Release Enhancements
SOCET GXP® v4.4

BAE SYSTEMS

Advanced geospatial exploitation and customized product creation combined into one comprehensive solution

The release of SOCET GXP® v4.4 delivers a wide range of exciting new capabilities integrated with the GXP Xplorer® Platform including Workflow Management, Structured Observation Management (SOM), and further advances in Machine Learning (ML). Current release enhancements include:

» Advanced workflow task management integrated with GXP Xplorer

» Simple extraction of structured observations over time, including import and trend analysis capabilities

» Product generation with PowerPoint® design templates

» Enhanced analysis and visualization tools to further enable Movement Intelligence (MOVINT)

» Terrain Analysis with a Post Query Tool

» New tools for advanced Synthetic Aperture Radar (SAR) processing and Feature Extraction

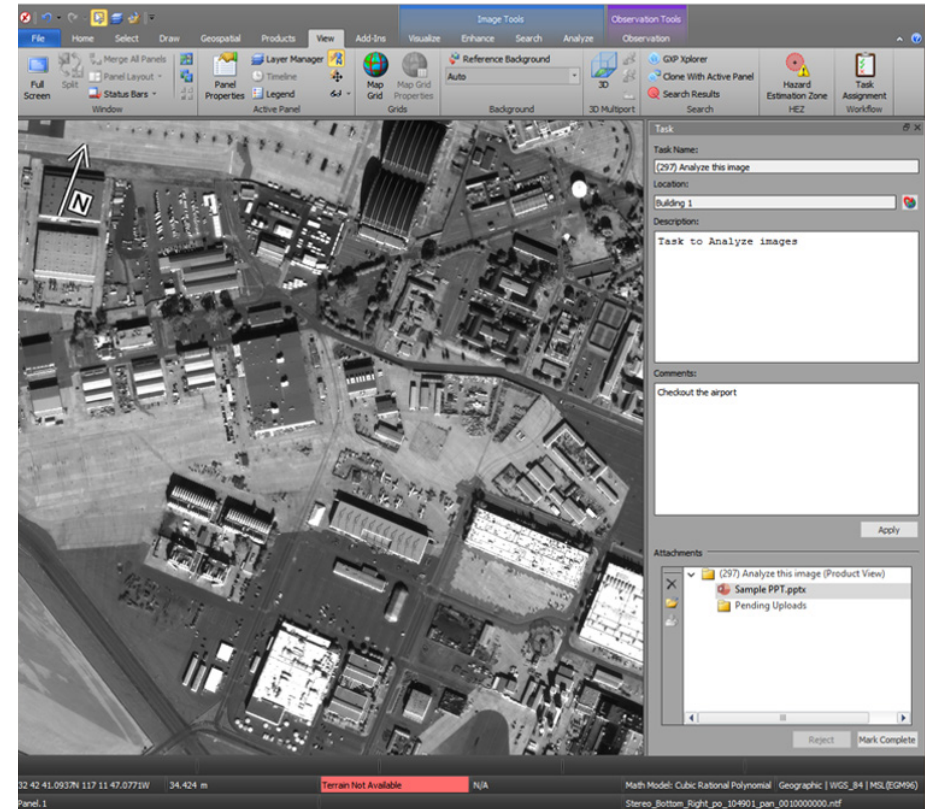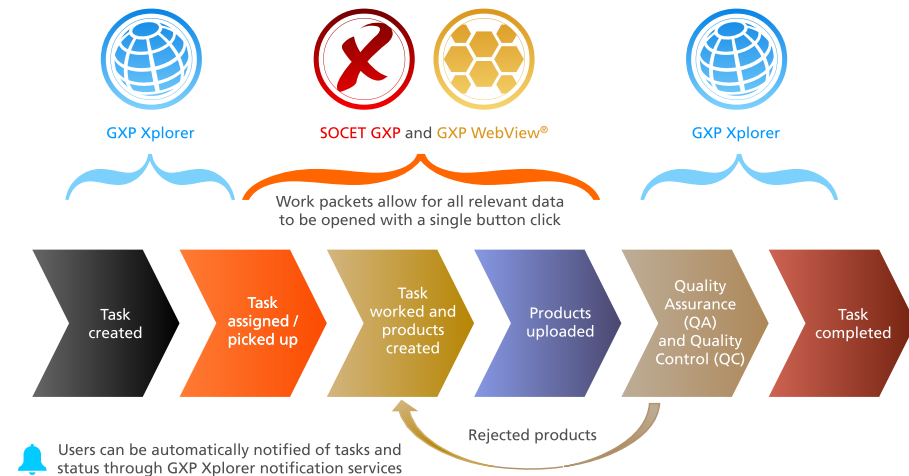» A new Python Application Programing Interface (API)

Incorporating customer feedback to significantly enhance workflow efficiencies, SOCET GXP v4.4 ensures an optimal user experience while continuing to expand upon the synergy between all of the GXP™ software solutions.

