

VISIONMAP

Boosting Productivity, Quality and Accuracy



VisionMap digital mapping systems reduce the cost of collecting and processing accurate, up-to-date geospatial data and increase the productivity of aerial survey providers. The company's flexible A3 systems are deployed throughout the world, providing mapping for environmental monitoring, urban planning, agriculture, navigation, disaster management and location-based services.

VisionMap was started in 2004 by Michael Pechatnikov, a talented young image processing expert who had previously founded TelMap – a mobile navigation company that was later bought by Intel – when aged just 17. Back in 2004, Michael realised that digital imaging technology and affordable computing power could fundamentally change the way aerial

surveys were performed, making them much faster and considerably less costly. Michael proceeded to recruit a team of bright, innovative physicists and engineers. Together, they envisioned technology that would allow high-quality geospatial data to be provided quickly and at prices that would make frequent updating affordable: a shift from once-in-a-decade government surveys that could only be interpreted and used by expert planners to the rapid generation of detailed, up-to-date, multi-angle, photogrammetrically accurate imagery, orthophoto and 3D data for many professional and consumer applications.

VisionMap's goal was – and remains – to increase the availability of up-to-date, very high-quality 3D geospatial data for large areas, potentially the size of states and countries. To turn this vision into reality, the company needed to solve two main problems: how to quickly capture large areas at high resolution, and how to efficiently process projects that could potentially consist of millions of images.

The A3 was conceived to solve both of these problems, with an agile airborne system that is able to quickly capture vast amounts of data at high resolution, and a processing system that can automatically process these images into high-quality, seamless geospatial data.

Within the space of just a few years, the A3 became a reality. It provided, for the first time, fully automated processing as well as advanced airborne capability to enable both traditional (orthophoto) and new mapping applications, such as efficient 3D city models.

VisionMap Today

The company's 80-strong interdisciplinary team comprises experts in photogrammetry, computer vision, optics, electronics, mechanics and software. This diversity of expertise allows the team to innovate by analysing problems from many perspectives, developing solutions and choosing those that contribute most to productivity and quality. VisionMap management, R&D and production are located in its headquarters in Tel Aviv, Israel. The company enjoys strong venture capital backing. VisionMap has been profitable since 2009 and sales have since quadrupled. A North American sales office supports customers in the Americas, with local support also available in EMEA, China and Australia.

New Paradigms

The VisionMap approach uses speed and motion rather than multiple camera clustering to generate the images required to ensure both high-resolution and wide-area collection, as well as absolute accuracy. The camera includes two rotating objectives/lenses that together capture 160 million pixels per second and cover more than 100 degrees of field of view using a 300mm focal length. Proprietary software rotates the lenses and, in real time, reads and stores the vast amounts of data collected in the airborne system. The system has a uniquely lightweight yet powerful built-in mechanism which is responsible for highly accurate image stabilisation that might be necessary due to any possible motion of the camera – forward motion, rotating motion and vibrations.

The characteristics and capabilities of the A3 camera – its small size, light weight, metric frames, ability to collect multiple, highly accurate

oblique and vertical images from both high and low altitudes –address the requirements of numerous applications. For urban mapping, it can collect detailed high-resolution images in vertical and oblique angles from high-altitude flights. High altitude is critical in many areas since low-altitude flights are typically limited due to safety or congested airspace. For wide-area surveys, the collection rate in kilometres per hour of high-resolution imagery far exceeds the efficiency of satellites, thus allowing aerial survey providers to successfully compete with satellite imagery providers. Moreover, high accuracy does not require an IMU or ground control, making A3 ideal for mapping remote areas, where ground control is impractical, and for disaster relief, where time is of the essence.

The A3 LightSpeed processing system is based on an additional paradigm shift: integration of all processing phases into a single, automated workflow that eliminates disruptions due to data transfer, reduces costs, and enables thousands of square kilometres of high-resolution imagery to be processed each day.

Looking Ahead to New Challenges

VisionMap is continuing to develop innovative solutions that will help make its customers even more productive and competitive in the aerial survey marketplace. The new-generation A3 Edge camera boasts an 80,000 pixel footprint across track and provides very high dynamic range imagery.

In addition to continuing to optimise every process from image collection to output in order to reduce costs, enhance quality and improve productivity, VisionMap will maintain its focus on increasing image-processing speed and further automating the production of highly realistic 3D models.

VisionMap plans to expand its activities in the area of time domain information with solutions that accurately and automatically detect changes in terrain over time. Developers are also working on sensing the terrain in additional spectral wavelengths to provide more useful thematic information.

In addition to increasing the capabilities of its current solutions to better serve the existing customer base, the company is also adapting its products in line with the needs of emerging vertical markets, including rapid response and emergency scenarios in which aerial surveys are used to collect images immediately when disaster strikes. Mapping data is quickly produced within a few short hours to enable rescue teams to identify structures that are at risk of collapse, or pinpoint where relief efforts are most needed. Environmental monitoring is another important vertical market that is expected to become more relevant as it is commercialised further.