

## Time-Sensitive Intelligence: Battlefield Data Management Enabled by Progress® ObjectStore®



## CASE STUDY

### CHALLENGE

The military requires technology that can provide a detailed, comprehensive, timely depiction of what is happening on the ground so that field commanders can act quickly and decisively.

### SOLUTION

Leveraging Progress® ObjectStore®, Northrop Grumman developed MTIX, the Moving Target Information Exploitation system.

### WHY PROGRESS® SOFTWARE

With ObjectStore as its infrastructure, the MTIX program could “fuse” disparate sensor data and provide a continuum of real-time information that guides military strategy and operations.

### BENEFIT

MTIX provided key battlefield support for the U.S. Army in Operation Iraqi Freedom. MTIX workstations are also used within selected Naval and Air Force deployments.

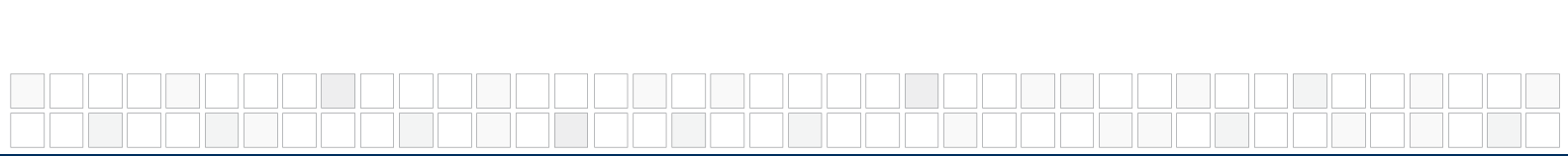
The mission of today’s United States military is a complex and demanding one, encompassing a multitude of responsibilities during both peacetime and conflict. Though there are many different types of military operations, common to all is the need for “intelligence.” Solid knowledge of friend, foe, terrain, environment, equipment and many other factors is crucial. Accurate and timely intelligence is becoming ever more integral to the operational decisions made by military field commanders. For commanders on the ground, the goal is to “see over the next hill”—to know what’s happening outside line-of-sight. That knowledge—delivered quickly and accurately—improves the prospects for success of an operation. It also helps to minimize the casualties and collateral damage that may be caused. Knowledge is indeed power on the modern battlefield. And in many instances, knowledge of what is happening on the ground is delivered from the sky.

### AERIAL INTELLIGENCE: MANAGING THE INFORMATION

The past fifteen years have witnessed a profound transformation in intelligence gathering technology. Sophisticated radar and other types of sensors—mounted on both manned and unmanned intelligence, surveillance, and reconnaissance (ISR) vehicles—have created a new world where vast amounts of information can be produced. But all the new devices—and data they generate—are of little value if the information cannot be synthesized and understood within a time span that permits military decision-makers to act. In battlefield situations, that means quick decisions in what are literally life-or-death situations. This real-time data management challenge is now being met with technology from Progress Software.

With each advance in the breadth, accuracy, and timeliness of intelligence gathering activities there comes commensurate increases in the volume of data that must be managed. And data volume is only a part of the challenge. Raw data is of little value to a field level commander. What is needed is the ability to process and interpret the information—i.e. transform data into true “intelligence.” In terms of surveillance data, military commanders need to:

- > Consolidate ISR data produced from different airborne platforms in order to develop a composite view that reflects the reality of the situation on the ground.
- > Be able to discern landmarks and man-made objects from the innumerable false readings and clutter (both natural and man-made) that obscure the truth—some of which reflect intentional enemy efforts at deception.

- 
- > Distinguish amongst friend, foe, and non-combatant to ensure that attention is focused on the correct targets.
  - > If foe, understand the potential threat in order to prioritize among potential targets.
  - > Identify and distinguish between moving and stationary objects, as well as to understand the path of moving objects in terms of speed and velocity (their “track”).
  - > Derive all the above regardless of weather or time-of-day.

And do it quickly. And dependably. And in some of the most pressured, chaotic circumstances imaginable! And, in the case of a successful US Air Force research and development program, MTIX, it's being done with ObjectStore.

