



GEOSPATIAL EXPLOITATION PRODUCTS (GXP®)

GXP WebView

A Web-based, full-resolution image viewing tool for
visualization, annotation, measurement, and publishing
— providing access to remote data from any location.

Introduction and value proposition

The entire Intelligence Community requires the ability to rapidly add imagery into intelligence reporting and situational awareness products. BAE Systems' ubiquitous Web-based ELT, GXP WebView (Figure 1), provides a solution that can access, annotate, measure and disseminate the full range of GEOINT products.



Figure 1
GXP WebView

The Geospatial eXploitation Products (GXP®) group of BAE Systems developed GXP WebView. This new product enables the visualization, mensuration, and annotation of imagery within a Web browser regardless of the physical proximity to the data. The innovative GXP WebView Pixel Server streams data from where it natively resides directly to a Web browser.

Built on the core strengths of the legacy SOCET SET® digital photogrammetric workstation and the market-leading SOCET GXP® IA/GA desktop application, GXP WebView enables users to interact with full-resolution, geospatially referenced imagery within an intuitive and enterprise-accessible interface.

Many IA/GA processes still require the rigor and power of a desktop application such as SOCET GXP. GXP WebView, however, enables simpler tasks within a Web browser and puts imagery in the hands of a wider user community who require access to image data; decision makers, all-source analysts, fusion cells, and first responders, to name a few.

Modern technology made to work

GXP WebView is a server application with a browser-based interface developed using HTML5 technology. Supporting the Microsoft Windows® platform, GXP WebView utilizes the open, extensible and scalable GXP Xplorer® architecture. It can be virtualized across multiple machines and administered remotely. Figure 2 displays the combined GXP WebView and GXP Xplorer architecture color coded to identify architectural layers.

