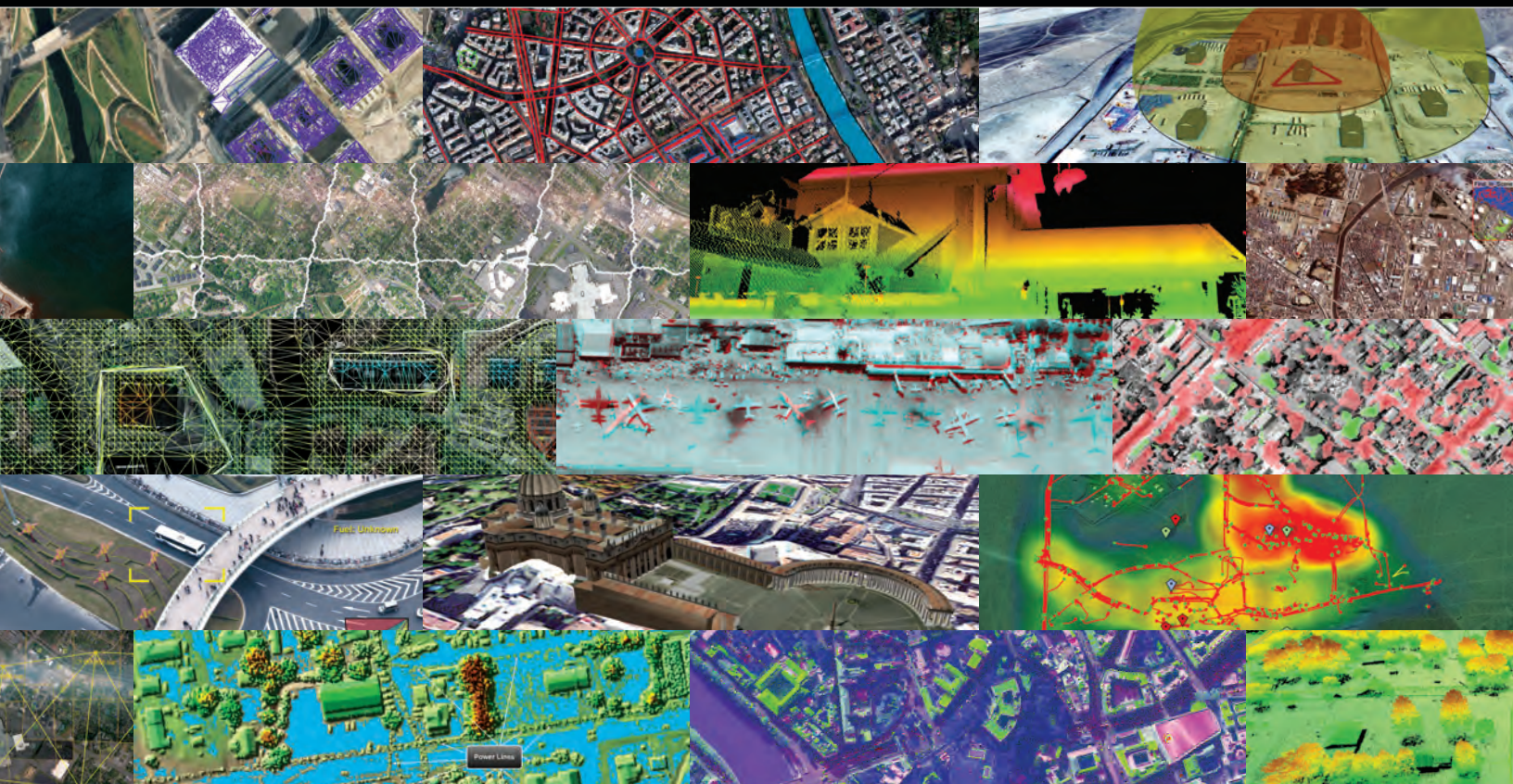


SOCET GXP[®]

GET WITH THE PROGRAM.



Geospatial eXploitation Products

BAE SYSTEMS



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WHAT IS SOCET GXP?



Data fusion
Analysis
3-D visualization
Product generation
Geospatial-intelligence reporting

Automatically record measurements, analyze imagery and video, extract features, work with terrain, and create 3-D models.

SOCET GXP® is a geospatial-intelligence software package that uses imagery from satellite and aerial sources to identify, analyze, and extract ground features quickly, allowing for rapid product creation.

Ingesting imagery and video from government and commercial sources, SOCET GXP accurately displays, annotates, catalogs, and extracts information. The information is used to build maps, develop transportation infrastructure, manage natural resources utilities and communications networks, coordinate operational missions, designate troop maneuvers, and build geospatial-intelligence reports.

Built from the ground up.

**IN 2001 IT WAS JUST AN IDEA.
NOW, IT'S A POWERFUL, TIME-SAVING
RESOURCE, WITH EASE-OF-USE BUILT IN
TO EVERY TASK, AND MOST IMPORTANTLY
— IMPECCABLE ACCURACY.**

We didn't just copy workflows from SOCET SET®, our legacy photogrammetric and geospatial production software, or VITec®, the previous image exploitation and electronic light table (ELT) package. We created a new system architecture with advanced technology drawn from internal BAE Systems research and development teams.

We combined the strengths of our successful geospatial production and image exploitation products to build a new Information Technology (IT) framework that addresses the search for higher productivity. SOCET GXP combines image analysis, geospatial production, photogrammetry tools, and remote sensing into one comprehensive package.

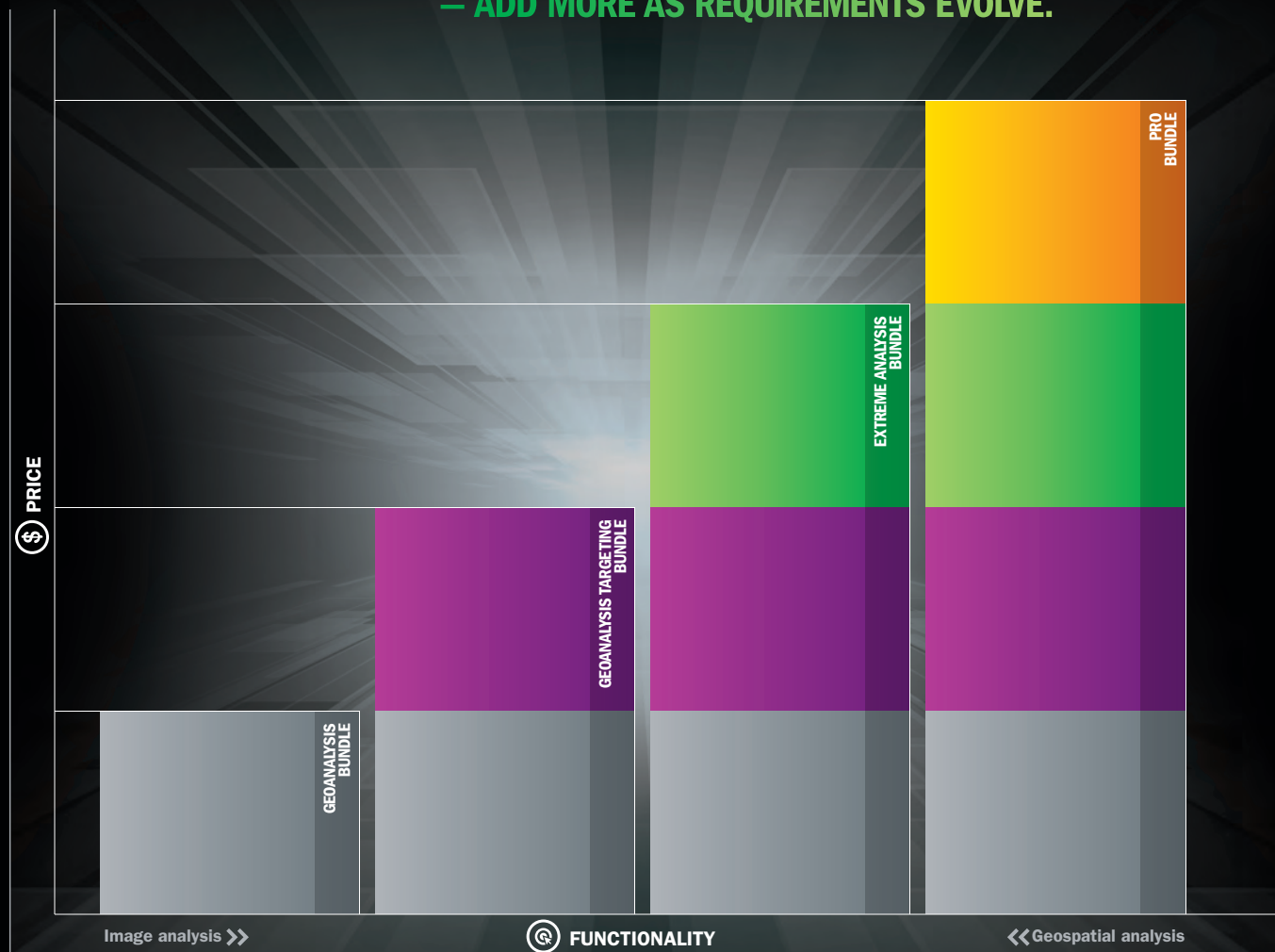
ONE PACKAGE — MANY ADVANTAGES

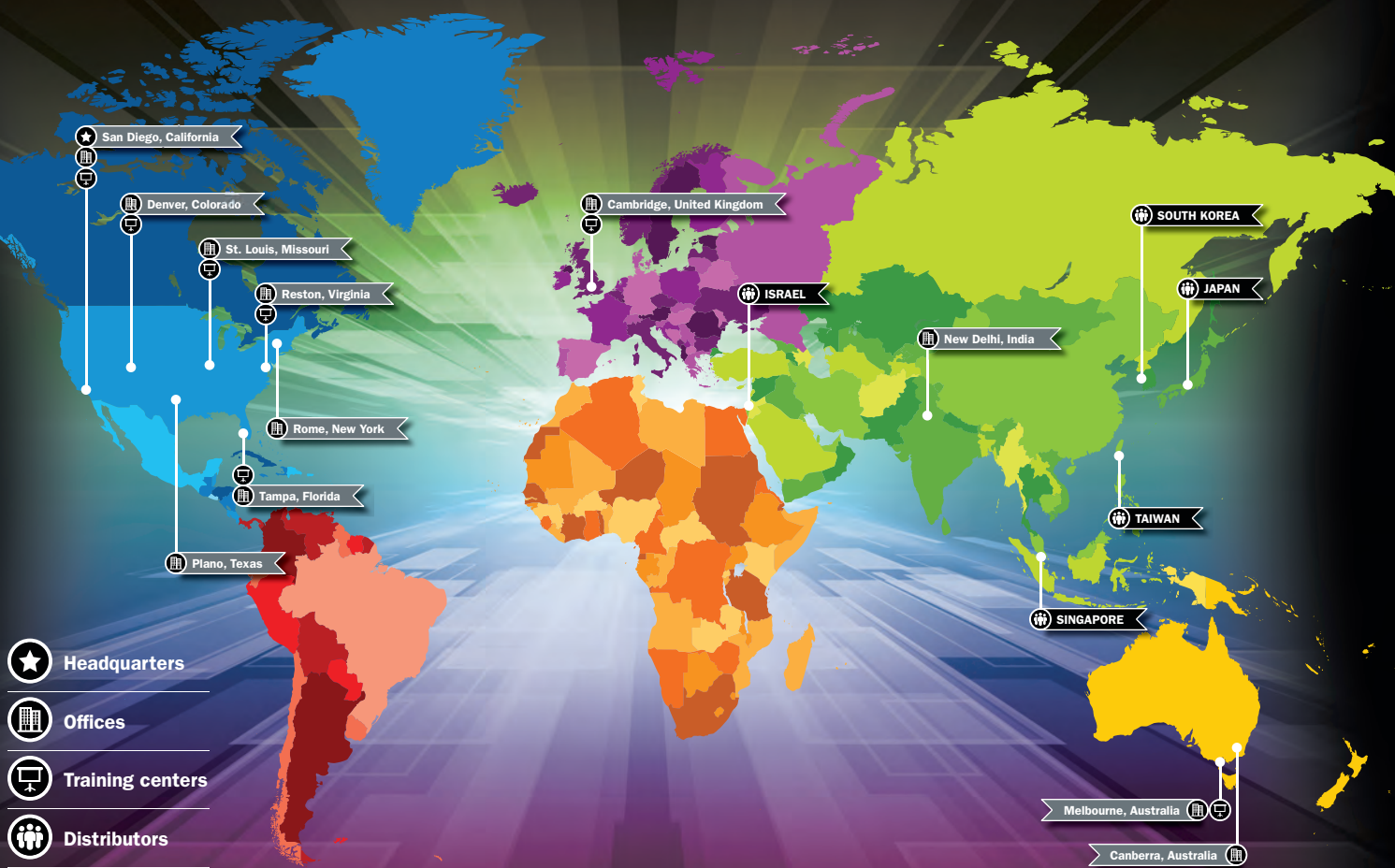
Stop working with multiple packages —
save time, money, and resources

SOCET GXP supports multiple projects and missions. Workflows are designed to reduce production cycle times, eliminate the redundancy of multiple specialty software packages, and maximize the interoperability with other geospatial technologies, such as Google Earth, TerraGo® GeoPDF®, SOCET for ArcGIS®, Esri® Geodatabase, and GXP Xplorer.