Workflow Management

Users can now utilize GXP Xplorer to create and manage workflow tasks, from creation and analysis to quality control and approval, that can be reviewed and exploited in SOCET GXP.

Key enhancements:

» View available tasks directly in SOCET GXP

» Open tasks and associated Workspaces from GXP Xplorer

» Automatically load task data for easy analysis

» Create and upload products for each task to review for quality assurance and disseminate via GXP Xplorer

» Create and review SOM detections as a part of Workflow Management

» Integrate with ML workflows for enhanced SOM analysis

GXP Xplorer   SOCET GXP and GXP WebView®   GXP Xplorer

Work packets allow for all relevant data to be opened with a single button click

Task created → Task assigned / picked up → Task worked and products created → Products uploaded → Quality Assurance (QA) and Quality Control (QC) → Task completed

Rejected products

Users can be automatically notified of tasks and status through GXP Xplorer notification services

Workflow tasking for airfield imagery analysis is initiated as all associated geospatial data is loaded into the SOCET GXP Workspace and Multiport™ (the task was selected by an image analyst from the list below). Imagery provided by Maxar.

Key enhancements (continued):

» GXP Xplorer Status window from the SOCET GXP Workspace Manager

  – New tab on the Workspace Manager

  – View connection status

  – Edit and manage connections

  – Sign in/out

» Customize ribbon

  – Hide entire tabs or groups of buttons

  – Create custom tabs with mix and match functionality from other tabs

  – Customize every Multiport type in SOCET GXP (2-D, 3-D, Stereo, Overview, and more)
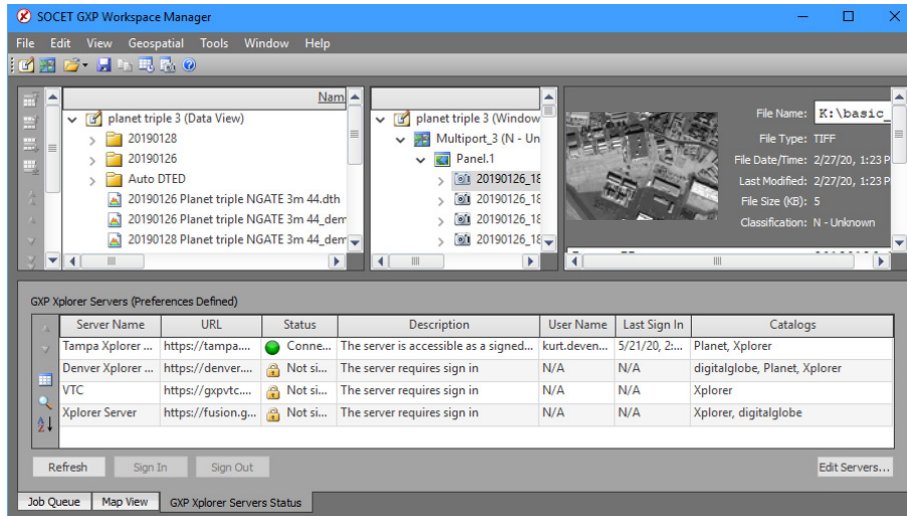
Integrated with the GXP Xplorer Platform and Workflow Management, the updated SOCET GXP Workspace Manager provides access to tasking, alerts, and status.
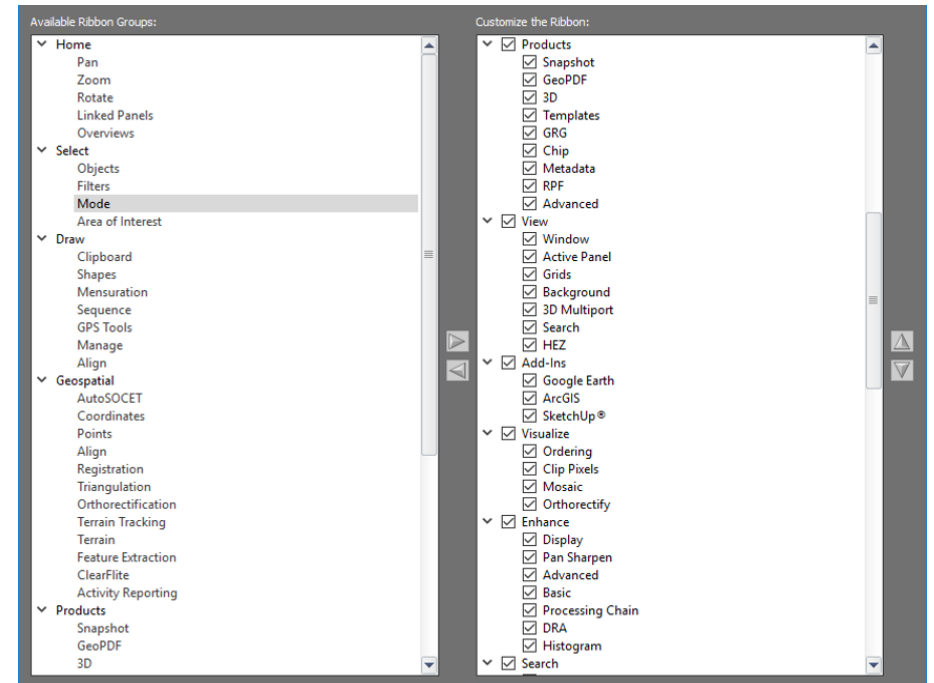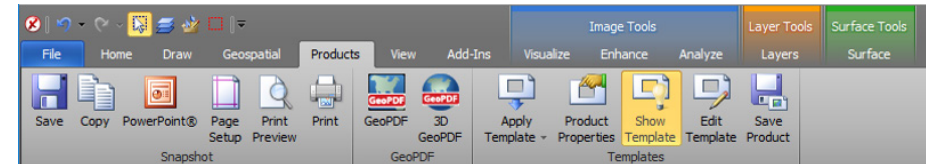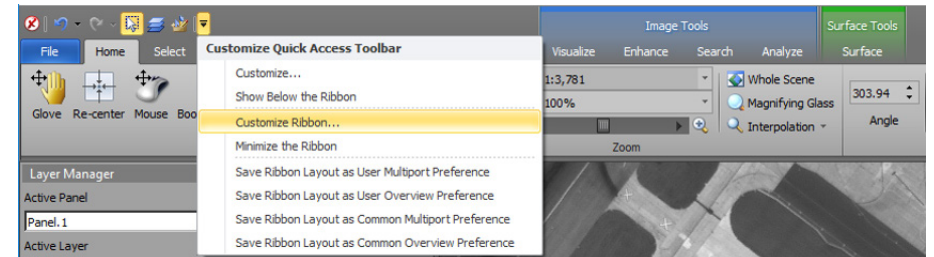
The Ribbon has been simplified to include capabilities for specific workflows.