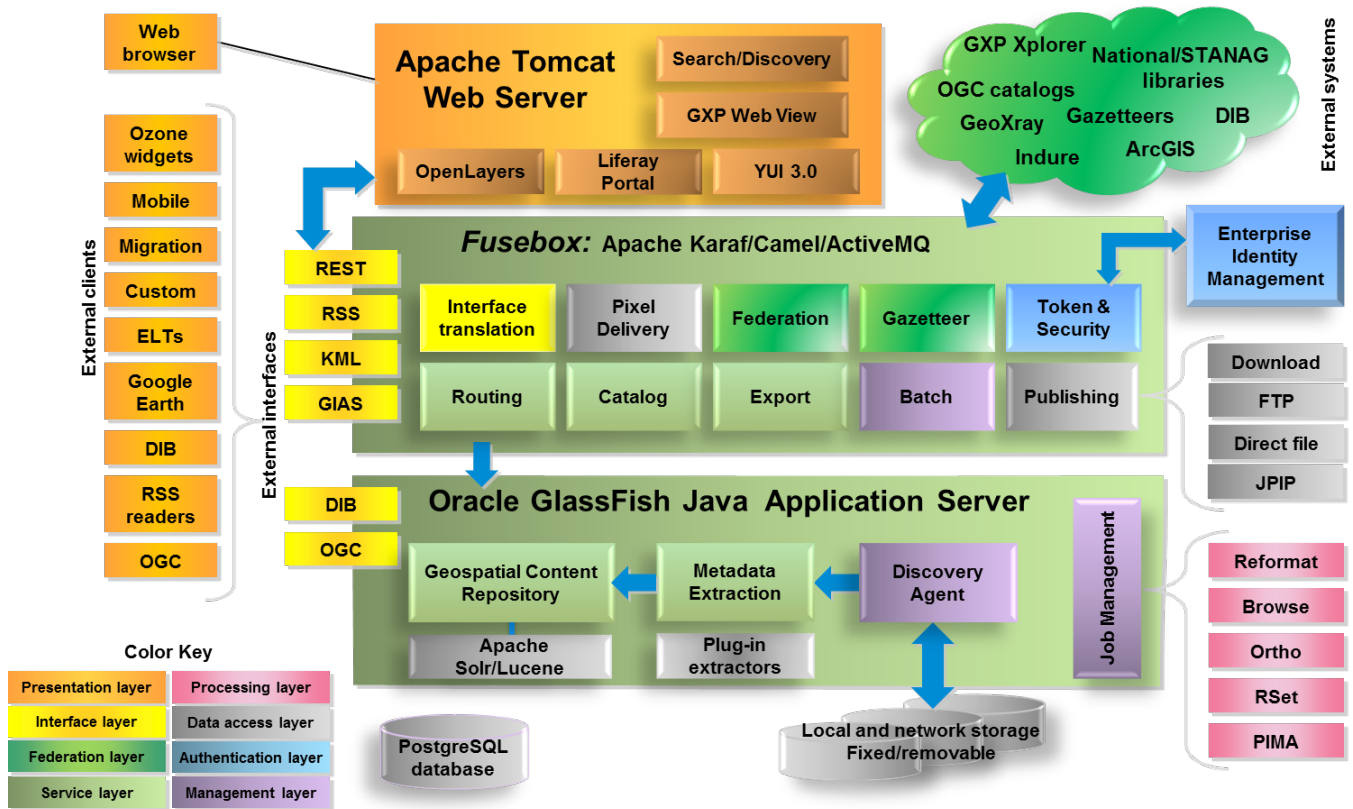


Figure 2
GXP WebView architecture

Satellite images today can easily approach file distribution limits. Downloading from a remote location could take hours or fail completely because of network interruptions, and file formats may require special software for pixel interaction. The GXP WebView Pixel Server leverages the capabilities of SOCET GXP, sharing the same underlying software components to stream data natively eliminating the need for full-product download or special software to start interacting with the pixels.

SOCET GXP loads data in its native format, which supports nearly 30 imagery formats; commercial formats such as JPEG2000, GeoTiff, NITF satellite imagery, and specialized commercial formats like CosmoSkyMed and SPOT imaging. The GXP legacy in photogrammetry yields an unmatched level of expertise in the implementation and support for rigorous sensor models for both domestic and international platforms.

Data access with GXP Xplorer®

Accessing imagery is made possible through the integration of GXP Xplorer®. GXP Xplorer is an innovative data management application with a powerful search and discovery engine that makes it easy to locate, retrieve, and share geospatial data on a local network or across an enterprise. Its design scales from a mobile device, to a laptop, to enterprise server configurations with Web browser access.

GXP Xplorer's catalog-in-place methodology points to files in their current location, eliminating the need to move large amounts of data around the network. The federation capability enables data access from multiple GXP Xplorer catalogs through a single Web interface, providing GXP WebView users access to imagery from multiple data sets, at multiple geographical locations, without excessive download times.

The Product Gallery within GXP Xplorer (Figure 3), enables the functionality to launch an image directly into GXP WebView, which opens in a separate tab in the same browser and immediately streams the image to the GXP WebView session. User preferences and layout are persisted, enabling exploitation to begin from the user's favorite and most productive configuration. This optimization provides a consistent, streamlined workflow to generate products efficiently.

