EarthWorX
Quick Start

APPLICATION NOTE

August 2014

Description: Introduction to using EarthWorX (Microsoft Bing mapping services, Esri Tile and Mapping services, or Google maps) in GraphWorX64 displays.
General Requirement: Internet connection or Esri GIS server connection.

Introduction

EarthWorX is a tool that allows you to insert geospatial information into your GraphWorX64 displays in order to add context to your data. This document will introduce you to EarthWorX and will walk you through how to incorporate it into your displays.

Creating an EarthWorX viewer in a display

The following steps can be used to integrate an EarthWorX viewer into a new display.

1. Open GraphWorX64.
2. Select the "Controls" ribbon and select the "EarthWorX Viewer" button in the ribbon.

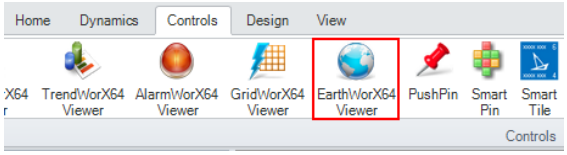

Figure 1 - EarthWorX Viewer button in the Ribbon

3. Click, drag, and release into an area of the GraphWorX64 display area in order to create a new EarthWorX viewer.
4. A warning message will appear notifying you that GraphWorX64 would like to change your display resolution. This is in order to make better use of the tile data you are receiving which is 512 X 512 pixels by default. Click "Yes" to continue.

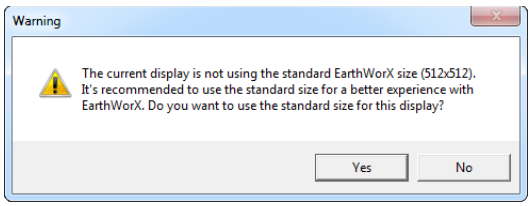

Figure 2 - Warning message about size of EarthWorX Viewer

NOTE: If you instead select "No" the EarthWorX Viewer will still be added to the display, but the resolution will not be modified. This advanced use of EarthWorX Viewers can be used to create map views of non-standard sizes.

You will see that the display resolution has been resized and that a map of the world appears in it. You have successfully added an EarthWorX Viewer into your display.

Customizing the EarthWorX Viewer

It is important to realize that EarthWorX is not a separate "provider" in GENESIS64 as some other components are (such as AlarmWorX64 or GridWorX64). Instead, EarthWorX is an enhancement of GraphWorX64 designed specifically for the purpose of adding geospatial information to displays. There are a number of enhancements to the GraphWorX64 configuration environment that are made available to you once you start using the EarthWorX Viewer in a display:

- **Display Zoom** – You can use the zoom capabilities to increase or decrease the zoom detail of the display. As you zoom in or out the EarthWorX Viewer will automatically update the tiles shown in order to provide the best representation for the view area. Specifying the minimum and maximum zoom level of the display can help lock the display to specific areas.
- **Latitude & Longitude** – Once an EarthWorX Viewer has been included in a display you will find that all display objects now have optional "Latitude" and "Longitude" settings. With these you can specify the exact coordinates of objects if known for more accurate placement. They can also be configured to read from a data source for real-time updating during runtime.
- **Display Clipping** – You can limit the EarthWorX Viewer to a certain region of the world using the clipping options available in the EarthWorX contextual ribbon.

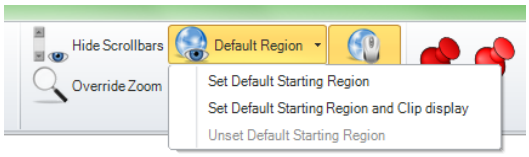

Figure 3 - Setting the Default Starting Region

- **Map Type** – You can select other map display formats other than the default used (depending on the map data source used)

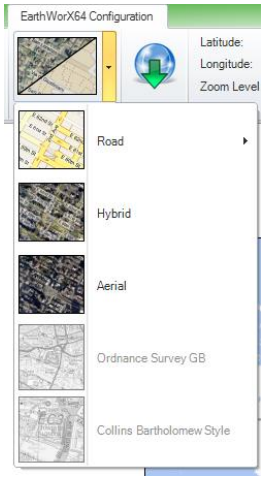

Figure 4 - Different Map Types for Bing provider

Map System used for EarthWorX tiles

The EarthWorX provider is a generic tool that can be used to visualize a wide variety of geospatial sources in your SCADA application. By default, EarthWorX viewers added to GraphWorX64 displays will be configured to use Bing Maps from Microsoft. However, you can configure your EarthWorX Viewer to use Bing Maps, Esri Maps, Google Maps, or OGC/WMS Maps.

