

Contents

Articles

Gpsd	1
MoNav	3
Navit	4
OpenStreetMap	6
VZ Navigator	14
Google Earth	17
Google Maps	39

References

Article Sources and Contributors	55
Image Sources, Licenses and Contributors	58

Article Licenses

License	59
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Gpsd

gpsd

Original author(s)	Remco Treffkorn, Derrick Brashear
Developer(s)	Eric S. Raymond
Stable release	3.10 / 2013-11-22
Development status	Mature
Written in	C, Python
Operating system	Linux, *BSD, Mac OS X, Android
Platform	Any
Size	~51K LOC
Available in	English
Type	GPS
License	BSD
Website	http://www.catb.org/gpsd/

gpsd is a daemon that receives data from a GPS receiver, and provides the data back to multiple applications such as Kismet or GPS navigation software. It thus provides a unified interface to receivers of different types, and allows concurrent access by multiple applications.

It is commonly used on Linux and FreeBSD systems.^{[1][2][3]} Distributed under a permissive free software license, gpsd is free software.

Design

gpsd provides a TCP/IP service by binding to port 2947.^[4] It accepts commands from that socket, and returns results back to it. These commands use a JSON-based syntax and return JSON responses (older, now obsolete versions used single-letter commands). Concurrent operation is supported. Most GPS receivers are supported, whether serial, USB, or Bluetooth. Starting in 2009, GPSD supports AIS receivers as well.^[5] Additionally gpsd supports interfacing with the UNIX network time protocol daemon ntpd via shared memory to enable setting the host platform's time via the GPS clock.

Authors

gpsd was originally written by Remco Treffkorn with Derrick Brashear, then maintained by Russell Nelson.^[6] It is now maintained by Eric S. Raymond.^{[7][8]}

References

- [1] Debian packages of gpsd (<http://packages.debian.org/search?keywords=gpsd>)
- [2] Fedora package of gpsd (<https://admin.fedoraproject.org/pkgdb/acls/name/gpsd>)
- [3] gpsd FreeBSD (<http://www.freebsdsoftware.org/astro/gpsd.html>) from the FreeBSD ports archive
- [4] gpsd manual page (<http://gpsd.berlios.de/gpsd.html>) gpsd project, retrieved 2011-07-11
- [5] A Brief History of GPSD, "In July and August 2009 ESR redesigned the GPSD command protocol and gave gpsd the ability to read data from marine AIS receivers and pass it to clients."; retrieved 2011-05-01 (<http://gpsd.berlios.de/history.html>)
- [6] GPSD CHANGELOG (<http://pygps.org/gpsd/CHANGELOG>)
- [7] GPSD History (<http://gpsd.berlios.de/history.html>)

[8] Bad Code Offsets: Open Web Innovation (<http://thedailywtf.com/Articles/Bad-Code-Offsets-Open-Web-Innovation.aspx>)

External links

- Official website (<http://www.catb.org/gpsd/>)

MoNav

Openstreetmap Navigation for Mobile

Developer(s)	Christian Vetter
Initial release	8 June 2010 ^[1]
Stable release	0.3.0 / 23 April 2011
Written in	C++
Operating system	Cross-platform
Platform	Windows, Windows Mobile, Linux, Symbian, Maemo
Available in	English
Type	Satellite navigation
License	GNU General Public License, v3
Website	code.google.com/p/monav/ ^[2]

MoNav (short for MObile NAVigation) is a free, car navigation system with GPS tracking, realtime routing engine. It uses data from the OpenStreetMap project. It supports multiple platforms and supports car, foot and bicycle navigation.

The software includes a local navigation daemon and a client. There is also a preprocessor, that converts OpenStreetMap data to data usable by the daemon, but the preprocessor does not need to run on the navigation unit. It is written in C++ using the Qt toolkit (for the non-graphical parts as well). It is maintained as a project in Google Code using the Mercurial version control system.

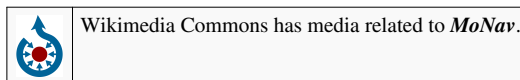
References

[1] Initial version control commit

[2] <http://code.google.com/p/monav/>

External links

- Official website (<http://code.google.com/p/monav/>)
- MoNav (<http://wiki.openstreetmap.org/wiki/MoNav>) on the OpenStreetMap wiki



Navit

NAVIT redirects here. For the joint technology school district in Arizona, see Northern Arizona Vocational Institute of Technology."

Navit

	
	
Developer(s)	Michael Farmbauer, Martin Schaller
Initial release	21 November 2005 ^[1]
Stable release	0.2.0 / 22 November 2010
Written in	C, C++
Operating system	Cross-platform
Available in	Multilingual (39) ^[2]
Type	Satellite navigation
License	GNU General Public License
Website	www.navit-project.org ^[3]

Navit is an open source and free, modular, touch screen friendly, car navigation system with GPS tracking, realtime routing engine and support for various vector map formats. It features both a 2D and 3D view of map data.^[4]

Navit supports a variety of operating systems and hardware platforms including Windows,^[5] Windows CE, Linux, Mac OS,^[6] Android,^[7] iPhone,^{[8][9]} and Palm webOS.^[10] The Win CE version can run on a GPS device like tomtom or cartrek.

Navit can be used with several sources of map data, notably OpenStreetMap and Garmin maps.^[11]

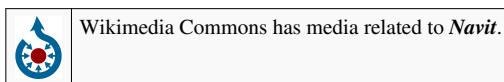
References

- [1] Navit (<http://www.linuxpromagazine.com/Events/CeBIT-Open-Source-Project-Lounge-2011/Navit>), CeBIT Open Source 2011 - Project Presentation Navit, By Amber Graner, *The first publishment was in december 2005, but the project existed privately already for about 3 years.*
- [2] Launchpad translations of Navit (<https://translations.launchpad.net/navit/trunk/+pots/navit>)
- [3] <http://www.navit-project.org/>
- [4] Open-Source-Navigation mit Navit:Richtungweisend (<http://www.linux-magazin.de/Heft-Abo/Ausgaben/2010/07/Richtungweisend>), von Thomas Haase, Markus Feilner Erschienen im Linux-Magazin 2010/07, interview in Linux Magazin Online (German)
- [5] Navit on Windows (<http://wiki.navit-project.org/index.php/Windows>)
- [6] Navit on MacOS (http://wiki.navit-project.org/index.php/MacOS_development)
- [7] Navit on Android (<http://wiki.navit-project.org/index.php/Android>)
- [8] Navit on iOS (iPhone) (<http://wiki.navit-project.org/index.php/iOS>)
- [9] Open Source Turn by Turn iPhone App using OpenStreetMap - Navit (http://www.mp3car.com/blogs/133594_Open-Source-Turn-by-Turn-iPhone-App-using-Open-Street-Maps--Navit.html), by optikalefx, 06-30-2009, Mp3car
- [10] Navit on Palm webOS (<http://www.webos-internals.org/wiki/Application:Navit>)

[11] Navit Maps (http://wiki.navit-project.org/index.php/Main_Page#Maps)

External links

- Official website (<http://www.navit-project.org/>)
- Navit (<http://sourceforge.net/projects/navit/>) on SourceForge.net
- *Navit* (<https://play.google.com/store/apps/details?id=org.navitproject.navit>) at the Google Play store
- *Navit* (<https://f-droid.org/repository/browse/?fdid=org.navitproject.navit>) Android package at the F-Droid repository



OpenStreetMap

OpenStreetMap



Web address	openstreetmap.org ^[1]
Slogan	The Free Wiki World Map
Commercial?	No
Type of site	Collaborative mapping wiki
Registration	Required for contributors
Available in	Over 50 site translations and unlimited map languages
Users	1,642,030
Content license	ODbL
Owner	OpenStreetMap Community. Project support by OpenStreetMap Foundation.
Created by	Steve Coast
Launched	1 July 2004

OpenStreetMap (OSM) is a collaborative project to create a free editable map of the world. Two major driving forces behind the establishment and growth of OSM have been restrictions on use or availability of map information across much of the world and the advent of inexpensive portable satellite navigation devices.

Created by Steve Coast in the UK in 2004, it was inspired by the success of Wikipedia and the preponderance of proprietary map data in the UK and elsewhere. Since then, it has grown to over 1.6 million registered users, who can collect data using manual survey, GPS devices, aerial photography, and other free sources. This crowdsourced data is then made available under the Open Database License. The site is supported by the OpenStreetMap Foundation, a non-profit organization registered in England.

Rather than the map itself, the data generated by the OpenStreetMap project is considered its primary output. This data is then available for use in both traditional applications, like its usage by Craigslist, Geocaching, MapQuest Open, JMP statistical software, and Foursquare to replace Google Maps, and more unusual roles, like replacing default data included with GPS receivers. This data has been favourably compared with proprietary datasources, though data quality varies worldwide.^{[2][3]}

History

Steve Coast founded the project in 2004, initially focusing on mapping the United Kingdom. In the UK and elsewhere, government-run and tax-funded projects like the Ordnance Survey created massive datasets but failed to freely and widely distribute them. In April 2006, the OpenStreetMap Foundation was established to encourage the growth, development and distribution of free geospatial data and provide geospatial data for anybody to use and share. In December 2006, Yahoo! confirmed that OpenStreetMap could use its aerial photography as a backdrop for map production.

In April 2007, Automotive Navigation Data (AND) donated a complete road data set for the Netherlands and trunk road data for India and China to the project and by July 2007, when the first OSM international *The State of the Map* conference was held, there were 9,000 registered users. Sponsors of the event included Google, Yahoo and Multimap. In October 2007, OpenStreetMap completed the import of a US Census TIGER road dataset. In December 2007, Oxford University became the first major organisation to use OpenStreetMap data on their main website.

Ways to import and export data have continued to grow – by 2008, the project developed tools to export OpenStreetMap data to power portable GPS units, replacing their existing proprietary and out-of-date maps. In February 2008, a series of workshops were held in India. In March, two founders announced that they have received venture capital funding of 2.4M euros for CloudMade, a commercial company that uses OpenStreetMap data.

In 2012, the launch of pricing for Google Maps led several prominent websites to switch from their service to OpenStreetMap and other competitors. Chief amongst these were Foursquare, Craigslist who adopted OpenStreetMap, and Apple, Inc, which ended a contract with Google and launched a self-built mapping platform which uses TomTom and OpenStreetMap data.

State of the Map

Since 2007, the OSM community has held an annual, international conference, *State Of The Map*. Venues have been:

- 2007 – Manchester, England
- 2008 – Limerick, Ireland
- 2009 – Amsterdam, Netherlands
- 2010 – Girona, Spain
- 2011 – Denver, USA
- 2012 – Tokyo, Japan
- 2013 – Birmingham, England

The 2014 event is scheduled to be held in Buenos Aires, Argentina, from 7 to 9 November.



Steve Coast (2009)

Map production

The initial map data was originally collected from scratch by volunteers performing systematic ground surveys using a handheld GPS unit and a notebook, digital camera, or a voice recorder. The data was then entered into the OpenStreetMap database.

More recently, the availability of aerial photography and other data sources from commercial and government sources has greatly increased the speed of this work and has allowed land-use data to be collected more accurately by the process of digitization. When especially large datasets become available, a technical team manages the conversion and import of the data.

