Geospatial Analysis at Your Fingertips: Imagery and Terrain from On-Line Services

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Carrollton, KY
Outline

• Background
• Services
• Analytics
• Examples
• Summary/Conclusions
Background

Rapidly accumulating web mapping services (KYAPEP)

- Imagery acquired at increasingly higher spatial and spectral resolutions
- Terrain data acquired at increasingly higher accuracies (LiDAR)
- Ease of consumption by different software clients in different environments
- GIS analytics include remote sensing tools
Outline

• Background
• **Services**
• Analytics
• Examples
• **Summary/Conclusions**
Data (and *information*) Provisioning

- Kentucky Division of Geographic Information (DGI)
- Office of Application Development (OAD)
- Commonwealth Office of Technology (COT)
- Finance and Administration Cabinet (FAC)
KYAPED

(Kentucky Aerial Photography and Elevation Data Program)
News

August 20, 2013: It is that time of year again! DGI and its KyFromAbove partners are beginning their review of Imagery and LiDAR data that was acquired during the Spring of 2013. Check out these two status maps for more information on when the LiDAR data was collected and the which partners were part of this truly collaborative effort. Inventory by Year | Agency

All 1” resolution imagery from the the 2012 KyFromAbove effort is now available for download via the Geoportal or it can be accessed via an ArcGIS Server Image Service. Use this simple viewer to take a peek at this new resource.

Select datasets from the the 2012 KyFromAbove effort are now available for download or access via the KyGeoNet’s ArcGIS Server Image Services. All of the 6” imagery for Franklin, Kenton, Campbell, Oldham, Jefferson, and Bullitt Counties is available and the new 5” DEMs are online for over 40% of the Commonwealth. Use the Geoportal to search for the downloadable datasets and image services that are associated with these resources.

The acquisition of both aerial photography and elevation data in 2012 was successful within the time frame and project scope. The data will likely continue up until the end of 2012. Model (DEM) data files derived from previously collected LiDAR data will be available for download when the data is often for informational updates.

Acquisitions for the Kentucky Aerial Photography and Elevation Data Program (KYAPED) will be made available in the coming weeks. Data is not yet made available.

An award has been made for RFP 756-1200000087, Digital Orthomagesy and LiDAR. The contract includes additional information, please visit the Commonwealth's eprocurement website:

Partnering Listing

(2012 and 2013)

Kentucky Division of Geographic Information
Kentucky Transportation Cabinet
Kentucky Abandoned Mine Lands
Kentucky Division of Water
Link-GIS/NKAPC
Louisville-Jefferson County Information Consortium
Boone County Planning Commission
City of Florence
Frankfort Plant Board
Fort Knox
Hardin County Fiscal Court
Paducah/McCracken County
Kentucky State University
United States Geological Survey
USDA - Natural Resources Conservation Service
FEMA

http://kygeonet.ky.gov/kyfromabove/
Data Provisioning

• Metadata query – textual/spatial

Kentucky Geoportal/Geography Network (KY Geonet)
Welcome to the Kentucky Geography Network. The KyGeoNet is the Geospatial Data Clearinghouse for the Commonwealth of Kentucky. A variety of datasets can be located and downloaded, static map products can be viewed, and many web mapping applications and services are easily accessible. Use the powerful search capabilities of the Kentucky Geoportal to locate maps and geographic data content for a particular part of the state or search based on keyword or content type. If you’re not looking for data but want to explore some web maps please browse the currently highlighted content using the KyGovMaps page or check out our guidance documents on how to connect directly to our ArcGIS server services.

New Cached Street Base Map

DGI Releases New Cached Street Base for the Commonwealth
Kentucky’s GIS users now have another base map option that focuses primarily on streets, airports, rail, and hydrography. The service was designed to work well with Esri’s base maps and include all the layers in the Commonwealth Map Base with the exception of imagery layers. The new base map can be accessed within the Commonwealth Map by selecting the “KyStreets” button in the base map switcher at the top of the viewer.

2012 KyFromAbove Imagery Available for Download
One foot resolution orthoph imagery collected in 2012 by the KyFromAbove Program is now available for download from the KyGeoNet. Use the link below to access the metadata and FTP link for this newly available data.