The configurable user interface and application programming interface (API) is the same for both Microsoft Windows® and Oracle® Solaris X86, with consistency across platforms and licensed product capabilities.

**PURCHASE ONLY THE FUNCTIONALITY YOU NEED
— ADD MORE AS REQUIREMENTS EVOLVE.**





WORLDWIDE SUPPORT AND TRAINING

BAE Systems offers flexible training modules and support options for your organization, whether you need to train an entire project team or require one-on-one instruction.

Our worldwide training centers offer free training to our customers at a number of regional facilities with tailored curriculum based on your learning requirements. On-site training is available at the time of initial software installation to introduce you to the core features and functionality of SOCET GXP.

Training can also be supplemented at a later date with refresher courses or advanced workflows. Contact a SOCET GXP customer support representative to schedule your training.

MYGXP.COM IS THE SELF-SERVICE CUSTOMER PORTAL, AND YOUR ONLINE RESOURCE FOR EXPORTABLE SOFTWARE BUILDS, PATCHES, AND OTHER CRITICAL PRODUCT INFORMATION.

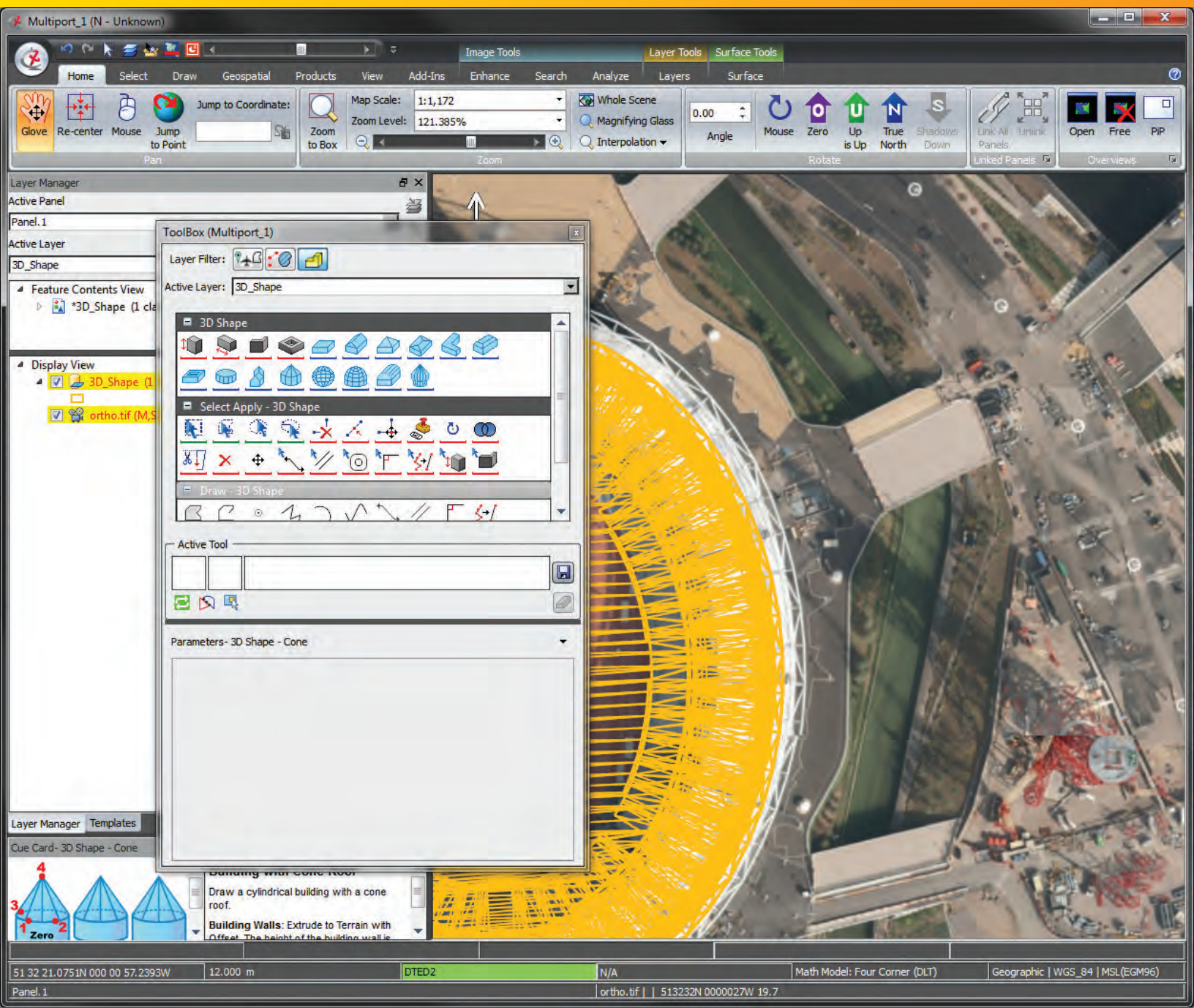
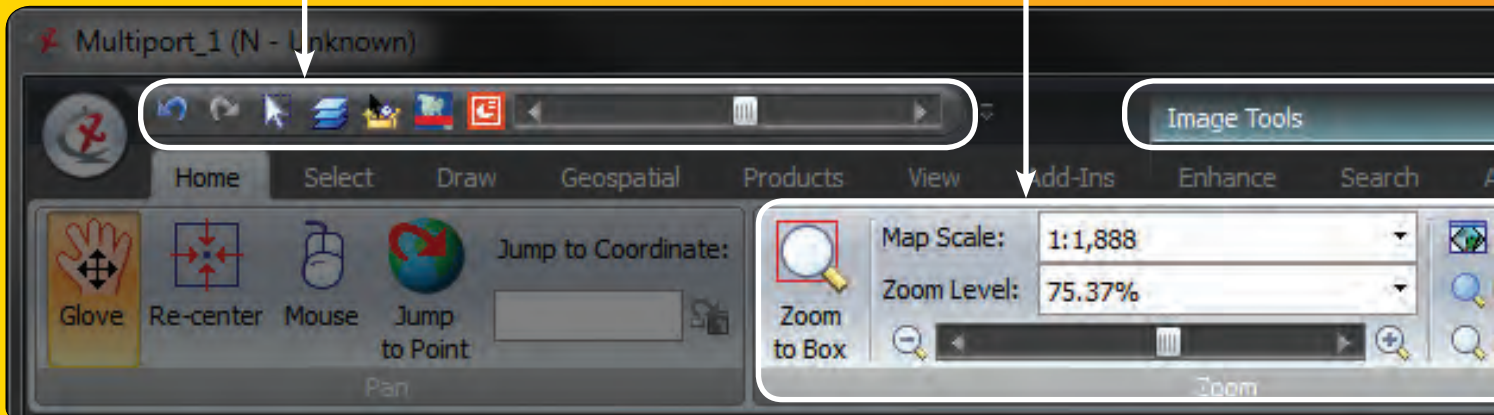
Update your profile, manage support requests and email preferences, request license keys and software, and search the FAQ technical knowledgebase for quick answers to outstanding issues at any time, in any time zone.

Define your toolset

Add frequently used tasks to the Quick Access Toolbar.

Find tools easily

Related functionality and buttons are grouped together.



Reduce screen clutter

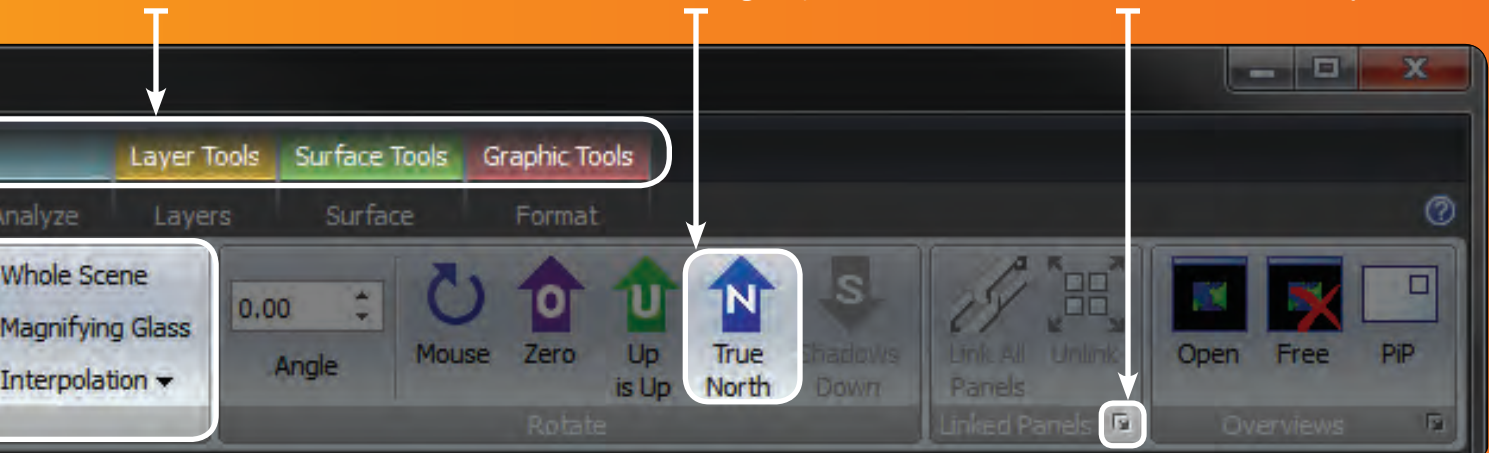
Menus and tabs update dynamically. Tools not used for the current task are hidden.

Access tools quickly

Buttons execute a task or begin a process.

Advanced functionality

Launch related windows with advanced functionality.



INTUITIVE AND CUSTOMIZABLE

Make it your own

The user interface offers quick access to an unprecedented range of versatile tools. Add or remove buttons according to the workflow. Minimize the toolbar to increase the viewable image space.

Logical working environment

SOCET GXP provides a common framework to extract features, create products, and store imagery. Functionality to dock windows provides accessibility to drawing tools, auto labels, and built-in templates. Windows can be stacked to display tabs for selection, or separated to move around the desktop freely. Drawing tools display with an accompanying cue card to provide instruction and a visual reference of the selected tool.

Jump-start productivity

Most operations within SOCET GXP are accessed with a few mouse clicks, resulting in superior workflow efficiency and usability. Customizable preferences and robust 64-bit processing increase productivity, while keyboard shortcuts provide quick access to an array of software functionality.

Windows related to the current task can be docked to the perimeter of the Multiport, the predominant viewing and exploitation window, or moved around the desktop. Imagery courtesy of Ordnance Survey Great Britain.

Workspace Manager

The Workspace Manager is the starting point for all SOCET GXP workflows and offers convenient access to load imagery, import imagery, connect to a database, and view job processing status.

Multiport

The Multiport is a multi-functional viewport and the predominant workspace for viewing, analyzing and modifying imagery, and creating 3-D products. Flexible options are available for customizing the working environment based on the tools most frequently used.

Job Queue

The Job Queue manages the number of processes dedicated to a specific job, and enables the scheduling of large jobs to run when convenient for maximized efficiency.

Tools

- Dockable windows: Toolbox, Layer Manager, cue cards, count graphics, template list, auto labels
- Quick Access Toolbar
- Web Map Service
- Customized preferences



Analyze imagery

Load satellite or aerial images directly into the Multiport to identify, analyze and extract ground features, and check accuracy. Combine different data types and process images in real-time.

View data in layers

View geospatial data in layers, analyze or superimpose images, terrain, features, graphics, and more. Merge different geospatial data types into a single window for comparison.