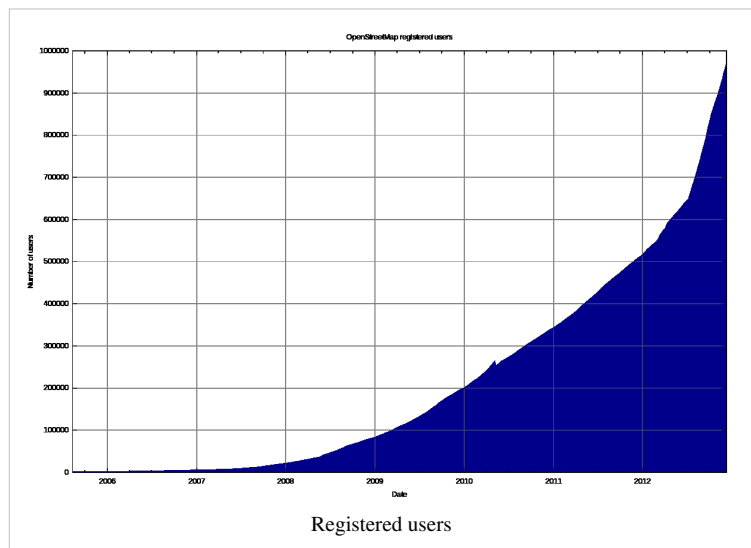
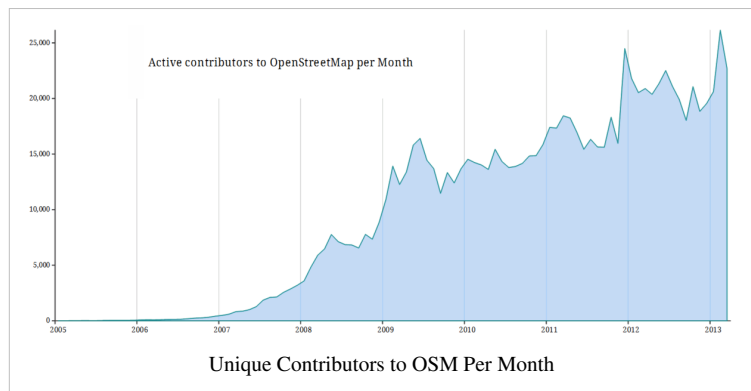
Software for editing maps

Editing of maps can be done using the default web browser editor called iD, an HTML5 application using d3.js and written by MapBox. The earlier Flash-based application Potlatch is retained for intermediate-level users. JOSM and Merkaartor are more powerful desktop editing applications that are better suited for advanced users.

Contributors

The project has a geographically diverse user-base, due to emphasis of local knowledge and ground truth in the process of data collection. Many early contributors are cyclists who survey with and for bicycles, charting cyclist routes and navigable trails. Others are GIS professionals who contribute data with Esri tools.

By August 2008, shortly after the second *The State of the Map* conference was held, there were over 50,000 registered contributors; by March 2009, there were 100,000 and by the end of 2009 the figure was nearly 200,000. In April 2012, OpenStreetMap cleared 600,000 registered contributors. On January 6, 2013, OpenStreetMap reached 1 million registered users, a minority of whom contribute the majority of content. Around 30% of users have contributed at least one point to the OpenStreetMap database.



Surveys and personal knowledge

Ground surveys are performed by a mapper, on foot, bicycle, or in a car, motorcycle or boat. Map data are usually collected using a GPS unit, although this is not strictly necessary if an area has already been traced from satellite imagery.

Once the data has been collected, it is entered into the database by uploading it onto the project's website. At that point, no information about the kind of uploaded track is available – it could be e.g., a motorway, a footpath, or a river. Thus, in a second step, editing takes place using one of several purpose-built map editors (e.g., JOSM). This is usually done by the same mapper, sometimes by other contributors registered at OpenStreetMap.

As collecting and uploading data is separated from editing objects, contribution to the project is possible also without using a GPS unit. In particular, placing and editing objects such as schools, hospitals, taxi ranks, bus stops, pubs, etc. is done based on editors' local knowledge.

Some committed contributors adopt the task of mapping whole towns and cities, or organizing mapping parties to gather the support of others to complete a map area. A large number of less active users contribute corrections and small additions to the map.

Government data

Some government agencies have released official data on appropriate licenses. Much of this data has come from the United States, where works of the federal government are placed under public domain.^[4]

In the United States, OSM uses Landsat 7 satellite imagery, Prototype Global Shorelines Prototype Global Shoreline from NOAA, and TIGER from the Census. In the UK, some Ordnance Survey OpenData is imported, while Canada's NRCan's CanVec vector data and GeoBase provide landcover and streets.

Out-of-copyright maps can be good sources of information about features that do not change frequently. Copyright periods vary, but in the UK Crown copyright expires after 50 years and hence Ordnance Survey maps until the 1960s can legally be used. A complete set of UK 1 inch/mile maps from the late 1940s and early 1950s has been collected, scanned, and is available online as a resource for contributors.

Map usage

Software for viewing maps



Surveying routes with a GPS receiver

Web browser

The most obvious software to employ to make use of the data provided by the OpenStreetMap project, is to view it in any ordinary web browser via Hypertext Transfer Protocol (HTTP).

GNOME Maps

is a graphical front-end written in JavaScript and introduced in GNOME 3.10. So far it provides a mechanism to find the user's location with the help of GeoClue and it can deliver a list as answer to queries.

Marble

received support for OpenStreetMap

FoxtrotGPS

FoxtrotGPS is a GTK+-based map viewer, that is especially suited to touch input. It is available in the SHR or Debian repositories.

Emerillon

Another GTK+-based map viewer.

The web site OpenStreetMap.org provides a slippy map interface based on the Leaflet javascript library (and formerly built on OpenLayers), displaying map tiles rendered by the Mapnik rendering engine, and tiles from other sources including OpenCycleMap.org^[5] and MapQuest Open. Maps can also be generated offline by a local installation of Mapnik and downloaded map data.

OpenStreetMap maintains lists of online and offline routing engines available, such as the Open Source Routing Machine. The OSM data is popular with routing researchers, and is also available to open-source projects and companies to build routing applications (or for any other purpose).

Humanitarian aid

See also: Crisis mapping, Smart mob and Ushahidi

During the 2010 Haiti earthquake, OpenStreetMap and Crisis Commons volunteers^[6] used available satellite imagery to map the roads, buildings and refugee camps of Port-au-Prince in just two days, building "the most complete digital map of Haiti's roads".

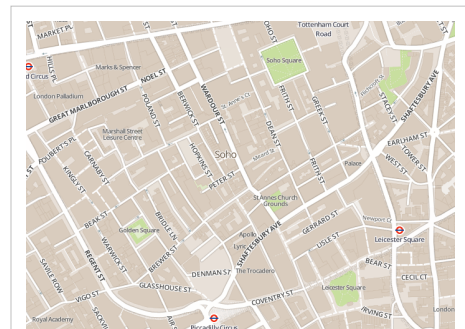
The resulting data and maps have been used by several organisations providing relief aid, such as the World Bank, the European Commission Joint Research Centre, the Office for the Coordination of Humanitarian Affairs, UNOSAT and others.

NGOs like the Humanitarian OpenStreetMap Team and others have worked with donors like USAID to map other parts of Haiti and parts of many other countries, both to create map data for places that formerly were blank, and to engage and build capacity of local people.

Along with post-disaster work, the Humanitarian OpenStreetMap Team has worked to build better risk models for Uganda and elsewhere, in partnership with the Red Cross, World Bank, and other humanitarian groups.



OpenStreetMap of Soho, central London, shown in Mapnik layer



Same as above, shown in MapBox Streets layer

Legal aspects

Licensing terms

OpenStreetMap data was originally published under a Creative Commons open content license with the intention of promoting free use and redistribution of the data. In September 2012, the license was changed to the Open Database License (ODbL) from Open Data Commons (ODC) in order to more specifically define its bearing on data rather than representation.

As part of this relicensing process, some of the map data was removed from the public distribution. This included all data contributed by members that did not agree to the new licensing terms, as well as all subsequent edits to those affected objects. It also included any data contributed based on input data that was not compatible with the new terms. Estimates suggested that over 97% of data would be retained globally, however certain regions would be affected more than others, such as in Australia where 24 to 84% of objects would be retained, depending on the type of object. Ultimately, more than 99% of the data was retained, with Australia and Poland being the countries most severely affected by the change.

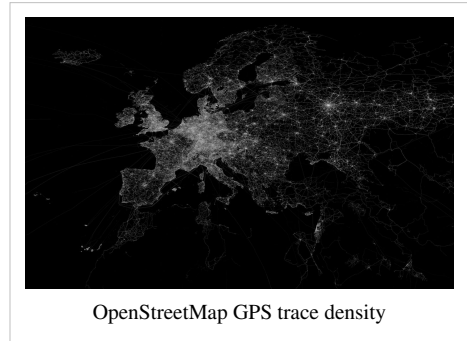
All data added to the project needs to have a license compatible with the Open Database License. This can include out-of-copyright information, public domain or other licenses. Contributors agree to a set of terms which require compatibility with the current license. This may involve examining licenses for government data to establish whether it is compatible.

Software used in the production and presentation of OpenStreetMap data is available from many different projects and each may have its own licencing. The application — what users access to edit maps and view changelogs, is powered by Ruby on Rails. The application also uses PostgreSQL for storage of user data and edit metadata. The default map is rendered by Mapnik, stored in PostGIS, and powered by an Apache module called *mod_tile*. Certain parts of the software, such as the map editor Potlatch2, have been made available as public domain.

Commercial data

Some OpenStreetMap data is supplied by companies that choose to freely license either actual street data or satellite imagery sources from which OSM contributors can trace roads and features.

Notably, Automotive Navigation Data provided a complete road data set for Netherlands and details of trunk roads in China and India. In December 2006, Yahoo! confirmed that OpenStreetMap was able to make use of their vertical aerial imagery and this photography was available within the editing software as an overlay. Contributors could create their vector based maps as a derived work, released with a free and open license, until the shutdown of the Yahoo! Maps API on 13 September 2011. In November 2010, Microsoft announced that the OpenStreetMap community could use Bing vertical aerial imagery as a backdrop in its editors. For a period from 2009 to 2011, NearMap Pty Ltd made their high-resolution PhotoMaps (currently of major Australian cities, plus some rural Australian areas) available for deriving OpenStreetMap data under a CC-BY-SA licence.



Operation

While OpenStreetMap aims to be a central data source, its map rendering and aesthetics are meant to be only one of many options, some which highlight different elements of the map or emphasize design and performance. The OpenStreetMap project keeps a list of OSM-based services which serves as a complete reference.

Data format

OpenStreetMap uses a topological data structure, with four core elements (also known as *data primitives*):

- *Nodes* are points with a geographic position, stored as coordinates (pairs of a latitude and a longitude) according to WGS 84.^[7] Outside of their usage in ways, they are used to represent map features without a size, such as points of interest or mountain peaks.
- *Ways* are ordered lists of *nodes*, representing a polyline, or possibly a polygon if they form a closed loop. They are used both for representing linear features such as streets and rivers, and areas, like forests, parks, parking areas and lakes.
- *Relations* are ordered lists of nodes, ways and relations (together called "members"), where each member can optionally have a "role" (a string). Relations are used for representing the relationship of existing nodes and ways. Examples include turn restrictions on roads, routes that span several existing ways (for instance, a long-distance motorway), and areas with holes.
- *Tags* are key-value pairs (both arbitrary strings). They are used to store metadata about the map objects (such as their type, their name and their physical properties). Tags are not free-standing, but are always attached to an object: to a node, a way, a relation, or to a member of a relation. A recommended ontology of map features (the meaning of *tags*) is maintained on a wiki.

The LinkedGeoData^[8] data set is a work of the Agile Knowledge Engineering and Semantic Web (AKSW) research group at the University of Leipzig, a group mostly known for DBpedia, that uses the GeoSPARQL and well-known text (WKT) RDF vocabularies to represent OpenStreetMap data.

Commercial services

A variety of popular services incorporate some sort of geolocation or map-based component. Notable services using OSM for this include:

Apple Inc unexpectedly created an OpenStreetMap-based map for iPhoto for iOS on 7 March 2012, and launched the maps without properly citing the data source – though this was corrected in 1.0.1. OpenStreetMap is one of the many cited sources for Apple's custom maps in iOS 6, though the majority of map data is provided by TomTom.



Flickr uses OpenStreetMap data for various cities around the world, including Baghdad, Beijing, Kabul, Santiago, Sydney, and Tokyo. In 2012, the maps switched to use Nokia data primarily, with OSM being used in areas where the commercial provider lacked performance. MapQuest announced a service based on OpenStreetMap in 2010, which eventually became MapQuest Open.

On 29 February 2012, Foursquare started using OpenStreetMap via MapBox's rendering and infrastructure. Craigslist also switched to OpenStreetMap in 2012, rendering their own tiles based on the data.

In 2009, Hasbro, the games company behind the property trading board game *Monopoly*, launched *Monopoly City Streets*, a massively multiplayer online game which allowed players to "buy" streets all over the world. The game used map tiles from Google Maps and the Google Maps API to display the game board, but the underlying street data was obtained from OpenStreetMap. The online game was meant to be a limited time offering, closing at the end of January 2010.