Download KyFromAbove Imagery using the Commonwealth Map
You can now download the new KyFromAbove 6 Inch Aerial Photography directly from the Commonwealth Map. Simply turn on the “Data Tiles Grid (6 Inch Aerials -2012)” in the Layers listing and zoom into one of the available areas. Click in a SS tile and you’ll be presented with a popup that includes the tilename, direct FTP link to the imagery for that tile, and the year it was acquired.

http://kygeonet.ky.gov/
Imagery Services
(Digital Orthoimagery – multispectral!)
KYAPED Imagery
(Service Status as of Aug. 2013)
Data Provisioning

• Image Server services
  - Web browser - based
Folder: ImageServices

Current Version: 10.11

View Footprints In: ArcGIS.com Map

Services:

- ImageServices/Ky_Benton_2009_1FT (ImageServer)
- ImageServices/Ky_Boone_2007_6IN (ImageServer)
- ImageServices/Ky_Bullitt_2009_6IN (ImageServer)
- ImageServices/Ky_CanopyClosure_2001_30M (ImageServer)
- ImageServices/Ky_Clarke_2011_1FT (ImageServer)
- ImageServices/Ky_Clarke_2011_6IN (ImageServer)
- ImageServices/Ky_DOQ_BW_PHASE1_1M (ImageServer)
- ImageServices/Ky_DOQ_BW_PHASE2_1M (ImageServer)
- ImageServices/Ky_Fayette_2007_6IN (ImageServer)
- ImageServices/Ky_Fayette_2010_1FT (ImageServer)
- ImageServices/Ky_Frankfort_2006_1FT (ImageServer)
- ImageServices/Ky_Geologic_Quadrangle_Maps (ImageServer)
- ImageServices/Ky_Henderson_2009_1FT (ImageServer)
- ImageServices/Ky_ImperviousAreas_2001_30M (ImageServer)
- ImageServices/Ky_Jefferson_2009_6IN (ImageServer)
- ImageServices/Ky_KLCD_2001_30M (ImageServer)
- ImageServices/Ky_KRG_LEGACY (ImageServer)
- ImageServices/Ky_KRG_MUTED (ImageServer)
- ImageServices/Ky_KRG (ImageServer)
- ImageServices/Ky_KYAPED_2012_1FT_IR (ImageServer)
- ImageServices/Ky_KYAPED_2012_1FT_WGS84WM (ImageServer)
- ImageServices/Ky_KYAPED_2012_1FT (ImageServer)
- ImageServices/Ky_KYAPED_Franklin_2012_6IN (ImageServer)
- ImageServices/Ky_KYAPED_NKY_2012_6IN (ImageServer)
- ImageServices/Ky_LOJIC_2012_6IN (ImageServer)
- ImageServices/Ky_Mayfield_2009_1FT (ImageServer)
- ImageServices/Ky_Murray_2009_1FT (ImageServer)
- ImageServices/Ky_NAIP_2004_1M (ImageServer)
- ImageServices/Ky_NAIP_2006_2FT (ImageServer)
- ImageServices/Ky_NAIP_2008_1M (ImageServer)
- ImageServices/Ky_NAIP_2010_1M (ImageServer)
The KYAPED “advantage”

- High spatial resolution: 1 foot statewide (sometimes 6 inch)
- Multispectral: 4 bands (RGB, nIR)
- Radiometry: 8 bit/16 (11) bit
- Leaf-off
Applications

- Imperviousness
- Land Cover/Land Use Change
- Vegetation analysis
- Environmental impact assessment
- Landscape change monitoring
- Hydrologic modeling
- Etc.
Elevation Services
(LiDAR = Laser altimetry)
LiDAR (light detection and ranging) is a technology through which a laser is fired at the ground from an airplane to measure distance to the ground. LiDAR was developed as a fast and effective way to gather digital elevation model (DEM) data. With state-of-the-art Leica ALS50 (83kHz) and Optech ALTM 2050 (50kHz) LiDAR sensors, and many thousands of square miles of data successfully acquired and processed, Sanborn sets the highest standard of accuracy and reliability for LiDAR technology.
KYAPED LiDAR DEM
(Service Status as of Aug. 2013)
Folder: ElevationServices