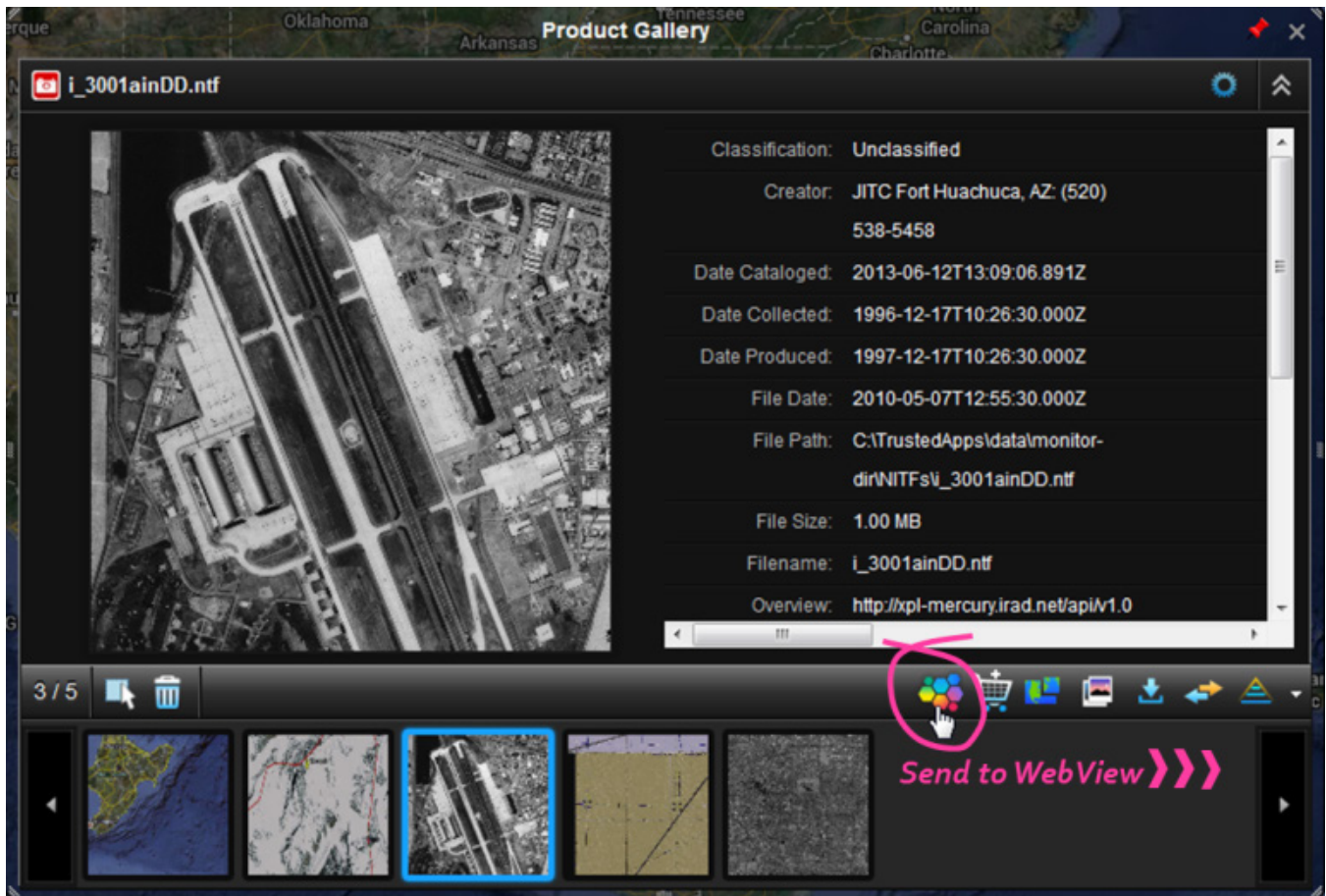


Figure 3
GXP Xplorer product gallery

Image visualization and manipulation

GXP WebView offers several methods for navigating and viewing imagery as well as image manipulation once launched from GXP Xplorer. Specific menu panels display based on the type of action to perform such as zoom, and tooltips appear on mouse hover with menu button functions. Traditionally, these actions are performed in a desktop application with dedicated processing power. However, with the GXP WebView Pixel Server and implementation of modern browser technology, these actions and other exploitation functions are performed directly in a Web browser.

Figure 4 displays the menu panels available within WebView; the associating descriptions detail the menu functionality.

