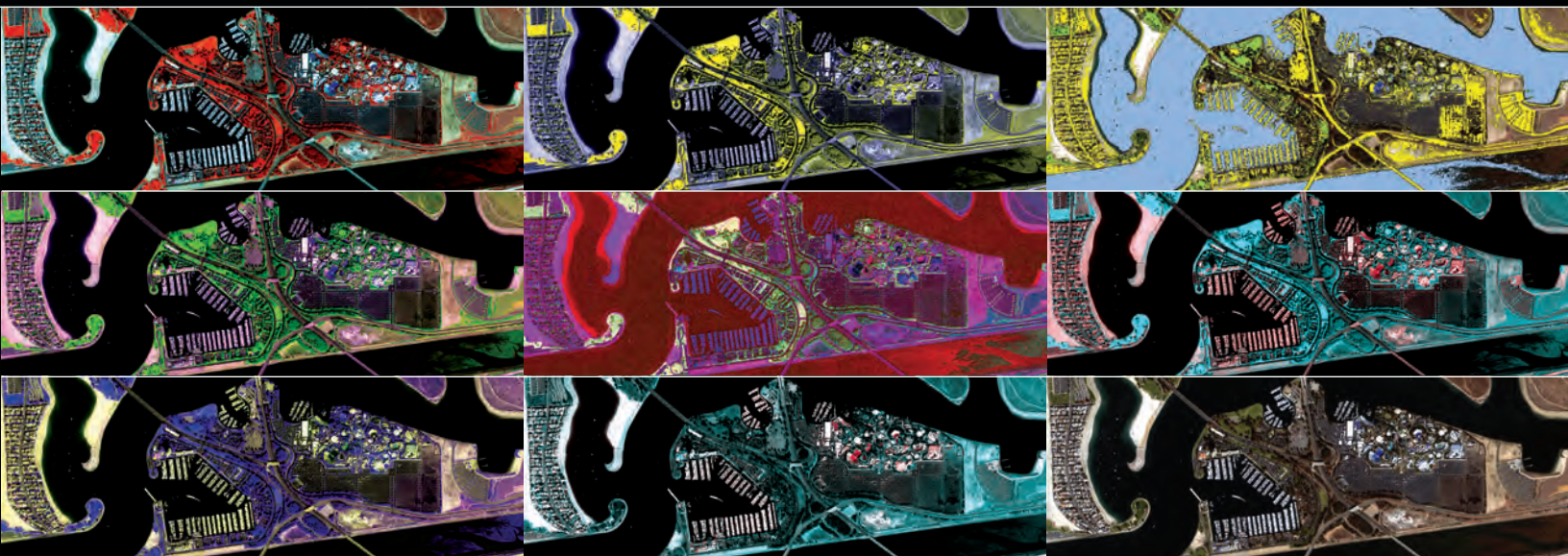


SOCET GXP® v3.1

Release enhancements



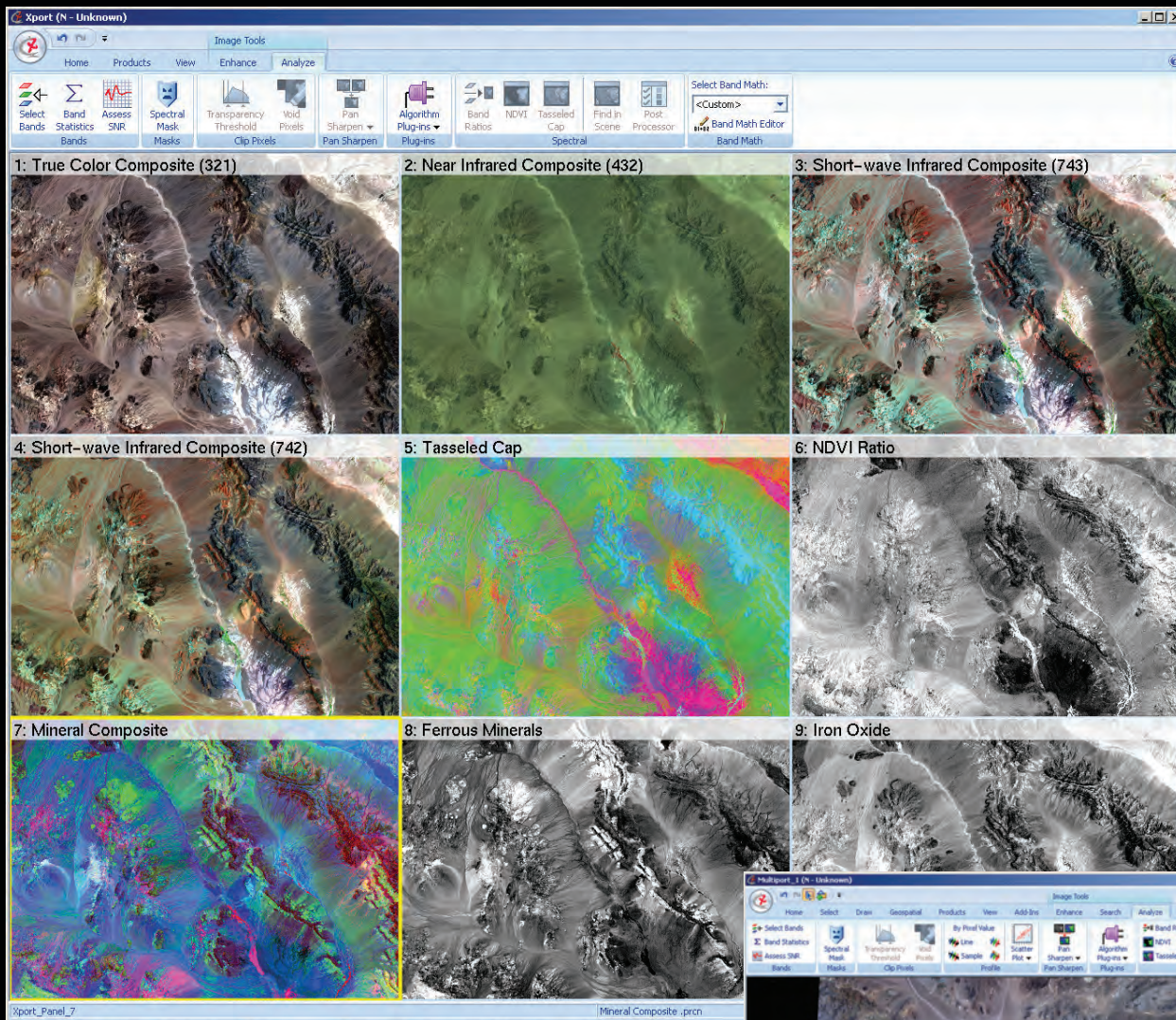
BAE Systems' SOCET GXP® software continues the focus on full integration of image analysis and geospatial analysis in one versatile product.

Core functionality has been refined to improve the overall user experience and boost production. New high-performance image analysis and geospatial production features are more efficient and intuitive.

In response to customer requests for fusing multiple data types, SOCET GXP v3.1 offers new on-the-fly terrain analysis capabilities. Additional image exploitation enhancements are included for video analysis, hyperspectral and multispectral image analysis, and the new Xport™ — a specialized Multiport™ that displays an image with up to 16 different linked panels to give users a new way to create multiple image processing configurations for in-depth analysis.

To accommodate the expanding SOCET GXP user base, BAE Systems has opened free hands-on training centers in Reston, Virginia, Tampa, Florida, St. Louis, Denver, and San Diego. A new Cambridge, United Kingdom training facility is scheduled to open in 2010.

