

Program Information: Montgomery County, Maryland
Program Title: GIS Data in a Format Non-GIS Users Understand: Google Maps
Program Category: # 14, Information Technology
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1. Abstract

The Montgomery County, Maryland, Department of Technology Services - Geographic Information Systems (DTS-GIS) team has begun using the Google Maps application to present GIS data to clients. The Google Maps application addresses the need for an interactive way of viewing GIS data that most users are familiar with. While intended for web publishing, Google Maps applications can also be provided to clients as standalone offline pages that can be viewed within a web browser.

2. The Problem / Need for the Program

For many years, DTS-GIS has provided its clients within Montgomery County government geographic services including geocoding addresses and generating printed maps as well as online maps in PDF and GIS/JPG formats. More recently, DTS-GIS has implemented Map Viewer applications on the County's intranet and Internet sites which bring access to a simplified geographic information system with many layers of geographic data to anyone with a web browser. These Map Viewer applications have allowed those willing to undergo an introductory learning curve to view data beyond what's possible with a printed map or static PDF or image version of the file by allowing them to zoom in or out, change viewable layers, and access attribute data.

However, some requests from DTS-GIS clients are too simple to warrant incorporation into a Map Viewer application or require any sort of learning curve, yet at the same time so complex that map features would appear crowded or even illegible on a printed map or static map document. Often, clients request geocoding of addresses from a spreadsheet file and simply prefer a quick and easy way to view this data in more detail than would be provided by a static map full of dots. They might require a way to identify locations by their attribute data; with a static map, this likely means heavy labeling of features, and with a Map Viewer application, this likely means weeding through other data layers and performing several steps. Clients also might require a quick and easy way to disseminate this information on the Internet or intranet.

3. Description of the Program

The Google Maps online application provides more interactivity than a static map with less complexity than a Map Viewer application. DTS-GIS has begun providing Google Maps applications for clients whose needs fall in this window. The final product can be distributed on an Internet or intranet page, or even by distributing a simple HTML file containing the javascript for the application. Use of Google Maps is free, but does require registering to receive a Google Maps API Key, which must be included in the javascript code.

Google Maps comes with several prefabricated data layers, including centerline streets, street annotation, route numbers, exit numbers, parks, campuses, water bodies, shopping centers, and more. These layers provided by Google automatically appear and disappear as the user zooms in and out to show more or less detail. Thus, there is no need for the user to learn about or even be aware of these base map data layers – the layers simply turn on when zoomed in to the appropriate

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scale. Google also provides a mode that displays aerial photos instead of the base map to which the user can switch manually. For the large number of users who are already familiar with Google Maps or similar web mapping applications, there is no learning curve to using the simple controls for panning, zooming in and out, or switching from “Map” to “Satellite” (aerial photo) or “Hybrid”.

Additional GIS data layers can be added to the base map provided by Google by converting GIS data to KML (Keyhole Markup Language) format, publishing the KML files on an Internet server, and simply referring to them in the javascript code. Conversion from shapefile to KML can be processed using the free “Export to KML Extension” for ArcMap available on the ESRI Support Center website. The extension allows the user to select GIS attribute data to display when a user clicks on a map feature in Google Maps. Point features are by default given a generic Google marker symbol, but the free Google Earth application can then be used to further customize the KML, including adding custom icons (which must be posted to an online location) and making any adjustments to the HTML callout window that appears when the user clicks on a map feature. If needed, a button can be added to the application using javascript that will allow the user to toggle a data layer on and off.