Current Version: 10.11

View Footprints In: ArcGIS.com Map

Services:

- ElevationServices/Ky DEM KYAPED 5FT Hillshade (ImageServer)
- ElevationServices/Ky DEM KYAPED 5FT PercentSlope (ImageServer)
- ElevationServices/Ky DEM KYAPED 5FT ShadedRelief (ImageServer)
- ElevationServices/Ky DEM KYAPED 5FT (ImageServer)
- ElevationServices/Ky DEM LOJIC 2009 5FT (ImageServer)
- ElevationServices/Ky DEM USGS 10M (ImageServer)
- ElevationServices/Ky Hillshade 10M (ImageServer)
- ElevationServices/KY ShadedRelief USGS 10M (ImageServer)
- ElevationServices/Ky Slope USGS 10M (ImageServer)

Supported Interfaces: REST SOAP Sitemap Geo Sitemap

http://kyraster.ky.gov/arcgis/rest/services/ElevationServices
ArcGIS REST Services Directory

Home > services > ElevationServices > Ky_DEM_KYAPED_5FT_ShadedRelief (ImageServer)

JSON | WFS | WMS

ElevationServices/Ky_DEM_KYAPED_5FT_ShadedRelief (ImageServer)

View In: ArcGIS JavaScript  ArcGIS.com Map  Google Earth  ArcMap

View Footprint In: ArcGIS.com Map

Service Description: This Dynamic Image Service provides access to a 5 Foot Digital Elevation Model (DEM) with a Shaded Relief function applied to the service as it becomes available through the KYAPED Program.

Name: ElevationServices/Ky_DEM_KYAPED_5FT_ShadedRelief

Description: This Dynamic Image Service provides access to a 5 Foot Digital Elevation Model (DEM) with a Shaded Relief function applied for select areas as they become available through the KYAPED Program.

Single Fused Map Cache: false

Extent:

XMin: 3798940
YMin: 3356425
XMax: 6019070
YMax: 4308265
Spatial Reference: 102763 (3857)

Initial Extent:

XMin: 3798940
YMin: 3356425
XMax: 6019070
YMax: 4308265
Spatial Reference: 102763 (3857)

Full Extent:

XMin: 3798940
YMin: 3356425
XMax: 6019070
YMax: 4308265
Spatial Reference: 102763 (3857)

Pixel Size X: 5.0

http://kyraster.ky.gov/arcgis/rest/services/ElevationServices/Ky_DEM_KYAPED_5FT_ShadedRelief/ImageServer
The KYAPED “advantage”

- High spatial resolution: 5 foot DEM statewide
- High accuracy: supports 2 foot contour interval
- Vertical accuracy: 18 inches (FEMA)
Applications

• Digital terrain modeling
• Cut/fill analysis
• Hydrologic/hydraulic modeling
• Topographic change change analysis
• Etc.
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NDVI
Imperviousness / Urban green spaces
Louisville (SoBro)
LiDAR/Imagery Provisioning Services

- NASA’s Reverb | ECHO: [http://reverb.echo.nasa.gov](http://reverb.echo.nasa.gov)
- Clark County GIS LiDAR:
  - [http://www.ccgisonline.com/clarkcountygisservices/lidar.html](http://www.ccgisonline.com/clarkcountygisservices/lidar.html)
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Summary/Conclusions

- Elevation and Imagery Services readily available

- Consumable by different clients:
  - Google Earth
  - ArcGIS Online
  - ArcGIS Desktop

- Analytic workflows for image and terrain analysis implemented in ArcGIS 10.1 - and ArcGIS Online Online (coming soon)!
Useful Links

- Kentucky Division of Geographic Information (http://gis.ky.gov)
- Kentucky Geography Network (KYGEONET) (http://kygeonet.ky.gov)
- Kentucky Geoportal (http://kygissserver.ky.gov/geoportal/catalog/main/home.page)
- Kentucky Aerial Photography and Elevation Data Program (http://kygeonet.ky.gov/kyfromabove/)
KYAPED Contacts

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