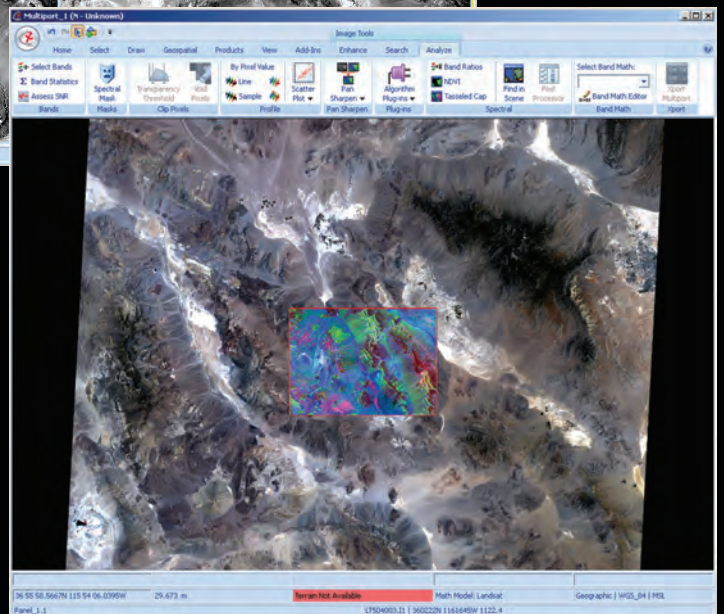
Analysts everywhere are experiencing the power of eXtreme Analysis™ (XA™) with SOCET GXP, adopting it as their tool of choice for advanced geospatial intelligence reporting.