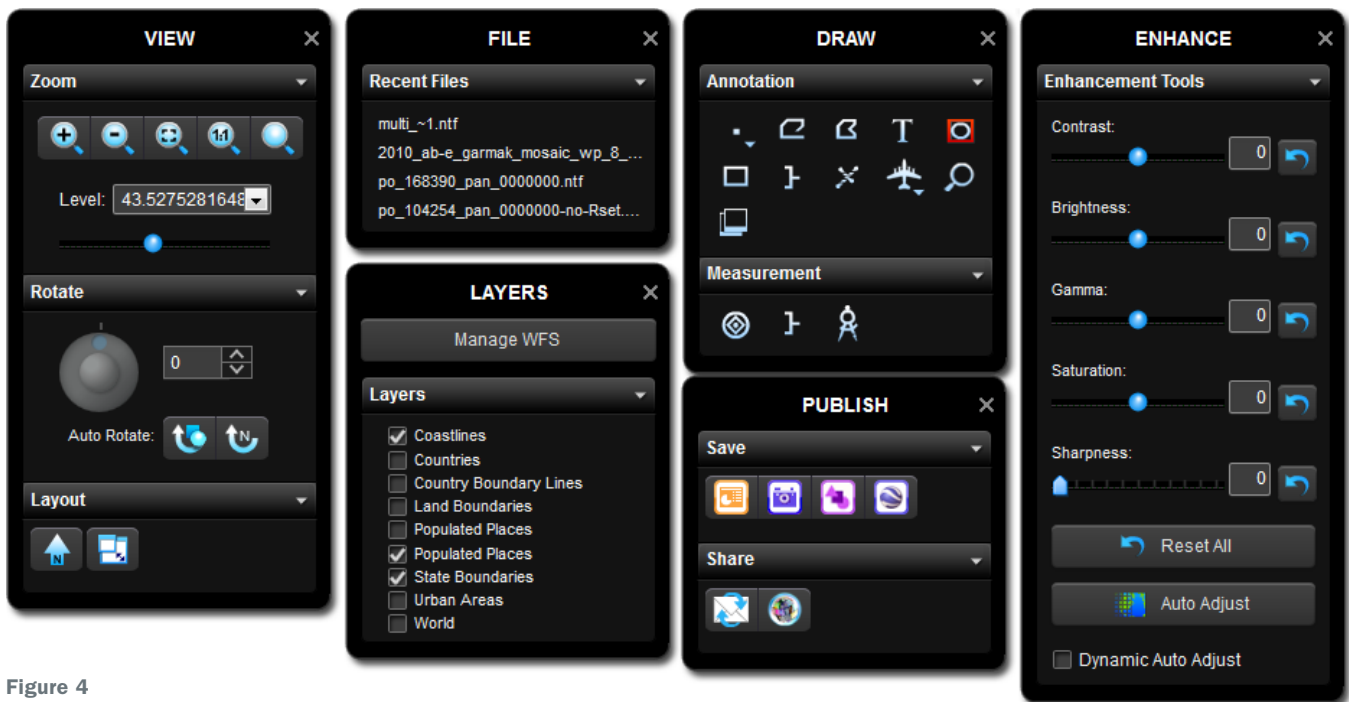


Figure 4
GXP WebView visualization
and exploitation panels

The View Panel

The View panel provides functionality to facilitate image analysis. Pan, zoom, and rotate the image via the mouse, or use pull-down menu options to define the levels of zoom. Rotate the image using the rotate wheel or select the Auto Rotate option to display the image in a north-is-up orientation. Layout options define whether to display a north arrow on the GXP WebView window.

GXP WebView automatically generates a cache of tiles based on the visible extent to optimize the display time for pixels when navigating around the image. Establishing the proper view angle and zoom level makes it easier to annotate features, collect metrics and conduct imagery analysis.

Microsoft PowerPoint® presentations continue to be the primary product by which intelligence briefings are presented. The Layout properties customize the aspect ratio, including the option to set the view area to automatically match Microsoft PowerPoint dimensions, which reduces the time spent editing and finishing the product. Additional layout settings are available to support different aspect ratios for specific output products.

The Enhance Panel

The Enhance panel provides functionality to enhance the image contrast, brightness, gamma, saturation, and sharpness. Enhancements are calculated on-the-fly within the browser. Sharpening, conversely, requires more difficult computation, and is calculated on the server; adjustments display within the browser. Automatic dynamic range adjustments are available to quickly remove flaws in the image and create an aesthetically pleasing picture. Manual enhancements enable users to make radical adjustments to images to help identify anomalies that were unnoticeable in the unadjusted image. Users can enhance individual parameters to make objects appear more distinguishable from their surroundings. The ability to perform these enhancements in a Web browser gives more users, who would typically require special software, access to powerful imagery manipulation tools.

The Draw Panel

The Draw panel offers a set of annotation and measurement tools that apply graphical overlays to the image within the Web browser. The annotation tools include point, polyline, polygon, text, ellipse, box, bracket, spoke and icons. The Magnifying Glass and Insert Picture functions are accessed from the list of available annotations. The Magnifying Glass tool can be dropped on to the image as a picture overlay. The measurement tools, marker, length, and area, use rigorous sensor model measurements to make calculations in ground space. The results display in image space within the browser.

The Layer Panel

GXP WebView integrates with the Open Geospatial Consortium (OGC®) Web Feature Service (WFS). The Layer panel functionality enables the connection to multiple WFSs and the dynamic display of features as graphical overlays on the image. The functionality to overlay features onto imagery is a form of intelligence fusion that increases the value of the set of features or the image to provide a comprehensive picture of the given area of interest. This simplistic case of multi-INT fusion provides the capability to combine the latest entries from a feature database to current satellite imagery displaying identifiable changes quickly from the feature baseline.

Product generation and dissemination

After image manipulation is completed with the required location and zoom level, measurements, and annotations, GXP WebView generates a What You See Is What You Get (WYSIWYG) product.

The Publish panel displays the output formats available for the specific WYSIWYG: Microsoft PowerPoint, JPEG, PNG and Google Earth. Future versions of GXP WebView will include a Dissemination panel with options to send via email/FTP, send to GXP Xplorer and send to Twitter/Facebook.

Figure 5 displays an example of a product generated using the tools within GXP WebView. The capability to view imagery and create annotated products in a Web browser is impressive, but annotations made to the image are lost once the browser session ends. GXP WebView provides publish and disseminate capabilities to persist and share those annotated products.