Display images in 3-D

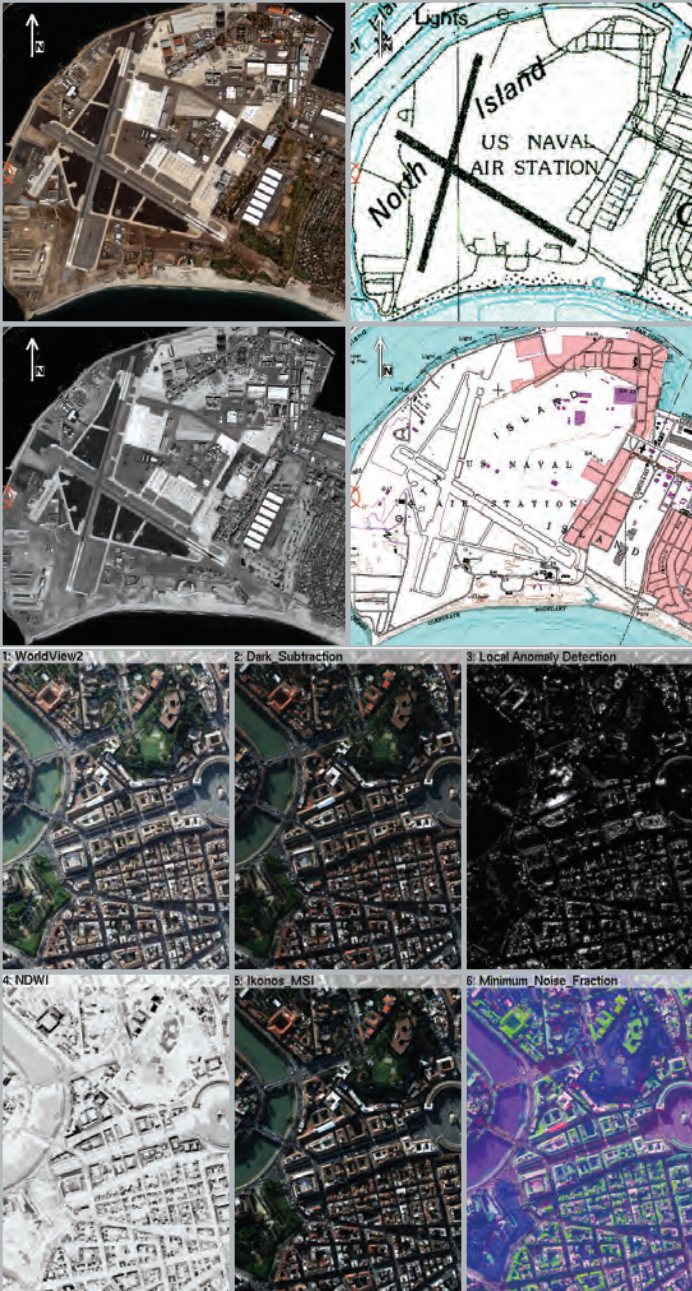
Visualize geospatial data from any perspective. Fly, walk, or drive through a view composed of real image data.

View multiple images

Display multiple raw images in a Virtual Mosaic to create a mosaic of images showing a broad area of coverage with immediate context.

Exploit stereo images

Use the Stereo Model Manager to locate stereo image pairs and automatically load stereo images as you navigate through large volumes of data.



FLEXIBLE AND EFFICIENT

Exploit and process on-the-fly

See your data in a new light. Examine every facet of an image with familiar tools — drag-and-drop, pan, zoom in-and-out, and rotate. Apply annotations, extract 3-D features, and add icons with the ToolBox functionality.

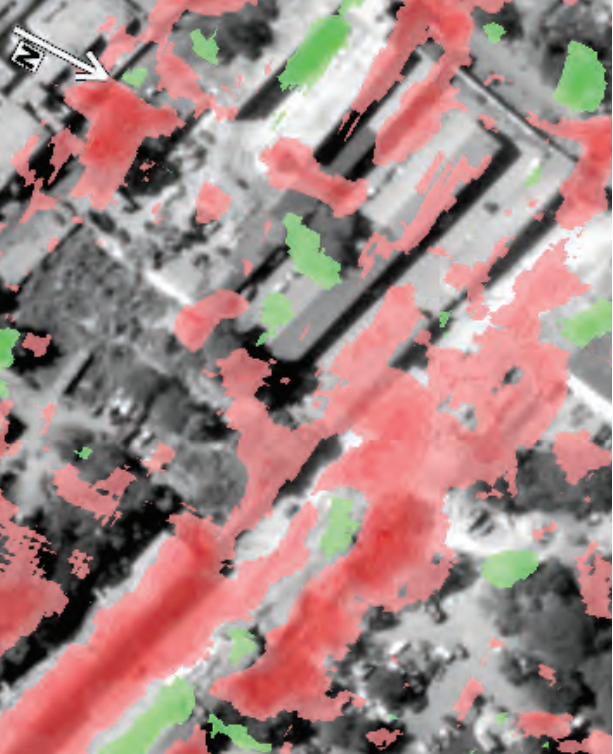
Observe patterns of life in microscopic detail to improve situational awareness. Rehearse and exploit data. Build geospatial products and reports. Generate and deliver actionable intelligence to users at the edge.

The Multiport can be split into four different panels to view multiple data sets. Use one as a reference from previous reporting, or compare two images in one Multiport. Satellite imagery courtesy of GeoEye.

View, analyze, and modify data, extract features, apply annotations, and create 3-D models. All buttons and tools always remain in the same functional group on the same tab, no matter how you resize the window. Imagery courtesy of DigitalGlobe.

Tools

- Smooth and continuous pan, roam, rotate, and zoom
- Overview display
- Web Map Service and map background
- Ortho on-the-fly
- Continuous epipolar rectification
- Spectral algorithms
- Pan-sharpening on-the-fly



DSMs from stereo satellite imagery before and after the 2010 Haiti earthquake. Red shows areas of negative elevation change indicating earthquake damage. Stereo imagery for the DSM generation courtesy of DigitalGlobe and GeoEye.

Two-color compare of temporal variant images (blue is new and red is fled) over the Toussaint Louverture International Airport in Port-au-Prince, Haiti. WorldView-2 satellite. Imagery courtesy of DigitalGlobe compared with a U.S. Air Force handheld aerial photo.



Analyze and compare images and terrain

Advanced image processing algorithms assist with change detection, image classification, trend analysis, tracking patterns of activity, and finding anomalies in imagery.

Analyze coincident terrain to determine height and volumetric differences in areas for construction, tunneling, stock pile inventory, environmental analysis, and damage such as sedimentation, flooding, landslides, earthquakes, and bomb damage assessment. Highlight, measure, and store areas of interest (AOI).

Use the two-color compare tool to view changes in old vs. new imagery. Tools such as Glove Align, Registration, and Triangulation tie images together for an accurate assessment of changes over time.

Ground space vs. display space

Ground space graphics are generated using latitude, longitude, and elevation (or X, Y, and Z) coordinates rather than pixel grid calculations. SOCET GXP employs ground space graphics to maximize registration when comparing images, features, and other geospatial data from multiple sources and dates. The software stores graphics with their corresponding error budget in ground units for future analysis and to maintain data integrity.

Extract terrain models

Analyze, create, and edit terrain and elevation data; update geodatabases with 2-D and 3-D features; generate image and map products such as Digital Terrain Models (DTMs) and Digital Surface Models (DSMs), perspective scenes, slope maps, image maps, orthophotos, true orthophotos, mosaics, and pan-sharpened images — all in a fraction of the time required using other tools.

Automatic Terrain Generation (ATG) creates DSMs or DTMs from stereo imagery. Triangulated irregular network (TIN) or grid output formats are optional, with densities that start as high as the ground sample distance of the stereo imagery. Accuracy is on the sub-pixel level.

Auto DTED

Catalog and manage Digital Terrain Elevation Data (DTED). The DTED files are automatically associated with geospatial data and processed as an added component to ensure successful, accurate exploitation. Auto-loading DTED is important for visualizing imagery and creating Virtual Mosaics of imagery using Ortho On-the-Fly, or merging panchromatic and multispectral images together with terrain, providing rigorous pan-sharpening. Workflows that benefit from auto-loading DTED include seeding the ATG and automatic tie-point measurement processes.

Tools

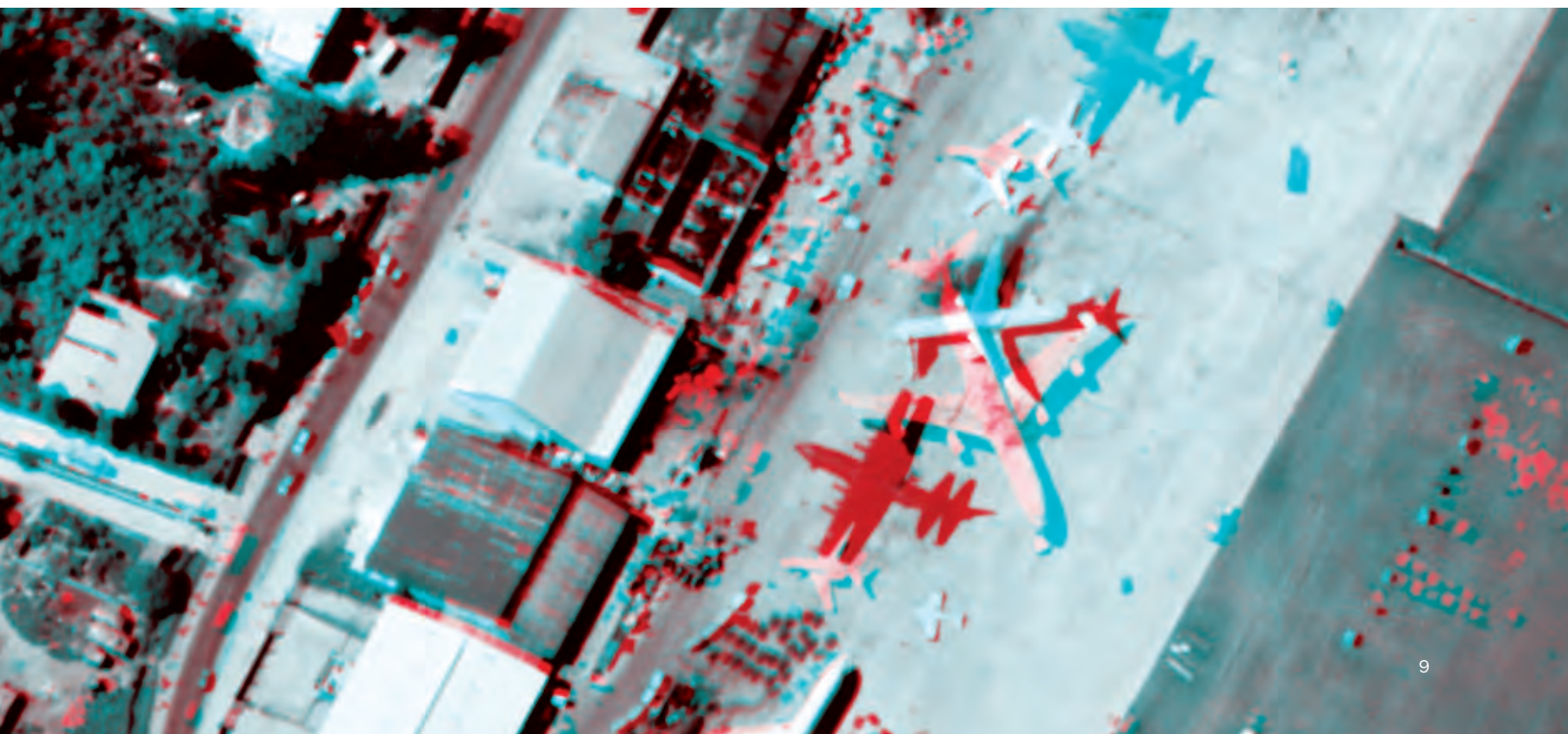
- | | |
|-------------------------|-------------------------------|
| – Glove align | – Terrain registration |
| – Triangulation | – ATG |
| – Multi-color compare | – Volumetric analysis |
| – Swiper | – Terrain Shaded Relief (TSR) |
| – Porthole | – Slope map |
| – Transparency | – Contours |
| – Flicker and animation | |