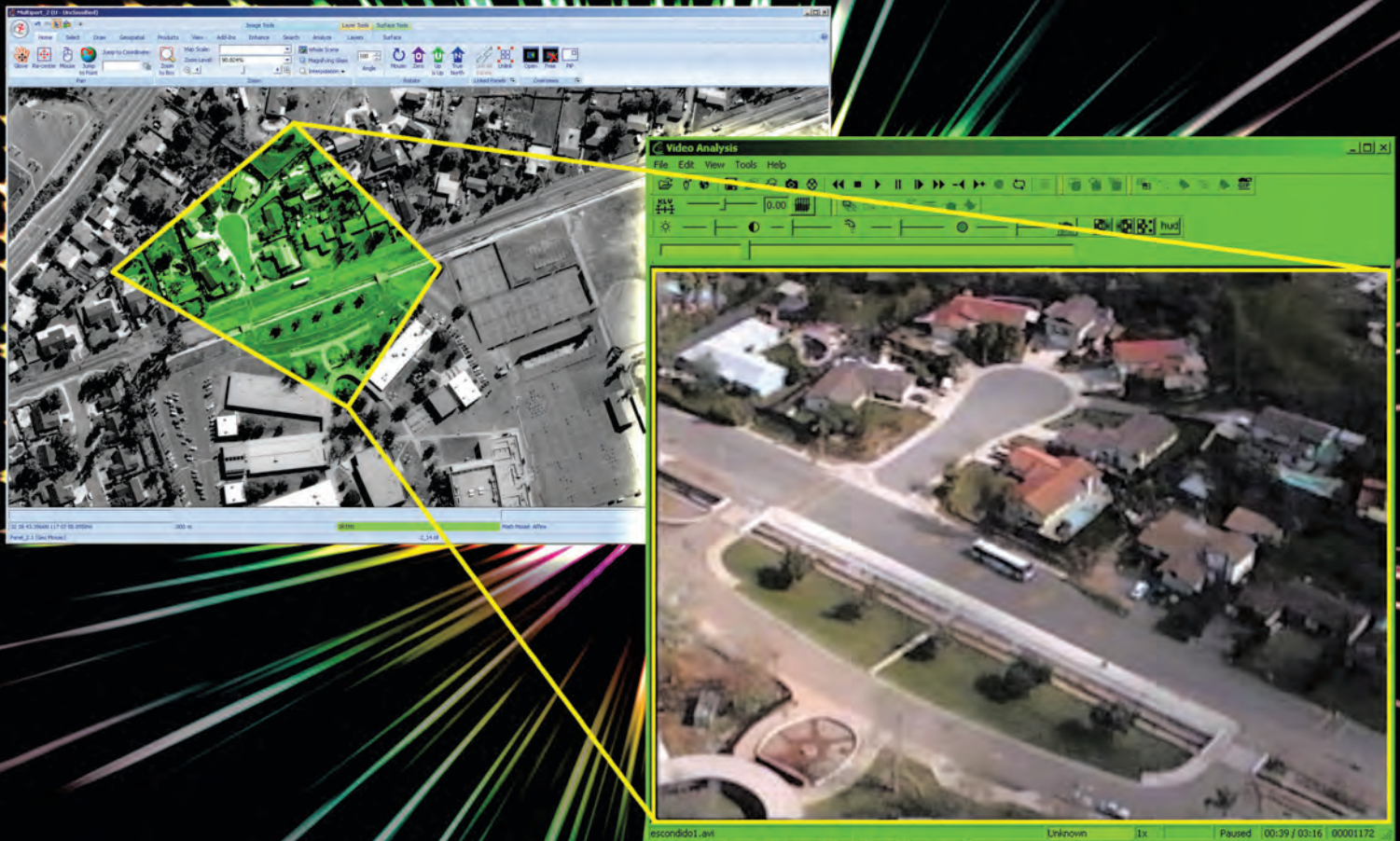


Xport™ image viewing tool

The Xport™ is a specialized Multiport™ designed for real-time image visualization and detailed analysis. It offers a palette of up to 16 preview panels for different image processing algorithms. Xport panels are linked to each other and to the main Multiport for dynamic updates as the user roams in the main viewing area. The goal is to streamline analysis by reducing the time required to determine the appropriate algorithm to use for image processing.

- Designed to perform advanced image analysis using multiple image processing and display functions in real-time.
- Focus is on efficiency — multiple algorithms are calculated and displayed simultaneously.
- Each preview panel shows a duplicate of the image in the Multiport parent reference panel with a custom processing chain applied.
- Processing chains include different band selections, band math, enhancements, analysis algorithms, or derived products.
- Each panel is dynamically linked for panning, zooming, and rotating with the other panels and the parent reference panel.
- The user can create multiple configurations for the Xport and select the appropriate configuration for the data in the parent Multiport panel.





Video analysis

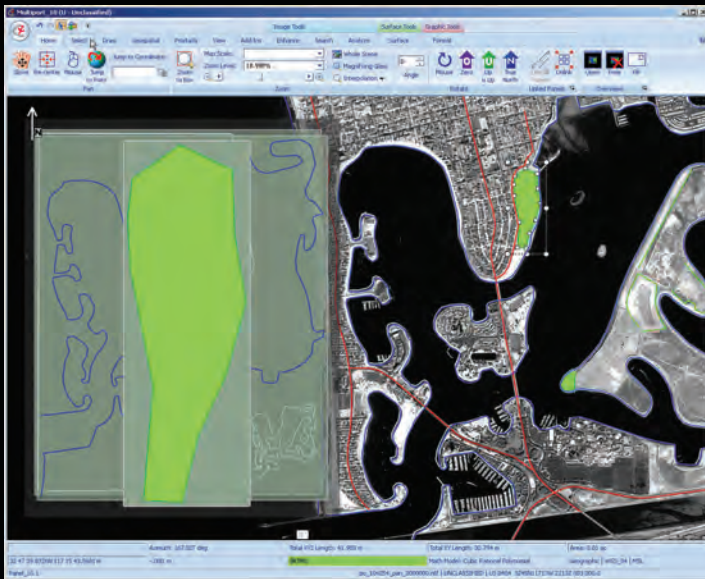
BAE Systems developed the Video Analysis capability to give analysts a convenient way to work with video and transmit critical data and reports to decision-makers. Innovations in video compression technology provide high-definition video quality at substantially lower bit rates than previous standards. Analysts see crisp, clear video in much smaller files, saving bandwidth and storage costs over previous generations of video coding and decoding equipment.