SOM collection in SOCET GXP

A new ribbon allows for easy extraction of observations at a facility over time. Both historical observations and ML detections can be easily imported to increase extraction efficiency and create trend analysis reports.

Key enhancements:

» Utilize a variety of sources for storing the Observations such as GXP Xplorer, Esri® Databases (DBs), or PostGIS

» Automatically jump to stored facilities that analysts need to monitor over time

» Utilize the Observation Toolbox to quickly select equipment of interest and automatically populate attributes

» Allow for manual review and attribution of features with a convenient table showing all observations in the scene

» Associate observations with optional reporting positions to correct coordinate inaccuracies caused by differing collection geometries

» View historical observations over the same facility from previous dates

  – Side-by-side views make comparisons simple

  – Obstructed views are attributed for context

» Bring in automated detections from ML algorithms

  – Allows for quick confirmation or rejection of detections

» Timeline analysis lets users animate activity over time

» Symbology improvements for ML integration with SOM

» Added a new Publish button to the Observation ribbon

» Observations with length and width auto-attributes can be captured with 2-click and 4-click tools

» Usability enhancements for the Observation Toolbox including Search, Filtering, and Add to Favorites
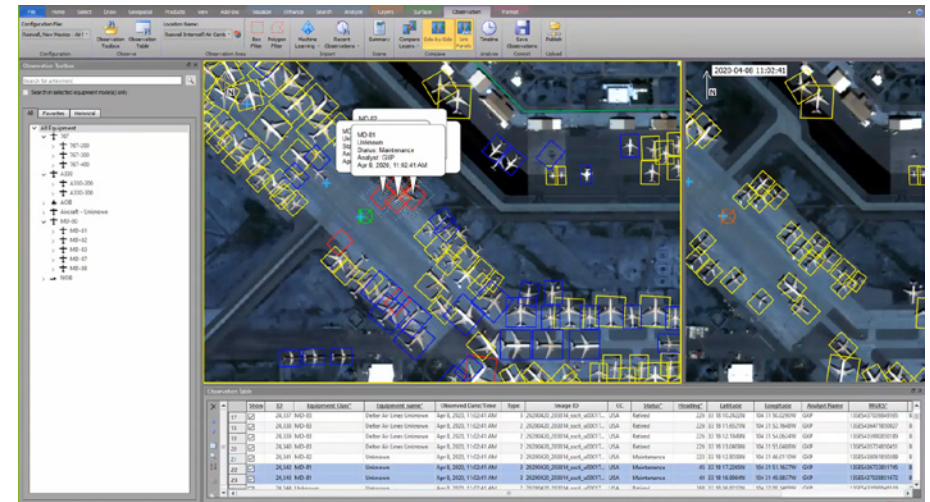
SOCET GXP Multiport with SOM showing temporal observation updates for features on both historical and current imagery. Autolabels (attribution) and an easy-to-use interface reduce the time required to collect and update observations. Image © 2020 Planet Labs Inc. All Rights Reserved. Reprinted by permission.

planet.

Export to PowerPoint

Ingest Microsoft® PowerPoint design templates into SOCET GXP for product generation.