Moovit uses maps based on OpenStreetMap in their free mobile application for public transit navigation.

Pictometry uses OpenStreetMap as the default map in their web based products for displaying their patented 3D aerial photography. Wikipedia:Citation needed

Wikipedia uses OpenStreetMap data to render custom maps used by the articles. Many languages are included in the WIWOSM project (Wikipedia Where in OSM) which aims to show OSM objects on a slippy map, directly visible on the article page. Wikivoyage uses OpenStreetMap as a locator map for cities and travel points of interest.

Dublin-based indie games developer Ballardia launched *World of the Living Dead: Resurrection* in October 2013, which has incorporated OpenStreetMap into its game engine, along with census information to create a browser-based game mapping over 14,000 square kilometres of greater Los Angeles and survival strategy gameplay. Its previous incarnation had used Google Maps, which had proven incapable of supporting high volumes of players, so during 2013 they shut down the Google Maps version and ported the game to OSM.

References

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- [2] Haklay, M. (2010). How good is volunteered geographical information? A comparative study of OpenStreetMap and Ordnance Survey datasets. *Environment and Planning B: Planning and Design*. volume 37, pages 682–703
- [3] Coleman, D. (2013). Potential Contributions and Challenges of VGI for Conventional Topographic Base-Mapping Programs. In Sui, D., Elwood, S and Goodchild, M. (Eds.), **Crowdsourcing Geographic Knowledge: Volunteered Geographic Information (VGI) in Theory and Practice** (pp. 245–264). New York, London: Springer Science+Business Media Dordrecht.
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- [5] openstreetmap.org (<http://openstreetmap.org>)
- [6] crisiscommons.org (<http://crisiscommons.org>)
- [7] WGS 84 (http://wiki.openstreetmap.org/wiki/WGS_84) *OpenStreetMap Wiki*
- [8] linkedgeodata.org (<http://linkedgeodata.org/>)

Further reading

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- Ramm, Frederik; Topf, Jochen; Chilton, Steve (2010). *OpenStreetMap: Using and Enhancing the Free Map of the World* (<http://www.openstreetmap.info>). UIT Cambridge. p. 386. ISBN 978-1-906860-11-0.
- OpenStreetMap in the media (https://wiki.openstreetmap.org/wiki/OpenStreetMap_in_the_media) (2005 to present)
- OpenStreetMap in scientific publications (<https://wiki.openstreetmap.org/wiki/Research>)

External links

- Official website (<https://www.openstreetmap.org>)
 - OpenStreetMap Foundation (<http://www.osmfoundation.org/>)
 - OpenStreetMap (<https://twitter.com/openstreetmap>) on Twitter
 - OpenStreetMap (<https://www.facebook.com/OpenStreetMap>) on Facebook
 - OpenStreetMap (<https://plus.google.com/+openstreetmap/posts>) on Google+
-

VZ Navigator

VZ Navigator

VZ Navigator with turn-by-turn navigation	
Developer(s)	Verizon Wireless
Stable release	7.1.0 build 113 (pictured above: v7)
Operating system	Android, Binary Runtime Environment for Wireless, Blackberry OS, Palm WebOS, Windows Mobile
Website	VZNavigator.vzw.com ^[1]

VZ Navigator is a GPS navigation software for Verizon Wireless phones that turns the phone into a GPS navigation device. It is a white label product based on Networks in Motion's AtlasBook mobile navigation platform. It is compatible with many recent Verizon GPS Phones, and available through Get It Now. It uses both GPS and cellular antennas through Assisted GPS. It supports turn-by-turn navigation, local area searches to search for businesses, ATMs, gas stations, etc., favorites, messaging between VZ Navigator users (in order to share addresses and/or times of arrival), maps (including "Where Am I?") and multiple voices. It uses the user's phone connection to download maps and to do searches. Once the map and route are downloaded, the phone can manage its position along the path without reconnecting. This initial update usually takes about 5 to 10 seconds. However, if the user departs from his planned route, the mobile phone will automatically contact the server for a new one.

The mobile phone is insensitive to which way the unit is pointing, guessing by which way the user is moving. If directions are requested while standing still (or moving very slowly) the phone might start off with an inadequate order. If the user takes a path not suggested, the phone will recalculate the route up to three times before requesting a completely new route or quitting the current one. It also has pedestrian support (ignoring one-way streets, for example), avoiding HOV lanes or toll roads. The user can specify if the route calculated is the simplest, shortest, or fastest.

GPS position is updated every 1 to 2 seconds on average, and it is possible to obtain the user's land speed and altitude from within the software.

It is possible to find out the user's location in coordinates instead of the physical address (provided it is in the database.) This requires going into the service menu and enabling gpsOne calls and dialing a special number, then checking the phone's GPS logs. This has so far only been verified in LG phones. In versions 6.1 and above, you can access your location from the menu > location info option. It will also display your speed, altitude, and heading.

The service includes a feature where two wireless devices that have the software installed can TXT message themselves addresses and their ETA, while the receiving unit can integrate the address into the database and utilize it for navigation.

VZ Navigator can sync with an online map browser at.^[2] Favorites and Recent Searches can be shared between the web interface and the wireless device, making it possible to back up the address and phone book in case of phone changeout or damage. Also, this makes it easier to plan a trip since users can enter the address or search for a destination online and then send the destination to any Verizon Wireless device for quick directions.

The cost is \$2.99 per day, \$4.99 per week or \$9.99 per month. VZ Navigator will not use airtime, on America's Choice plans, or incur data transfer charges, on Nationwide plans, to download updates to the software, maps updates, routes or re-routes.

Versions

On May 8, 2008, Verizon released version 4 of the VZ Navigator software to include Traffic Avoidance (in certain areas) and other features such as Local Movies and Events, 3D Perspective View, Gas Finder and Weather.^[3]

Version 4.5.1 of the software adds voice recognition abilities to most menu screens. Simply hold the "Send" key while you speak the name and release when finished. The device will analyze the voice imprint and automatically convert to text. Menu transitions have been added to the GUI for a smoother look. Note: As of this writing, the upgrade must be done from the VZ menu "Upgrade Check" rather than from within VZ Navigator. Checking for updates from within the program show none available. 4.5.1 is a very worthwhile upgrade and further adds to the functionality of the software.

Version 5.1 updated the application User Interface (UI) and routing.

Version 6.1 again updated the application UI and search engine. The formerly proprietary engine (assumed to be Networks In Motion), was replaced by Bing(TM) local search.

Version X updated the application UI and added new traffic avoidance routing technology, day/night mode, and new mapping tools, including satellite view and City views for 6 major cities (Los Angeles, Chicago, Kansas City, Detroit, New York City, Washington DC).

Complaints and Criticisms

Many customers complain about the price of VZ Navigator.

Most new devices that can install and run third-party app such as Google Maps now have access to the device's GPS chip.

The ability to see LAT/LON Coordinates depends on the Version of VZ Navigator. In earlier versions of VZ Navigator (i.e. Before 5.0) GPS coordinates were available for ALL locations. This functionality was again restored in version 6.1 and higher.

Some customers complain that the VZ Navigator does not avoid toll roads, like the "Avoid Toll Roads" feature suggests it should.

Some customers have complained about the version 5.1.0 being buggy, slow or lacking formerly available features. An option to downgrade was given to customers, and was available through July 30, 2010. Newer versions have removed these concerns.

Others have been charged without ever accepting the service.

External links

- Engadget Review of Version X ^[4]
- CNET Review ^[5]
- VZ Navigator - Overview ^[1]
- Product Demo ^[6]
- VZ Get It Now service ^[7]

References

- [1] <https://vznavigator.vzw.com/index.html>
 - [2] VZNavigator.com (<http://vznavigator.com>)
 - [3] VZ Navigator Version 4: Available Today (<http://news.vzw.com/news/2008/05/pr2008-05-07a.html>)
 - [4] http://www.engadget.com/2011/01/28/vz-navigator-version-x-breaks-cover-adds-virtual-city-maps-s?icid=sphere_blogsmith_inpage_engadget
 - [5] http://reviews.cnet.com/handheld-software/verizon-wireless-vz-navigator/4505-3638_7-31814632.html
 - [6] http://support.vzw.com/swf/vz_navigator6/swf/simulator.html
 - [7] http://support.vzw.com/features/data_services/get_it_now.html
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Google Earth

Google Earth

Google Earth v7.0 running on Windows 7	
Original author(s)	Google Inc.
Developer(s)	Google Inc.
Initial release	June 11, 2005
Stable release	<ul style="list-style-type: none"> • Windows, OS X, Linux 7.1.2.2041 (October 7, 2013) [±] ^[1] • Android 7.1.1.1781 (June 6, 2013) [±] ^[1] • iOS 7.1.1.1843 (June 26, 2013) [±] ^[1]
Preview release	Windows, OS X, Linux 7.1.2.2041 (October 31, 2013 "Google Earth Release Notes" ^[2] . Google. Retrieved 1 Nov 2013.) [±] ^[3]
Operating system	<ul style="list-style-type: none"> • Windows 2000 and later • OS X • Linux • Android • iOS • Symbian • Blackberry Storm
Size	<ul style="list-style-type: none"> • Windows: 12.5 MB • OS X: 35 MB • Linux: 24 MB • Android: 8.46 MB • iOS: 27 MB
Available in	45 languagesWikipedia:Citation needed
Type	Virtual globe
License	Freeware
Website	earth.google.com ^[4]

Google Earth is a virtual globe, map and geographical information program that was originally called EarthViewer 3D created by Keyhole, Inc, a Central Intelligence Agency (CIA) funded company acquired by Google in 2004 (see In-Q-Tel). It maps the Earth by the superimposition of images obtained from satellite imagery, aerial photography and geographic information system (GIS) 3D globe. It was originally available with three different licenses, but has since been reduced to just two: Google Earth (a free version with limited function) and Google Earth Pro (\$399 per year), which is intended for commercial use. The third original option, Google Earth Plus, has been discontinued.

The product, re-released as Google Earth in 2005, is available for use on personal computers running Windows 2000 and above, Mac OS X 10.3.9 and above, Linux kernel: 2.6 or later (released on June 12, 2006), and FreeBSD. Google Earth is also available as a browser plugin which was released on May 28, 2008. It was also made available for mobile viewers on the iPhone OS on October 28, 2008, as a free download from the App Store, and is available to Android users as a free app in the Google Play store. In addition to releasing an updated Keyhole based client, Google also added the imagery from the Earth database to their web-based mapping software, Google Maps. The release of Google Earth in June 2005 to the public caused a more than tenfold increase in media coverage on virtual

globes between 2004 and 2005, driving public interest in geospatial technologies and applications. As of October 2011, Google Earth has been downloaded more than a billion times.

For other parts of the surface of the Earth, 3D images of terrain and buildings are available. Google Earth uses digital elevation model (DEM) data collected by NASA's Shuttle Radar Topography Mission (SRTM).^[5] This means one can view almost the entire earth in three dimensions. Since November 2006, the 3D views of many mountains, including Mount Everest, have been improved by the use of supplementary DEM data to fill the gaps in SRTM coverage.

Many people use the applications to add their own data, making them available through various sources, such as the Bulletin Board Systems (BBS) or blogs mentioned in the link section below. Google Earth is able to show all kinds of images overlaid on the surface of the earth and is also a Web Map Service client. Google Earth supports managing three-dimensional Geospatial data through Keyhole Markup Language (KML).

Detail

Google Earth is simply based on 3D maps, with the capability to show 3D buildings and structures (such as bridges), which consist of users' submissions using SketchUp, a 3D modeling program software. In prior versions of Google Earth (before Version 4), 3D buildings were limited to a few cities, and had poorer rendering with no textures. Many buildings and structures from around the world now have detailed 3D structures; including (but not limited to) those in the United States, Canada, Mexico, India, Japan, United Kingdom, Spain, Germany, Pakistan and the cities, Amsterdam and Alexandria. In August 2007, Hamburg became the first city entirely shown in 3D, including textures such as façades. The 'Westport3D' model was created by 3D imaging firm AM3TD using long-distance laser scanning technology and digital photography and is the first such model of an Irish town to be created. As it was developed initially to aid Local Government in carrying out their town planning functions it includes the highest resolution photo-realistic textures to be found anywhere in Google Earth. Three-dimensional renderings are available for certain buildings and structures around the world via Google's 3D Warehouse and other websites. In June 2012, Google announced that it will start to replace user submitted 3D buildings with auto-generated 3D mesh buildings starting with major cities. Although there are many cities on Google Earth that are fully or partially 3D, more are available in the Earth Gallery. The Earth Gallery is a library of modifications of Google Earth people have made. In the library there are not only modifications for 3D buildings, but also models of earthquakes using the Google Earth model, 3D forests, and much more.

