L3HARRIS™
FAST. FORWARD.

INTELLIMATICS

Fully automatic geospatial intelligence from multiple space and airborne sources

Knowledge and experience allow humans to anticipate what we expect to happen in the future. A rigorous computer program can do the same thing – better in some regards. Intellimatics provides near real-time intelligence that can automatically detect and track changes using time-based processing analogous to the real world.

ACTIONABLE INTELLIGENCE

L3Harris Intellimatics is an advanced, unified capability that uses one or many intelligence sources. It provides fully automatic intelligence from sensors based in space and on aircraft in near-real-time. This time-based volumetric processing uses representations that correspond to the real world.

The results are actionable intelligence products scalable from small events to global effects.

Precise processing provides a rich basis for a wide variety of uses that also works in conjunction with traditional data sources, resulting in a wide array of state-of-the-art capabilities.

SUPERIOR APPROACH

Intellimatics taps into electro-optical (EO) and synthetic aperture radar (SAR) data as well as other sources to create an advanced knowledge base. It fully automates the production of cross-sensor intelligence products that are temporally accessible and machine-query compatible.

The Intellimatics system requires no specific sensor geometries and collections, and applications like change detection are inherent.

An automated method to co-register data from multiple sources generates predictive and forensic products that create a virtual persistent data volume from any input source.
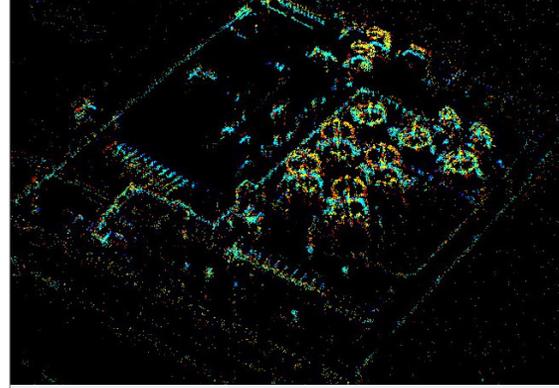
BENEFITS

> Sensor agnostic detection enables versatility and compatibility

> Multi-sensor collection correlation results in simplicity and efficiency

> Precise cross registration among imagery sources provides enhanced accuracy and performance

> Results translate easily for users and machines

> Compatibility with conventional processing delivers robust data

> Collection geometry-agnostic approach enables full potential of multi-constellation change detection

Multi-view 3D Prototype Viewer
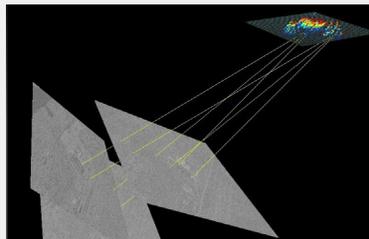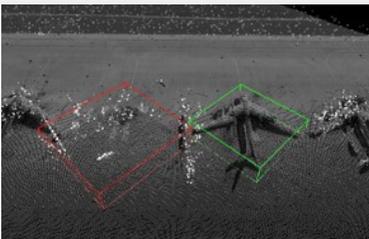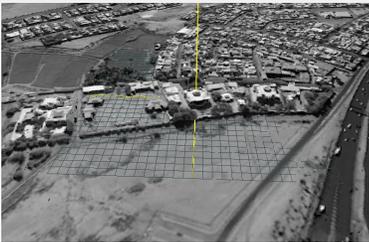
Features: Rapid prototyping viewer based on open graphics library, volumetric EO/SAR using flight and orbit camera modes, vertex buffer object/shader-based rendering 4.0+ and screen/video capture.
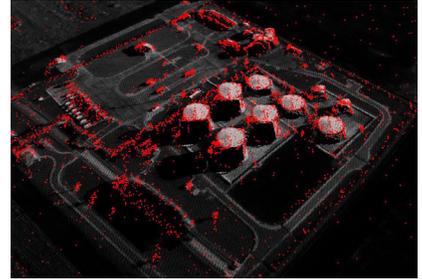
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HOW IT WORKS

Intellimatics focuses on automated knowledge base production and exploitation. One of the best tests of knowledge is prediction. For example, if a person is in a room that has a table, computer, lights, chairs and wall color and the person is moving around the room, they can still tell what is and is not changing. This includes computer screen images, sounds, a fan spinning or other activities. A person can do this because humans are spatially and temporally aware. If the person leaves the room, they can make an educated guess at the room contents and item locations before reentering. They have unconsciously built a cognitive model of the scene.
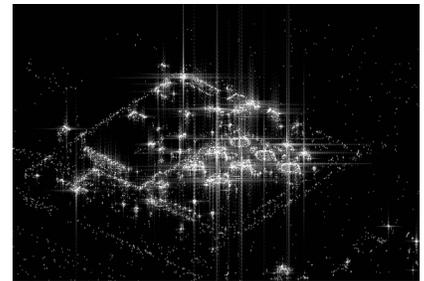
The human experience is a great surrogate for understanding core principles and values of full spatial, temporal exploitation. The primary difference is that a computer is more rigorous than fragile human recollection.

PREDICTIVE CHANGE DETECTION

The images below provide predictive change detection examples showing sensor-agnostic detection and cross combining between imagery from the TerraSAR-X and Cosmo-Skymed satellites. Working across the top row, a TerraSAR-X volume was used to create a prediction of a Cosmo-Skymed image (upper left), the actual image is shown in the upper middle and then in the automatic detection of the airplane is shown in the upper right block. This all happens automatically, and results are provided in near real time. The detection is shown graphically but the data provided is much richer than the simple shapefile graphic. Items like the location, time of change, confidence metrics, latitude, longitude and detection history are all available.

Cosmo-Skymed prediction

Cosmo-Skymed image

Cosmo-Skymed detection

TerraSAR-X prediction

TerraSAR-X image

TerraSAR-X detection

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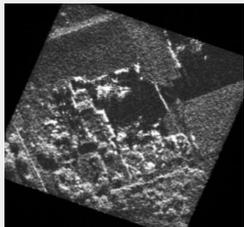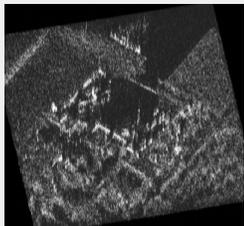

Labeled EO volume

SAR prediction from labeled EO

SYNERGIES WITH SAR, SIMULATION PRODUCTS

Combining EO and SAR volumes can significantly improve temporal persistence to maintain custody of activities or objects of interest during daylight as well as night, including dark and stormy conditions.

Combining EO and SAR volumes improves the accuracy and automatic translation of each. For example, the direct measurement in SAR improves the EO geolocation but the high fidelity of EO improves the discrimination of surface versus multi-path returns in SAR.

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