Key enhancements:

- » Product Templates are compatible between SOCET GXP and GXP WebView

- » Based on Microsoft PowerPoint .pptx

- » Still supports Autolabels, editable text and graphics, and PowerPoint notes

- » Updates for Product Templates
  - – Support for graphics in template margins
  - – Templates are retained in Image List Tool

- » Text Character Outline, Shadow Color, and Offset
  - – Updates for font types
 - – Shadow Text, Color, and Outline options
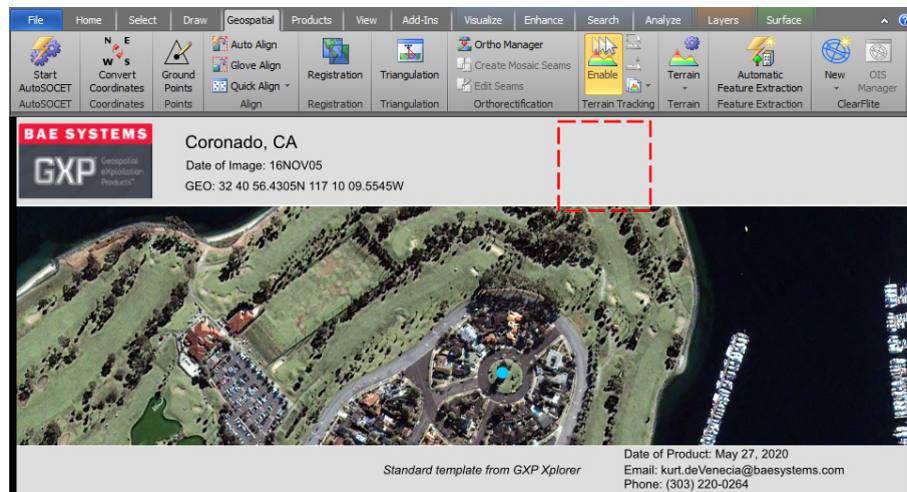
A shared Microsoft PowerPoint template imported from GXP WebView. The coordinates in the template header are an Autolabel associated with the blue reference point on the image. Imagery provided by Maxar.

Autolabel updates

Partial strings can now be extracted from image metadata for use in templates or feature attribution, and hierarchical fallback. Autolabels enable users to pull a piece of metadata from different tags depending on the image being exploited.

Key enhancements:

- » Extract partial strings using <$Autolabel, #-#$>

- » Customizable file allows for creation of Autolabels that pull from different locations

- » New reference coordinate autolabel allowing point features or image pixels to display their coordinates

- » New Target Location Error (TLE) autolabel computed as the square root of the sum of the squares from the Circular Error/Linear Error (CE/LE) values
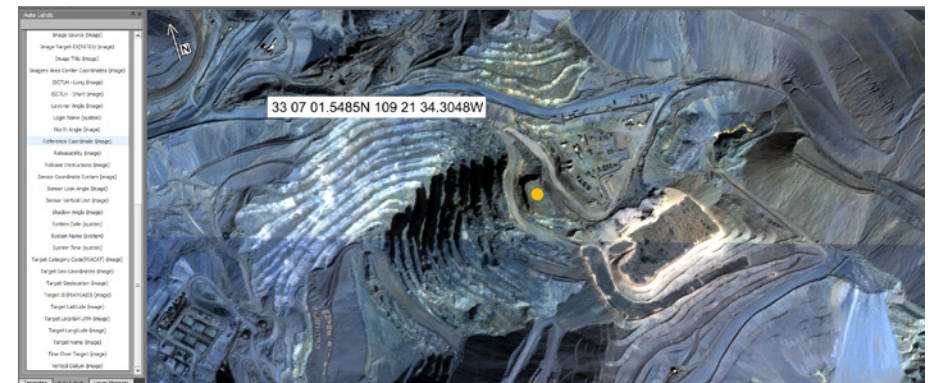
Coordinate Autolabel can be placed anywhere in an image product to depict the coordinates of an associated reference point (yellow dot on the image). Image © 2020 Planet Labs Inc. All Rights Reserved. Reprinted by permission.

Unmanned Aerial Vehicle (UAV) processing

Create vibrant 3-D output products from UAV/drone imagery with limited geospatial metadata. Output options include rigorous support files, orthomosaics, surface terrain models, bare earth terrain models, and 3-D point clouds.

