Rapid Dissemination of High Priority Sensor Data

Cloud Front Group’s Eternal Vigilance™ Combines pixServe® and Flume® to Increase Speed-to-Intelligence

The sheer volume of data collected by onboard ISR sensors poses a critical hurdle for intelligence-gathering entities – while more, higher-resolution data can inform better, faster PIR identification, targeting and other decisionmaking, it also challenges both technical resources’ ability to process and transmit the data timely and accurately, and human analysts’ ability to discern actionable intelligence from it.

Even the best-trained, most experienced human analysts are prone to distraction and inattention. Further, captured video may contain many elements, including multiple PIRs, which may impede thorough, timely human review, resulting in PIRs being overlooked.

It is increasingly a mission imperative to leverage machine analytics at the point of data collection to metatag, index, and analyze content from video and other sensors to rapidly identify PIRs and alert human analysts.

However, automated image “understanding” addresses only one of these barriers. The challenged network conditions inherent in today’s critical, tactical networks also inhibit speed-to-intelligence.

In the push to drive latency out of the intelligence life cycle, it is necessary to consider and mitigate the impacts of bandwidth limitations, distance, and network congestion and intermittency on analysts’ ability to provide warfighters with timely, actionable intelligence.

Eternal Vigilance™ is a software-only solution from Cloud Front Group that unites two novel technologies – piXlogic’s pixServe® and Saratoga Data Systems’ Flume™ – to speed prioritization of sensor data, alert analysts and other subscribers of potential PIRs, and to reliably and efficiently transmit over constrained networks higher-resolution video segments for human review and analysis.

1. Onboard sensor processing using piXlogic pixServe recognizes PIRs accurately and in near real-time from full-resolution video stream, creates a video segment file at high resolution around the PIR, and queues for distribution.
2. Video segments (and other data) are burst to subscribers via Saratoga Data Systems’ Flume using protocol optimized for challenged networks.
3. Subscribers receive timely alerts to PIRs, and have access to high-quality video segment(s) to improve their analysis and understanding.
4. At mission end, video sensor’s data is fully indexed and can be added to searchable archive without further processing.
SPEED-TO-INTELLIGENCE
Leverage onboard machine-enabled analytics to process video segments to derive activity-based intelligence and actionable intelligence of tactical environments in near real-time.

ENHANCED SITUATIONAL AWARENESS
Provide both warfighters and analysts with access to high-quality, high-priority airborne sensor data in near real-time.

SMALLER ANALYST HEADCOUNT
Reduce the manpower devoted to observing sensor data on unmanned platform missions.

HIGHER RESOLUTION VIDEO OVER THE SAME NETWORK
Achieve 5x or better improvement in video segment resolution that can be transferred without need to increase bandwidth.

OVERCOME CHALLENGED NETWORKS
Double (or better) the rate of successful alerts over challenged networks without improving quality of service.

SUPPORTS ACTIVITY-BASED INTELLIGENCE
Direct tactical support of activity-based intelligence (ABI) requirements through use of machine-enabled enhanced understanding and content change detection in video.

BENEFITS
- Saratoga Data’s Flume™ Network Optimization utility accelerates file transfers across challenged networks by 5-100x, moving & synchronizing globally-distributed data at unprecedented speeds.
- A client-server software-only solution running on commodity hardware in standard or virtual Linux machines over existing IP networks, Flume averts aborted connections and guarantees 100% accuracy of transfers of all data types and file formats by minimizing the impacts of network latency, congestion, and intermittency.
- In US Air Force testing, Flume demonstrated up to 39x performance improvement over standard file transfer methods for moving large files to/from airborne platforms, even under network conditions in which conventional tools failed altogether.
- Whether over broadband landline, SATCOM, or low bandwidth IP-over-radio networks, Flume is:
  - PRECISE
    Flume always delivers an exact replica of the original file.
  - EFFICIENT
    Flume transfers files in the shortest time while utilizing the least amount of memory, processing power, and link bandwidth.
  - PERSISTENT
    Flume completes file transfers despite link delays, packet errors, throughput limitations, or temporary network outages.

An In-Q-Tel portfolio company, piXlogic provides strong and unique image analysis and understanding capabilities through the use of its piXserve® solution.

piXserve can “see” the contents of streaming video, and stores a description of this content in an XML database.

piXserve is able to discern and vectorize, synthesize description (including location, geometry, size, color, relationships), and tag objects in live video streams in near real-time, allowing user alerts when objects or individuals of interest appear.

Further, piXserve enables automatic comparison of images and video segments to detect changes at the object level, enhancing the efficacy of persistent surveillance efforts.

piXserve’s user interface allows users to search by keyword or by selecting specific items in a frame to search or monitor for those. Further, piXserve can combine geospatial, temporal, and semantic filters with its visual filters to enhance results.

piXserve also offers language-independent text recognition, and can effectively “read” text that may appear within the field of view within a frame with a level of accuracy unmatched in the industry.

Running on commodity hardware and able to leverage multicore parallel processing, piXserve also offers a REST-based API package for integration with third-party applications and workflow environments.

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