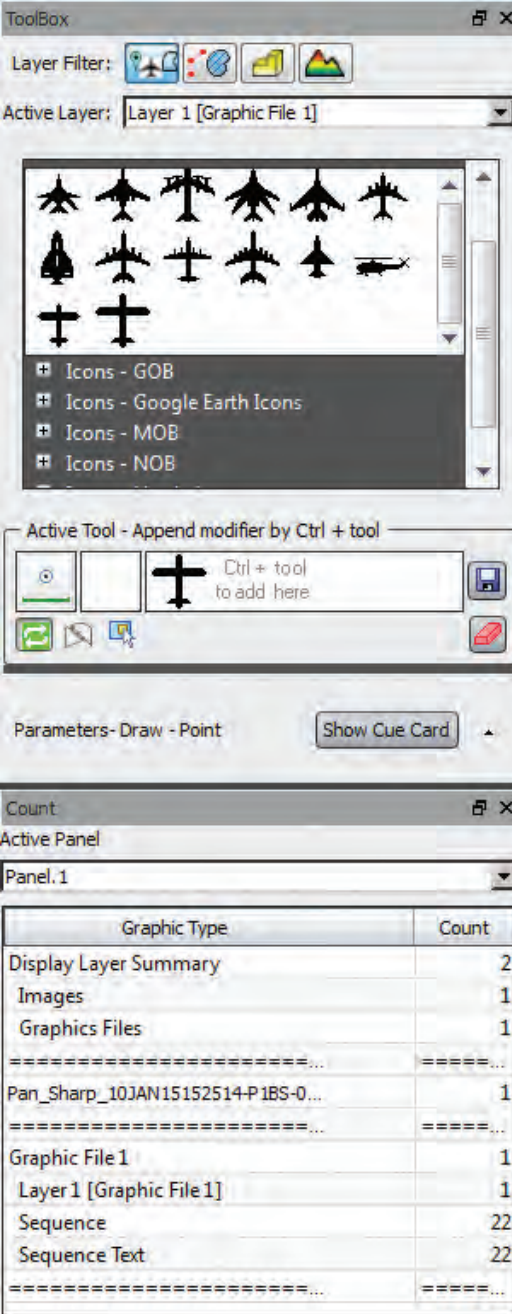


INTELLIGENCE REPORTING

Be prepared for the mission

View and annotate all geospatial-intelligence data critical to the mission. Identify borders and features; define entry points, dimensions, and other important structures surrounding the primary area of interest. Apply a template and send to PowerPoint® to create slides for intelligence reporting.

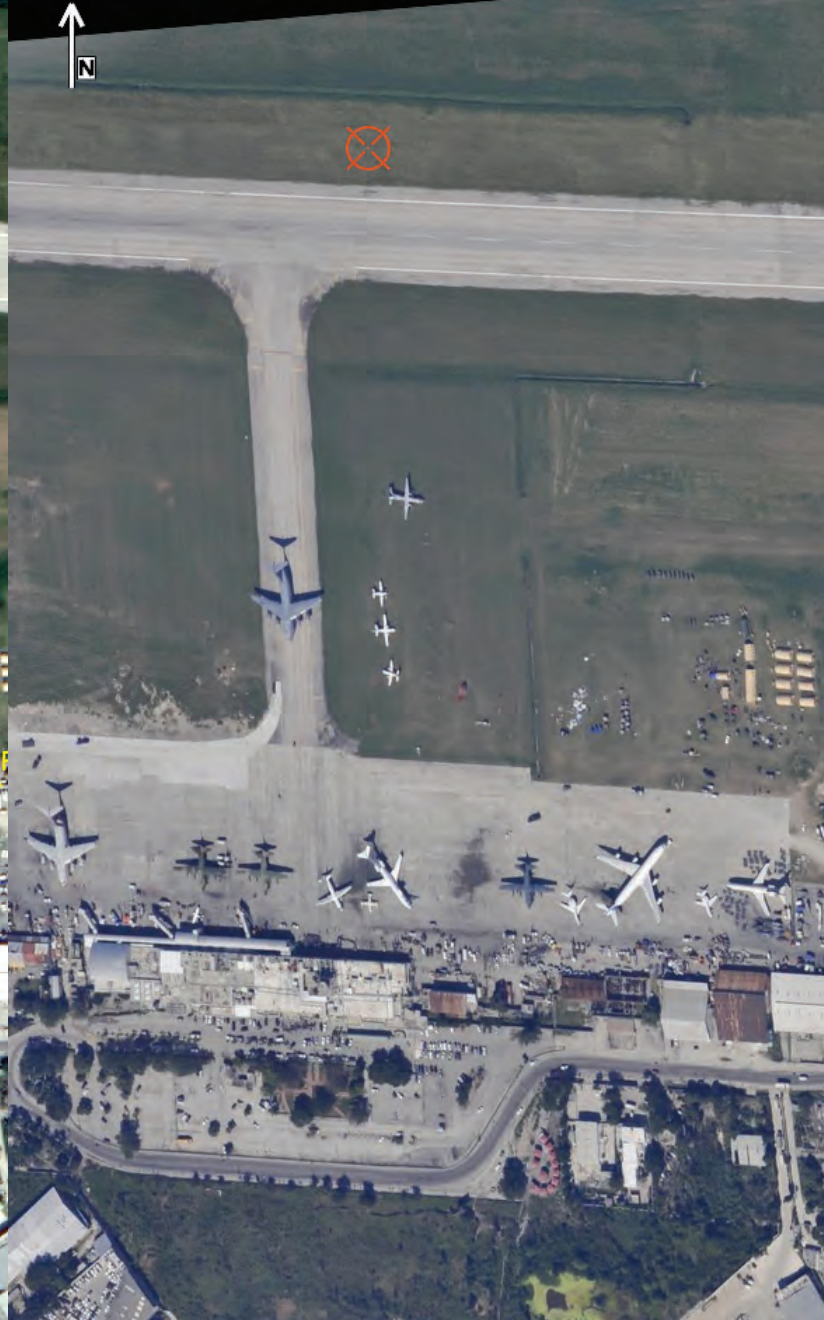




INTELLIGENCE REPORTING

The rigorous pan-sharpened image combines the high-resolution panchromatic band with a GSD of 0.52 m with the 8-band multispectral image to add color without writing a new image file. The Sequence Graphics tool automatically numbers an alphanumeric sequence to plot for easy reference, and the on-the-fly display allows for quick analysis and product generation. Imagery courtesy of DigitalGlobe.

Registration of a handheld U.S. Air Force photograph taken by Airman 1st Class Perry Aston with a Nikon D3 35 mm camera on January 16, 2010, to a DigitalGlobe WorldView-2 rigorous pan-sharpened image acquired on January 15, 2010. Imagery courtesy of DigitalGlobe.



IN THE FIELD

A 7.0 magnitude earthquake with an epicenter 10 miles west of Port-au-Prince, Haiti, occurred on January 12, 2010, killing tens of thousands of people, devastating the poor, third-world country. The Toussaint Louverture International Airport in Port-au-Prince remained open accepting foreign flights to support the relief mission. DigitalGlobe's WorldView-2 satellite began acquiring imagery shortly after the earthquake.

DigitalGlobe and GeoEye are two of the many satellite sensors SOCET GXP supports. When opening images from supported sensors, SOCET GXP uses metadata included with the images to derive exact coordinates for direct association to the ground.

On January 16, 2010, Airman 1st Class Perry Aston used a Nikon D3 35 mm digital camera to photograph the Toussaint Louverture International Airport from the air. This imagery did not contain metadata for georeferencing. However, when used with SOCET GXP, the unreferenced image was registered to WorldView-2 imagery for temporal analysis and ground space extraction.

The 8-band multispectral image and high-resolution, panchromatic DigitalGlobe image were merged and displayed in real-time for viewing and analysis of the rigorous pan-sharpened result. Using rigorous sensor models, measurements can be made in true 3-D space for storage and retrieval to support information over time.

BAE SYSTEMS

Toussaint Louverture International Airport

BE Number: 1234-99999

Image IDs: Multiple

GEO: 18 34 31.000N 072 17 24.000W



- Path
- Road
- Runway
- Powerline
- Rail
- Pole
- Pylon



UNCLASSIFIED

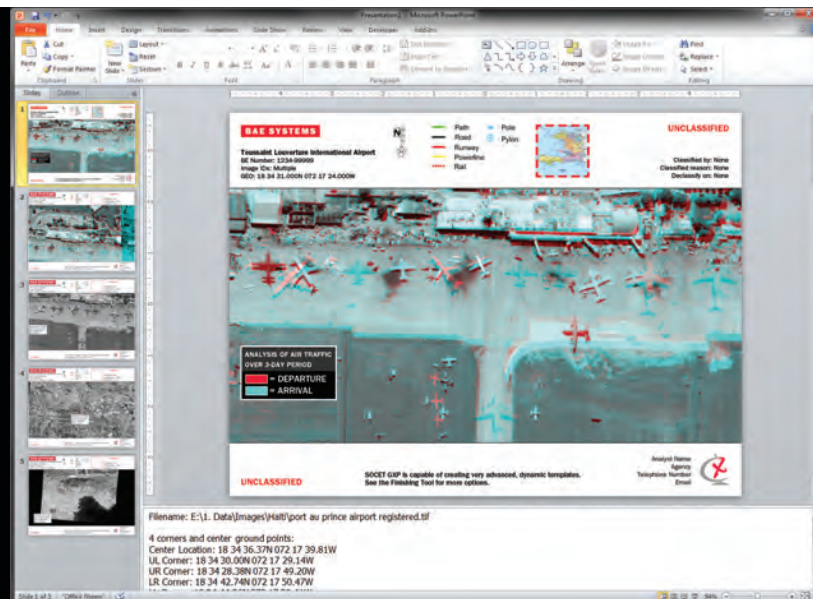
Classified by: None
Classified reason: None
Declassify on: None



UNCLASSIFIED

SOCET GXP is capable of creating very advanced, dynamic templates.
See the Finishing Tool for more options.

Analyst Name
Agency
Telephone Number
Email



PRODUCT CREATION

Create custom products

Create detailed, custom geospatial products and reports to collaborate with colleagues and mission partners in the field.

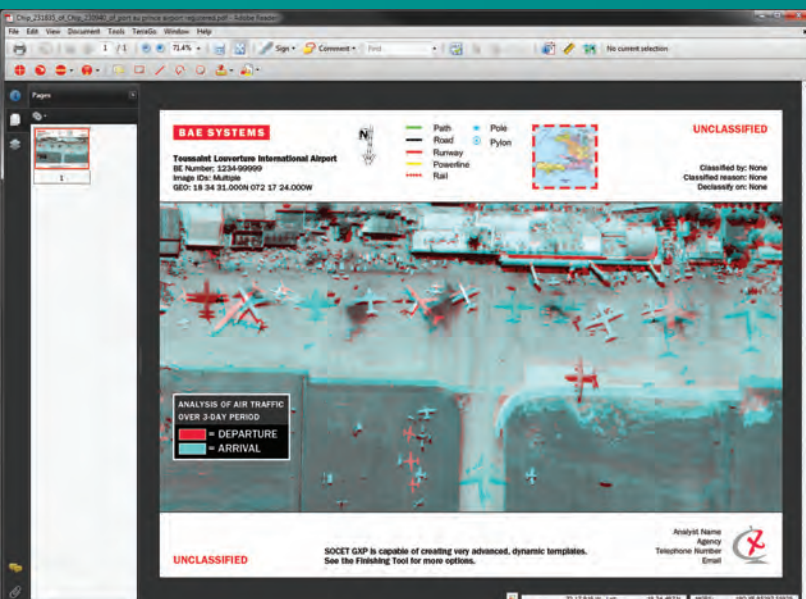
Templates and product creation

Zoom-in on an AOI, add graphics and annotations, apply a pre-defined product template, or create a custom template. Snapshot to PowerPoint, save as a National Imagery Transmission Format (NITF) product, or output as a TerraGo-layered 2-D GeoPDF or geospatial 3-D PDF.