The Video Analysis tool reads and displays live video feeds or saved video files from airborne sensors. It uses the image metadata and a video sensor model for accurate geopositioning. The metadata associated with a video can be viewed graphically, or in text format, with a head-up display superimposed on the video. With a single click, analysts can move still frames from a video sequence into the SOCET GXP® Multiport™ for in-depth analysis. SOCET GXP provides geopositioning to allow fusion with other geospatial data types such as terrain, features, and other images.

The user-friendly interface has a customizable toolbar that displays standard video controls for play, pause, stop, fast-forward, reverse, and frame-by-frame. Advanced controls are provided for slow-motion or frame-by-frame metadata search and review, and video bookmarks are used for playback and analysis. Image enhancements can be applied to video streams on the fly for brightness, contrast, saturation, hue,

sharpness, smoothing, and edge detection. Additional object-tracking tools manage real-time coordinates, speed, and bearing. The expansive range of functionality available in SOCET GXP also can be applied to still video frames.

- Supports MPEG-2, MPEG-2 with H.264 encoding, Apple® QuickTime®, .asf, .wmv, and .avi video formats.
- With the addition of recommended codecs, also can support MPEG-4, Motion JPEG, and much more.
- Sensor modeling from KLV metadata (104.5 and 601.1).
- Supports STANAG 4609 NATO motion imagery interoperability standards.
- Metadata viewing with a head-up display, including sensor attributes and target information — location, attitude, speed, range, date, and time.
- Video bookmarking for review, chipping, and film roll presentation.
- Real-time video enhancements — brightness and contrast, saturation and hue, sharpen, soften, and edge detection.
- Sensor position and video footprints can be displayed with images or maps in a Multiport or in Google Earth™.
- Still frames captured into a SOCET GXP Multiport can be analyzed further with tools such as registration, annotation, mensuration, feature extraction, image comparison, Ortho On-the-Fly™, and mosaicking.
- Object-tracking tool.



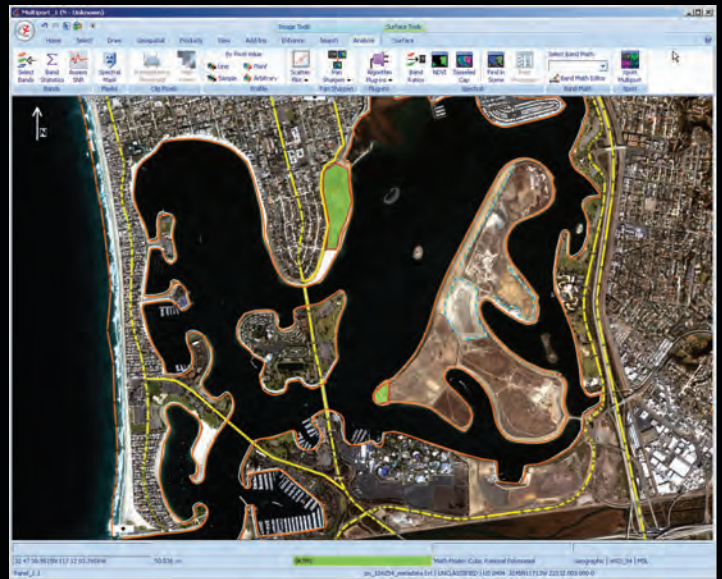
Flip tool.

Usability

SOCET GXP is designed to simplify workflows and make the software easy to use for every kind of task. When merging photogrammetry into mainstream image analysis, ease of use is particularly important. Many intuitive features are added to aid analysis: A new flip tool enables quick browsing through stacked graphics, eliminating the need to hunt, zoom, and precisely click on a graphic for editing; cursor enhancements indicate roaming direction; and the void pixel removal process deletes black edges that appear with non-square imagery when mosaicked with Ortho On-the-Fly™ or Virtual Mosaic tools.