In 2007, Google began offering traffic data in real-time, based on information crowdsourced from the GPS-identified locations of cellular phone users. In version 4.3 released on April 15, 2008, Google Street View was fully integrated into the program allowing the program to provide an on the street level view in many locations.

On January 31, 2010, the entirety of Google Earth's ocean floor imagery was updated to new images by SIO, NOAA, US Navy, NGA, and GEBCO. The new images have caused smaller islands, such as some atolls in the Maldives, to be rendered invisible despite their shores being completely outlined.

Uses

Google Earth is useful for many day-to-day and other purposes.

- Google Earth can be used to view areas subjected to widespread disasters if Google supplies up-to-date images. For example, after the January 12, 2010 Haiti earthquake images of Haiti were made available on January 17.
- With Google's push for the inclusion of Google Earth in the Classroom, teachers are adopting Google Earth in the classroom for lesson planning, such as teaching students geographical themes (location, culture, characteristics, human interaction, and movement) to creating mashups with other web applications such as Wikipedia.
- One can explore and place location bookmarks on the Moon and Mars.

- One can also get directions using Google Earth, using variables such as street names, cities, and establishments. But the addresses must be typed in search field, one can't simply click on two spots on the map.
- Google Earth can also function as a hub of knowledge, pertaining the users location. By enabling certain options, one can see the location of gas stations, restaurants, museums, and other public establishments in their area.
- One can create custom image overlays for planning trips, hikes on handheld GPS units.
- Google Earth can be used to map homes and select a random sample for research in developing countries.

All of these features are also released by Google Earth Blog.^[6]

Features

Wikipedia and Panoramio integration

In December 2006, Google Earth added a new layer called "Geographic Web" that includes integration with Wikipedia and Panoramio. In Wikipedia, entries are scraped for coordinates via the Coord templates. There is also a community-layer from the project Wikipedia-World. More coordinates are used, different types are in the display and different languages are supported than the built-in Wikipedia layer. Google announced on May 30, 2007 that it is acquiring Panoramio. In March 2010, Google removed the "Geographic Web" layer. The "Panoramio" layer became part of the main layers and the "Wikipedia" layer was placed in the "More" layer.

Flight simulator

In Google Earth v4.2 a flight simulator was included as a hidden feature. Starting with v4.3 it is no longer hidden. Initially the F-16 Fighting Falcon and the Cirrus SR-22 were the only aircraft available, and they could be used with only a few airports. However, one can start flight in "current location" and need not to be at an airport. One will face the direction they face when they start the flight simulator. They cannot start flight in ground level view and must be near the ground (approximately 50m-100m above the ground) to start in take-off position. Otherwise they will be in the air with 40% flaps and gears extended (landing position). In addition to keyboard control, the simulator can be controlled with a mouse or joystick. Google Earth v5.1 and higher crashes when starting flight simulator with Saitek and other joysticks.

Featured planes

- F-16 Fighting Falcon – A much higher speed and maximum altitude than the Cirrus SR-22, it has the ability to fly at a maximum speed of Mach 2, although a maximum speed of 1678 knots (3108 km/h) can be achieved. The take-off speed is 225 knots, the landing speed is 200 knots (370 km/h).
- Cirrus SR-22 – Although slower and with a lower maximum altitude, the SR-22 is much easier to handle and is preferred for up-close viewing of Google Earth's imagery. The take-off speed is 75 knots (139 km/h), the landing speed is 70 knots (130 km/h)

The flight simulator can be commanded with the keyboard, mouse or plugged-in joystick. Broadband connection and a high speed computer provides a very realistic experience.^[7] The simulator also runs with animation, allowing objects (for example: planes) to animate while on the simulator. Programming language can also be used to make it look like the cockpit of a plane, or for instrument landing.

Sky mode

Main article: Google Sky

Google Sky is a feature that was introduced in Google Earth 4.2 on August 22, 2007, and allows users to view stars and other celestial bodies. It was produced by Google through a partnership with the Space Telescope Science Institute (STScI) in Baltimore, the science operations center for the Hubble Space Telescope. Dr. Alberto Conti and his co-developer Dr. Carol Christian of STScI plan to add the public images from 2007, as well as color images of all of the archived data from Hubble's Advanced Camera for Surveys. Newly released Hubble pictures will be added to the Google Sky program as soon as they are issued. New features such as multi-wavelength data, positions of major satellites and their orbits as well as educational resources will be provided to the Google Earth community and also through Christian and Conti's website for Sky. Also visible on Sky mode are constellations, stars, galaxies and animations depicting the planets in their orbits. A real-time Google Sky mashup of recent astronomical transients, using the VOEvent protocol, is being provided by the VOEventNet collaboration. Google's Earth maps are being updated each 5 minutes.

Google Sky faces competition from Microsoft WorldWide Telescope (which runs only under the Microsoft Windows operating systems) and from Stellarium, a free open source planetarium that runs under Microsoft Windows, OS X, and Linux.

On March 13, 2008, Google made a web-based version of Google Sky available via the internet.

Street View

Main article: Google Street View

On April 15, 2008 with version 4.3, Google fully integrated its Street View into Google Earth. In version 6.0, the photo zooming function has been removed because it is incompatible with the new 'seamless' navigation.

Google Street View provides 360° panoramic street-level views and allows users to view parts of selected cities and their surrounding metropolitan areas at ground level. When it was launched on May 25, 2007 for Google Maps, only five cities were included. It has since expanded to more than 40 U.S. cities, and includes the suburbs of many, and in some cases, other nearby cities. Recent updates have now implemented Street View in most of the major cities of Canada, Mexico, Denmark, South Africa, Japan, Spain, Norway, Finland, Sweden, France, the UK, Republic of Ireland, the Netherlands, Italy, Switzerland, Portugal, Taiwan, and Singapore.

Google Street View, when operated, displays photos that were previously taken by a camera mounted on an automobile, and can be navigated by using the mouse to click on photograph icons displayed on the screen in the user's direction of travel. Using these devices, the photos can be viewed in different sizes, from any direction, and from a variety of angles.

Water and ocean

Introduced in version 5.0 (February 2009), the *Google Ocean* feature allows users to zoom below the surface of the ocean and view the 3D bathymetry beneath the waves. Supporting over 20 content layers, it contains information from leading scientists and oceanographers. On April 14, 2009, Google added underwater terrain data for the Great Lakes. In 2010, Google added underwater terrain data for Lake Baikal.

In June 2011, higher resolution of some deep ocean floor areas increased in focus from 1-kilometer grids to 100 meters thanks to a new synthesis of seafloor topography released through Google Earth. The high resolution features were developed by oceanographers at Columbia University's Lamont-Doherty Earth Observatory ^[8] from scientific data collected on research cruises. The sharper focus is available for about 5 percent of the oceans (an area larger than North America). Underwater scenery can be seen of the Hudson Canyon off New York City, the Wini Seamount near Hawaii, and the sharp-edged 10,000-foot-high Mendocino Ridge off the U.S Pacific Coast. There is a Google 2011 Seafloor Tour for those interested in viewing ocean deep terrain.

Historical Imagery

Introduced in version 5.0, Historical Imagery allows users to traverse back in time and study earlier stages of any place. This feature allows research that require analysis of past records of various places.

Mars

Main article: Google Mars

Google Earth 5 includes a separate globe of the planet Mars, that can be viewed and analysed for research purposes. The maps are of a much higher resolution than those on the browser version of Google Mars and it also includes 3D renderings of the Martian terrain. There are also some extremely high resolution images from the Mars Reconnaissance Orbiter's HiRISE camera that are of a similar resolution to those of the cities on Earth. Finally, there are many high resolution panoramic images from various Mars landers, such as the Mars Exploration Rovers, Spirit and Opportunity, that can be viewed in a similar way to Google Street View. Interestingly enough, layers on Google Earth (such as World Population Density) can also be applied to Mars. Layers of Mars can also be applied onto Earth. Mars also has a small application found near the face on Mars. It is called Meliza, and features a chat between the user and an automatic robot speaker.

Moon

Main article: Google Moon

On July 20, 2009, the 40th anniversary of the Apollo 11 mission, Google introduced the Google Earth version of Google Moon, which allows users to view satellite images of the Moon. It was announced and demonstrated to a group of invited guests by Google along with Buzz Aldrin at the Newseum in Washington, D.C.

Liquid Galaxy

Liquid Galaxy is a cluster of computers running Google Earth creating an immersive experience. On September 30, 2010, Google made the configuration and schematics for their rigs public, placing code and setup guides on the Liquid Galaxy wiki.

Liquid Galaxy has also been used as a panoramic photo viewer using KRpano^[9], as well as a Google Street View viewer using Peruse-a-Rue Peruse-a-Rue is a method for synchronizing multiple Maps API clients.

Influences

Google Earth can be traced directly back to a small company named Autometric, now a part of Boeing. A team at Autometric, led by Robert Cowling, created a visualization product named Edge Whole Earth. Bob demonstrated Edge to Michael T. Jones, Chris Tanner and others at SGI in 1996. Several other visualization products using imagery existed at the time, including Performer-based ones, but Michael T. Jones stated emphatically that he had "never thought of the complexities of rendering an entire globe ..." The catch phrase "from outer space to in your face" was coined by Autometric President Dan Gordon, and used to explain his concept for personal/local/global range. Edge blazed a trail as well in broadcasting, being used in 1997 on CBS News with Dan Rather, in print for rendering large images draped over terrain for National Geographic, and used for special effects in the feature film *Shadow Conspiracy* in 1997.

Gordon was a huge fan of the 'Earth' program described in Neal Stephenson's sci-fi classic *Snow Crash*. Indeed, a Google Earth co-founder claimed that Google Earth was modeled after *Snow Crash*, while another co-founder said it was inspired by the short science education film *Powers of Ten*. In fact Google Earth was at least partly inspired by a Silicon Graphics demo called "From Outer Space to in Your Face" which zoomed from space into the Swiss Alps then into the Matterhorn. This launch demo was hosted by an Onyx 3000 with InfiniteReality4 graphics, which supported Clip Mapping and was inspired by the hardware texture paging capability (although it did not use the Clip

Mapping) and "Powers of Ten". The first Google Earth implementation called Earth Viewer emerged from Intrinsic Graphics as a demonstration of Chris Tanner's software based implementation of a Clip Mapping texture paging system and was spun off as Keyhole Inc.

Technical specifications

Detailed release notes/history/changelog are made available by Google.

Imagery and coordination

- Coordinate System and Projection
 - The internal coordinate system of Google Earth is geographic coordinates (latitude/longitude) on the World Geodetic System of 1984 (WGS84) datum.
 - Google Earth shows the earth as it looks from an elevated platform such as an airplane or orbiting satellite. The projection used to achieve this effect is called the General Perspective. This is similar to the Orthographic projection, except that the point of perspective is a finite (near earth) distance rather than an infinite (deep space) distance.
- Baseline resolutions
 - Czech Republic: 0.1 – 0.5 m (by Eurosense / Geodis Brno)
 - Slovakia: 0.5 m (by Eurosense / Geodis Slovakia)
 - Hungary: 2.5 m SPOT Images. Budapest approx. 0.3 m.
 - Germany, Switzerland, Netherlands, Denmark, UK, Andorra, Luxembourg, Liechtenstein, San Marino, Vatican City: 1 m or better
 - Balkans: 2.5 m (medium resolution)
 - U.S.: 1 m (excludes Alaska & Hawaii)
 - Global: Generally 15 m (some areas, such as Antarctica, are in extremely low resolution), but this depends on the quality of the satellite/aerial photograph uploaded.
- Typical high resolutions
 - Europe: 0.3 m, 0.15 m (e.g. Berlin, Zurich, Hamburg), 0.1 m Prague
 - U.S.: 1 m, 0.6 m, 0.3 m, 0.15 m (extremely rare; e.g. Cambridge and Google Campus, or Glendale)
- Altitude resolution:
 - Surface: varies by country
 - Seabed: Not previously applicable, but since the introduction of "Ocean", elevation data has been introduced (a colorscale approximating sea floor depth is "printed" on the spherical surface at views from high altitudes).
- Age: Images dates vary. The image data can be seen from squares made when DigitalGlobe Coverage is enabled. The date next to the copyright information is not the correct image date. Zooming in or out could change the date of the pictures. Most of the international urban image dates are from 2004 and have not been updated. However, most US images are kept current. Google announces imagery updates on their LatLong Blog in form of a quiz, with hints of the updated locations. The answers are posted some days later in the same blog.

