ICE
Integrated Component-Based Exploitation Solution
Comprehensive, multi-sensor, field-proven imagery intelligence solution
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ICE is a field-proven solution addressing the operational imagery intelligence (IMINT) requirements of numerous armed forces around the world.

**Comprehensive** – ICE provides a solution for every phase of the IMINT operational cycle beginning with the creation of new priority intelligence requirements (PIR) through to mission planning, monitoring, real-time data reception and processing, exploitation and ending with report creation and dissemination.

**Multi-sensor** – ICE is sensor independent and capable of receiving data from airborne or satellite payloads, synthetic aperture radar (SAR), electro-optic (EO), infrared (IR) as well as observation video and images. All images and reference data are integrated into generic workstations ready for ICE’s powerful exploitation capabilities, giving an updated and comprehensive view of the battlefield.

**Field-Proven** – Fully operational and successfully deployed around the world, ICE is a component-based platform that can be customized to a specific operational doctrine. ICE has been integrated with C4I systems to deliver a complete intelligence, surveillance and reconnaissance (ISR) center.

**Flexible** – ICE’s scalable architecture enables seamless implementation of additional sensors and rapid modification of the mission planning and monitoring process. In addition ICE can be integrated with C4I systems, completing the sensor-to-shooter loop.

ICE is comprised of various components including the Generic Geolocation Gateway (G3), Reconnaissance Operations Center (ROC) Management, Mission Planning and Real-Time Softcopy Interpretation capabilities. ICE’s Modular architecture is easily modifiable and integrated with external C4I systems.

**Generic Geolocation Gateway (G3)**

**Real-time processing of raw image data**

The G3 converts raw airborne and satellite data into images in real-time. The G3 receives and stores compressed, high-rate data streams (over 300 MB/s) from a variety of sources, automatically preparing them for exploitation. Sources include real-time data via the data link antenna, SAR, video servers as well as offline storage.

The G3 component includes the following capabilities:

- **Metadata-based geo-referencing** – Using photogrammetric algorithms
- **High-accuracy geolocation in real-time** – Utilizing photogrammetric algorithms, correlations, reference material and a camera model
- **Video reception** – Geolocation of video data in real-time
- **Additional modules** – Mosaic creation, image enhancements and any other custom operation
- **Compression** – Compressing the processed data into a high-efficiency proprietary format
- **Storage** – Geolocated images stored on-line and in the system’s database
Reconnaissance Operations Center (ROC) Management

Efficiently manages all exploitation processes and resources

Using the ROC, the operations manager can supervise and control all aspects of the ISR application and workstations including stopping and starting different servers, managing and maintaining storage as well as monitoring and detecting malfunctions. The ROC includes complete user administration, management of user roles, and levels expertise. The ROC also manages the distribution and dissemination of intelligence reports.

The ROC manager component includes the following capabilities:

- **Control and monitor** – All aspects of the system including processors, archives, storage and data links.
- **Full user administration** – Defines user properties, roles, and classification
- **Workflow** – Receives, prepares, prioritizes and assigns customer PIRs to interpreters.
- **Exploitation tasks** – Creates, assigns and monitors tasks both automatically and manually.
- **Exploitation reports** – Reviews, authorizes and routes intelligence reports and products.
- **Distribution of intelligence reports** – Operates through established distribution channels and via interface to other systems.

Mission Planning

Optimizes the mission plan using sophisticated algorithms

Using numerous sophisticated algorithms, the mission planning component optimizes the sensor mission plan, based on received information requests and taking the many internal and external constraints into account. The mission planning component allows for the creation, modification, and evaluation of mission plans and pilot reports.

The mission planning component includes the following capabilities:

- **Various sensors** – Creates mission for various sensors (SAR, EO and tactical) and allows for new sensors to be added quickly with relatively little effort.
- **Flexible planning** – Creates a mission for a specific sensor or multiple sensors. Defines different targets for different sensors.
- **Mission monitoring** - Monitors the platform and sensor status. Uploads and receives mission data from the sensor.
- **Mission updates** – Performed in real-time, enabling the pilot to adjust to current conditions.
- **Image queue** – Allows prioritization of the images according to operational needs.
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Real-time Softcopy Interpretation

Mission-orientated, advanced interpretation techniques, video and change detection support

Based on a mission-oriented exploitation concept, ICE delivers relevant imagery data from various sensors to the customizable interpretation workstation. ICE supports a wide variety of interpretation techniques as well as a highly-accurate and intuitive target generation process.

The interpretation component includes the following capabilities:

- **Full stereoscopic interpretation** – Enables the interpreters to perform interpretation tasks in a 3D perspective.
- **Restitution process** – A semiautomatic or manual process aimed at improving geolocated images.
- **Image enhancements** – Offers numerous powerful functions and algorithms.
- **Reference materials** – Automatically generates intelligence aids based on powerful photogrammetric tools.
- **Multiple exploitation modes** – EO, tactical, digital camera and SAR images all synchronized and geolocated (according to their corresponding camera model).
- **Report preparation** – Facilitates the generation of intelligence reports.
- **Graphic display** – Highly advanced annotation capabilities, ability to display, rotate and maneuver any military entity in a 3D view.
- **Video motion detection** – Compares consecutive frames from online and offline video streams.
- **Automatic change detection** – Compares two images using advanced algorithms.
- **Automatic detection** – Automatically detects new fixed targets, consistent fixed targets and targets that no longer exist.

Software Architecture

Modular architecture, easily modifiable and integrated with external C4I systems

ICE’s modular and scalable architecture allows the system to be easily modified and adapted to changing requirements. Based on a service-orientated architecture (SOA), ICE can be expanded with various plug-ins to enrich the system capabilities. The ICE architecture enables easy integration with other C4I systems, providing detailed and up-to-date information to the end user.

- **Multiple data formats** – XML, binary, streams, databases and others.
- **System gateway** – Supports a large range of adapters for various protocols (HTTP, FTP etc.).
- **SOA** – Facilitates the generic creation of an application according to the customer needs and maximizes the reuse of code.
- **MapCore®** – Geographic information system supporting 2-D and 3-D visualization, along with tactical overlays and symbology.
- **Real-time processing** – Processes incoming data from several imagery sources in parallel, with an aggregated processing rate of more than 300 MB/s.