



Plug-and-play web-based visualization of mobile air monitoring data

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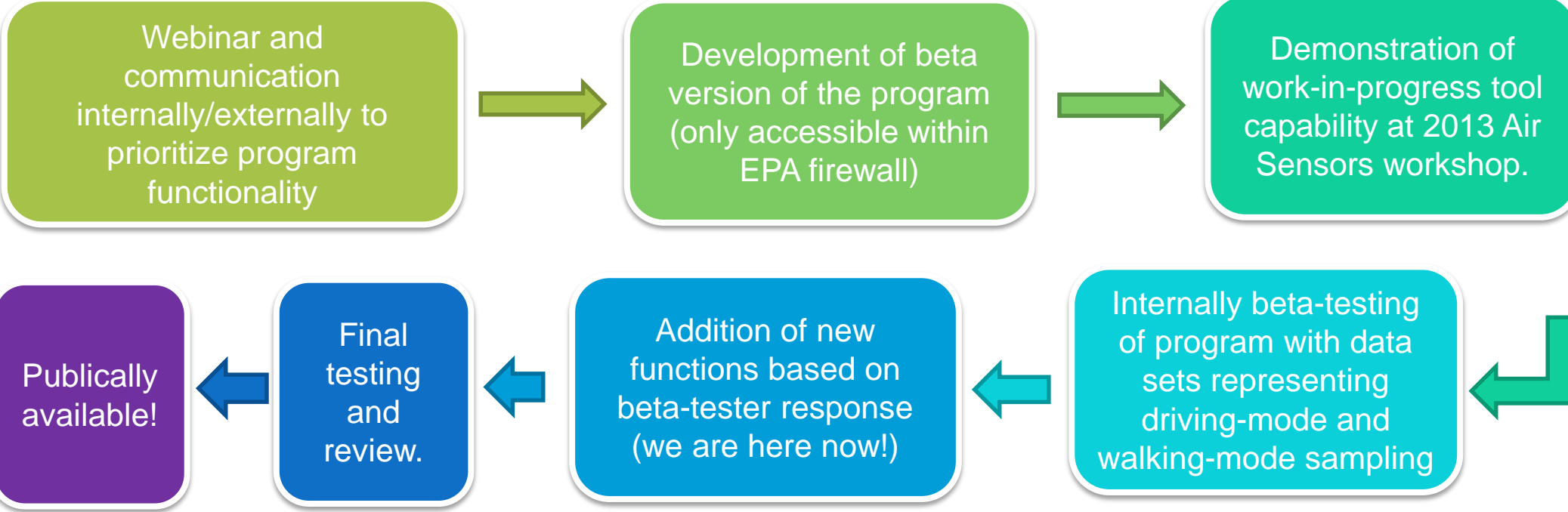
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Introduction

The collection of air measurements in real-time on moving platforms, such as wearable, bicycle-mounted, or vehicle-mounted air sensors, is becoming an increasingly common method to investigate local air quality. However, visualizing and analyzing geospatial air monitoring data requires advanced data analysis skillsets that limit participation in data analysis to few individuals. EPA's Real-Time Geospatial (RETIGO) Data Viewer web-based tool is a new program that reduces the technical barriers to visualize and understand geospatial air data time time series.

RETIGO: Development process



RETIGO: Making data import as easy as possible

Program provides:

- Options to import geospatial air data and wind speed/direction data, and overlay AirNow data.
- Standardized and flexible data input format that supports many columns of air monitoring variables, multiple monitoring packages, disordered time
- Tool to convert many timestamp options to the UTC/ISO 8601 international standard

Required columns

Timestamp(UTC)	EAST_LONGITUDE(deg)	NORTH_LATITUDE(deg)	ID(-)
2012-07-18T15:44:00-00:00	-78.9979	35.9508	route1
2012-07-18T15:44:19-00:00	-78.9947	35.9470	route1
2012-07-18T15:44:57-00:00	-78.9896	35.9361	route1
2012-07-18T15:45:58-00:00	-78.9846	35.9172	route1
[etc...]			

Flexible number of data columns

ozone(ppb)	pm2.5(ug/m^3)
49.0491	32.6768
43.2706	26.7231
42.3130	34.1504
47.7046	33.2918

RETIGO Timestamp Converter

This tool can convert timestamps from a variety of formats to the UTC/ISO 8601 timestamp required by RETIGO. The converted timestamps can be copied and pasted into another application (such as a spreadsheet) to create a valid RETIGO input file.

