

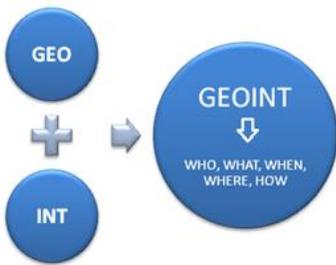
### Quarterly Newsletter

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## What is GIS?

A geographic information system (GIS) is a computer system used to visualize, question, analyze, and interpret spatial data to understand relationships, patterns, and trends, and plays a vital role in developing geospatial intelligence (GEOINT).

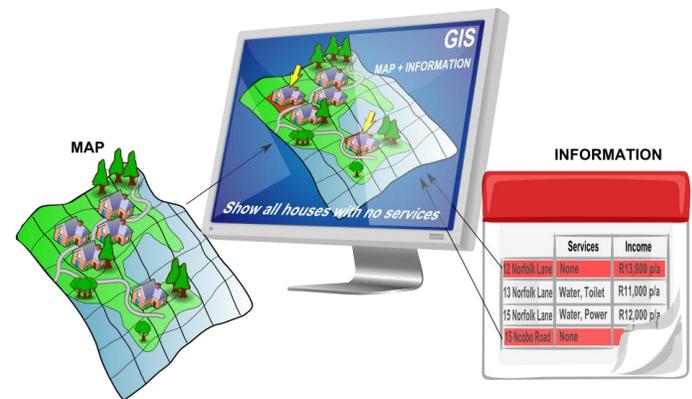


GEOINT has been a term tossed around the defense and national intelligence communities for a while. The term geospatial

intelligence is defined as intelligence about the human activity on earth derived from the exploitation and analysis of imagery and geospatial information that describes, assesses, and visually depicts physical features and geography referenced activities on Earth. Each are defined as a process for identifying and visualizing patterns within spatial data for the purpose of decision making, but one can be considered the cog by which a product is created or attained, while the other is the wheel the cog is attached to.

In a recent conversation, I was asked what the difference between GIS and GEOINT is. My initial response was there is no difference, they are one in the same. Further analysis of my answer while actively thinking about the term GIS and GEOINT quickly directed me to the error in my judgement. My rebuttal stated that GIS (geographic information **systems**) were apart of this umbrella term *Geospatial Intelligence* that would encompass any activity whose purpose was to visualize, question, analyze, and interpret geographic data for the purpose of making an intelligence decision.

As a GIS professional, I'm often asked what is GIS and what do I do? The simple answer is to reply with "I make maps," but there is so much more to GIS than just making maps. And that is a misrepresentation my simple answer conveys. The map is the end product of what GIS is and what GIS professionals do that is not represented in such a simple reply. In actuality my response should read similar to, "I collect, manage, and analyze spatial data to develop geointelligent solutions for decision makers. The product of these analysis are maps." This reply, at least, would not get the "Oh you're a cartographer?" response.



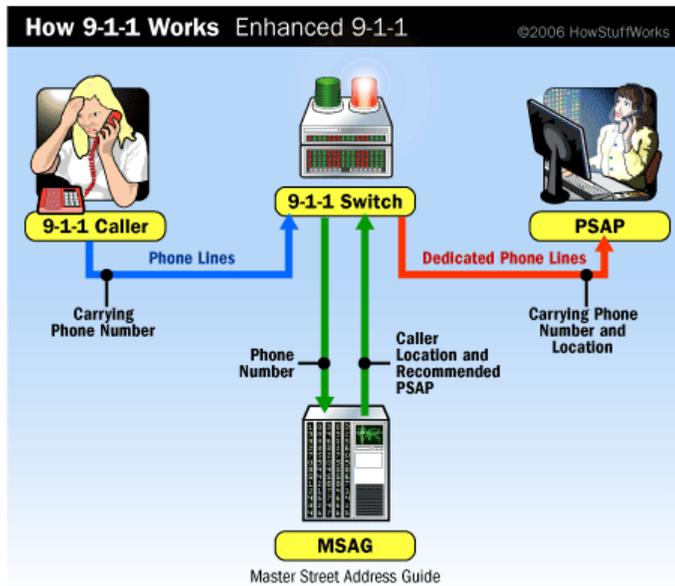
Maps, created using GIS, are a visualization of intelligent information. For this reason, I put GIS under the umbrella of GEOINT, because the final product, the map created using spatial data and analysis, is a product depicting geospatial intelligence and GIS is the system used to acquire that intelligence.