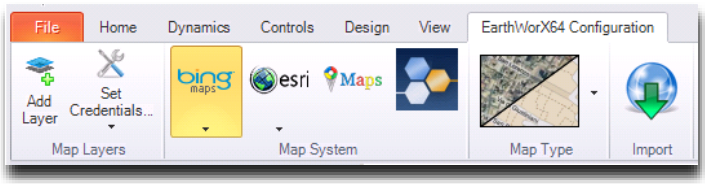

Figure 5 - EarthWorX Configuration Ribbon

Bing

Bing maps are fully navigational road maps that are available through the Bing network. Bing maps are also the default map type for EarthWorX projects. By default, EarthWorX uses the Demo Tile System - a free, account-less demonstration system for mapping. Some mapping features are not available with this option.

Selecting the Bing icon will by default transform the selected region into a Bing Road map (No Shade).

To set Bing credentials, click on the Set Credentials button, and then select Bing. This lets you provide your credentials (Bing maps key) for your Bing Maps Developer account. To sign up for an account, go to https://www.bingmapsportal.com/

Esri/ArcGIS

Esri maps are fully navigational satellite images available through Esri (Environmental Sciences Research Institute). By setting credentials, users also have the ability to access Esri's vast online network of GIS layers.

Selecting the Esri icon will by default transform the selected region into an Esri Imagery map. Esri maps are can also be customized by Map Type. The Esri network has access to 7 types of maps: Imagery (default setting), World Boundaries and Places, Streets, Topographic, Light Gray Canvas, National Geographic, Oceans, as well Custom tile sources available for download through the Esri database. For details, see the Help files.

To set Esri credentials, click on the Set Credentials button, and then select Esri. This lets you provide sign in credentials (Username and Password) for an Esri account. To sign up for an account or free trial, go to http://www.arcgis.com/about/

Once you have set credentials for Esri, you have the option to toggle between Custom Esri Maps and Default Esri Maps. Custom Esri Maps can only be accessed if the user is logged into the Esri network by setting Esri credentials or by logging in through the Esri website. By selecting this option, 8 Map Types will become available to the user as well as a Custom Tile Source which allows the user to directly access custom Esri and ArcGIS maps through the Esri database.

Google Maps

Google maps are fully navigational hybrid maps available through Google maps.

Please note that there are some limitations to using the Google maps provider within EarthWorX. Google limits the number of map loads per day, and if this limit is exceeded it will cause EarthWorX to stop getting map tiles from Google.

OGC/WMS Maps

OGC/WMS maps are fully navigational GIS maps available through the OGC (Open Geospatial Consortium).

Selecting the OGC/WMS icon will not automatically alter the map. First you need to click on the Set Credentials button, and select OGC/WMS. An OGC/WMS Connection Setup menu will then appear. After filling out the fields on this window, you can click on the OGC/WMS icon to change the map. Please consult the Help files for more details.

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Best Practices for development with EarthWorX Viewer

There are a number of best practices that you can follow when developing your displays using EarthWorX that will ease development. A few of them are:

- Decide on the range of map you will use and clip the display to these bounds before placing other objects. This will help keep objects in the correct location and prevent you from unnecessarily developing outside of the boundaries.
- Use multiple layers on the map if you are going to have a wide range of zoom levels. In order to make development easier and to improve user experience, consider having multiple layers with objects of differing levels of detail to best represent the detail needed at each zoom level. They can selectively be shown or hidden based upon the de-clutter settings on the Layer.
- Use EarthWorX Viewers in embedded GraphWorX64 Viewers. Rather than having the EarthWorX content integrated into the same display as the main content for your application, consider placing the EarthWorX Viewer into a dedicated GraphWorX64 display that is then embedded into the primary GraphWorX64 display. This will help keep them from conflicting during operation and allow you to independently control and resize objects.

What's New in 10.85

Some new features have been added to 10.85 for EarthWorX. New features include security credentials, multi-platform availability, and changes in the way map layering works.

Security

In EarthWorX in 10.85 users can enter their map provider credentials on platforms other than the desktop. Now users can enter their credentials on any platform, and EarthWorX will communicate with the FrameWorX Server to access those stored credentials. This security feature is only available on all platforms for the Bing map provider. The Esri security credentials can only be accessed from the desktop in Workbench Classic. There is no access to the Esri credentials from WebHMI or MobileHMI.

Multi-platform availability

The most important new feature for EarthWorX in 10.85 is the multi-platform availability. EarthWorX functionality is now available on Silverlight, WinRT, Windows Phone, and HTML5 (Android and iOS) through AnyGlass. In previous versions functional EarthWorX was only available through the desktop, and there was only screenshot support for EarthWorX through MobileHMI.

Now you can browse, zoom, pan, etc. through any platform. All basic map features are supported. Other supported map features include default regions and map layering visibility and opacity. AnyGlass clients operate maps directly, meaning that they communicate directly with the map provider. Each tile is displayed separately.

Map Layering

Map layering (and visibility/opacity for layers) is supported on all platforms. You can display multiple images on each map. The setup process has been simplified and the way tiles are displayed has been changed. Each tile is displayed separately, which improves EarthWorX behavior.

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