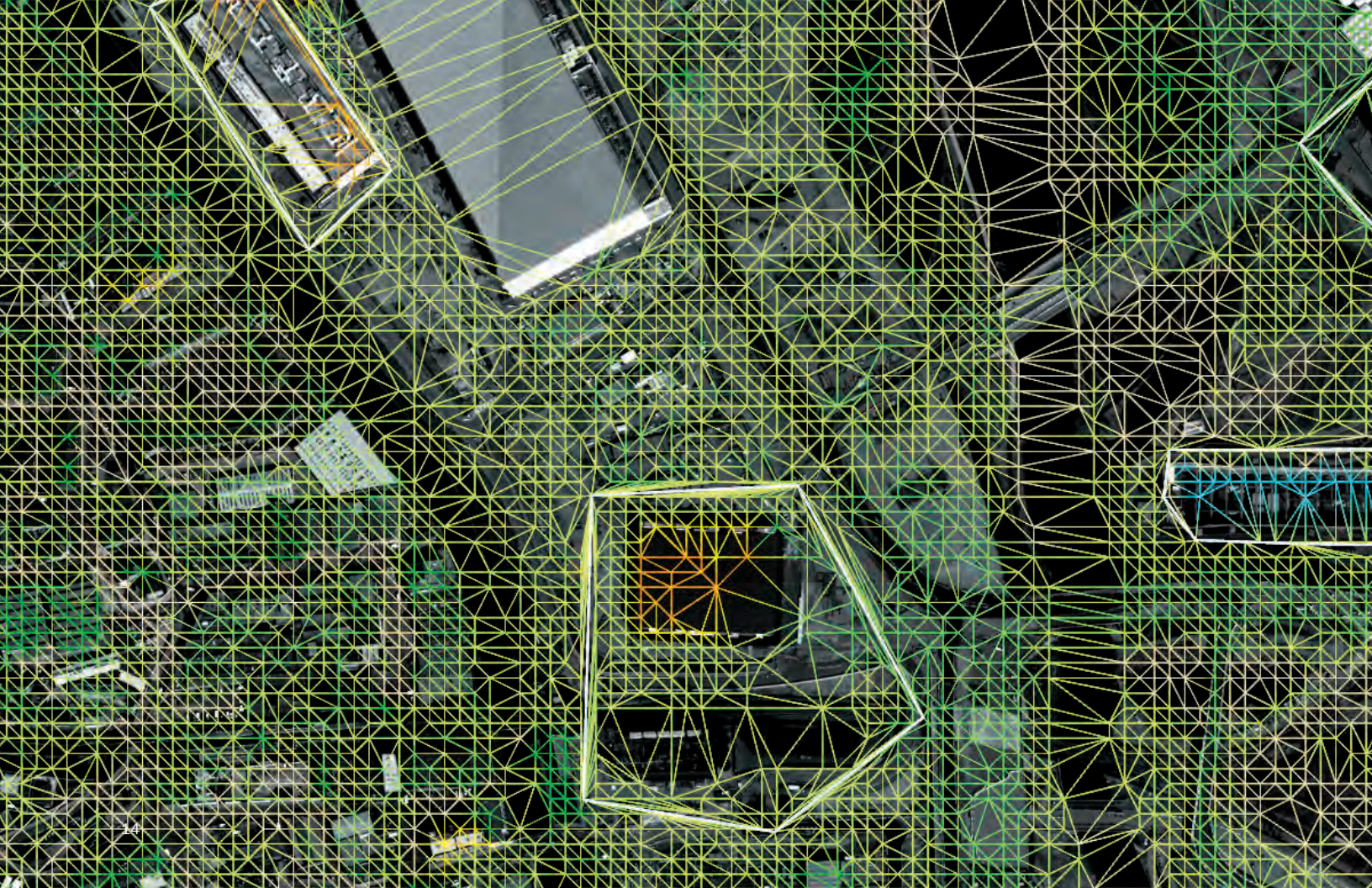
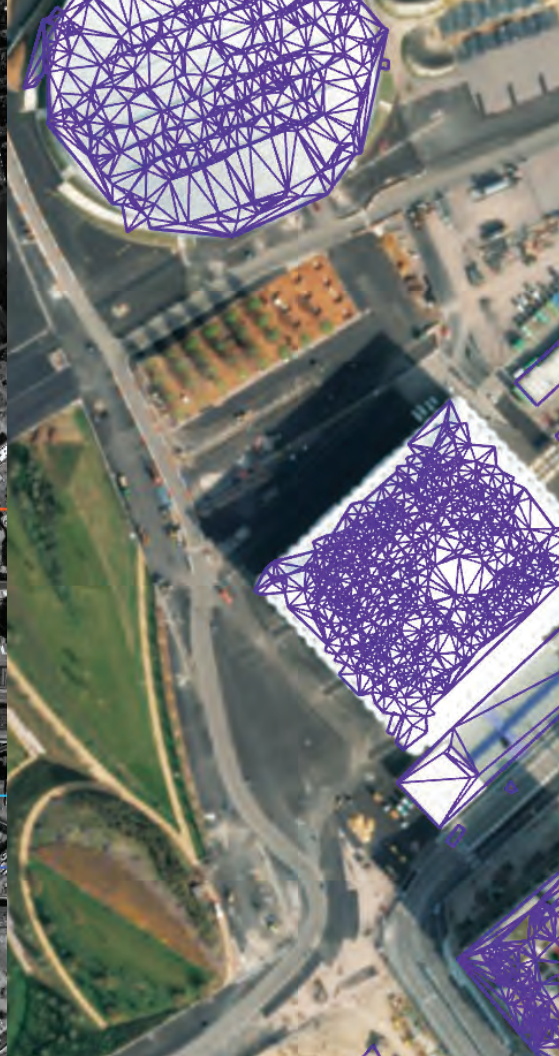
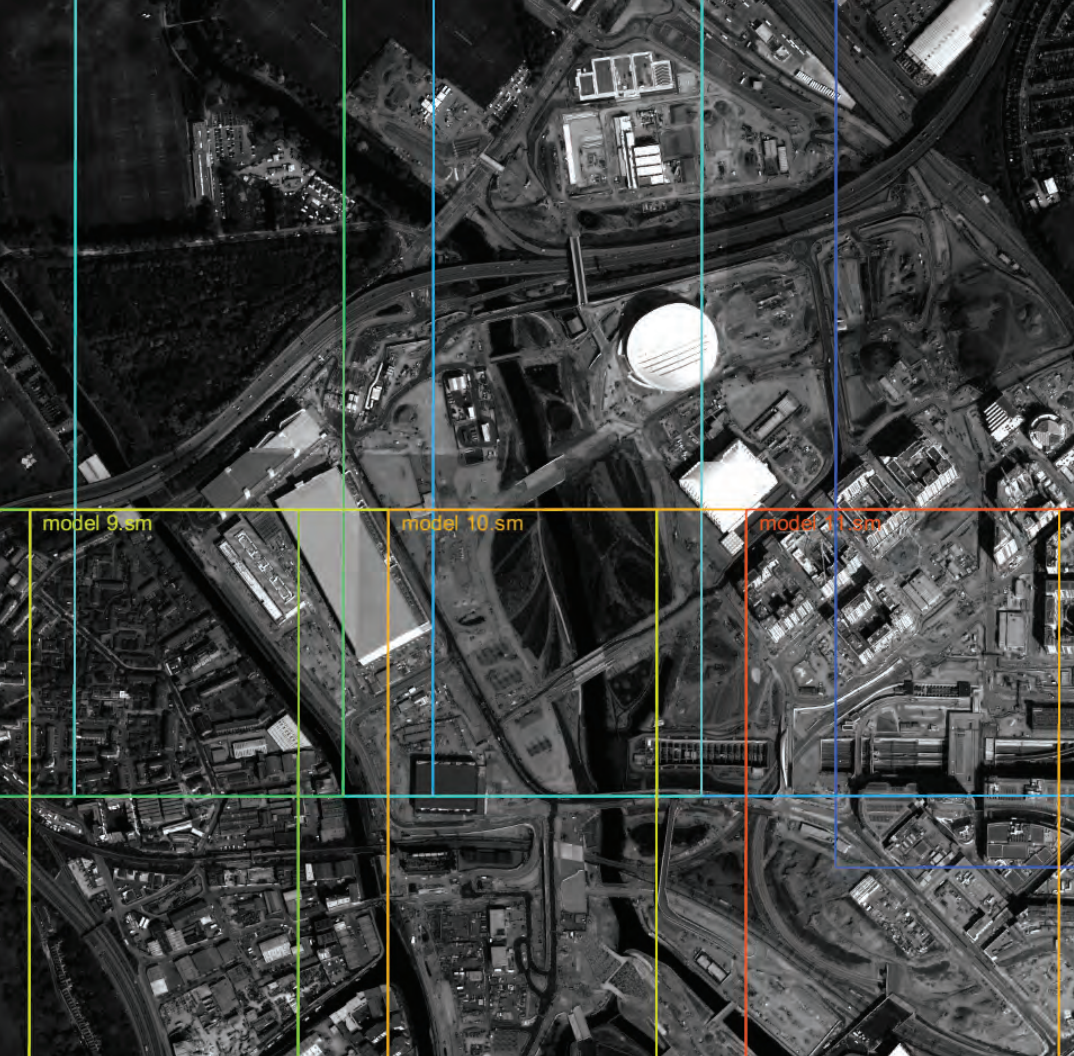
Product templates display with labels extracted from various sources automatically including imagery metadata, classification markings, system date/time, and user login name. Custom templates can be saved for selection and subsequent use for generating products.

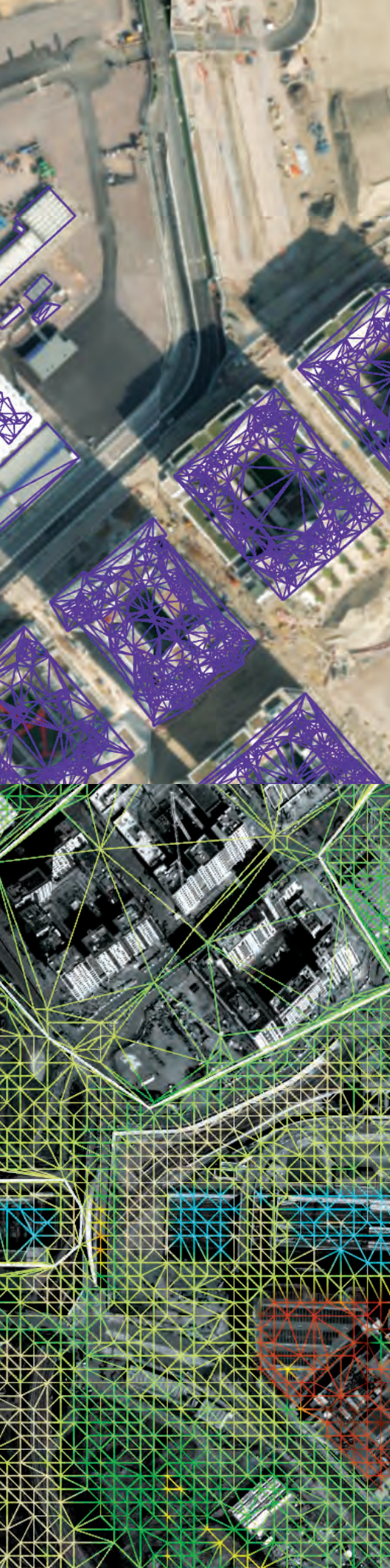
Standard Profile for Imagery Access (SPIA) tags

Use auto-populated Standard Profile for Imagery Access (SPIA) tags to derive and populate important details into finished geospatial products. Product labels and feature attributes automatically display with data values associated with current data tags.



Snapshot the workspace to PowerPoint, or export to GeoPDF. Imagery courtesy of DigitalGlobe.





Stereo Model Manager footprints shown on a Virtual Mosaic of the block of aerial images. Imagery courtesy of Ordnance Survey Great Britain.

Automatic Feature Extraction (AFE) of buildings from a 0.5 m, Next Generation Automatic Terrain Extraction (NGATE) DSM. Imagery courtesy of Ordnance Survey Great Britain.

3-D MODELING AND VISUALIZATION

Rehearse and execute the plan

See what's happening around the corner.

View the entry points.

Measure the height of the walls.

Know the obstacles.

Extract 3-D features with intuitive tools, automation, and real-time texturing to bring your data to life. Visualize entire city blocks from every angle with real or simulated textures to support construction and planning, situational awareness, patterns of life, and navigation.

SOCET GXP provides a quick and easy extraction process with 3-D building modeling tools including snap to point, line, and plane, and joining model components for complex 3-D features. Extract models from imagery, and insert engineering models in COLLADA format from Google or a CAD format such as dgn or dxf.

Feature collection interacts with SketchUp for access to design and rendering tools to manually texture building facades in areas where image content is unavailable, and to create a realistic perspective model. All 3-D models preserve their geographic reference information and attributions.

Stereo Model Manager

Automatically locate DPPDB pairs or stereo image pairs from commercial airborne sensors, reconnaissance sensors, and/or satellite sensors with the Stereo Model Manager. Functionality automatically locates stereo pairs for display within a Stereo Multiport eliminating the need to manually search for individual left and right images. Additional stereo pairs of the imagery are automatically loaded into the Stereo Multiport when transitioning across a large area to extract features.