- 1) Select the format of your timestamp data.
- 2) If needed, specify the timezone and starting date of your data. Note: not all formats require this information.
- 3) Paste your timestamp data into the box below (one timestamp per line).
- 4) If desired, specify the timezone of the converted data. While not required, this is offered as a convenience if you prefer to see timestamps relative to a particular timezone.
- 5) Hit the "Convert" button to convert the timestamps into the format used by RETIGO.

Format:

Original Timezone:

Starting Date:

Output Timezone:

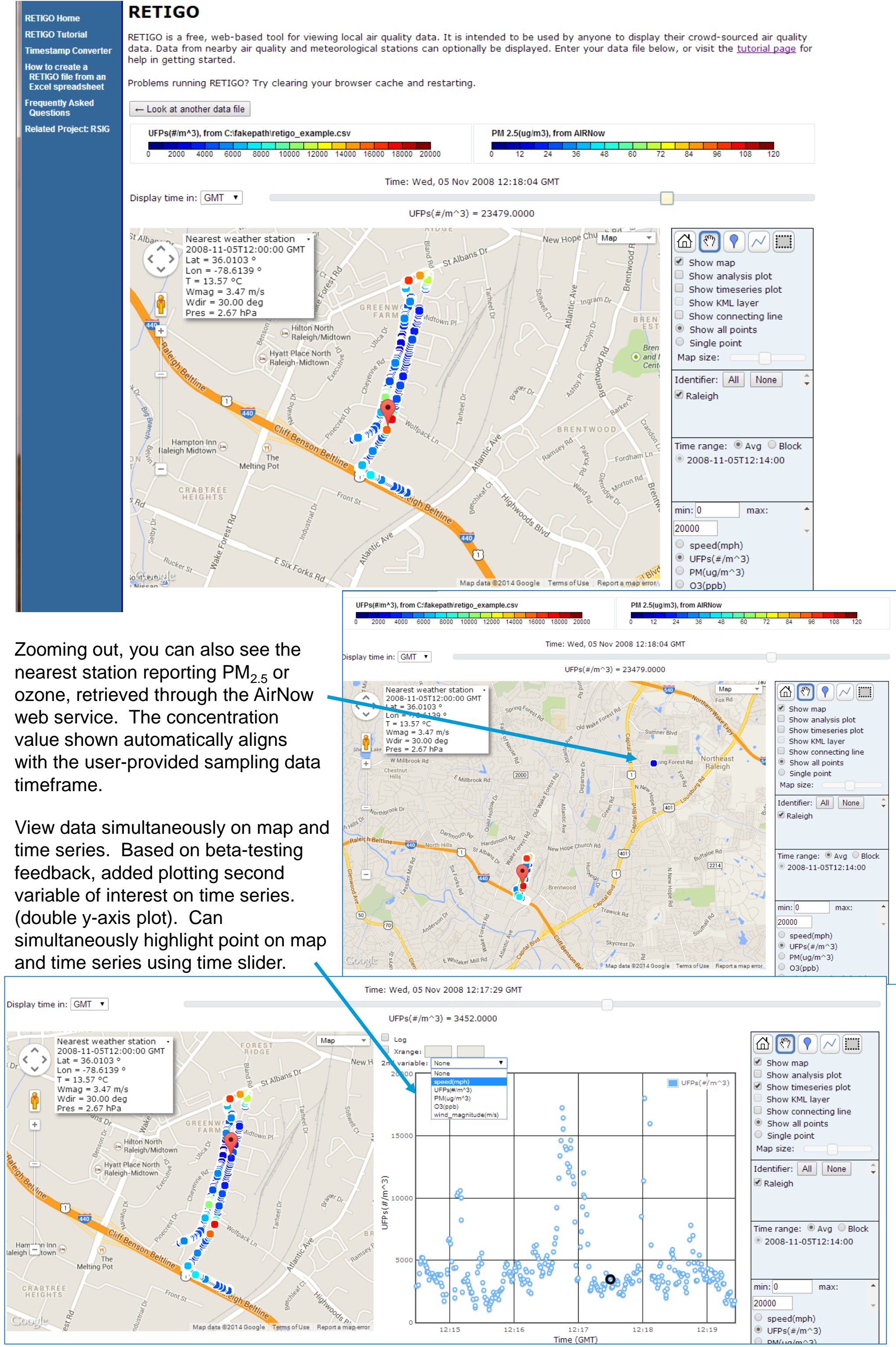
Paste list of timestamps here:

Converted timestamps:

How does RETIGO help me explore my data?