Hardware and software

Google Earth is unlikely to operate on older hardware configurations. The most recent system requirements update document these minimum configurations:

- Pentium III, 500 MHz
- 256 Megabytes of RAM
- 400 MB free disk space
- Network speed: 128 kbit/s
- 64 MB DirectX9 and 3D capable graphics card
- Resolution of 1024x768, 16-bit High Color – DirectX 9 (to run in Direct X mode)
- Windows 2000, Windows XP, Windows Vista, Windows 7, Linux or OS X

The most likely cause of failure is insufficient video RAM: the software is designed to warn the user if their graphics card is not able to support Earth (this often occurs due to insufficient Video RAM or buggy graphics card drivers). The next most likely mode of failure is Internet access speed.

Linux specifications

Minimum system requirements include:

- Kernel: 2.4 or later
- CPU: Pentium III, 500 MHz
- Random-access memory (RAM): 128 MB
- Hard disk: 400 MB free space
- Internet connection speed: 128 kbit/s
- Screen: 1024x768, 16-bit color

Works on the following distributions:

- Ubuntu 5.10 or later
 - SUSE 10.1 or later
 - Fedora Core 4 or later
 - Linspire 5.1
 - Gentoo 2006.0
 - Debian 3.1/4
 - Red Hat 9
 - Slackware 11.0
 - FreeBSD 6.1/7.0 with Linux Emulation
 - Arch Linux 0.7.2 Duke
 - Xandros 3.0.3 Business Edition
 - Mandriva 2007
 - Sabayon Linux 3.26
 - PCLinuxOS 5.0
 - PC/OS 7.10
-

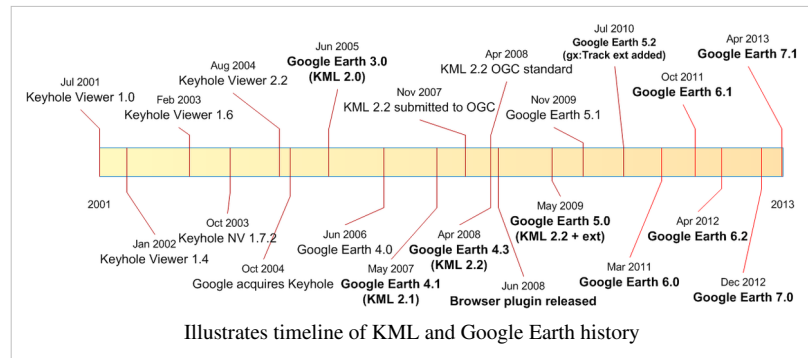
Web browsing

As of Google Earth 5, the contents of description balloons, which are created in KML using JavaScript and iFrames, are rendered with an embedded WebKit engine.^[10]

Versions and variations

Release timeline

- Keyhole Earthviewer 1.0 – June 11, 2001
- Keyhole Earthviewer 1.3 – January 1, 2002
- Keyhole Earthviewer 1.7 – February 2002
- Keyhole LT 1.7.1 – August 26, 2003
- Keyhole NV 1.7.2 – October 16, 2003
- Keyhole 2.2 – August 19, 2004
- Google Earth 3.0 – June 28, 2005
- Google Earth 4.0 – June 11, 2006
- Google Earth 4.1 – May 29, 2007
- Google Earth 4.2 – August 23, 2007
- Google Earth 4.3 – April 15, 2008
- Google Earth 5.0 – May 5, 2009
- Google Earth 5.1 – November 18, 2009
- Google Earth 5.2 – July 1, 2010
- Google Earth 6.0 – March 29, 2011
- Google Earth 6.1 – October 21, 2011
- Google Earth 6.2 – April 11, 2012
- Google Earth 7.0 – June 27, 2012 (Android and iOS platform only)
- Google Earth 7.0 – Dec 18, 2012 (Desktop)
- Google Earth 7.1 - June 6, 2013 (Android platform only)
- Google Earth 7.1 - June 26, 2013 (Desktop and iOS platform only)



Mac version

A version for OS X was released on January 10, 2006, and is available for download from the Google Earth website. With a few exceptions noted below, the Mac version appears to be stable and complete, with virtually all the same functionality as the original Windows version.

Screenshots and an actual binary of the Mac version had been leaked to the Internet on December 8, 2005. The leaked version was significantly incomplete. Among other things, neither the Help menu nor its "Display License" feature worked, indicating that this version was intended for Google's internal use only. Google released no statement regarding the leak.

The Mac version runs only under OS X version 10.3 or later. There is no embedded browser, no direct interface to Gmail and no full screen option. As of January 2009 there are a few bugs concerning the menu bar when switching between applications and a few bugs concerning annotation balloons and printing.

Since version 4.1.7076.4558 (released on May 9, 2007) onward OS X users can, among other new features, upgrade to the "Plus" version via an option in the Google Earth menu. Some users reported difficulties with Google Earth crashing in the then current version when zooming in. The current version for Mac is 5.2.1.1588 .

Linux version

Starting with the version 4 beta Google Earth functions under Linux, as a native port using the Qt toolkit. The Free Software Foundation consider the development of a free compatible client for Google Earth to be a High Priority Free Software Project.^[11]

There were initial reports of users being unable to use revision 7.0 of Google Earth on Linux because of a bug.

Android version

An Android version was released on Monday, February 22, 2010.

iOS version

A version for the iOS, which runs on the iPhone, iPod Touch and the iPad, was released for free on the App Store on October 27, 2008. It makes use of the multi-touch interface to move on the globe, zoom or rotate the view, and allow to select the current location using the iPhone integrated Assisted GPS. Although it previously did not support any layers apart from Wikipedia and Panoramio, version 6.2 brought KML support to add additional layers. Version 7 introduced 3D modeling of several cities.

Google Earth Plus

Discontinued in December 2008, Google Earth Plus was an individual-oriented paid subscription upgrade to Google Earth that provided customers with the following features, most of which are now available in the free Google Earth.

- GPS integration: read tracks and waypoints from a GPS device. A variety of third-party applications have been created which provide this functionality using the basic version of Google Earth by generating KML or KMZ files based on user-specified or user-recorded waypoints. However, Google Earth Plus provides direct support for the Magellan and Garmin product lines, which together hold a large share of the GPS market.
The Linux version of the Google Earth Plus application does not include any GPS functionality.
- Higher resolution printing.
- Customer support via email.
- Data importer: read address points from CSV files; limited to 100 points/addresses. A feature allowing path and polygon annotations, which can be exported to KML, was formerly only available to Plus users, but was made free in version 4.0.2416.
- Higher data download speeds

Google Earth Pro

For a \$399 annual subscription fee, Google Earth Pro is a business-oriented upgrade to Google Earth that has more features than the Plus version. The Pro version includes add-on software such as:

- Movie making.
- GIS data importer.
- Advanced printing modules.
- Radius and area measurements

The professional version is available for Windows (NT-based versions), Mac OS X 10.4 or later.

Google Earth Enterprise

Google Earth Enterprise is a version of Google Earth designed for use by organizations whose businesses could take advantage of the program's capabilities, for example by having a globe that holds company data available for anyone in that company.

Automotive version

An automotive version of Google Earth is available in the 2010 Audi A8.

Google Earth Plug-in

The Google Earth API is a free beta service, available for any web site that is free to consumers. The Plug-in and its JavaScript API allows users to place a version of Google Earth into web pages. The API enables sophisticated 3D map applications to be built.

The Google Earth Plug-in is available for the following web browsers and operating systems:

Microsoft Windows (2000, XP, Vista, and 7)

- Google Chrome 1.0+
- Internet Explorer 6.0+
- Firefox 2.0+
- Flock 1.0+

Apple Mac OS X 10.4 and higher (Intel and PowerPC)

- Safari 3.1+
- Firefox 3.0+

To date the plug-in supports the following layers:

- Terrain
- Roads
- Buildings
- Borders
- 3-D Buildings

The Google Updater Plugin from Google^[12] will keep the Google Earth Plugin (and all other Google plugins) up to date on your browser.

It also supports 'Sky Mode', 'Photo Overlays', and provides much of the same controls and information bar as the full application.

- Google Earth Plug-in^[13]
- Google Earth API^[14]
- Current version plugin Google update^[15]

Imagery resolution and accuracy

Most land areas are covered in satellite imagery with a resolution of about 15 m per pixel. This base imagery is 30 m multispectral Landsat which is pansharpened with the 15 m [panchromatic] Landsat imagery. However, Google is actively replacing this base imagery with 2.5 m SPOTImage imagery and several higher resolution datasets mentioned below. Some population centers are also covered by aircraft imagery (orthophotography) with several pixels per meter.

Google has resolved many inaccuracies in the vector mapping since the original public release of the software, without requiring an update to the program itself. An example of this was the absence from Google Earth's map boundaries of the Nunavut territory in Canada, a territory that had been created on April 1, 1999; this mistake was corrected by one of the data updates in early 2006.

The images are not all taken at the same time, but are generally current to within three years. However, with the release of Google Earth 5.0, it has historical images dating back to the 1940s in some spots. Image sets are sometimes not correctly stitched together. Updates to the photographic database can occasionally be noticed when drastic changes take place in the appearance of the landscape, for example Google Earth's incomplete updates of New Orleans following Hurricane Katrina, or when placemarks appear to shift unexpectedly across the Earth's surface. Though the placemarks have not in fact moved, the imagery is composed and stitched differently.

Place name and road detail vary greatly from place to place.

In some areas, local government jurisdictions have submitted more finely gridded terrain models through the Map Content Partners program. In March 2010, the County of Marin, just north of the Golden Gate Bridge by San Francisco, California, published a 40 cm gridded terrain surface of 1425 km² through the program.

The "Measure" function shows that the length of equator is about 40,030.24 km, giving an error of -0.112% compared with the actual value of 40,075.02 km Earth; for the meridional circumference, it shows a length of about 39,963.13 km, also giving an error of -0.112% compared with the actual value of 40,007.86 km.

On December 16, 2007, most of Antarctica was updated to a 15 m resolution using imagery from the Landsat Image Mosaic of Antarctica (1 m resolution images of some parts of Antarctica were added in June 2007); however, the Arctic polar ice cap is completely absent from the current version of Google Earth, as are waves in the oceans. The geographic North Pole is found hovering over the Arctic Ocean and the tiling system produces artifacts near the poles as the tiles become 'infinitely' small and rounding errors accumulate.

Cloud cover and shadows can make it difficult or impossible to see details in some land areas, including the shadow side of mountains.

Missing Imagery

While Google Earth comprehensively covers all continental land masses with satellite imagery at various resolutions, this is not always the case for offshore islands. A number of remote and often uninhabited islands and rocks across the world's oceans have no satellite imagery at all in Google Earth. In these cases, the only imagery visible is that of the ocean floor and, typically, what appears to be a seamount where the island is located, but no imagery of the island itself.

In some cases, pre-2009 high resolution imagery of some remote islands has been obliterated by misplaced or absent haloing and feathering around those islands when ocean floor imagery was added in 2009 (for example, Brazil's Martin Vaz Islands and Seychelles' Bertaut Reef) but this imagery is usually accessible by viewing Google Earth's Historical Imagery for that location.

The vast majority of the missing imagery is for islands in the Pacific, and among those, Australia's Coral Sea Islands Territory has the most missing imagery.