Interactive Terrain Edit showing polygon break lines added to a TIN that includes tools for thinning or deleting mass points. Imagery courtesy of Ordnance Survey Great Britain.



3-D MODELING AND VISUALIZATION

3-D feature extraction using the Drawing Toolbox to extract structures under construction for the 2012 Summer Olympics in London, England. Imagery courtesy of Ordnance Survey Great Britain.

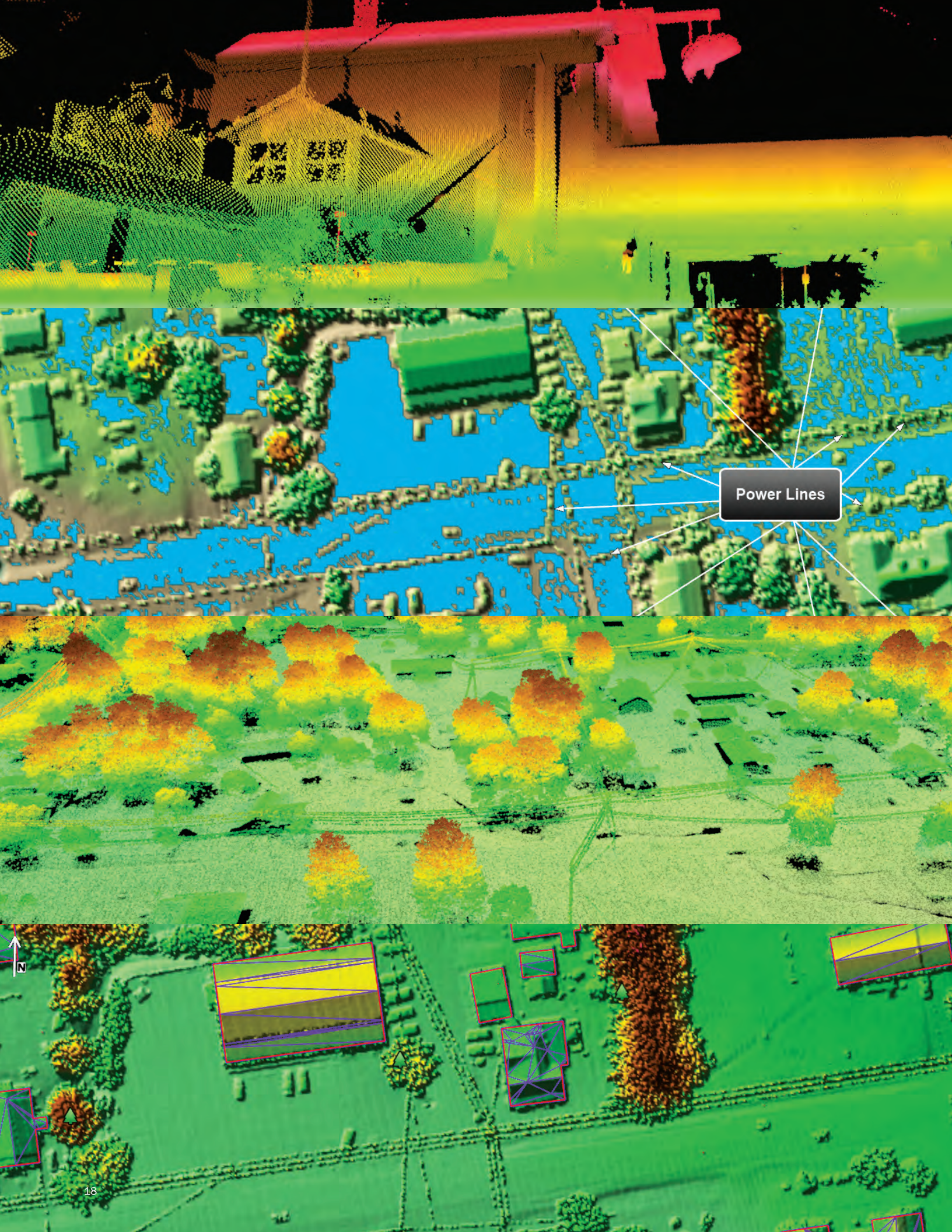
Feature extraction and automatic texture patching of bridges and structures in the foreground (middle and right) using the integrated 3D Multiport viewer. Imagery courtesy of Ordnance Survey Great Britain.

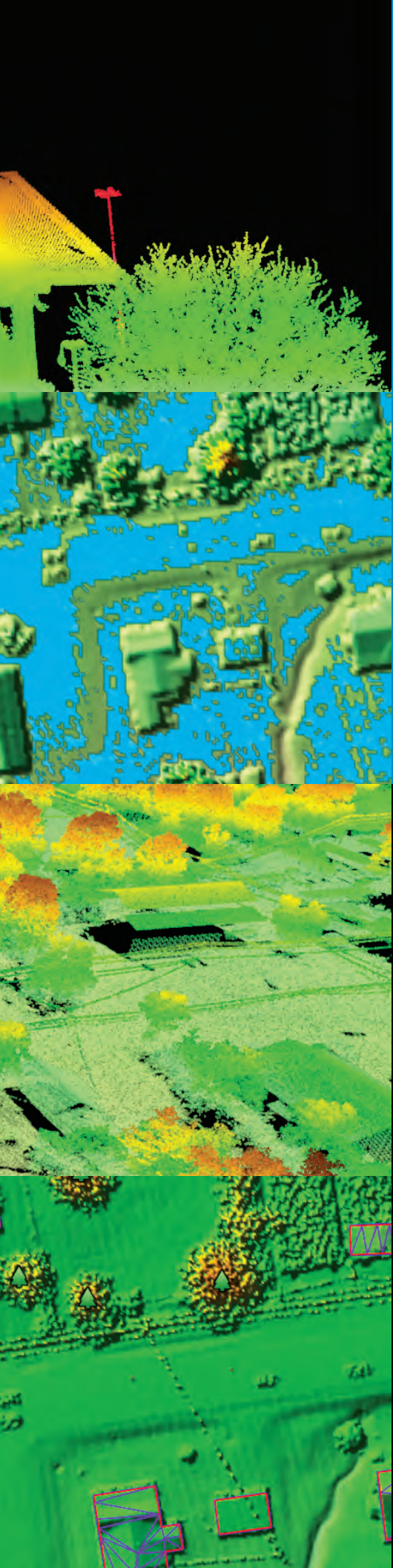


IN THE FIELD

Ordnance Survey Great Britain (OSGB) captured an aerial view of the 2012 Summer Olympic park in London, England. SOCET GXP was used to extract 3-D features to show progress for buildings under construction. Full engineering models in COLLADA format were included to show a visual of current buildings with views of completed buildings. Projective sensor models for images from the aerial photography, taken by the OSGB, and satellite imagery, were loaded into a Stereo or a 2-D Multiport for 3-D feature collection.

Underlying terrain was created automatically using the ATG functionality and the input stereo imagery. The ATG process generated DSM and bare-earth terrain models. A half-meter TIN was extracted from the stereo images to accurately model the earth. The terrain model and 3-D features were textured with imagery automatically and viewed in the 3D Multiport for site progress assessment.





LiDAR AND TERRAIN VISUALIZATION

Forge new ground

Take advantage of LiDAR and other high-density terrain files to automatically extract 3-D buildings, rooftop detail, and trees with impressive accuracy. SOCET GXP manages the complexities of sensor models and terrain behind the scenes. Determine minute height differences in crop and ground disturbances, identify ingress and egress routes, detect Improvised Explosive Devices (IED), and find helicopter landing zones. Remove spurious data, such as small objects and blunders from LiDAR data, or assign colors to a point cloud from imagery, classification type, return level, or elevation. Point clouds and terrain surfaces display in a 3D Multiport for a complete view of the scene.

BAE Systems has advanced R&D efforts to build tools for automatic 3-D feature collection and bare-earth terrain modeling. Native support for NITF, GeoTIFF, DTED, and High-Resolution Elevation (HRE) formats streamline production for grid formats. SOCET GXP supports the import of individual LiDAR returns as grid or TIN formats.

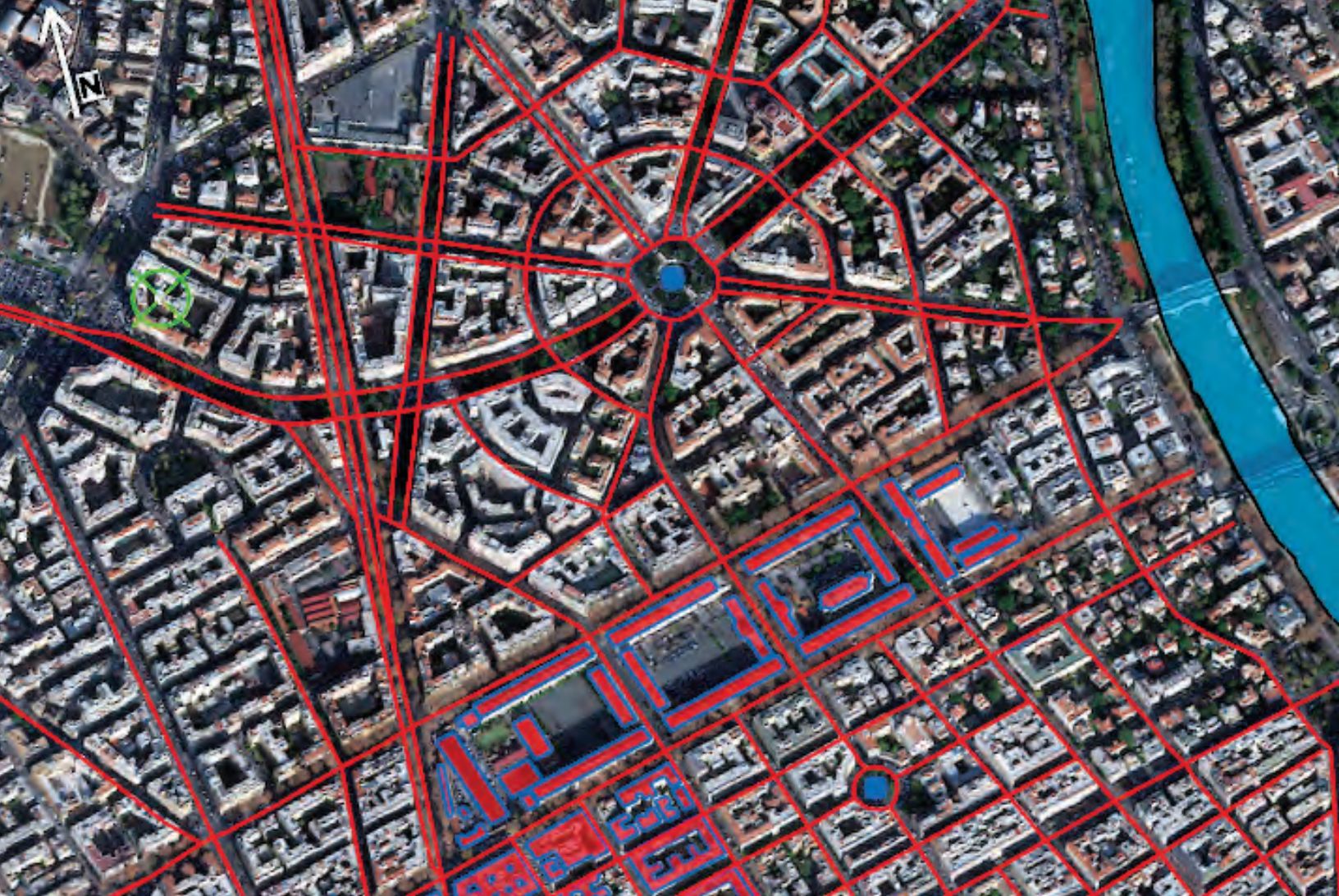
These formats can be used to drape imagery, create TSRs, slope maps, aspect maps, and line of sight analysis, or used as an elevation source for the imagery. Merging feature data as points, lines, and polygons in TIN format preserves the fidelity of non-grid data. Support of TIN and grid formats ensures high accuracy and productivity in derived products whether creating, editing, or using terrain and surface models in SOCET GXP.

Terrestrial LiDAR of Vaughan Mills Mall, Ontario, color-coded by elevation in the SOCET GXP 3D Multiport. © Optech Incorporated. Lynx Mobile Mapper M1 data provided courtesy of Optech.

Candidate helicopter landing zones (blue indicating slope of 5 percent or less) with power lines clearly visible on the LiDAR TSR display.

AFE of building and trees from airborne LiDAR. Imagery courtesy of Tuck Mapping Solutions, Inc.