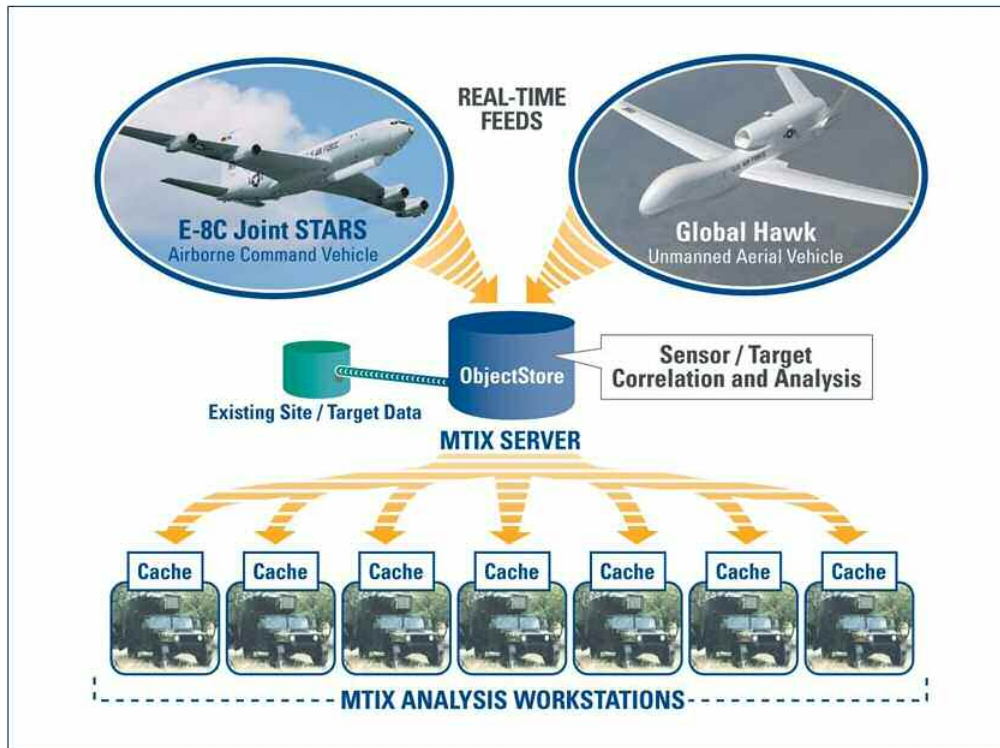
## **MTIX**

MTIX, Moving Target Information Exploitation, was developed by Northrop Grumman Integrated Systems, a major defense contractor, under government program management provided by Air Force Research Laboratory (AFRL), Rome, NY. The challenge put to Northrop Grumman was to build a system that could process data collected on moving objects, exploit that data using a common set of tracking and other tools, and disseminate and display the results to authorized users. Sensor data from different devices and delivery platforms abounded, but existing efforts to create a consolidated picture from the different data sources had proven operator-intensive, limiting battlefield effectiveness. The goal of MTIX was to deliver a detailed, comprehensive, timely depiction of what was happening on the ground so that field commanders could act quickly and decisively. This consolidated view of different data—what the military calls “fusion”—is being delivered to MTIX through a Progress-based solution. MTIX processes, exploits, and disseminates its exploitation products in a Web-enabled environment. MTIX receives data in standardized format from multiple platforms. Two of the key platforms are JSTARS and Global Hawk.

- > The JSTARS (Joint Surveillance Target Attack Radar System) is a Boeing 707 aircraft that operates between 29,000 and 42,000 feet and is outfitted with a multi-mode radar that can scan fixed and moving targets. With its 24 foot long antenna, JSTARS delivers a wide range of data that includes moving/fixed target reports, tracking of moving objects, as well as synthetic aperture radar (SAR) scans that are used to profile landmark and terrain data.
- > The Global Hawk is an unmanned aerial vehicle (UAV) that operates at up to 65,000 feet and can scan 10KM widths of territory with an image precision of one meter. This Northrop Grumman-developed vehicle offers high resolution SAR data gathering along with moving target information and other types of data.

Both the JSTARS and Global Hawk platforms—as well as the data they generate—predate the MTIX program. However, the goal for MTIX was to harness this sensor information and make it available to field-based intelligence analysts in a format that they could use. The MTIX information had to be available within a time span that would support real-time decision-making. This “eXploitation” of existing intelligence data (as well as new data that future sensors will deliver) represented the capability to be delivered by the new solution: the crucial “X” in the MTIX acronym.