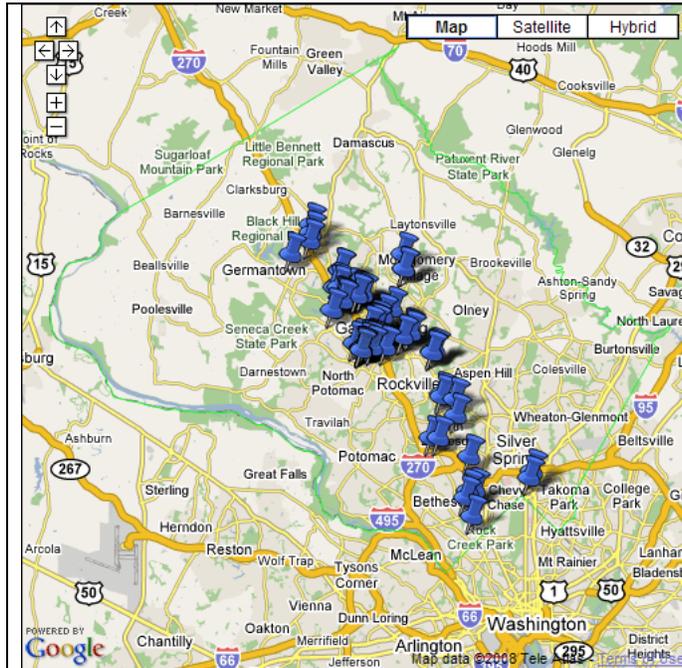
The default map view that a user sees when opening a page containing a Google Maps application can be controlled within the javascript as well by specifying geographic coordinates for a centerpoint and one of 18 preset scales provided by Google that range from showing a neighborhood block to the entire world within a map window. Google provides code for an assortment of functions on its Google Map API page.

The following two figures represent the two Google Maps applications that the DTS-GIS team has developed for its clients:

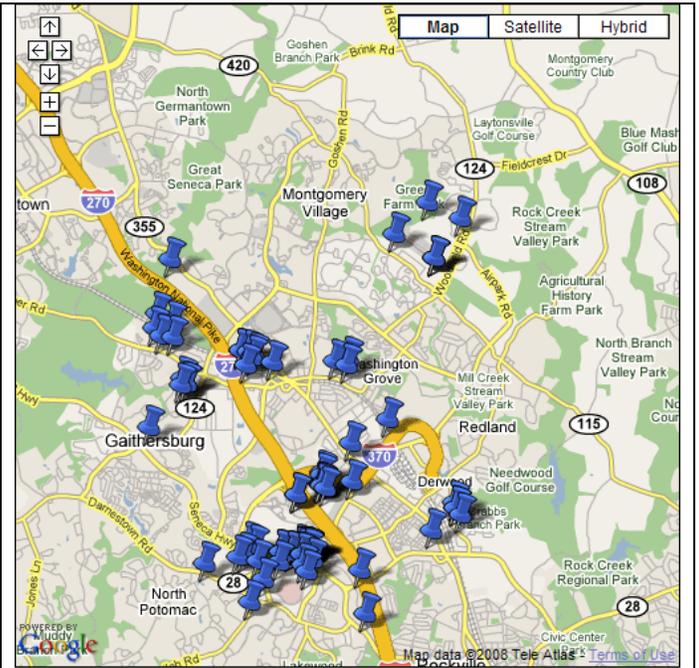
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DTS Google Maps offline application for County's Department of Economic Development



Default view of all County biotech companies. County boundary KML in green outline.

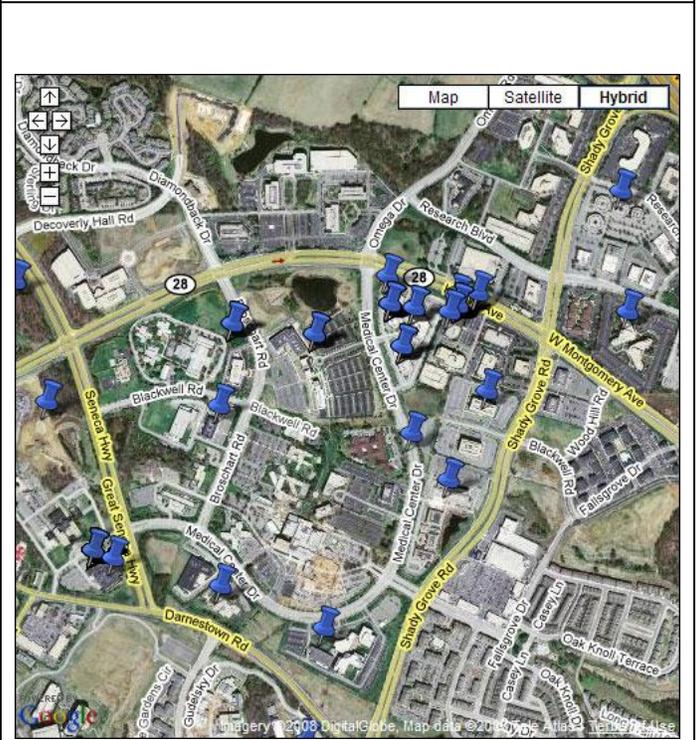


Zoomed in view.

