

Middle School Geospatial Technology

Information for the TSA Competition

August 2016

Geospatial Software

- You can use versions of ArcGIS from ESRI for free. <http://www.esri.com/>
- There are other free geospatial programs available, such as QGIS. <http://qgis.org/en/site/>
- You need software to manipulate data, not just pictures of maps.

Practice Lessons

It is imperative that all team members work through the Geospatial practice lessons. This will help to ensure that a baseline understanding is obtained about the GIS software and the various tools available, as well as the different data types and sources. By following the tutorials, you will learn the skills needed to compete in this competition and familiarize yourself with the correct tools to use with various datasets.

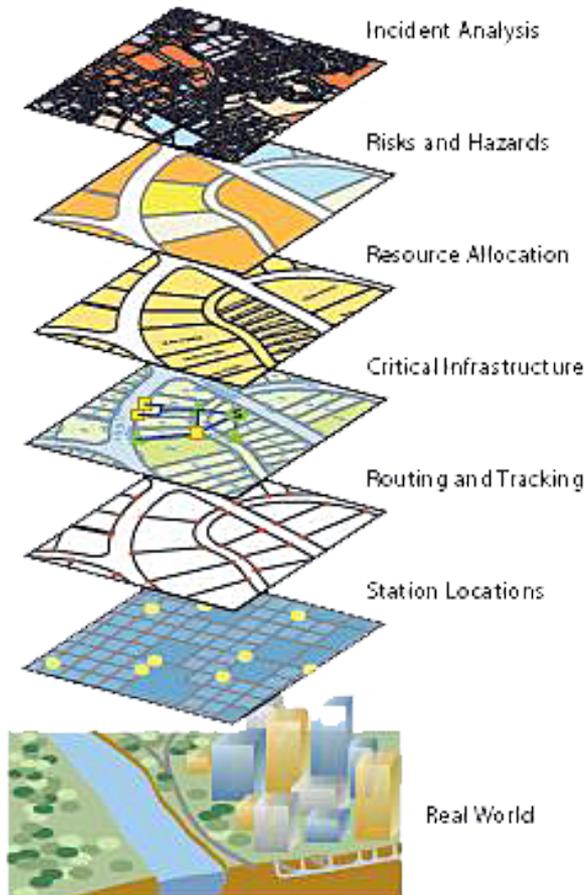
To prepare for the competition, teams are encouraged to use the geospatial technology practice lessons provided at <http://www.digitalquest.com/tsa.html>

What is Geospatial Technology?

Geospatial technology allows people to spatially identify places, events, and data to effectively make a decision about communicating information.

Consider the 2016 Rio Olympics or 2005 Hurricane Katrina storm (events); the physical locations of Rio De Janeiro, Brazil and New Orleans, Louisiana (places); and data, such as population, streets, hospitals, hotels, rivers, etc. Such items can all be combined into a map or series of maps to communicate information.

What Does Geospatial Data Look Like?



Vector Data

Raster Data

Numeric Data (spreadsheet)

Polygons

Lines

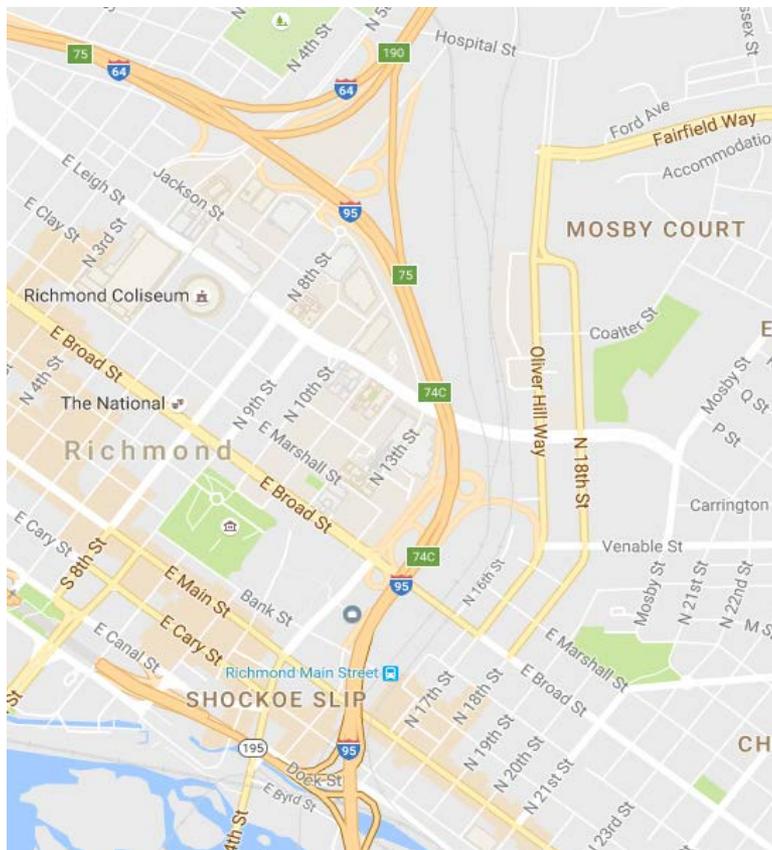
Points

Where Can You Get Data?

