of specialists towards much more widespread use, while many government entities are making government-funded Lidar survey data available to other government agencies and, in some cases, to the general public. PCs also continue to improve. While this is a decades-old trend, standard PC processors, memory and graphics capabilities have crossed a thresâ€“hold that permits exploitation of large Lidar datasets. The result is decentralisation of data and

increased demand on the part of users who previously could not even contemplate working with Lidar. Another trend is data fusion. Users are now incorporating GIS, CAD, photogrammetry and other geospatial information with Lidar data, and vice versa. These factors, combined with Lidar data availability and more powerful PCs means that more people are working with the data. These new users will drive creativity and innovation.

Further, there is increased demand for high-resolution elevation data. In the US, flood mapping and disaster-response planning have been traditional drivers in the demand for Lidar data. As this data is collected, processed and put into operation, user expectations regarding elevation resolution and accuracy increase. Awareness of the possibilities is spurring demand for high-resolution elevation data for civil works planning, coastal engineering, geology, urban planning and a variety of other emergent applications. We are also seeing enhanced general awareness of geospatial data; widespread press coverage concerning Google Earth and Microsoft Virtual Earth has provided public exposure for geospatial products and set a benchmark for ease of use and data availability.