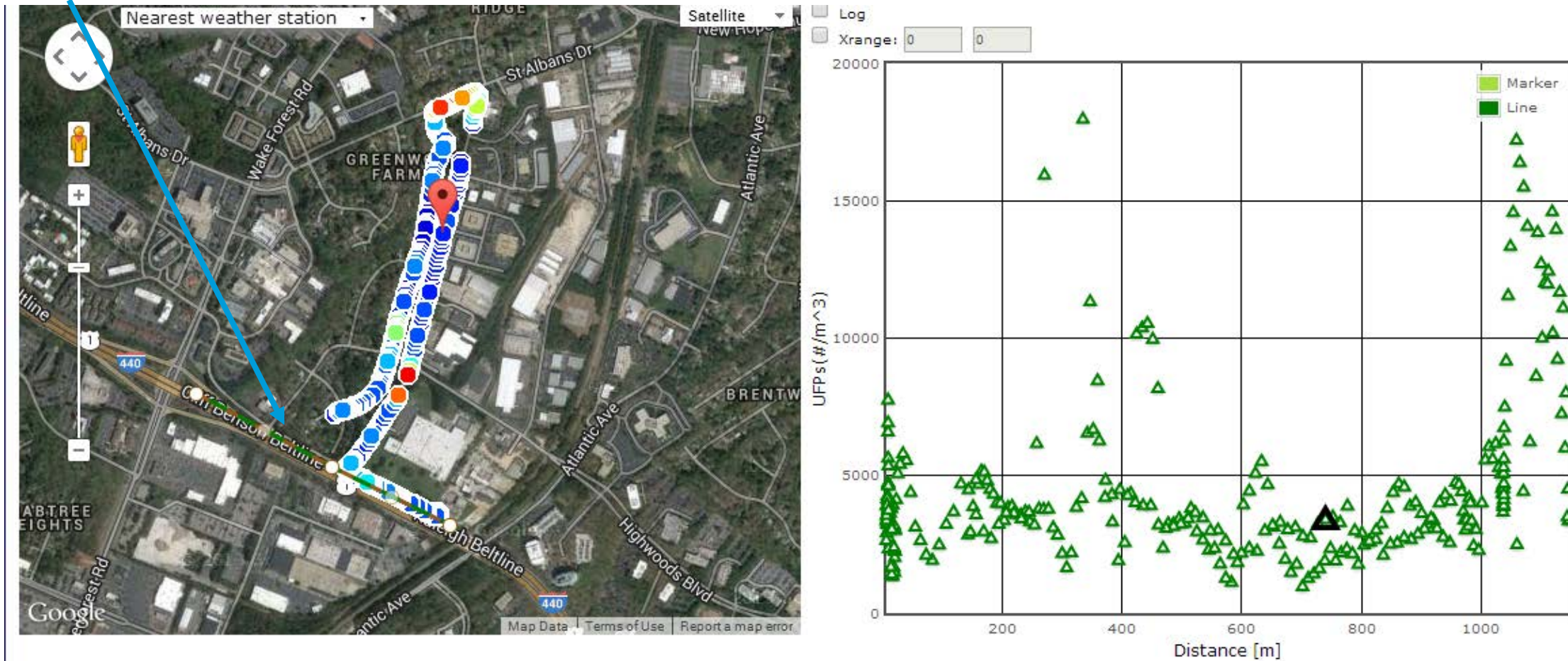
Viewing of complex data over time and space

You can chose to simply overlay on a map and use all the functions you are used to with Google Maps (satellite view, streetview). You can slide along a time control bar to highlight specific points along the route. You can toggle between multiple pollutants measured. You can also select to obtain a summary of meteorological conditions (source: World Meteorological Organization) retrieved from the nearest weather station, automatically set to match your sampling period.