A non-exhaustive list of Google Earth Missing Imagery as at 28 July 2014 includes:

Atlantic Ocean

- **Brazilian offshore islands:** St Peter and St Paul Rocks
- **South Georgia and South Sandwich Islands:** Black Rock, Shag Rocks, Clerke Rocks
- **United Kingdom:** Rockall

Indian Ocean

- **Lakshadweep:** Pitti

Pacific Ocean

- **Coral Sea Islands Territory:** Cato Island, Diane Bank Cay, Elizabeth Reef, Flinders Reefs, Frederick Reefs, Holmes Reef, Kenn Reefs, Lihou Reef and Cays, Magdelaine Cays, Marion Reef, Mellish Reef, Middleton Reef, Saumarez Reefs, Tregosse Reefs, Wreck Reefs.
- **Federated States of Micronesia:** Ngulu Atoll, Sorol.
- **Fiji:** Ceva-i-ra (Conway Reef), South Minerva Reef
- **French Polynesia:**
 - **Austral Islands:** Marotiri (Bass Rocks).
 - **Tuamotu Archipelago:** Anuanurunga, Nukutipipi
- **Hawaii:** Gardner Pinnacles, Necker Island
- **Japan:**
 - **Izu Islands:** Beyonesu Retsugan, Sofugan (Lot's Wife), Sumisu-to (Smith Island)
 - **Ogasawara Islands:** Nishino Shima
- **Kermadec Islands:** L'Esperance Rock, L'Havre Rock
- **Kiribati:** Rawaki (Phoenix Island)
- **Macquarie Island Group:** Bishop and Clerk Rocks, Judge and Clerk Rocks
- **New Caledonia:** Cayes de Sable (Sable Islands)
- **Revillagigedo Islands:** Roca Partida
- **Solomon Islands:** Fatutaka
- **Vanuatu:** Merig

Controversy and criticism

The software has been criticized by a number of special interest groups, including national officials, as being an invasion of privacy and even posing a threat to national security. The typical argument is that the software provides information about military or other critical installations that could be used by terrorists.

- Former President of India APJ Abdul Kalam expressed concern over the availability of high-resolution pictures of sensitive locations in India. Google subsequently agreed to censor such sites.
- The Indian Space Research Organisation said Google Earth poses a security threat to India, and seeks dialogue with Google officials.
- The South Korean government expressed concern that the software offers images of the presidential palace and various military installations that could possibly be used by hostile neighbor North Korea.
- In 2006, one user spotted a large topographical replica in a remote region of China. The model is a small-scale (1/500) version of the Karakoram Mountain Range, which is under the control of China but claimed by India. When later confirmed as a replica of this region, spectators began entertaining military implications.
- In 2006, Google Earth began offering detailed images of classified areas in Israel. The images showed Israel Defense Forces bases, including secret Israeli Air Force facilities, Israel's Arrow missile defense system, military headquarters and Defense Ministry compound in Tel Aviv, a top-secret power station near Ashkelon, and the Negev Nuclear Research Center. Also shown was the alleged headquarters of the Mossad, Israel's foreign

- intelligence service, whose location is highly classified.^[16]
- Operators of the Lucas Heights nuclear reactor in Sydney, New South Wales, Australia asked Google to censor high resolution pictures of the facility. However, they later withdrew the request.
 - In July 2007, it was reported that a new Chinese Navy Jin-class nuclear ballistic missile submarine was photographed at the Xiaopingdao Submarine Base south of Dalian.
 - Hamas and the al-Aqsa Martyrs' Brigades have reportedly used Google Earth to plan Qassam rocket attacks on Israel from Gaza (See: List of Qassam rocket attacks.)
 - The lone surviving gunman involved in the 2008 Mumbai attacks admitted to using Google Earth to familiarise himself with the locations of buildings used in the attacks.
 - Michael Finton, aka Talib Islam, used Google Earth in planning his attempted September 24, 2009, bombing of the Paul Findley Federal Building and the adjacent offices of Congressman Aaron Schock in Springfield, Illinois.^[17]
 - In 2009, Google superimposed old woodblock prints of maps from 18th and 19th century Japan over Japan today. These maps marked areas inhabited by the **burakumin** caste, who were considered "non-humans" for their "dirty" occupations, including leather tanning and butchery. Descendants of members of the burakumin caste still face discrimination today and many Japanese people feared that some would use these areas, labeled *etamura* (穢多村, *translation: "village of an abundance of defilement"*), to target current inhabitants of them. These maps are still visible on Google Earth, but with the label removed where necessary.
 - Thieves in the United Kingdom allegedly use Google Earth to find Church of England churches with lead roofs in order to steal the lead and sell it as scrap (at \$2,400 per metric tonne) on the metals market.

Google Earth has been blocked by Google in Iran^[18] and Sudan^[19] since 2007 due to US government export restrictions. The program has also been blocked in Morocco since 2006 by Maroc Telecom, a major service provider in the country.

Some citizens may express concerns over aerial information depicting their properties and residences being disseminated freely. As relatively few jurisdictions actually guarantee the individual's right to privacy, as opposed to the state's right to secrecy, this is an evolving point. Perhaps aware of these critiques,^[20] for a time, Google had Area 51 (which is highly visible and easy to find) in Nevada as a default placemark when Google Earth is first installed.

As a result of pressure from the United States government, the residence of the Vice President at Number One Observatory Circle was obscured through pixelization in Google Earth and Google Maps in 2006, but has since been lifted. The usefulness of this downgrade is questionable, as high-resolution photos and aerial surveys of the property are readily available on the Internet elsewhere. Capitol Hill used to also be pixelized in this way, but this was lifted. The Royal Stables in The Hague, Netherlands used to be pixelized as well, but was partially lifted. If one zooms in too close to the Stables, it is still pixelized.

Critics have expressed concern over the willingness of Google to cripple their dataset to cater to special interests, believing that intentionally obscuring any land goes against its stated goal of letting the user "point and zoom to any place on the planet that you want to explore".

In the United Kingdom, critics have also argued that Google Earth has led to the vandalism of private property, highlighting the graffiti of a penis being drawn on the roof of a house near Hungerford,^[21] on the roof of Yarm School at Stockton on Tees^[22] and on the playing fields of a school in Southampton^[23] as examples of this.

In Hazleton, Pennsylvania, media attention and critics focused on Google Earth once more because of the defacing of the Hazleton Area Highschool Football field. Grass was removed to create the image of a penis approximately 35 yards long and 20 yards wide.

Late 2000s versions of Google Earth require a software component running in the background that will automatically download and install updates. Several users expressed concerns that there is not an easy way to disable this updater, as it runs without the permission of the user.

In the academic realm increasing attention has been devoted to both Google Earth and its place in the development of digital globes more generally. In particular, the International Journal of Digital Earth ^[24] now features many articles evaluating and comparing the development Google Earth and its differences when compared to other professional, scientific and governmental platforms.

Elsewhere, in the Humanities and Social Sciences, Google Earth's role in the expansion of "earth observing media" has been examined. Leon Gurevitch in particular has examined the role of Google Earth in shaping a shared cultural consciousness regarding climate change and humanities capacity to treat the earth as an engineerable object. ^[25] Gurevitch has described this interface between earth representation in Google Earth and a shared cultural imaginary of geo-engineering as "Google Warming".

Copyright

Every image created from Google Earth using satellite data provided by Google Earth is a copyrighted map. Any derivative from Google Earth is made from copyrighted data which, under United States Copyright Law, may not be used except under the licenses Google provides. Google allows non-commercial personal use of the images (e.g. on a personal website or blog) as long as copyrights and attributions are preserved. By contrast, images created with NASA's globe software World Wind use The Blue Marble, Landsat or USGS layer, each of which is a terrain layer in the public domain. Works created by an agency of the United States government are public domain at the moment of creation. This means that those images can be freely modified, redistributed and used for commercial purposes.

Layers

Google Earth also features many layers as a source for information on businesses and points of interest, as well as showcasing the contents of many communities, such as Wikipedia, Panoramio and YouTube. Google updates with new layers often. Many Google Earth layers, such as Panoramio and Google Earth Community layers, are updated daily with entries from the respective websites.

Borders and labels

Contains borders for countries/provinces and shows placemarks for cities and towns.

- *Borders: Marks international borders with a thick yellow line (borders with territorial disputes with thick red lines), 1st level administrative borders (generally provinces and states) with a lavender line, and 2nd level administrative borders (counties) with a cyan line. Coastlines appear as a thin yellow line. Displays names of countries, 1st level administrative areas, and islands.*
- *Labels: Displays labels for large bodies of water, such as oceans, seas, and bays, and populated places.*

Places of interest

A collection of business listings provided by many local services.

Panoramio

Shows many of the most relevant pictures uploaded onto Panoramio's website.

Roads

Displays available road networks. The colors and signs displayed vary depending on the type of roadway.

- Limited-access freeways and tollways that are part of widespread networks such as the International E-road network, United States Interstate Highways and many other national road networks are represented by orange lines.
 - Other freeways are marked with pale orange lines.
-

- Some roads in Japan are indigo.
- Other important roads, generally those most travelled, highest capacity, or bearing a road number, are labeled with yellow lines.
- All other roads are labeled white.
- Some pedestrian walkways and private roads are signified by transparent white lines, especially when greatly resembling a road intended for public automotive traffic.

Buildings in 3D

Further information: SketchUp, Google Building Maker and Google 3D Warehouse


















Shows many 3D computer building models in many cities, in these styles:







- Photorealistic: *Shows many buildings in a realistic style, with more complex polygons and surface images.*
- Gray: *Low-detail models of city buildings designed for computers that may not have the capability of showing the photorealistic models.*


In 2009, in a unique collaboration between Google and the Museo del Prado in Madrid, the museum selected 14 of its most important paintings to be photographed and displayed at the ultrahigh resolution of 14,000 megapixels inside the 3D version of the Prado in Google Earth and Google Maps.

In June 2012, Google announced that it will be replacing user made 3D buildings with an auto-generated 3D mesh. This will be phased in, starting with select larger cities, with the notable exception of cities such as London and Toronto which require more time to process detailed imagery of their vast number of buildings. The reason given is to have greater uniformity in 3D buildings, and to compete with other platforms already using the technology such as Nokia Here and Apple Maps.

Locations available with the auto-generated 3D mesh:

Country	Cities
 Argentina	Buenos Aires, La Plata, Mar Del Plata
 Australia	Adelaide, Brisbane, Canberra, Perth
 Austria	Graz, Innsbruck, Linz, Salzburg, Steyr, Traun, Wels
 Belgium	Charleroi, Ghent, Mons
 Brazil	Belo Horizonte, Brasília, Curitiba, Florianópolis, Natal, Porto Alegre, Recife, Rio de Janeiro, Salvador
 Bulgaria	Blagoevgrad, Haskovo, Montana, Pleven
 Canada	Ajax, Oshawa, Peterborough, Greater Sudbury, Calgary, Edmonton, Montreal, Regina, Vancouver, Victoria, Winnipeg
 Denmark	Copenhagen
 France	Angers, Arles, Avignon, Bastia, Besançon, Béziers, Bourges, Clermont-Ferrand, Colmar, Dijon, Grenoble, La Rochelle, Lille, Lyon, Marseille, Mulhouse, Nancy, Nice, Niort, Nîmes, Paris, Pau, Perpignan, Poitiers, Rennes, Rouen, Saint-Étienne, Troyes, Toulouse, Valence
 Hungary	Debreczyn, Dunaújváros, Kecskemét, Nyíregyháza, Pécs, Szeged, Székesfehérvár, Szolnok, Szombathely
 Germany	Augsburg, Bremen, Brunswick, Karlsruhe, Leipzig, Mannheim, Munich, Nuremberg, Salzgitter, Ulm, Friedberg, Speyer, Weinheim
 Italy	Cagliari, Catania, Ferrara, Foggia, Livorno, Lucca, Messina, Modena, Naples, Oristano, Padua, Palermo, Parma, Perugia, Piombino, Pisa, Reggio Calabria, Rimini, Rome (including  Vatican City), Sassari, Siena
 Japan	Chiba, Kanagawa, Kyoto, Okayama, Sendai, Tokyo
 Luxembourg	Luxembourg
 Mexico	Acapulco, Juárez, Cabo San Lucas, La Paz, Leon, Mazatlán, Mérida, Mexico City, Puebla, San Luis Potosí, Guadalajara
 New Zealand	Christchurch