- Your city, county, state GIS office
- National Map Viewer: <http://viewer.nationalmap.gov/basic/>
- US Census Bureau: <http://www.census.gov/geo/maps-data/data/tiger.html>
(Tigerline data)
- US Department of Transportation:
http://www.rita.dot.gov/bts/sites/rita.dot.gov/bts/files/publications/national_transportation_atlas_database/2015/index.html
- USGS Hazards Data: <http://hddsexplorer.usgs.gov/>
- Point of Interest Factory: <http://www.poi-factory.com/>
- ESRI Maps and Data:
http://www.arcgis.com/home/group.html?owner=esri&title=ESRI%20Data%20%26%20Maps&content=all&_ga=1.267293709.2010237583.1411838248&sortField=modified&sortOrder=desc&start=81&q=

What Can You Do with the Data?

Make a base map of the community and add layers of data, turning features on and off to make them visible for certain needs.



This map has streets with names turned on, as well as the water feature turned on. To have a map that just shows water, turn off the feature for streets. To just show the streets, turn off the water feature.

You want to clearly show the important things you need by adding and subtracting features to your map like layers.

What Data Should You Have?

Depending on the problem, you should have shape files of the state, county, and city/community boundaries. These comprise location information you build on. You should have files that locate roads, railroads, water, utilities, and sometimes elevation or populations.

You should geocode addresses that are relevant, or find files that have already located certain items. Examples might be schools, government buildings, hospitals, fire stations, parks, restaurants, etc.

You might have event data. Examples of event data are earthquakes, tornados, 911 calls, virus outbreaks, measurements of conditions like water pollution, or where car accidents happen frequently.

Too much data is confusing, but too little data reduces your options. You will want to have data on which to build when you compete at the national TSA conference. A flash drive with data will be submitted as part of the entry at the conference.

What Skills Should You Have?

By working the tutorials and gathering local data to work with on the design problem, you should develop the ability to decide on the data you need.

By following the tutorials, you will learn the skills needed to compete in the competition, and you will familiarize yourself with the correct tool to use with the various datasets.

The next few slides provide a list of software skills that you should develop using the tutorials.

Skills for Geospatial Technology

- Open data in Geographic Information System software (ArcGIS, QGIS, or other)
- Manage files
- Open maps
- Use and add scale
- Add layers and change their location in the contents list
- Establish a buffer zone
- Clip buffer shapes

Skills for Geospatial Technology

- Create a shape file
- Merge shape files
- Change symbol color, shape, and outline width
- Add text
- Geocode spreadsheet data, such as addresses
- Create a report
- Do an inset
- Use a standard map layout format: scale text upper left hand corner (font, size), legend, north arrow, title

What Should You Have in Your Flash Drive Folders?

- Data for making new maps
 - ✓ Location information: county, city, and possibly others, such as wetlands, streams, property boundaries
 - ✓ Transportation: roads, rail, and possibly others
 - ✓ Utilities: gas, electricity, water/sewer, and possibly others
 - ✓ Possible others: schools, city buildings, fire stations, hospitals, parks, etc.
 - ✓ Possible event information: earthquakes, car accidents, tornados, or other information, such as festivals
- Work log, data dictionary spreadsheet, narrative about the problem, maps you created (PDF format), possibly other maps used

Work Log

Use a standard work log format for TSA. A work log should be a narrative of the project. It should indicate steps taken, decisions made and why they were made, maps created using specific data and why, and actions such as geocoding.

It should include dates of the work and the amount of time spent on the work.

The Portfolio

The portfolio should tell the story of why you made the decisions you did, starting with defining the problem. When defining the problem, you should identify constraints and criteria.

A constraint might be a gas line, an electrical substation, water, existing streets, and buildings. Criteria may be what the customer wants, like adequate parking, an area with green space, or a location near a certain type of building or activity.

Maps should have a reason to be in the portfolio - and not just included as a filler.

And, the maps...

- Foremost, explain what each map has to do with the problem.
 - ✓ Does it help you narrow down options?
 - ✓ Does it identify places you can locate as part of the solution?
 - ✓ Why is the map included in your solution?
- Use the final map as the basis for developing and writing about the solution to the problem.