## MTIX and ObjectStore



## MTIX DATA CHALLENGES

MTIX's sophisticated requirements demanded much of its data management infrastructure. MTIX had to:

- > Digest large amounts of data from different sources and create consolidated views. A typical 12-hour MTIX processing session can produce up to 2GB of data, with new sensor data received every 20-30 seconds. The combination of territorial breadth, precision, and frequency represented a significant data collection effort for the receiving systems.
- > Synchronize inbound data with spatial/temporal cues. MTIX must combine images from different sources, received at different times, to ensure that depictions accurately reflect the same information at the same time. This data reconciliation helps to identify moving objects and to validate the sensor accuracy, avoiding dependence on a single source.
- > Correlate sensor-detected data, using known target attributes that were maintained within the database. This helped to identify sensor readings and profile prospective targets, distinguishing threats from benign objects, as well as to gauge threat levels of likely targets.
- > Support geo-registration in which sensor data from different sources is mapped to known terrain and landmarks to cross-verify locations by showing sensor data within the context of the surrounding landscape.
- > Manage an ongoing record of the data that permitted MTIX to track the movement of objects within the terrain, helping determine attributes (whether off-road capable or not, what speed and direction they are moving, etc.). Mobility data also represents a means of vehicle identification, further helping an analyst understand the potential threat of a target.
- > Deliver the information in real-time to intelligence analysts who are operating in forward brigade deployments.

> Support real-time display of information, as well as ad hoc queries and playbacks of archived information. This permitted MTIX operators to respond to field requests for specific information, and to create filtered views of certain areas or views over specific time periods.

## RESPONSIVE AND EFFECTIVE DATA MANAGEMENT

MTIX provided key battlefield support for the US Army in Operation Iraqi Freedom. MTIX workstations are also used within selected Naval and Air Force deployments. Operating as part of the Army's Tactical Exploitation System (TES), the MTIX solution receives sensor information over secure data links from the different airborne sensor platforms and delivers the data to users in a form that they can understand and leverage for rapid decisions.

As shown in the figure, the MTIX server collects and correlates the data, associating real-time data feeds with information already managed within the ObjectStore database. This information is pushed out to MTIX workstations which access intelligence information from a cache that allows new inbound data to be collected, in tandem with query/monitoring that is performed by analysts. The volume, complexity and real-time correlation all reflect MTIX capabilities aided by ObjectStore. Army analysts need this intelligence as quickly as possible. The volume and complexity of data—together with the correlation effort required—were far beyond the capabilities of traditional relational databases. Collection, correlation and rapid response proved a requirement at which ObjectStore excelled.

## CONCLUSIONS

Policy makers are increasingly demanding that military operations combine both power and precision. And precision requires sophisticated weaponry and the timely intelligence that can exploit its sophistication. That's what MTIX is delivering. With ObjectStore, MTIX can quickly digest large amounts of aerial sensor data, validate the data accuracy, and present the information within the context of the ground situation.

Data fusion and exploitation are crucial US defense initiatives. With its different service branches and varied programs, the military runs the same risk of developing stovepipes of information that typify a Fortune 500 corporation. However, unlike a Fortune 500 company, the imperative to integrate has real life or death consequences. Real-time response is essential. With its ObjectStore infrastructure, the MTIX program is helping to "fuse" disparate sensor data and provide a continuum of real-time information that guides military strategy and operations. Warfighters and intelligence analysts can know what is happening on the earth's surface, using data gathered miles high in the atmosphere. And it all comes together in an MTIX program supported by ObjectStore. Real time intelligence when it is needed the most.

### Worldwide Headquarters

Progress Software Corporation, 14 Oak Park, Bedford, MA 01730 USA  
Tel: +1 781 280-4000 Fax: +1 781 280-4095  
On the Web at: [www.progress.com](http://www.progress.com)

For regional international office locations and contact information, please refer to the Web page below:

<http://www.progress.com/worldwide>

© 2007 Progress Software Corporation. All rights reserved. Progress and ObjectStore are trademarks or registered trademarks of Progress Software Corporation or one of its affiliates or subsidiaries in the U.S. and other countries. Any other trademarks contained herein are the property of their respective owners. Specifications subject to change without notice.

## ABOUT PROGRESS SOFTWARE

Progress Software Corporation (Nasdaq: PRGS) provides application infrastructure software for the development, deployment, integration and management of business applications. Our goal is to maximize the benefits of information technology while minimizing its complexity and total cost of ownership.

[www.progress.com](http://www.progress.com)

**PROGRESS**  
SOFTWARE