3D Multiport with LiDAR airborne point cloud data colored by elevation. Imagery courtesy of Tuck Mapping Solutions, Inc.



Feature extraction

Create, collect, edit, query, store, and retrieve geospatial features and their associated attributes with information captured directly within the SOCET GXP environment. SOCET GXP feature databases, shapefiles, and Esri geodatabases are available for immediate use and dissemination.

Esri geodatabases

Connectivity to the Esri Geodatabase provides functionality to the SOCET for ArcGIS and ArcMap® functionality. SOCET for ArcGIS displays the ArcMap canvas and enables access to the drawing and editing tools within SOCET GXP to extract features and superimpose attributes on imagery. SOCET for ArcGIS stores and retrieves the feature data, and vectors of the imagery display in a Stereo Multiport with the associated sensor model. The Spatially Enabled Exploitation (SEE) initiative of the National Geospatial-Intelligence Agency to standardize data formats is an extension of the SOCET for ArcGIS functionality supported within SOCET GXP.

Complementary formats

SOCET GXP loads shapefiles and Keyhole Markup Language (KML) data into a Multiport as a data layer. The Safe Software FME plug-in used with SOCET GXP offers access to more than 275 formats. It transforms the data between a SOCET GXP feature database and spatial data resources, including CAD, GIS, and vector feature formats for compatibility with numerous analytical, visualization, simulation, and engineering tools.



FEATURE ANALYSIS

We have connections

Anticipate conditions, such as rough terrain or collapsed bridges, and accurately pinpoint operational or evacuation routes. Reduce the dependency on external specialty packages for timely situational awareness, visualization, and data collection.

SOCET GXP Multiport synchronized with SOCET for ArcGIS window. Imagery courtesy of DigitalGlobe.

Tools

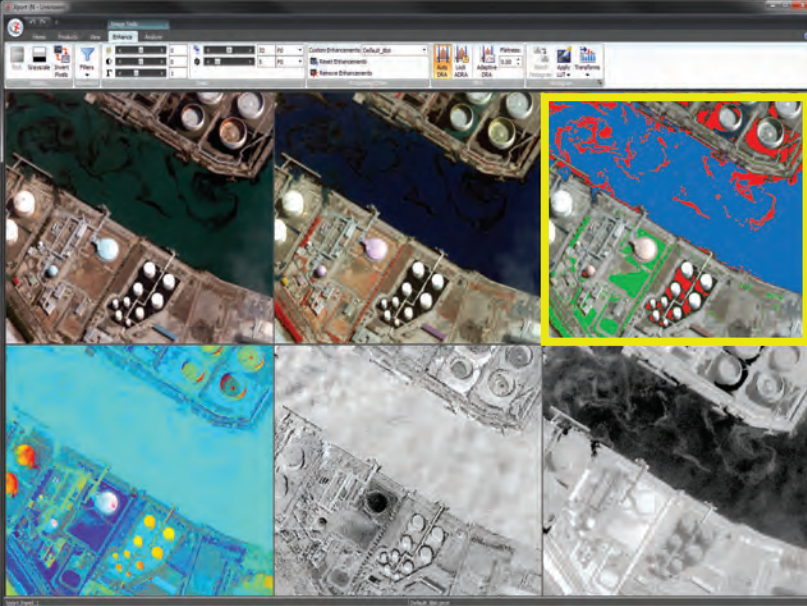
- Advanced drawing and feature collection tools include buffers, parallel lines, trim/extend, thin level of detail, square, curve, arc, static, freehand/stream digitize, monotonic, copy/rubber stamp, move, rotate, scale, 3-D extrude, and 3-D walls
- 2-D and 3-D snapping for grid, lines, points/vertices, and planes, plus a custom snap cursor to improve collection efficiency by providing visual cues during extraction
- Automatic attribution
- Specification files
- Style sheets
- Feature database
- Feature query
- SEE
- Stereo Model Manager
- SOCET for ArcGIS
- COLLADA and KMZ models
- FME and SketchUp integration



IN THE FIELD

Multispectral, 8-band, WorldView-2 images taken after the 2011 earthquake and tsunami in Japan are used to classify oil leaking into the ocean from a damaged refinery. The extent and location of oil and debris in the ocean is monitored over time to assist relief efforts, determine environmental impact, and expose potential navigational hazards.

SOCET GXP algorithms track the footprint of oil washed into the ocean. Anomaly detection and supervised classification algorithms quickly establish the size and location of debris when compared to its surroundings. Viewing and exploitation windows are linked when roaming to display the results of multiple algorithms simultaneously. The spectral signature of the supervised classification is saved in subsequent image collections for rapid classification.



The Xport is a specialized Multiport used to view an image with various enhancement chains or algorithms applied. WorldView-2 imagery courtesy of DigitalGlobe.

REMOTE SENSING

What's in my image? Get answers — fast

Discover solutions to your problems using more than just visible light. Analyze complex hyperspectral imagery (HSI), multispectral imagery (MSI), synthetic-aperture radar (SAR) data, and LiDAR. Detect a camouflaged vehicle in a heavily forested area, identify oil spills, and determine the health of crops or vegetation with simple interfaces and real-time processing.

Remote sensing and Advanced Geospatial Intelligence (AGI) workflows

Analyzing HSI, MSI, SAR, and panchromatic imagery from numerous satellites in real time without reformatting the input imagery provides quick and accurate results. SOCET GXP combines photogrammetry (rigorous sensor modeling) and advanced image exploitation to make integrated analysis a reality. Noisy or non-discriminating bands can be masked to avoid processing the entire data cube. Results are built in memory rather than written to a file to execute multiple algorithms on-the-fly. Complex SAR imagery is used natively for real-time processing including display of the detected image automatically.

The SOCET GXP user interface and tools bring advanced full-spectrum Geospatial intelligence (GEOINT) workflows to the standard imagery analyst's desktop. Anomaly detection algorithms tip and queue the analyst to abnormalities and AOIs.

Third-party developers create algorithms and plug-ins on the SOCET GXP platform to increase the utility of geospatial-intelligence derived from fusing spectral data with HSI and MSI algorithms.

The Xport

The Xport is a specialized Multiport that displays up to 16 linked preview panes, each with a different image processing chain. Visualize results while roaming, exploit multiple band composites, process algorithms, band math, and other image enhancements simultaneously, and save specific Xport configurations for reuse.

AAIC atmospheric correction

Imagery used for land cover mapping is often contaminated by the effects of atmospheric particles. The atmospheric correction algorithm converts pixels to ground material reflectance to enable accurate spectral matches and signature comparisons across different sensors.

Tools

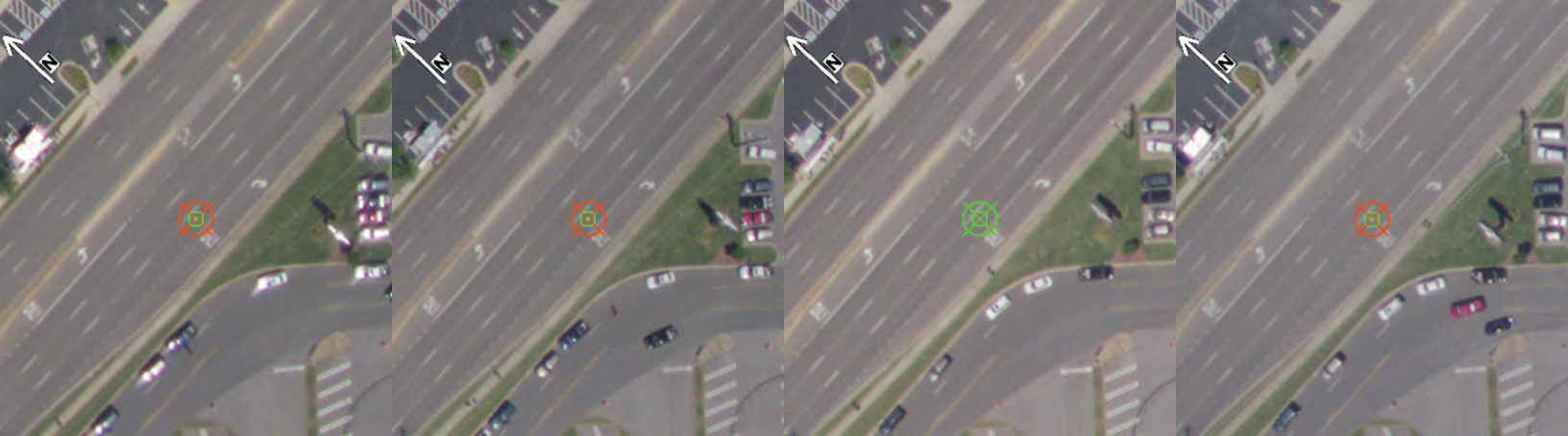
- | | |
|-------------------------------|-------------------------------|
| – Band math | – Unsupervised classification |
| – Scatter plot | – Linear spectral unmixing |
| – Find-in-Scene | – Spectral libraries |
| – (Supervised classification) | – Anomaly detection |
| – Pan-sharpening | – Spectral change detection |
| – Spectral masks | – Image colorization |
| – Destriping | – MSI composites |
| – Reflectance calibration | – Histograms |
| – Components analysis | |



IN THE FIELD

The first step in creating accurate geospatial products is triangulation. On April 27, 2011, a massive tornado touched down in Tuscaloosa, Ala., killing 50 people and causing damage to more than 5,000 homes. Two days later, the National Oceanic and Atmospheric Administration's (NOAA) National Geodetic Survey (NGS) flew an aerial mission using their Trimble® Digital Sensor System (DSS™) to create a digital orthophoto mosaic of the area to assist relief efforts, and help assess the damage.

SOCET GXP uses imagery and metadata in its native format, eliminating the need to reformat data. Color TIFF imagery from the Trimble DSS is directly associated with the Trimble POSEO IMU/GPS data within the SOCET GXP Frame Import process. This process associates the exterior and interior camera orientation information from the metadata to the imagery allowing it to be tied to Earth — in this case, the latitude and longitude of Tuscaloosa.



Interactive point measurement allows the review and measurement of tie and control points on separate image panels. Imagery courtesy of NOAA/NGS.

ACCURACY AND TRIANGULATION

Automation is the key to accurate results

Advanced triangulation improves accuracy. Complex photogrammetric procedures are simplified to enable novice-to-expert users to complete triangulation effortlessly, with options to perform advanced operations. SOCET GXP reads data from an unprecedented number of image sensors and supports sensor modeling for all sensors. Using data in its native format increases the capacity to generate accurate results, and delivers performance and usability advantages.

Metadata is often included with imagery to provide a direct association to the ground when used within SOCET GXP, such as satellite imagery. A catalog of DTED files provides elevation information for the ground location of the imagery allowing the images to align with the ground and to each other within SOCET GXP.

Triangulation displaying the connections between images and the associated automatically generated tie points; color coded by the number of measurements. Imagery courtesy of NOAA/NGS.

Triangulation

Triangulation improves the accuracy of input images, and manages strips and blocks of mixed source imagery. Ground control, image control, and/or automatic tie point measurements are processes used to tie images together, and to the ground. These processes improve accuracy by adjusting the metadata of input images based on sensor parameter accuracies and derived covariance data. Fully weighted least squares bundle adjustment, blunder detection, and graphical analysis provide full error propagation and reporting. Resulting images are used to support downstream measurements, feature extraction, terrain extraction, orthophoto production, and processes with error attributes.

Tools

- Triangulation block setup and management
- Automatic tie point matching
- Graphical analysis
- Control point editor
- Interactive Point Measurement
- Automatic Point Measurement



IN THE FIELD

The flight mission for the NOAA/NGS relief operation acquired imagery with 30 percent overlap with the intent to produce orthophotos and a high-resolution, large-area coverage orthophoto mosaic. The entire block of imagery was loaded into a single SOCET GXP Multiport after triangulation, and the Ortho On-the-Fly functionality applied. Image pixels stretched and warped to display the image as if it were taken from nadir throughout the entire image, or a mosaic of many images.

Seam lines for an image mosaic are generated automatically and displayed for editing with Ortho On-the-Fly processing applied resulting in edits that detail the actual product output. Imagery courtesy of NOAA/NGS.



ORTHORECTIFICATION

Do it yourself on-the-fly

Create orthorectified images in real time, and convert images when orthophotos or orthophoto mosaic products are required.