Key enhancements:

» Intuitive wizard walks users from image import to output product creation

» Read camera parameters from images

» Automatically find image tie points to mosaic and georeferenced images

» Optionally import and pick ground control points for a more accurate solution
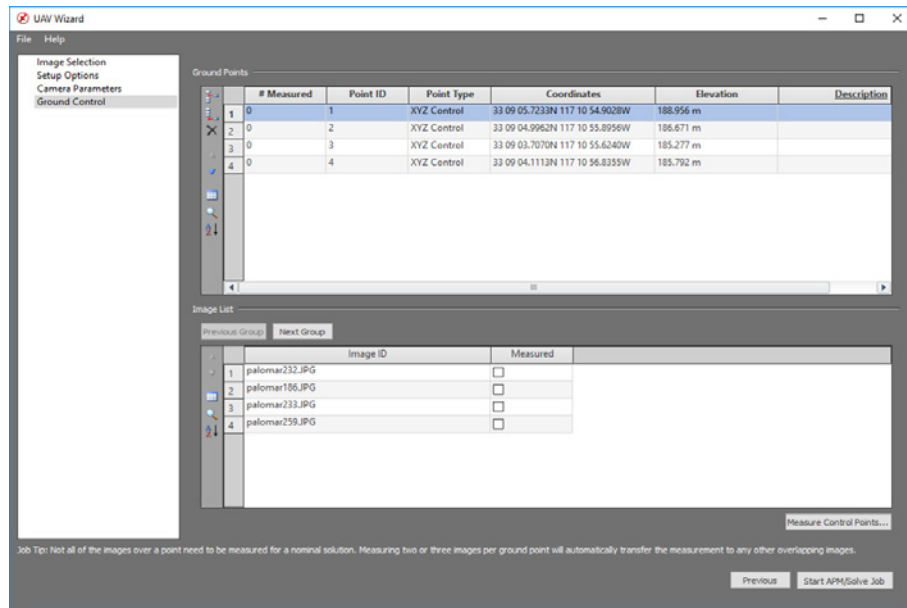
UAV Wizard for ingesting UAV projects.
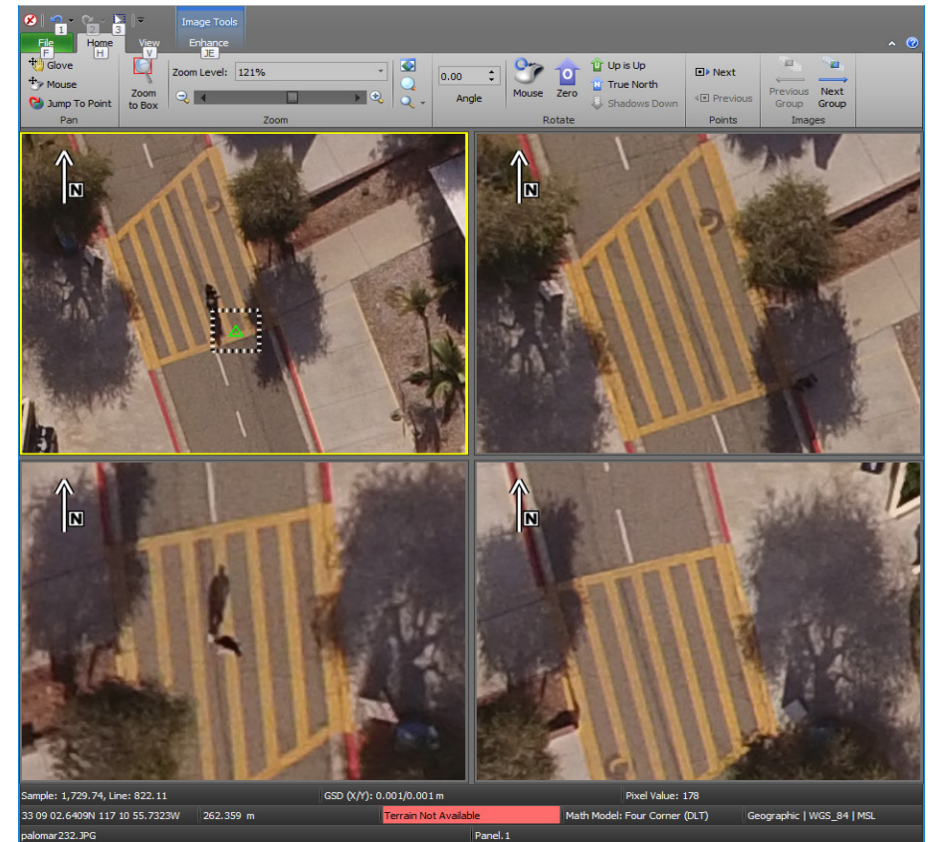
Marking control points on UAV imagery, the UAV wizard and workflow provide the ability to ingest and triangulate the small format imagery associated with UAVs utilizing new matching techniques (structure from motion) and processing methods. Outputs include updated triangulation metadata, point clouds, digital surface and terrain models, orthos, and 3D visualization products. Imagery provided by Palomar College.

MOVINT

New Ground Moving Target Indictor (GMTI) ribbon includes new analysis and visualization tools for points and tracks.

Key enhancements:

» GMTI support

  – Colorize detections based on age, platform, or inbound/outbound status

  – Control trail display during animation to distinguish older detections

  – View individual point metadata using a convenient dockable window

» Track visualization

  – Ingest 4676B

  – Graphical attributes controlled with a style sheet

  – Start/End of track displayed as green/red

  – Time animation of tracks using time attribution

  – Turn on/off points

» Signal Intelligence (SIGINT)

  – Ingest Native Hawkeye 360 GeoJSON and Tactical SIGINT Data Format (TSDF)

  – Attributed features with error ellipses, location, time, orientation, etc.