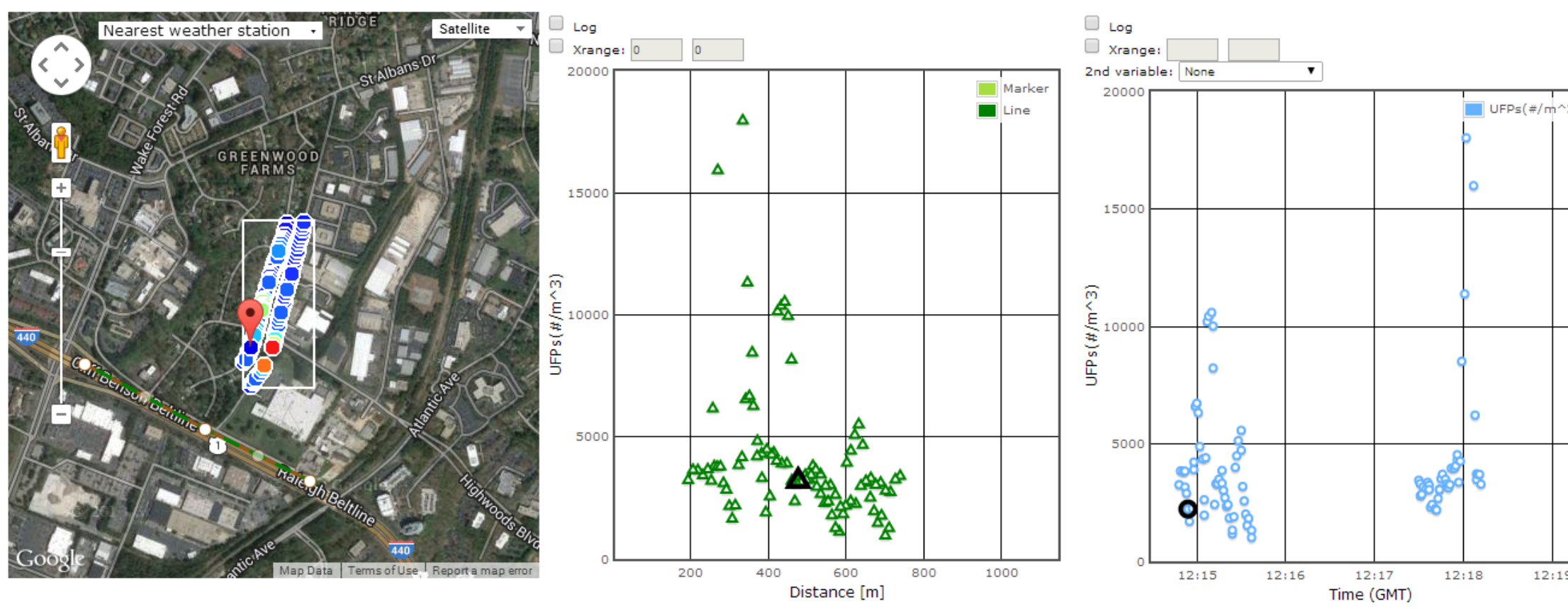


Exploring spatial gradients and hypothesized source impacts

You can manually draw a line or place a marker to represent a nearby point or line source, then create a plot of concentration versus distance.. The line can be manually manipulated to be a curved path. The graph does live updates while the user moves the marker or line around on the map. Using the time slider allows a specific point in time to be simultaneously highlighted on the map and concentration vs. distance graph.



You can manually draw a box on the map for a subset of the route, which isolate those time periods on the concentration vs. distance graph and time series plots.



What about my 200,000 rows of 1 second data, with 100 overlaps of the same route? What if I have my own wind data?

You can chose to view the data in raw form, shown in blocks of 1000 data points. Or, you can select to view as time-averaged to reduce to 1000 points. You can also upload your own wind data and the program can show the data as wind flow vectors.

Taking analysis even further

RETIGO will support the user to output datasets in an ArcGIS-friendly format (XY data, reduced to 1000 rows maximum) which will support follow-on analyses with EPA's Community-Focused Exposure and Risk Screening Tool (C-FERST). C-FERST allows the user to access a vast array of additional publically available GIS data sets (e.g., population demographics), which can be used for broader analysis of the user's data in the context of other data on the surrounding environment.

When can I access RETIGO?

EPA staff anywhere can access the development version of the program now. RETIGO will be made publically available after a review process, with Fall 2014 being the anticipated timeframe of availability. For more information, contact Gayle Hagler at hagler.gayle@epa.gov.

Acknowledgements

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