This data-driven process puts people at the beginning of the system. People present the question, the process, or a need to solve a problem or develop an intelligent process to address an issue. The expected outcome is a map, a chart, a diagram, something visual to help illustrate the problem, identify a solution, or verify a trend. Remember



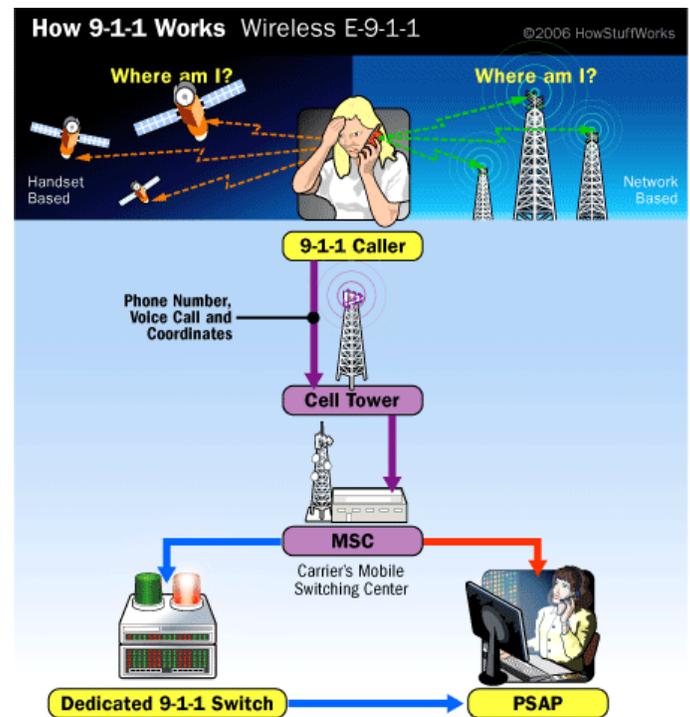
the caller for location information. There is more technology involved with E911 where a local 911 network of databases plays a collaborative role in assisting the dispatcher before the call is ever picked up, introduce the automatic number identification (ANI), automatic location identification (ALI), and the master street address guide (MSAG) databases.

When 911 is dialed from any phone, the phone company recognizes this number and uses the ANI system to pull up your phone number and send that data, with your phone call, to the PSAP. When the call arrives at 911, the ALI taps into the database to pull up the address that matches your phone number (extremely easy to do with landlines, but a bit more challenging with mobile devices). The MSAG is then used to determine how to route your 911 call using collaborative efforts between the phone company and public safety agencies.



To add to the somewhat confusing process, let's throw in mobile phones. In 2006 it was estimated that more than 8 million people in the U.S. used a cell phone as their only phone and nearly 29.7% of all U.S. households rely on wireless as their primary telephone service in 2011. Due to this increasing trend, Wireless Phase I and Phase II were defined and implemented by the FCC. Prior to this advancement, when a call was received from a

wireless caller, no information appeared at dispatch to help aid the caller nor was the call routed to the nearest PSAP. This created problems in determining the location of the call and routing response to the caller, as the PSAP receiving the call maybe located in another county where the dispatcher had no firsthand account of the area where the call originated from. Phase I enables the call taker to see the phone number and location of the nearest cell-tower to where the call is being placed, while Phase II enabled the call taker to see the phone number and the location of the caller to an accuracy of 50 to 300 meters of where the call originated.



It is easy to see how much work has gone into keeping 911 in line with where technology is to ensure expedited response should an emergency occur, but there is still work to be done to catch up to the technology being used by people. Next Generation 911 (NG911) is the latest advancement to address 911 as they fall behind in technology currently being utilized by the general public, such as text messaging, picture and video from cell phones, emails and telematics services such as those provided by OnStar. Current 911 systems cannot

deliver caller or location information from calls originating on cell phones to the 911 call center. NG911 provides the capability for these technologies to interface with the 911 network using Internet Protocol (IP) standards, which is dominant in the United States. Implementing NG911 will allow for dispatch and transfer of any call to a public safety entity almost anywhere in the world.

As outlined above, address validation and call routing is performed through a series of databases managed between local government agencies and the telephone company. NG911 requires a new and innovative approach to address validation and call routing; this is the critical role GIS will address in the future. GIS replaces the MSAG and ALI databases allowing for easier creation of an address or geographic feature, as well as disseminating revised data to the 911 call center.

This methodology has proven to reduce the time and resources needed to maintain the combined datasets and implement updates with fewer errors. In a NG911 system:

- GIS becomes one of the central data stores
- GIS is fully integrated into 911
- GIS does not require a separate ALI feed to PSAP customer premises equipment (CPE)
  - Caller location and data come with the 911 call

In preparing for NG911 integration, Fauquier County GIS and Fauquier Sheriff's Office Emergency Communications Division have been working to implement NG911 standards and perform dataset cleanup over the past year. The State of Virginia has provided Fauquier GIS with an analysis of how well the GIS data matches with the MSAG and ALI databases. Using this analysis we are able to make corrections to the GIS data and/or MSAG/ALI databases to ensure accurate location identification.

Accurate location identification and validation are what makes the difference when responding to any

emergency and seconds matter. GIS integration into the 911 process is the key to NG911 viability, as is access accurate data, updated data, and seamless access to data across the region, state, and nation. GIS will become the hero of emergency response in a next generation 911 world, shifting from a supporting role to being the corner stone of call routing and many other functions. The map will no longer be the supplemental, visual representation of an area on the screen, but will be the foundation of emergency response moving forward.

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