  – Animation using time attributes

  – Turn on/off error ellipses
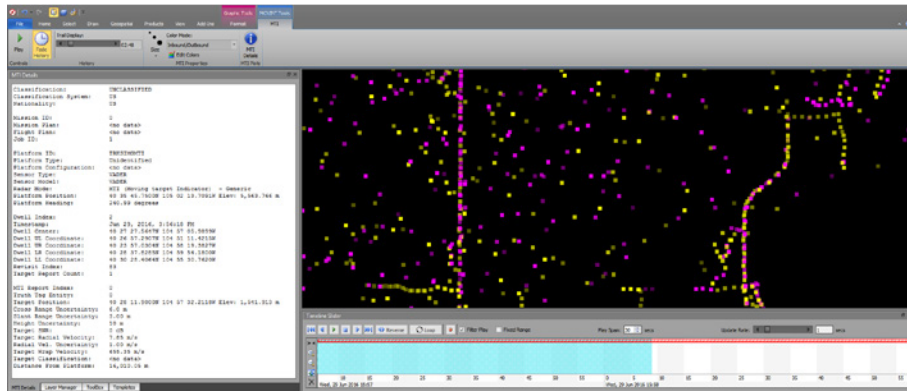
SOCET GXP Multiport GMTI ribbon tab with controls to visualize point data over time.

Terrain Analysis with the Post Query Tool

Easily identify and interactively edit grid terrain posts based on elevation information or Figure of Merit (FOM) values with the Post Query Tool.

Key enhancements:

» Interactive Terrain Editing Post Query Tool

  – Quickly allows for searching of terrain posts in grid terrain files

  – Queries can be run based on FOM value, elevation, elevation change, and average delta elevation

  – Complex queries can be created

  – Table shows all posts that match the query

  – Values can be edited directly in the table

  – Export directly to a new terrain file

  – Grid Post Viewer tool allows users to review and share query results

» Geographic terrain files now display post spacing in both seconds and meters

» When loading a GeoTIFF terrain with missing coordinate system info, a co-located .cs file is created so the file may load immediately

» When generating grid terrain files or utilizing Terrain Operations, the output boundary coordinates can be moved to evenly spaced posts

» Users can now specify a configuration file to use when exporting Triangulated Irregular Network (TIN) terrain to ASCII

» New terrain editing algorithms

  – First Order Fill Interpolation

  – Second Order Fill Interpolation

» Ingest LiDAR .las v1.4

» The ability to generate LiDAR intensity images has been added to the 3D Multiport ribbon

» Corrected display of void areas in GeoTIFF terrain prior to terrain editing

» New formats

  – TERCOM

  – Generic Point-Cloud Model sensor support for Binary Point File LiDAR data

» Automatically load terrain into the GXP Multiport from the GXP Xplorer catalog
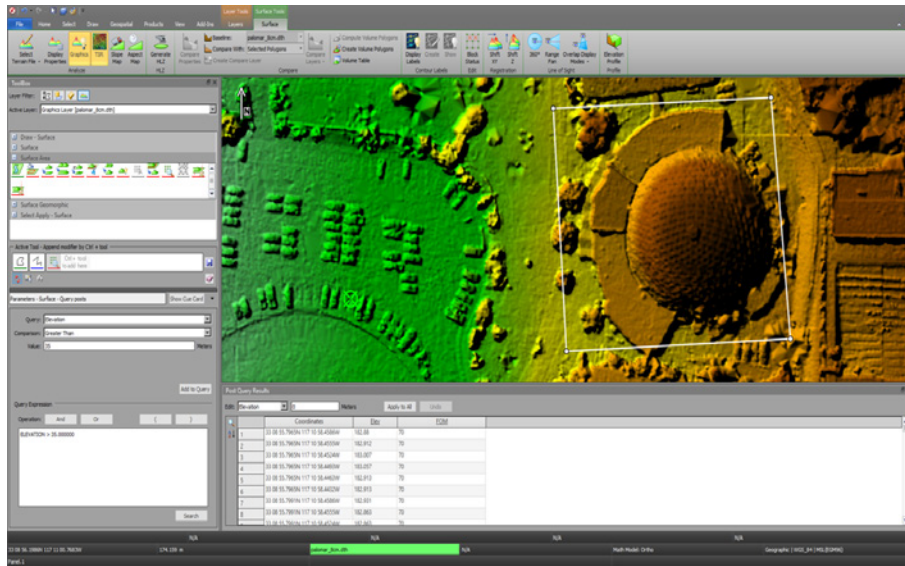
SOCET GXP Post Query Tool displaying tabular results of elevation data over a region of interest.

Integration with ArcGIS® Pro

Connect SOCET GXP with Esri® DBs and ArcGIS Pro to enable feature collection workflows; publish products created in SOCET GXP directly to Portal for ArcGIS.

