

# GISette

City of Marlborough  
Massachusetts



A quarterly newsletter to keep people informed of updates and changes to the City's Geographic Information System

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FOLLOW THIS LINK TO THE NEW PUBLIC WEB GIS SITE

<http://gis.marlborough-ma.gov>

**Welcome** once again to the seventh edition of the *GISette*! I still want remind everyone that *PIMA*, Marlborough's GIS website, is available to the general public! Marlborough's geographic information system continues to aid the general public, professionals and city employees alike. Please pass the word to anyone you think can benefit from its use. We have had great success do far! I will continue to include the 'Tips and Tricks' section to the newsletter in the hopes that it will make the web mapping site easier to use. There are a lot of tools built in to the new site.

### Remember, *PIMA* Allows Users to:

- Create customized abutters lists
- Identify property and ownership information
- Utilize Google and Bing for enhanced viewing
- Create and print fully customizable maps
- Turn on and off layers, displaying a range of information
- View and download utility plans

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## ***Aerial Survey***

### *Mapping from the air*

Hearing words like aerialphotogrammetry and geomatics usually make people's eyes roll back in their heads. I know this to be true, I've seen it firsthand. And, regrettably they really do give the impression of pending tedium. Once you manage to get beyond that boring outer shell, however, these terms open up to a really cool world of *oohs* and *ahhhs*.

What it all boils down to is collecting information from the air and making a map or chart from the information you collect. That's easy enough, right. Now, what if I told you that they can shoot lasers at the ground and make 3-D maps? Hey, wait a minute, it just got cool didn't it! I am referring to LiDAR (Light Detection And Ranging) and it is just one of the many ways they collect the information that ultimately ends up on maps and in a GIS. By bouncing millions of points of light off of a target and measuring the time it takes for that light to return to the instrument, a distance measurement is calculated. Do that millions of times and toss in an algorithm or two and you start to develop a picture of the objects below. Houses, driveways, rivers, trees and general topography can all be discerned and accurately mapped.

Aerial surveying wasn't always so technical and Buck Rodgers-like. It all started out using balloons. In fact, one of the very first uses of balloons was to observe and map the location of opposing armies. All the way back in 1794, the French pioneered this. During the American Civil War, World War I and all the way up to

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our present involvement in Afghanistan, balloons have been and continue to be a platform for aerial surveying. The most common platform for surveying, however, continues to be the airplane. Although, unmanned aerial vehicles (UAVs) are starting to gain a foothold along with more traditional aircraft. See? Drones – more cool stuff!

Taking the actual images requires specialized camera equipment and flying methods to get today's precisions. Cameras are generally mounted in the belly of the aircraft and then flown in very straight lines and very precise altitudes. This allows for full coverage of a target area and also for some overlap in the images. This overlap is important in creating the perception of 3-D depth. If you want to see this for yourself, you can stare at an object in front of you and then alternate opening one eye and closing the other. Do this several times. The object will appear to shift slightly to the left and right. Guess what? You just simulated stereoscopic imagery! By using the measurements made from two or more images taken from slightly varying locations, specialized software can then calculate the location points for objects. Using this method, the locations of buildings, parking lots and elevation information can be obtained and accurately mapped with a high degree of precision.

The types of information that can be collected in an aerial survey have changed with the evolution of new technologies. A photograph can tell you a lot, but it limits you to visible light and what can be seen by the human eye. New ways of collecting imagery have changed that forever. The platforms for data collection have also changed. Satellites, high altitude aircraft and undersea rovers can now reach new heights (and depths) that were previously unattainable. Radar, lasers and Sonar have been added to the ways in which we collect and view information. Cameras can now see types of light reflected by objects that the human eye cannot. Using these cameras, maps of land cover (trees, asphalt) and land use (farms, used car lots) can be used to monitor growth, types of foliage and examine the health of crops and vegetation for entire regions. Ocean temperatures and currents can be seen and examined and have allowed us to analyze patterns that change the world's weather. We've all heard of El Nino and La Nina by now. With these advances in aerial survey we've learned how these slight variations in ocean behavior can cause an increased level of activity in forest fires in the western United States. None of which would have been possible without our ability to map and understand these natural occurrences from the sky.

I think you can see that once you lift that initial veil of big, boring words and technical jargon, the whole process of aerial survey is really pretty interesting and benefits all of us in ways we can relate too. So next time, before you roll your eyes in anticipation of some egghead subject, just remember the words "lasers from space", and give it a chance.

### ***TIPS AND TRICKS***

#### ***UTILIZING GOOGLE STREETVIEW AND BING MAPS***

1. Open the site and navigate to the area of interest.
2. Once zoomed in, click on the "Extended Tools" icon  at the top of the page.
3. Once expanded, move your cursor to the Google icon  in the drop down list of tools and click to activate.
4. Now click on the desired location in the map view and Google's Streetview will open for you at that location.
5. To use Microsoft's Bing imagery, giving you a different aerial perspective, select the Bing icon  to activate the tool.
6. Click on a location as I explained before and Microsoft's Bing will automatically open at the desired location.



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