Reference imagery and maps such as DPPDB, CIB®, and CADRG can be loaded automatically into a Multiport for greater situational awareness when working with data sets that cover a small field of view. This imagery can be used as a control source for globe align, registration, or triangulation processes. Other enhancements include double-click to center and zoom, auto annotation improvements, enhanced image display, and reduced load, zoom, and pan times. In addition, speed and quality for RSET generation are substantially improved.

- **Flip tool:** offers a quick visual way to access data and select feature graphics that may be cluttered after dense collects.
- **Interactive range and bearing tool:** creates, measures, and labels lines drawn on an image to indicate length and direction.
- **Bracket tool:** measures and annotates features automatically when selecting end points that define the feature.
- **Zoom tool:** zooms an image to a map scale, such as 1:100, 1:2000, and computes the equivalent screen zoom level, for example 30%.
- **Auto load map and image background:** opens map and image backgrounds that correspond to data loaded in the Multiport for greater situational awareness.
- **Roam cursors:** compass rose cursor specifies the 4-standard geographic directions, and directional cursor designates 16-standard geographic directions, plus the digital roam direction.



Feature extraction is used to create and store a database of three-dimensional point, poly-line, and polygon objects.

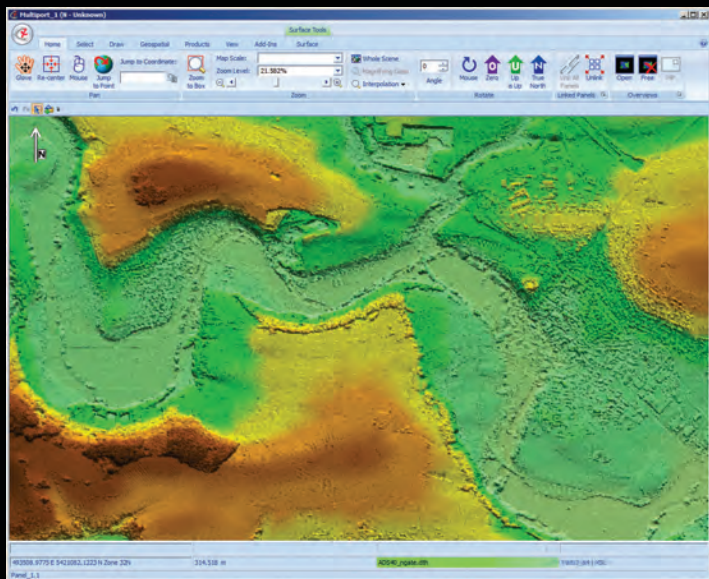
- **Ground cursors:** distance rings and compass rose cursors provide geographic direction and proximity information.
- **Hide void pixels:** removes unwanted edge pixels for Ortho On-the-Fly and Virtual Mosaic processes.
- **Jump to point coordinates:** recognizes common coordinate formats from third-party applications.
- **Graphic annotation:** generates map labels based on system information and image metadata.
- **Text annotation:** adds options for defining text styles for individual characters, such as font, color, and size

Feature analysis

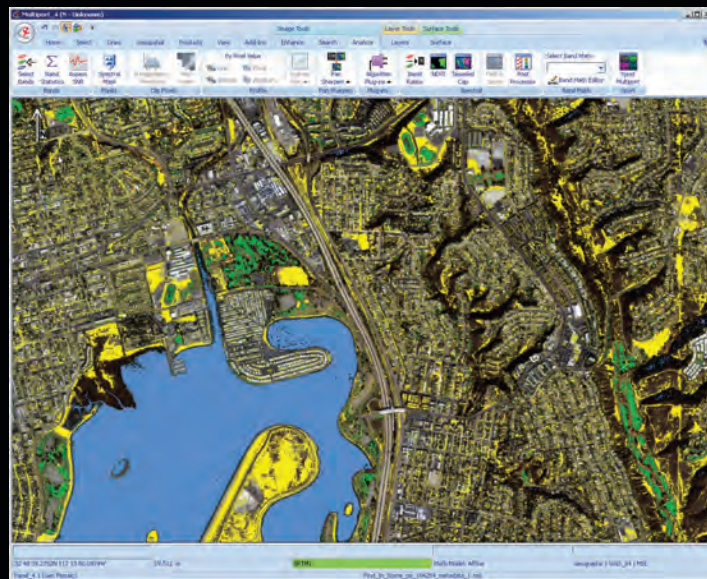
SOCET GXP v3.1 adds new feature analysis tools. The connection to Web Mapping, Web Feature and Web Coverage Services (WMS, WFS, WCS) conforms to the standards of the Open Geospatial Consortium. Analysts can quickly locate and download vital information to aid analysis. Web graphics and images can be loaded into feature attributes, which can be exported and viewed in Google Earth. Users also can display volumetric features in Flythrough mode.