Ortho On-the-Fly

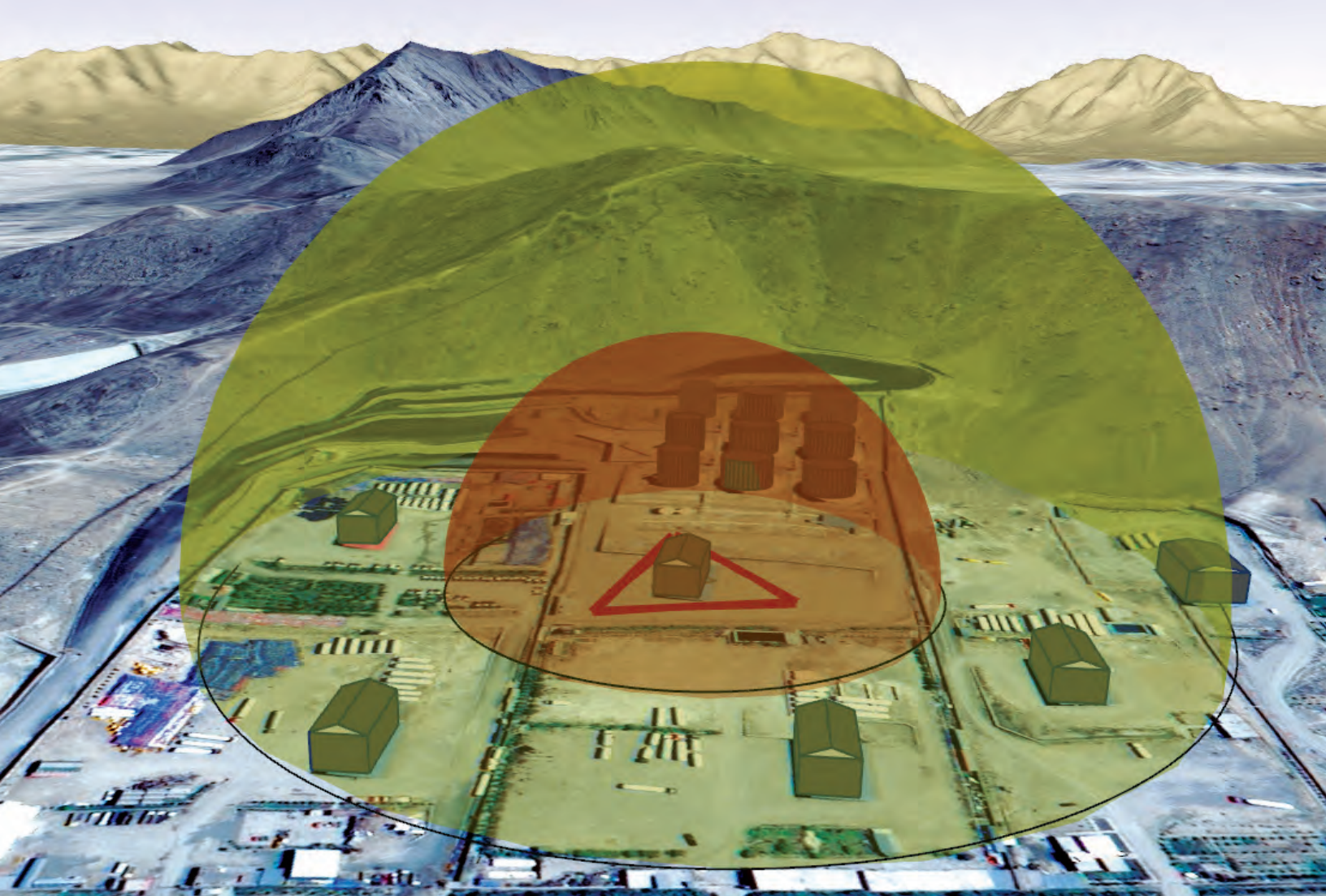
Ortho On-the-Fly completes the orthorectified process in real-time, providing instant visualization of imagery and data for analysis and exploitation.

Ortho Manager

The Ortho Manager automatically generates seam lines to build mosaicked orthophotos. Convert one or more original images into an orthophoto or orthophoto mosaic by transforming the pixels to their proper position according to the sensor model, terrain, and feature information. Quickly correct the appearance of building lean or other features to position them in their exact geometric location. Edit seam lines to refine the appearance of the mosaic by routing them around obstacles, such as buildings, lakes, or bridges.

Tools

- | | |
|-------------------------------|---------------------------------|
| – True orthophotos | – Automatic seam line |
| – Ortho sheets/tiles | – Interactive seam line editing |
| – Raster Product Format (RPF) | – Mosaic |



Automatically find tie points between a single image and control images. View your targets, range rings, and joint mensurated point of impact in 3-D. WorldView-2 image of Kabul, Afghanistan, courtesy of DigitalGlobe.

TARGETING

Every minute counts

Fast and precise with proven accuracy. Fuse analytical data with operational strategies and tasks. Minimize manual measuring and complete your targeting tasks with confidence.

Precision mensuration

BAE Systems' CGS program is the DoD standard for precision targeting, geopositioning services, and photogrammetric applications, representing more than 25 years of development. CGS combines with SOCET GXP to provide an all-source precision geolocation capability with reliable and accurate 3-D coordinates and statistically valid error estimates. CGS uses SOCET GXP as the integrated viewer to deploy as a standalone targeting workstation on Oracle Solaris x86 and Microsoft Windows platforms. The defense and intelligence communities recognize SOCET GXP and CGS as reliable, precision geopositioning services that set the standard for target-location error determination.

Tools

- Automatic registration
- Source selection
- Configurable target icons for output products

ACTIVITY-BASED INTELLIGENCE

Get answers to your most difficult questions

Find order in the chaos

Activity from multiple images and video streams produces an excessive amount of data – all of which must be analyzed. Active-Based Intelligence (ABI) provides an analytical technique to visualize disparate data in the imagery, and provides a visual reference in which to track events.

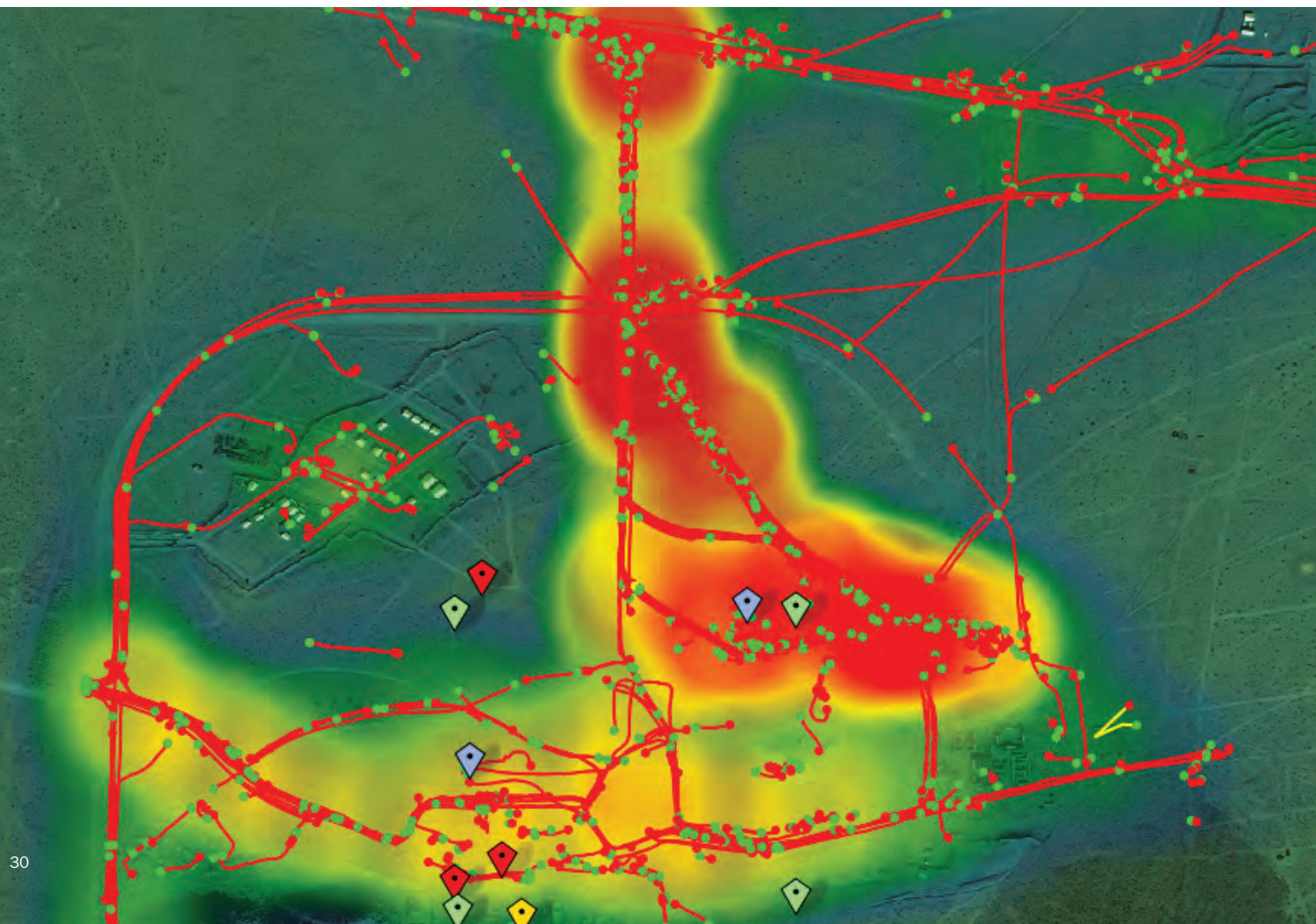
ABI used with collaborative software streams through hours of video quickly. Apply filters and algorithms to attributes within the video to locate specific patterns of behavior, such as a certain time of day, or to track movements and recurring events. Information is georeferenced to provide the exact location of vehicles, buildings, or individuals.

Analyze patterns of life and complex networks, and make decisions based on the results. Isolate events and share activity data through linked Activity Stores. ABI enables intelligent decision making based on past movements and assists to predict events before they occur.

Create ABI system events in SOCET GXP using Web services. Imagery courtesy of DigitalGlobe.

Tools

- Activity Store
- Event Web Service
- Dockable ABI Toolbox



APPLICATION DEVELOPMENT

Leverage the functionality

Reduce the cost for system developers and system integrators, and save millions of dollars. The SOCET GXP API eliminates the time and expense required to create, maintain, and support stove-piped ELT solutions.

Focus on your mission

Spend development dollars on mission requirements. The SOCET GXP API enables third-party applications to communicate with the software and provides direct integration into larger system architectures.

Existing programs that build on SOCET GXP reap the benefits of immediate exposure to BAE Systems' global community of more than 15,000 trained analysts and users.

The SOCET GXP API is popular with systems integrators such as Boeing, Lockheed Martin, Northrop Grumman, Raytheon, SAIC, and General Dynamics.

Tools

- C++ API interface
- Source code available for sample applications
- Comprehensive documentation



About BAE Systems

BAE Systems is a global defense and security company with approximately 100,000 employees worldwide. The Company delivers a full range of products and services for air, land, and naval forces, as well as advanced electronics, security, information technology solutions, and support services.

BAE Systems is a global provider of software for image analysis, geospatial production, mapping, 3-D visualization, video analysis, and photogrammetry. For more than 40 years, BAE Systems has been a trusted supplier of imagery, geospatial products, and services to the defense and intelligence communities, and commercial markets. BAE Systems has experience and depth in managing, implementing, and developing products with a wide variety of other industry-standard applications that support geospatial and related tradecrafts, and experience developing GIS tools. This experience requires knowledge of the scientific underpinning of the technologies, methods, and techniques in use to solve geospatial production challenges.

Geospatial eXploitation Products (GXP®)

GXP develops powerful software tools used to deliver highly accurate geospatial and intelligence data. Based in San Diego, Calif., GXP provides direct worldwide sales and support. In some areas, this is done in conjunction with a select team of distributors to facilitate greater coverage and to provide effective customer service. GXP offers its customers top-quality technical support and training to optimize their return on investment.

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SOCET GXP IN THE FIELD

SOCET GXP software is used on the frontlines for homeland defense and security, and systems integrators working on National Geospatial-Intelligence Agency programs to produce GEOINT products. The U.S. Army has procured SOCET GXP for Army-wide implementation into its Imagery Workstation baseline for operational units, establishing the software as its primary GEOINT exploitation tool.

Customers include:

- Defense forces
- Intelligence agencies
- Homeland security
- Systems integrators
- National and local mapping agencies
- State, local, and regional governments
- Private photogrammetry, mapping, surveying companies
- Transportation departments
- Natural resources management consultants
- Universities, colleges, research organizations
- Image scientists