 Norway	Oslo
 Romania	Bucharest
 Spain	Alicante, Badajoz, Baiona, Blanes, Burgos, Cáceres, Castellón, Ciudad Real, Elche, Huesca, Jaén, Lleida, Lugo, Manresa, Merida, Pamplona, Ponferrada, Salamanca, San Sebastian, Santander, Segovia, Sevilla, Tarragona, Toledo, Torremolinos, Zamora, Zaragoza
 Sweden	Malmö
 Switzerland	Basel, Berne, Biel, Fribourg, Geneva, Lausanne, Nyon, Thun, Zurich
 United Kingdom	Birmingham, Bradford, Cardiff, Leeds, London, Newcastle-upon-Tyne, Reading, Stoke-on-trent, Telford, Wolverhampton

Country	State	Cities
 United States	Alabama	Anniston, Montgomery, Auburn, Birmingham, Dothan, Mobile, Opelika, Tuscaloosa, Florence, Daphne
	Arizona	Flagstaff, Phoenix, Prescott, Red Rock State Park, Sedona, Tucson, Lake Havasu City, Picture Rocks
	Arkansas	Jonesboro, Little Rock, Pine Bluff, Fort Smith, Hot Springs, Russellville
	California	Anaheim, Angwin, Barro, Barstow, Bakersfield, Berkeley, Calistoga, Cathedral City, Chico, Corona, Crestline, Deer Park, Delano, Desert Hot Springs, Elk[26], Fetters Hot Springs-Agua Caliente, Glen Ellen, Graton, Grove, Escondido, Fremont, Fresno, Hanford, Hayward, Healdsburg, Helendale, Indio, Kenwood, Larkfield-Wikiup, Lodi, Los Angeles, Long Beach, Madera, McFarland, Merced, Modesto, Napa, Novato, Oak Knoll, Oakland, Oakville, Ojai, Oroville, Palm Springs, Petaluma, Redding, Rohnert Park, Rutherford, Sacramento, Salvador, San Diego, San Francisco, San Jose, San Rafael, Santa Ana, Santa Cruz, Santa Rosa, Sebastopol, Sonoma, St. Helena, Stockton, Twentynine Palms, Union[26], Windsor, Woodleaf, Yountville, Yuba City, Zinfandel
	Connecticut	Hartford, Middletown, Windsor Locks, New Britain
	Colorado	Colorado Springs, Denver, Grand Junction, Boulder, Fort Collins, Broomfield, Loveland, Greeley
	Florida	Miami, Ocala, Orlando, Tampa, Tallahassee, Cocoa, Crystal River, Titusville, Palm Bay, Panama City
	Georgia	Athens, Atlanta, Columbus, Dalton, Macon, Rome, Warner Robins, Fort Oglethorpe, Valdosta, Brunswick
	Hawaii	Kahului
	Idaho	Idaho Falls, Pocatello, Twin Falls, Lewiston
	Illinois	Bloomington, Chicago, Danville, East St. Louis, Kankakee, Streator
	Indiana	Anderson, Bloomington, Fort Wayne, Indianapolis, Evansville, Kokomo, Lafayette, Michigan City, Plainfield, Terre Haute
	Iowa	Dubuque, Sioux City, Ames, Waterloo, Cedar Falls
	Kansas	Lawrence, Topeka, Wichita, Manhattan, Olathe, Overland Park
Kentucky	Bowling Green, Louisville, Owensboro, Elizabethtown	

Louisiana	Baton Rouge, New Orleans, Monroe, Monroe, Eunice
Massachusetts	Boston, Hyannis
Maine	Bangor, Biddeford, Lewiston, Portland, Mount Desert Island
Maryland	Cumberland, Salisbury
Michigan	Bay City, Battle Creek, Detroit, Flint, Lansing, Grand Rapids, Holland, Kalamazoo
Missouri	Jefferson City, Kansas City, St Louis, Springfield, St Joseph, Joplin, Columbia, St Louis, Cape Girardeau
Minnesota	Duluth, Mankato, St. Cloud, Rochester
Mississippi	Jackson
Montana	Billings, Bozeman, Great Falls, Missoula, Kalispell
Nebraska	Lincoln, Omaha
Nevada	Boulder City, Las Vegas, Reno
New Hampshire	Concord, Dover, Manchester, Portsmouth
New Jersey	Bayonne, Hoboken, Jersey City, Newark, Union City
New Mexico	Albuquerque, Farmington, Las Cruces
New York	Albany, Buffalo, Ithaca, New York City, Utica, Rochester, Queensbury
North Carolina	Charlotte, Raleigh, Fayetteville, Wilmington, Jacksonville, Rocky Mount, Hickory, Greensboro
North Dakota	Bismarck, Fargo, Grand Forks
Ohio	Cincinnati, Cleveland, Mansfield, Lima, Youngstown, Toledo
Oklahoma	Lawton, Enid, Stillwater
Oregon	Portland, Bend, Pendleton, Hermiston, Bend, Corvallis, Eugene, Medford, Roseburg, Grant's Pass
Pennsylvania	Erie, Philadelphia, Pittsburgh, Johnstown, Scranton, Wilkes-Barre
Tennessee	Chattanooga, Nashville, Clarksville, Morristown, Maryville, Loudon, Madisonville
Texas	Austin, Dallas, El Paso, Houston, Killeen, Odessa, San Angelo, San Antonio, Victoria, Texarkana, Longview, College Station, Beaumont, Midland, Athens
South Carolina	Columbia, Greenville, Florence, Anderson, Sumter
South Dakota	Mount Rushmore, Rapid City, Sioux Falls
Utah	Bryce Canyon National Park, Logan, Moab, St George, Salt Lake City, Ogden
Vermont	Burlington
Virginia	Danville, Harrisonburg, Lynchburg, Portsmouth, Richmond, Roanoke, Staunton, Virginia Beach, Waynesboro, Norfolk, Charlottesville, Suffolk
Washington	Longview, Seattle, Spokane, Bremerton, Bainbridge Island, Everett, Mount Vernon, Olympia, Yakima, Wenatchee
Wisconsin	Beaver Dam, Cedarburg, Eau Claire, Fond du Lac, Janesville, La Crosse, Madison, Manitowoc, Port Washington, Racine, Sheboygan, West Bend
West Virginia	Huntington, Parkersburg, Morgantown
Wyoming	Casper, Cheyenne,

Google Street View

Main article: Google Street View

Weather

- Clouds – *Displays cloud cover based on data from both geostationary and low Earth-orbiting satellites. The clouds appear at their calculated elevation, determined by measuring the cloud top temperature relative to surface temperature.*^[27]
- Radar – *Displays weather radar data provided by weather.com and Weather Services International, updating every 5–6 minutes.*
- Conditions and Forecast – *Displays local temperatures and weather conditions. Clicking on an indicator displays a 2 Day Forecast (Example: Monday Morning, Monday Night, Tuesday Morning, Tuesday Night) forecast provided by weather.com.*
- Information – *Clicking Information allows users to further read up on where Google Earth gets weather information.*

Gallery

- Ancient Rome: *Launched by Google on November 12, 2008.*
 - Discovery Networks: *Shows geographical information from the Discovery Channel.*
 - European Space Agency: *Shows many satellite images taken of Earth.*
 - Gigapan Photos: *Images from Google's Gigapan project.*
 - Gigapxl Photos: *Photographs taken using Gigapxl.*
 - Google Book Search: *An application of the Google Book search in Google Earth.*
 - Google Earth Community: *User developed content hosted on Google's official Google Earth Community Forum.*
 - Google News: *Shows news stories from many worldwide news sources.*
 - NASA: *A showcase of many satellite images, overlays and features from NASA.*
 - National Geographic magazine: *Shows many features from the National Geographic Magazine.*
 - New York Times: *A collection of news stories from the popular New York City newspaper.*
 - Rumsey Historical Maps: *Shows a collection of historic maps, dating back to the 1600s.*
 - Travel and Tourism
 - 100% Pure New Zealand
 - Egypt Tourism
 - Japan Tourism
 - Korea Tourism
 - Kyoto Tourism
 - South Africa Tourism
 - Turn Here: City Video Guides
 - Walt Disney World Resort
 - Trimble Outdoor Trips: *A collection of hiking trails with recordings.*
 - Volcanoes
 - Webcams.travel: *A collection of webcams around the world*
 - YouTube: *A collection of popular videos on YouTube.*
-

Global awareness

A collection of services spreading global awareness. The layer was provided by Google Earth Outreach.

- Appalachian Mountaintop removal
- ARKive: Endangered species
- Earthwatch Expeditions
- Fair Trade Certified
- Global Heritage Fund
- Greenpeace
- Jane Goodall's Gombe Chimpanzee Blog
- The Earth from Above with Goodplanet
- The Elders: Every Human Has Rights
- UNDP: Millennium Development Goals Monitor
- UNEP: Atlas of our Changing Environment
- UNICEF: Water and Sanitation
- USHMM: World is Witness
- War in Darfur
- WaterAid
- WWF Conservation Projects

Ocean

- Animal Tracking
 - ARKive: Endangered Ocean Species
 - BBC Earth
 - Census of Marine Life
 - Cousteau Ocean World
 - Explore the Ocean
 - Marine Protected Area
 - National Geographic
 - Magazine Quiz
 - Ocean Atlas
 - Ocean Expeditions
 - Ocean Sports
 - Dive Spots
 - Kite Surfing Spots
 - Surf Spots
 - Shipwrecks
 - State of the Ocean
 - Marie Tharp Historical Map
 - Underwater Features
-

Sky layers

Layers for Google Sky.

- Welcome to Sky: An introduction to the Sky mode.
- Current Sky Events
 - EarthSky Podcasts^[28]
 - Hubblecast
 - StarDate by the University of Texas
 - VOEventNET
- Our Solar System: Shows locations, orbits and information of the Solar System.
- Backyard Astronomy: Shows information about constellations and other space sights visible from a backyard telescope.
- Featured Observatories
 - Hubble Showcase
 - Spitzer Infrared Showcase
 - GALEX Ultraviolet Showcase
 - Chandra X-Ray Showcase
 - WMAP Microwave Showcase
 - IRAS Infrared Sky
- Education Center
 - Celestron SkyScout Audio
 - Virtual Tourism
 - User's Guide to Galaxies
 - Life of a Star
- Historical Sky Maps
 - Rumsey Star Maps
 - Hevelius Constellations
- Sky Community: Posted KML files in the Sky forum in the Google Earth Community.

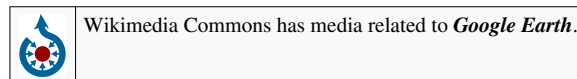
Mars layers

- Featured Satellite Images
- Global Maps
- Place Names
- Mars Gallery
 - A Traveler's Guide to Mars
 - Rovers and Landers
- Spacecraft Imagery

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- [3] http://en.wikipedia.org/w/index.php?title=Template:Latest_preview_software_release/Google_Earth&action=edit
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- [7] Webwise: Google's flight simulator (http://technology.timesonline.co.uk/tol/news/tech_and_web/the_web/article3250643.ece) The Sunday Times, January 27, 2008
- [8] <http://www.ldeo.columbia.edu/>
- [9] <http://krpano.com/>
- [10] KML Reference Documentation – UNIQ-nowiki-0-157d72fe2115b31a-QINU (<http://code.google.com/apis/kml/documentation/kmlreference.html#description>)
- [11] FSF.org (<http://www.fsf.org/campaigns/priority.html>): High Priority Free Software Projects
- [12] Current Version of Google Update Plugin (<http://www.currentversionplugin.net/google-update/>)
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- [27] Google Earth: Weather layer, information link -- accessed: 03 March 2009 v5.0.11337.1968 (beta)
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External links



Official and related sites

- Official website (<http://earth.google.com/>)
- Facebook page (<https://www.facebook.com/pages/Google-Earth/107745592582048>)
- Google LatLong (<http://google-latlong.blogspot.com>) – News and notes by the Google Earth and Maps team