Web services

- Connect to OGC-compliant Web content services using standard protocols for requests and responses so that geographic information can be served over the Internet:
 - WMS — georeferenced map images are generated by a map server using data from a GIS database
 - WFS — geographic features
 - WCS — geographic coverage
- SOCET for ArcGIS® results tab added to Query tool
- Auto-attribute features from image source metadata, for example: date, time, CE, LE, and sensor
- Export pictures to Google Earth as attributes to features
- Volumetric features generated from the Spatially Enabled Exploitation module display in 3-D flythrough mode



▲ *Terrain shaded relief.*



▲ *Find-in-scene algorithm.*

Terrain analysis

New tools are provided for slope and aspect analysis, giving users the added visualization needed to complement terrain shaded relief (TSR) displays. Optimized terrain analysis results are generated on-the-fly, and displayed graphically. When displayed with stereo imagery, analysis tools can be shown in stereo. Terrain analysis results can be converted to a georeferenced raster image product such as a GeoTIFF.

The Line-of-Sight tool has been restructured to display as a range fan or 360-degree view, and also can be converted to a georeferenced raster image product.

- New slope and aspect tools; improvements to TSR, profile, and Line of Sight tools
- Preferences for transparency, color, ranges, and light source
- Map legend integration

Product generation

Product generation is one of SOCET GXP's most valuable features. The tool has been restructured to separate the process of creating and editing a template from the actual application of the template. New features include changing font, size, and color in the same text annotation. The legend capability has been updated so that users can determine the number of columns, fonts, title, color, and position of the legend.

- Updated font libraries
- Auto-label text variables (for example, <\$system date\$> provides system date in the text label)
- Feature and terrain legends
- Specialized annotation tools
- New Edit Template Multiport
- Raster Product Format, or RPF, dataset creation for use in FalconView™

Hyperspectral and multispectral image analysis

Satellite and remote sensors have multispectral and panchromatic bands of image data that provide information beyond what can be seen with the human eye. Hyperspectral sensors, with tens or hundreds of bands, often stretching beyond the visible as far as the thermal infrared, are more challenging to understand and demand powerful software to render the huge image cubes into useful information. The goal for SOCET GXP is not to offer specialist hyperspectral and multispectral image (HSI and MSI) analysis software but to provide basic capabilities that are fully integrated with all of the other functionality and equally easy to use. Therefore, numerous algorithms have been added to SOCET GXP for HSI and MSI processing. The algorithms are used to extract information contained in multiple bands of image data.

- Pan-sharpening algorithm updates provide rigorous RGB band transformation (using sensor models and terrain) into the sensor space and model of the panchromatic image
- Destriping
- Reflectance calibration
- Principal components analysis
- Unsupervised classification – K-means clustering and ISODATA
- Supervised classification – spectral angle mapping, adaptive matched filtering, and adaptive cosine estimation
- Spectral change detection
- Anomaly detection – global, local, and Gaussian mixture
- Spectral unmixing
- Band math for user-customized image processing

Sensor models and formats

- Sensor models: TerraSAR-X, RADARSAT-2, EROS-B, FORMOSAT-2
- Image formats: MrSID Georeferenced, IMAGINE IGE, ENVI, BigTIFF (image and terrain)

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