Key enhancements:

» Extract features in SOCET GXP to take advantage of best in class accuracy, stereo viewing, mensuration, and 3-D extraction tools

» Utilize editing tools and other GIS extensions in ArcGIS Pro

» SOCET GXP compatibility with ArcGIS Pro v2.5+ add ins

– Includes support Multipatch

– Performance improvements for Area of Interest (AOI) graphics clipping

» Incremental loading of Esri feature service data in the SOCET GXP Multiport

» Publish to Portal for ArcGIS

– Utilize GXP Xplorer to re-host local images used in product creation

– Add in optional basemaps as a background

– Directly link back to GXP WebView from Portal for ArcGIS for product editing

» SOCET GXP can now connect to hosted Esri Feature Services
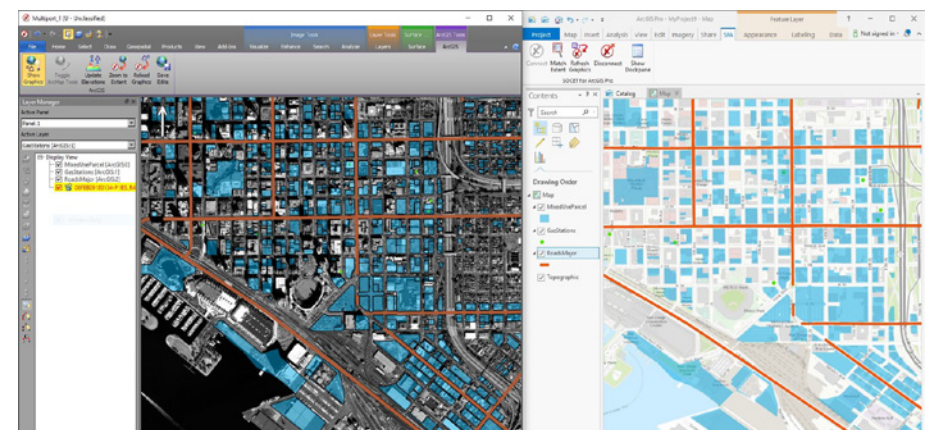
Synchronized vectors with associated graphical attributes between the SOCET GXP Multiport and Esri ArcGIS Pro. Imagery provided by Maxar.

SAR processing

A new tool for identifying interferometric pairs suitable for Coherent Change Detection (CCD) processing; a legend illustrating relevant collection geometry for SAR images.

Key enhancements:

» Interferometric pair finder

  – Search a directory of SAR images or loaded images in the Workspace Manager

  – Customize search parameters based on collection geometry requirements
    – Sensor type
    – Percentage overlap
    – Time between collects
    – Incidence angle delta
    – Look direction
    – Pass direction (satellite only)

» Legend showing relevant collection geometry for SAR images

  – New angles have been added for contextual awareness

  – North arrow
  – Layover angle
  – Right or left side looking
  – Text angles are now in reference to ground space relative to North

» CCD now supports SICD and 2 band floating point images

» Flat Earth Correction can now be toggled during CCD processing
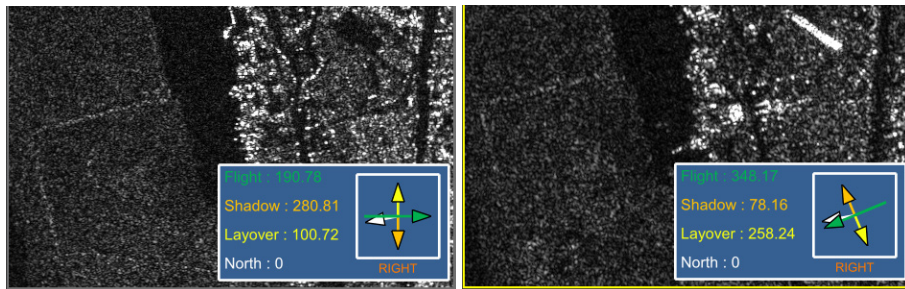
*SAR images with collection geometry. Imagery provided by Maxar.*

Feature Extraction enhancements

User requested enhancements for feature extraction, editing, and visualization, including updates for the tabular view.

Key enhancements:

» Provide attribute constraints using attribute subtypes for feature collection efficiency

» Split polygons during feature editing

» When batch importing shapefiles, allow all feature classes defined in the specification file to be created regardless of whether a corresponding shapefile exists

» Improve table editing functions for the feature extraction specification file editor

» Selected feature(s) in the Feature Attribute window (multiple features) are retained when sorting the table

» Setting what features are displayed in the Feature Attribute window (multiple features) is now saved as a hidden preference (All, Selected Only, All Displayed in Panel)

» Save column settings in the Feature Attribute table

» When saving sequence graphics as a shapefile, the count is saved as an attribute

» Add Save As options for KML from the Workspace Manager or Multiport to include edited KML files in SOCET GXP

» Preference for selecting and moving features or feature vertex with a pixel tolerance for the optional move

