

VIST: Vast Imagery Streaming Technology

Value Proposition

The Vast Imagery Streaming Technology (VIST) architecture, developed under a DARPA SBIR award, allowed delivery of world's first operational 360-degree day/night wide area persistent surveillance system to the Army and Navy.

About the Company

Year founded: 1996

Greg Poe, President and CEO

Logos Technologies, Inc. offers innovative solutions in remote sensing, data exploitation, intelligence analysis, cyber security, information technology, stability operations and alternative energy.



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Technical Description

The VIST system consists of algorithms and software for the geometric calibration, 3D modeling, and rendering of wide area airborne surveillance data. It provides an efficient architecture for pixel-level registration and highly accurate geolocation and mensuration in persistent surveillance image data, leading to stable video, seamless image stitching, accurate 3D models, improved compression, and expanded data exploitation.

The DARPA SBIR award that funded the development of VIST enabled improvements in image stability, geolocation, and compressibility with modest computational resources. This patent-pending technology is now embedded in Kestrel, an aerostat-based sensor system deployed in 2011, and the Lightweight Expeditionary Airborne Persistent Surveillance (LEAPS) system to be deployed in 2012.

VIST is at the heart of the Department of Defense Information Assurance Certification and Accreditation Process for Kestrel which increases forward operating base protection by converting hundreds of images per second into a stable, seamless panoramic video of a city-sized field of view. Kestrel is providing intelligence, surveillance, and reconnaissance support to deployed warfighters in theater.

On the LEAPS system, VIST is used during ground data exfiltration. The 1U COTS exfiltration server provides rapid rectification, stabilization, tracking, and compression at approximately the rate of collection (2 Hz). VIST is also used to improve the geolocation of the LEAPS imagery through the creation of camera models and terrain elevation maps. LEAPS development is funded by the Office of Naval Research to provide a lightweight, persistent surveillance capability for the Navy and Marine Corps. Full VIST processing is planned for the LEAPS airborne processor.

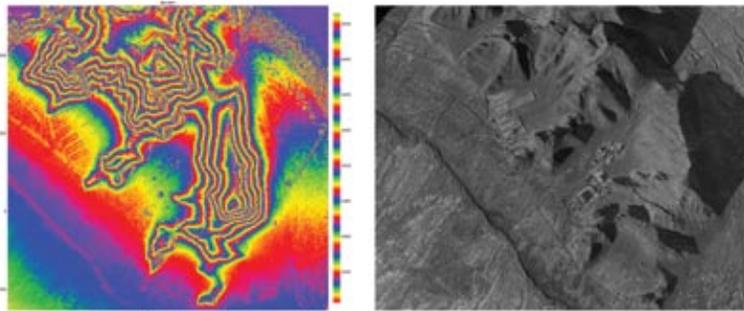


VIST provides stable imagery in the Kestrel system

Technical Challenge Addressed

Compression of the vast quantities of data collected by wide area persistent surveillance imaging systems is necessary when sensor output outstrips available bandwidth, as is the case in orbiting aircraft. Logos Technologies, Inc. successfully used accurate registration to achieve better compression ratios, and removed parallax effects by creating high-resolution, 3D models containing accurate locations for depth discontinuities. Compression could then encode changes that could not be encoded with a static model. By spending processing power on creating accurate models and transmitting only changes, improved compression ratios allowed new applications for imagery access.

Using wide area data to build accurate 3D models and render the data in a stable form, VIST allows processing, compression, and tracking of wide area data in real time with one-tenth the computation and one-fiftieth the false alarm rate of a competing system that uses 2D methods.



VIST improves image stabilization and location for the LEAPS system

Lessons Learned and Best Practices

- ▶ Identify and analyze a problem with existing products, and formulate a solution.
- ▶ Develop a core technology that enables and extends many other capabilities.
- ▶ Identify which customers will need the multiple uses of your base capability.
- ▶ Make salable products that incorporate the technology.

Applications

VIST-enabled Kestrel systems are being added to the Persistent Threat Detection System and Persistent Ground Surveillance System aerostats for Naval Air Systems Command (NAVAIR). They will support warfighters by using multiple viewer windows, watch-box trigger alerts, digital zoom, and sensor cross-cueing to track and locate activities of interest covering expansive areas. The LEAPS system provides wide area persistent surveillance in a 50-pound payload. The underlying technologies can be applied to many other surveillance needs.

Partnering and Collaboration

VIST was incorporated into government-funded sensor system development programs. Using a Phase III SBIR contract through NAVAIR, Logos Technologies, Inc. was able to provide a fast and efficient vehicle to bring the Kestrel system to rapid development and deployment in Afghanistan within 12 months. Logos will be providing the VIST processing capability with the ONR developed LEAPS system for the DARPA Insight program.

Logos Technologies, Inc. continues to make internal research and development investments in VIST and to use its architecture to produce state-of-the-art surveillance systems for defense and commercial applications.

Economic Impact

- ▶ VIST's contribution to the persistent surveillance program grew the company's revenue and nearly doubled its employee count from 117 in 2009 to 204 in 2012.
- ▶ Projects that benefitted from VIST were responsible for 40% of the company's 2011 revenue.
- ▶ More than \$50 million in funding has been provided through VIST Phase III SBIR contracts since 2010.