Remote Sensing Information Gateway (RSIG3D)

Advanced High Computing Application Enables Easy Access to Atmospheric Databases and Provides 3D Visualization Capabilities

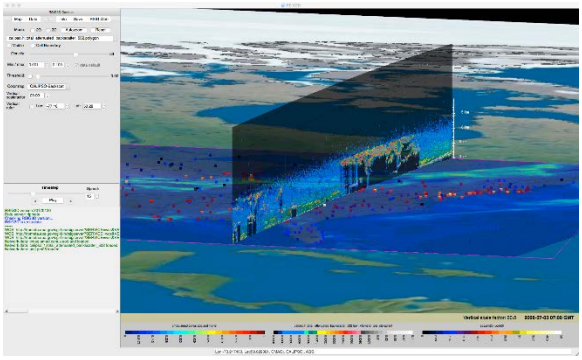
What is RSIG3D?

The Remote Sensing Information Gateway-3D (RSIG3D) is a free and downloadable application that provides easy and secure access to petabytes (millions of gigabytes) of atmospheric data that can be used to study complex air quality issues. RSIG3D enables users to easily access data from multiple sources in minutes and explore the data by geographic location and time using sophisticated 3D visualization capabilities. Since inception in 2005, RSIG has been used by over 100 institutions worldwide and its development continues to evolve with new data and capabilities added every year.

What are the benefits of using RSIG3D?

Atmospheric scientists require access to air quality data from ground stations, aircraft and satellites to assist them with model evaluation and analysis, including exceptional air quality events such as large-scale wildfires. RSIG3D provides unparalleled high performing data retrieval and use for improved modeling capabilities. Key features include:

- **One access point to many data sources.** The RSIG3D provides a single website that serves as a selective access point to many kinds of data.
- **Streams only the needed data.** The RSIG3D accesses large numbers of files from diverse sources and streams the user-selected subset of data. The data goes directly to the client computer's memory and is discarded unless the user saves it to a file.



A screenshot from RSIG3D that shows several data sets within the new graphical user interface.

- **Aggregates separate data files into a single stream.** RSIG3D aggregates the multiple files of a given data type into a single stream, reducing the download burden and simplifying data analysis.
- **Built-in visualization.** RSIG3D can immediately integrate multiple selected datasets into a single MPEG animation. For example, EPA AirNow data can be layered over NASA's MODIS satellite data, or a user can compare CMAQ model predicted outputs and actual ground sensor data. The user can also save the animation or individual images to their computer.
- **Saves data to standard formats.** RSIG3D integrates incoming proprietary dataset formats into standard formats. Users can save the data or visualization--or both--to their local computer in such standard formats as portable binary, ASCII, NetCDF IOAPI and COARDS, GeoTIFF, MPEG and KMZ. The user can then export the selected datasets from RSIG3D into other applications such as GIS tools for further analysis.

- **Fast.** RSIG3D accomplishes all of this far faster than a lone user could with currently available means. For example, RSIG3D can capture a week of MODIS AOD data in a few minutes, compared to two months using conventional web-form ordering/ftp approaches.

How is RSIG3D used?

RSIG3D is used to support modeling and exposure research by EPA and others. EPA researchers use the application to assist in model-to-measurement comparison with satellite data available in RSIG3D. Others have used RSIG3D to access satellite data, in additional to access to CMAQ modeling results to support exposure research

What data is available on RSIG3D?

RSIG3D maintains a dynamic inventory of atmospheric data from multiple federal agencies. Data currently available include:

NASA satellites measurements:

- MODIS: Aerosol Optical Depth (AOD), Cloud Optical Thickness (COT), ozone, pressure, temperature
- CALIPSO: L1b Backscatter and Depolarization and L2 Aerosol and Cloud: Backscatter, Extinction, Depolarization, Aerosol/Cloud Layer Fraction and Column Optical Depth.
- OMI: (Ozone Monitoring Instrument): CONUS Berkeley High Resolution (BEHR) NO2 retrieval.

National Oceanic and Atmospheric Administration measurements:

- GOES/GASP: Aerosol Smoke Product Aerosol - Optical Depth
- VIIRS: High-Resolution aerosol optical depth
- NESDIS: Wildfire-related pollutants

Hazard Mapping System: satellite-detected wildfires

EPA Monitoring Data:

- AirNow Program: hourly ozone, PM2.5
- Air Quality System: ozone, PM2.5
- Ceilometer: aerosol, cloud mixing-layer height, and backscatter profiles
- NEUBRew Brewer spectrophotometers measuring ozone.

EPA Modeling Data:

- WRF-CMAQ
- Fused Air Quality Surfaces Using Downscaling (FAQSD) - daily ozone (8-hr max) and fine particulate air (24-hr average) data

Aircraft Data:

- Measurements of Ozone, etc. by Airbus aircraft (MOZAIC) data: Ozone, CO, H2O, temperature, wind, etc.

The RSIG Team continues to add data sources to meet user demands.

Getting Started

Download the application and get instructions, tutorials and troubleshooting information at www.epa.gov/rsig. A list of available datasets is provided.

There are two user interfaces to RSIG. RSIG3D is a standalone application (Windows or OSx), which must first be downloaded to your computer and unzipped. It provides a richly immersive and interactive visualization capability. RSIG2D, a legacy software, is a Java applet that runs inside your web browser and is not recommended.

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