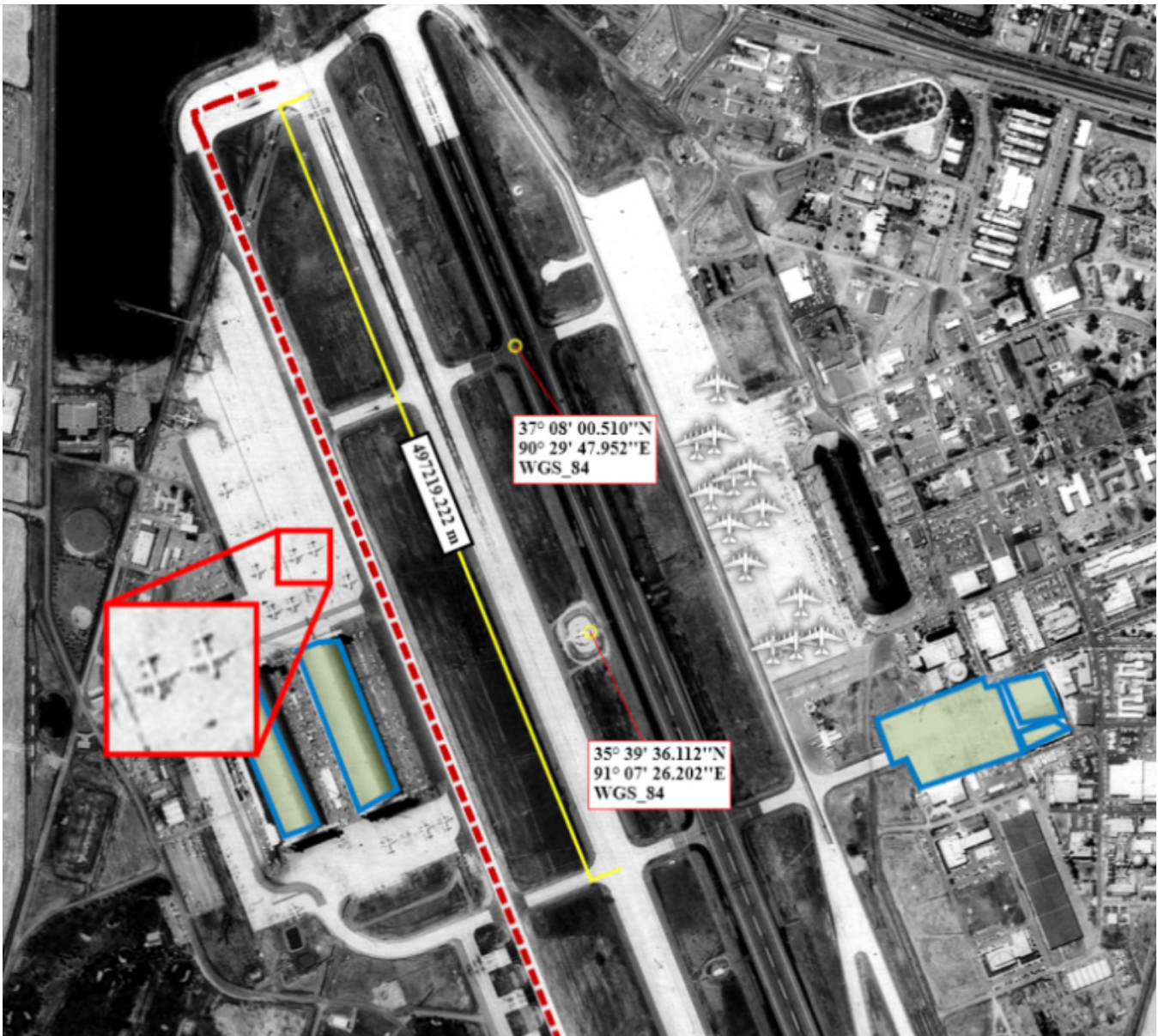


Figure 5
Sample product annotated
with GXP WebView

Summary

Imagery is a critical part of any intelligence product whether performing traditional imagery analysis or creating products as part of a fusion cell. More users have access to imagery, which adds value to the intelligence lifecycle – Web access with GXP WebView means more users can visualize image data.

GXP WebView merges the universal accessibility of Web-based applications with the reliability, accuracy and intuitive usability expected from desktop exploitation tools. It integrates the technology of photogrammetric software development experience refined over 25 years, and supports commercial and national imagery formats. Fully integrated with a catalog, search, and discovery product such as GXP Xplorer, GXP WebView provides capabilities to view, annotate, and publish products faster than order-based exploitation workflows, and empowers users throughout the enterprise to rapidly add imagery into intelligence reporting and situational awareness products.

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