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TITLE:	Founder
EMPLOYEES:	520

[Shape2Earth](#)

Name, address, and contact info for a map feature.



“Hybrid” Map/Satellite view.

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DTS Google Maps application for Public Libraries web page

Aspen Hill Library

4407 Aspen Hill Road, Rockville, MD 20853 [Directions Map](#)
 240-773-9410 [MD Relay Service \(7-1-1\)\(TTY\)](#)

More photos

Monday	10-8:30
Tuesday	10-8:30
Wednesday	9-8:30
Thursday	9-5
Friday	10-5
Saturday	9-5
Sunday	

[Programs and Events](#)
[Facilities](#)
[Computers](#)
[Accessibility](#)
[About the Library](#)
[Volunteering](#)
[Nearby Branches](#)

[Directions to the Aspen Hill Library](#)
By Bus: Ride On Bus #26 #48
By Metro (Red Line): Easy access to the Aspen Hill Library is not available from Metro
By Car From: [Get driving directions from your address.](#)

North (Gaithersburg area)
 South on Route 355 to Veirs Mill Road. Left on Veirs Mill Road.
 South on Veirs Mill Rd., past Twinbrook Parkway to Aspen Hill Road stoplight. Turn left onto Aspen Hill Road. Go up hill past light at Arctic Ave. to library on the left.

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4. Use of Technology

As described above, two pieces of software are involved in generating the KML files for use in a Google Maps application:

1. Export to KML Extension for ArcMap – to convert GIS shapefiles to KML format
2. Google Earth – to customize the KML file

Google provides sample javascript code that can freely be copied and pasted for an assortment of Google Maps functions on its Google Map API page.

5. The Cost of the Program

DTS-GIS already has several ArcGIS licenses which include the ArcMap program, and currently it is hard to imagine that any organization that maintains GIS data would not already have an ArcGIS license. Both the Export to KML Extension for ArcMap and Google Earth are available for free download, so there is no cost of adding the software capability to generate KML files. Likewise, the sample javascript code provided by Google online is also free.

Staff time required for completion of a Google Maps application of course depends on the complexity of the particular map. It should be noted, however, that Google Maps applications are not appropriate for an overly complex map with many layers; the Google Map window can get noisy quickly, and very large datasets can take a long time to load. However, for the basic application that allows users to look at geocoded point data, the work is as simple as (1) generating the KML file, (2) posting the KML file online, and (3) adjusting the code in a standard file for the new file locations and new center point and default scale. Additional time may be required if the application is to be posted online to incorporate the map into an existing web page.

6. The Results / Success of the Program

In May 2007, DTS-GIS first provided a Google Maps product to the Montgomery County Department of Economic Development (DED), which had requested geocoding of 218 biotechnology companies in the county and needed an easy way for DED staff to view the data. The 218 points were far too numerous to be legible on a static map, but DED did not need or want the points to be added to a Map Viewer application. With a quick turnaround, DTS-GIS was able to provide DED via e-mail a 2 KB HTML file that could be viewed in any current web browser. Users were by default provided with a view of the entire County on which they could easily zoom in to any of the clusters of points. They could then click on any individual point to bring up a callout window containing the name, address, and contact information for any of the points. Google Maps proved to be a simple and elegant solution for DED's requirements.

A second Google Maps application was not only created but also published to the County Internet site in July 2007. Montgomery County Public Libraries wanted to replace their static JPG maps on their website with more interactive Google Maps. They wanted citizens to be able to quickly find the nearest library and bring up information about it. DTS-GIS converted GIS points for the libraries to KML and added a custom library icons using Google Earth. Also, library addresses and hours were added to the callout window. The library website was provided first with an HTML page displaying a map showing all libraries in the entire County and then with an individual HTML page for each of the 22 libraries with a map zoomed into the neighborhood streets surrounding it.

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7. Worthiness of an Award

By implementing Google Maps applications, Montgomery County DTS-GIS is providing geographic information in a new and innovative way that very easily displays information to clients who may not be familiar with GIS, but are very likely familiar with the operation of Google Maps. Wider use of Google Maps for intranet or Internet display of County GIS data better leverages the County's GIS investment. This approach has proved to be effective and economical. DTS-GIS plans to offer clients requesting geocoding of addresses the option of viewing their data using a Google Map, and will produce more Google Maps code for web publishing upon request.