» Provide visual indicators for snapping to vertices

» Provide visual topology warnings when breaking a 2D/3D coincident vertex

» Indicator for snapping in 2D/3D

» Jump to extent when multiple records are selected in the Feature Attribute table

» Trim and Extend tool now only alters the end point of the line being trimmed or extended

» Utilizing a Map Exchange Document (MXD) for symbology on a feature database that contains feature class aliases now works

» Preference to disable double-click when using Reshape tool

» Stream shapefiles using the Workflow Improvement Module (WIM) from the GXP Xplorer catalog
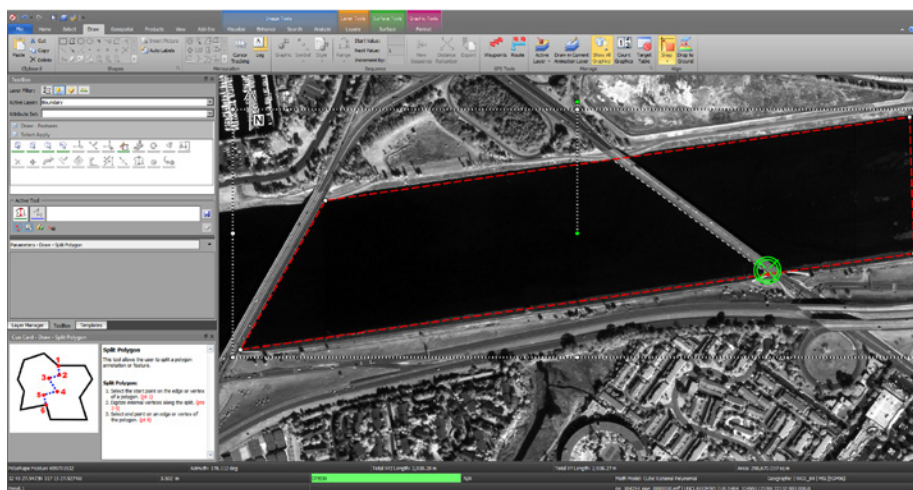
Split Polygon tool. Imagery provided by Maxar.

Python API

A new Python API has been added for SOCET GXP.

Key enhancements:

» Uses the C++ API as the backbone

» Full duplication of the functionality in the C++ API

» The Python API was designed to work with Python v3.7.3 64 bit

» Documentation and several examples including "Hello World", a feature query, image loading, and coordinate conversion are included in the DevKit installation

Additional enhancements

Numerous enhancements based on customer requests and other user-based requirements.

Key enhancements:

» Export products to Microsoft Word directly from SOCET GXP

» Automatically place a georegistered dot on the Automap to show image location

» Optionally utilize SIPS XML files to determine initial image display settings; SOCET GXP v4.4.0.6 updated to SIPS 2.4.13a

» Preview all bands contained within a multi-band image to enable viewing of signature changes across wavelengths

» New North arrow can be added as a default preference or drawn manually

» Set user-defined rectangles in ground space using width, height, and rotation

» Convert ground truth graphics into an AOI for advanced selection and operations

» New fill effects for polygons allow for blurring of pixels

» Create USMTF messages using information derived from imagery loaded into a Multiport

» Users can now stream data from a Coalition Shared Database (CSD) catalog plug-in in GXP Xplorer directly to SOCET GXP using the WIM

» Tracks from Tracking Analytics Software Suite (TASS) can now be saved as KML directly from the SOCET GXP Multiport

» EXIF coordinate population during JPEG saves can be toggled in Preferences

» AOI can now be used as an input to OpenFlight export

» Graphics can now be scaled based on Windows scaling factors

» Users can customize any time value displays to be a 24-hour format

» The Concentric Circles options for cursors will now allow for them to be calculated in ground space as opposed to average Ground Sample Distance (GSD)

» The Text with Line tool now allows endpoint styles to be selected

» *.ers files are now parsed for coordinate system information if they are co-located with JPG files opened in SOCET GXP

Key enhancements (continued):

» SOCET GXP logging has been greatly improved and allows for much greater levels of customization

» The Porthole and Swiper tools now work with streamed images

» GeoPackage Export now supports coded domains

» Scaling of text on 4K monitors with Windows scaling factors beyond simple increments of 100 (ie., 150%)

» The Target Table can now report up to four additional coordinate systems as defined in Preferences

» MGRS coordinate preferences support 10-digit coordinates

» Allow searching in the Workspace Manager to roll forward from the bottom of the metadata back up to the top

» Remember color ramp settings when closing and reopening the UI

» Update Controlled Image Base (CIB)-like production to support the generation of eCIB-like image tiles based on MIL-PREF-32466A

» Improve authentication with the GXP Xplorer Platform

» Export PDF without GeoPDF®

» Provide metadata within GeoPDF to include attributes such as classification

» Performance improvements for triangulation solve function

» Create GeoPackage export with or without imagery

GXP

Geospatial solutions to ensure **a safer world.**

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