Unofficial guides and tips

- Google Earth Blog (<http://www.earthblog.com/>): Google Earth news, tips, and updates
- Google Sightseeing (<http://googlesightseeing.com/>) – Guide to interesting and unusual sights
- Ogle Earth (<http://www.ogleearth.com/>) – Google Earth news site charting innovative uses and political implications of Google Earth
- Google Earth in Education (<http://www.jogtheweb.com/play/vWtFwVndYCs>) – A guided tour by a teacher for teachers, students and all.
- Google Earth Germany (<http://www.globezoom.info/wbb2/hmportal.php/>): Germany's Google Earth Portal
- Using Google Earth as a mini GIS (<http://www.arnalich.com/en/goopsen.html>): Changing icons to show data. Examples and guide.
- Google Earth plugin (<http://8biits.com/google/current-version-plugin-google-earth-plugin/>): Current version plugin Google earth plugin

Placemarks and overlays

- North Korea Uncovered (<http://www.nkeconwatch.com/north-korea-uncovered-google-earth/>) – An extensive mapping of North Korea's economic, cultural, political, and military infrastructures, featured in the Wall Street Journal (<http://online.wsj.com/article/SB124295017403345489.html/>).
- King's College London's Collection of KML databases (<http://www.kcl.ac.uk/geodata>)
- STScI's community contributions to Sky website (http://hubblesite.org/explore_astronomy/gsky/)
- Google Earth Anomalies (<http://www.googleearthanomalies.com/>)- Satellite imagery of documented, scientific anomaly sites including mound sites and unexplained circular features via Google Earth
- Virtual Prospector (<http://www.usminer.com/tools/virtual-pro prospector/>) - BLM ownership maps, USGS topos, geologic maps via Google Earth Plugin


Tools

- GeoServer (<http://docs.codehaus.org/display/GEOSDOC/Google+Earth>) – Server to generate KML from Shapefiles, ArcSDE, Oracle, PostGIS, MySQL, GeoTiff, ArcGrid, with support for Network links, superoverlays, time and custom pop-ups.
- GPSVisualizer (<http://www.gpsvisualizer.com/map?form=googleearth>) – Will convert GPS data for use in Google Earth.
- GoogleEarthToolbox (<http://googleearthtoolbox.googlecode.com>) – Matlab & Octave functions that output KML.
- PlaceSurf (<http://placesurf.com>) – Dynamic KML file generator

Google Maps

This article is about the mapping service. For the smartphone application, see Google Maps (application).

Google Maps

	
Screenshot of classic Google Maps street map view.	
Type	Web mapping
Key people	Jens Eilstrup Rasmussen (Inventor & Co-Founder) Lars Rasmussen (Co-Founder)
Owner	Google
Website	maps.google.com ^[1] , maps.google.com/preview ^[2]
Registration	Optional, included with a Google Account
Available in	Multilingual
Launched	February 8, 2005
Current status	Active

Google Maps is a desktop and mobile web mapping service application and technology provided by Google, offering satellite imagery, street maps, and Street View perspectives, as well as functions such as a route planner for traveling by foot, car, bicycle (beta test), or with public transportation. Also supported are maps embedded on third-party websites via the Google Maps API, and a locator for urban businesses and other organizations in numerous countries around the world. Google Maps satellite images are not updated in real time; however, Google adds data to their Primary Database on a regular basis, and most of the images are no more than 3 years old.^[3]

The opt-in redesigned version of the desktop application has been available since 2013, alongside the "classic" (pre-2013) version. The redesigned version was met by user criticism regarding hiding some common functions, removing a scale bar, and lack of other features that include My Places and sharable customized links to parametrized split Street View and Map views.

Google Maps uses a close variant of the Mercator projection, and therefore cannot accurately show areas around the poles. A related product is Google Earth, a stand-alone program which offers more globe-viewing features, including showing polar areas.

Google Maps for mobile is the world's most popular app for smartphones, with over 54% of global smartphone owners using it at least once during the month of August 2013.

Satellite view

Much of the world's available satellite imagery are not more than 3 years old and updated on a regular basis.^[4] Google Maps provides high-resolution aerial or satellite images for most urban areas of the world. Satellite imagery does not necessarily appear in the same resolution— for example less populated areas often appear with less detail. Wikipedia:Citation needed

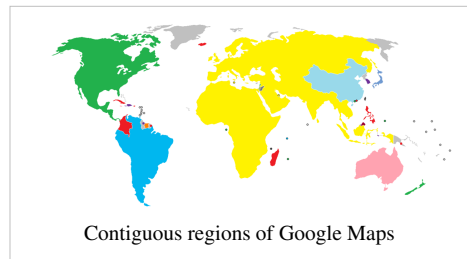
Google's mapping engine prompted a surge of interest in satellite imagery, due to its easily pan-able and searchable mapping and satellite imagery tool. Wikipedia:Citation needed Websites were created to feature satellite images of interesting natural and human-made landmarks, including such novelties as large writing visible in the imagery, famous stadiums, and unique geological formations.^[5] Although Google uses the word *satellite*, most of the high-resolution imagery of cities is aerial photography taken from aircraft flying at 800 feet (240 m) to 1,500 feet (460 m); however, most of the other imagery is from satellites. Google Aerial View is provided in some urban areas. Wikipedia:Citation needed

Security concerns

In 2005 the Australian Nuclear Science and Technology Organization (ANSTO) complained about the potential for terrorists to use the satellite images in planning attacks, with specific reference to the Lucas Heights nuclear reactor; however, the Federal Australian government did not support the organization's concern. At the time of the ANSTO complaint, Google had colored over some areas for security (mostly in the US), such as the rooftop of the White House and several other Washington, D.C., US buildings.

Directions

Google Maps provides a route planner under "Get Directions". Up to four modes of transportation are available depending on the area: driving, public transit (see the Google Transit section below), walking, and bicycling. In combination with Google Street View, issues like parking, turning lanes, and one-way streets can be viewed before traveling. Driving directions are covered as follows:



- Most countries of mainland Eurasia and Africa are covered contiguously, including the United Kingdom, Ireland, the Canary Islands, Cyprus, Malta, Sri Lanka, most of Indonesia and Timor-Leste. China mainland, Hong Kong, Macau, Jordan, Lebanon and North Korea have directions available without connection to other states. Only public transit directions are provided for South Korea.
- All countries of mainland North and Central America are covered contiguously.
- All countries of mainland South America are covered. All countries excluding Colombia but including Trinidad and Tobago are treated contiguously. Colombia has directions available without connection to other states.
- All inhabited countries and territories in the Caribbean are covered, though in general there are no connections between islands.
- Additionally, American Samoa, Australia, the Azores, Cape Verde, The Comoros, The Cook Islands, the Faroe Islands, The Federated States of Micronesia, Fiji, French Polynesia, Guam, Hawaii, Iceland, Japan, Madagascar, the Maldives, Mauritius, Mayotte, New Caledonia, New Zealand, Niue, Northern Mariana Islands, Palau, the Philippines, Réunion, São Tomé and Príncipe, the Seychelles, Samoa, Taiwan, Tonga, Vanuatu, Wallis and Futuna are covered as stand-alone regions, as are Nuuk in Greenland, Sabah in Malaysia, parts of Papua New Guinea, parts of Solomon Islands and Socotra in Yemen.

Implementation

Like many other Google web applications, Google Maps uses JavaScript extensively. As the user drags the map, the grid squares are downloaded from the server and inserted into the page. When a user searches for a business, the results are downloaded in the background for insertion into the side panel and map; the page is not reloaded. Locations are drawn dynamically by positioning a red pin (composed of several partially transparent PNGs) on top of the map images. A hidden IFrame with form submission is used because it preserves browser history. The site also uses JSON for data transfer rather than XML, for performance reasons. These techniques both fall under the broad Ajax umbrella. The result is termed a slippy map and is implemented elsewhere in projects like OpenLayers.

In October 2011, Google announced MapsGL, a WebGL version of Maps with better renderings and smoother transitions.

Extensibility and customization

As Google Maps is coded almost entirely in JavaScript and XML, some end users have reverse-engineered the tool and produced client-side scripts and server-side hooks which allowed a user or website to introduce expanded or customized features into the Google Maps interface.

Using the core engine and the map/satellite images hosted by Google, such tools can introduce custom location icons, location coordinates and metadata, and even custom map image sources into the Google Maps interface. The script-insertion tool Greasemonkey provides a large number of client-side scripts to customize Google Maps data.

Combinations with photo sharing websites, such as Flickr, are used to create "memory maps". Wikipedia:Please clarify Using copies of the Keyhole satellite photos, users have taken advantage of image annotation features to provide personal histories and information regarding particular points of the area.

Google Maps API

After the success of reverse-engineered mashups such as [chicagocrime.org](#) and [housingmaps.com](#), Google launched the Google Maps API ^[6] in June 2005 to allow developers to integrate Google Maps into their websites. It is a free service, and currently^[7] does not contain ads, but Google states in their terms of use that they reserve the right to display ads in the future.

By using the Google Maps API, it is possible to embed Google Maps site into an external website, on to which site specific data can be overlaid. Although initially only a JavaScript API, the Maps API was expanded to include an API for Adobe Flash applications (but this has been deprecated), a service for retrieving static map images, and web services for performing geocoding, generating driving directions, and obtaining elevation profiles. Over 1,000,000 web sites use the Google Maps API, making it the most heavily used web application development API.

The Google Maps API is free for commercial use, provided that the site on which it is being used is publicly accessible and does not charge for access, and is not generating more than 25 000 map accesses a day. Sites that do not meet these requirements can purchase the Google Maps API for Business.

The success of the Google Maps API has spawned a number of competing alternatives, including the Yahoo! Maps API, Bing Maps Platform, MapQuest Development Platform, and OpenLayers. Wikipedia:Citation needed

In September 2011, Google announced it would discontinue a number of its products, including Google Maps API for Flash.

Google Maps for mobile and other devices

Main article: Google Maps (application)

In October 2005, Google introduced a Java application called Google Maps for Mobile ^[8], intended to run on any Java-based phone or mobile device. Many of the web-based site's features are provided in the application.

On November 4, 2009, Google Maps Navigation was released in conjunction with Google Android OS 2.0 Eclair on the Motorola Droid, adding voice commands, traffic reports, and street view support. The initial release was limited to the United States. The service was launched in the UK on 20 April 2010 and in large parts of continental western Europe on June 9, 2010.

In March 2011 Google Vice President of Location Service, Marissa Mayer said that Google provided map services to 150 million users.

In June 2012, Apple announced that they would replace Google Maps with their own maps service from iOS 6. However, on December 13, 2012, Google announced the availability of Google Maps in the Apple App Store, starting with the iPhone version. Just hours after the Google Maps iOS app was released, it became the top free app in the App Store.^[9]

It was announced on December 6, 2012 that Google Maps would make its way to the Wii U, Nintendo's eighth generation video game home console.^[10] Accessibility to a variant of Google Street View on the Wii U was released in February 14, 2013 as an initially free downloadable app available via the Nintendo eShop. As of October 31, 2013, the app is no longer available for free.

Google Maps and Street View parameters

In Google Maps, URL parameters are sometimes data-driven in their limits and the user interface presented by the web may or may not reflect those limits. In particular, the zoom level (denoted by the *z* parameter) supported varies. In less populated regions, the supported zoom levels might stop at around 18. In earlier versions of the API, specifying these higher values might result in no image being displayed. In Western cities, the supported zoom level generally stops at about 20. In some isolated cases, the data supports up to 23 or greater, as in these elephants ^[11] or this view of people at a well ^[12] in Chad, Africa. Different versions of the API and web interfaces may or may not fully support these higher levels.

As of October 2010, the Google map viewer updates its zoom bar to allow the user to zoom all the way when centered over areas that support higher zoom levels. In the classic version, customized (split) Map and Street View views can be saved as parametrized URL links and shared by users. In the 2013 redesigned version, a much smaller overview window becomes interactive upon hovering it and enables a user to change the location and rotate the Street View and save a parametrized view, as well.

History

Acquisitions

Google Maps first started as a C++ program designed by two Danish brothers Lars and Jens Eilstrup Rasmussen at the Sydney-based company Where 2 Technologies. It was first designed to be separately downloaded by users, but the company later pitched the idea for a purely Web-based product to Google management, changing the method of distribution. In October 2004, the company was acquired by Google Inc where it transformed into the web application Google Maps. In the same month, Google acquired Keyhole, a geospatial data visualization company, (with controversial investment from the CIA), whose marquee application suite, Earth Viewer, emerged as the highly successful Google Earth application in 2005 while other aspects of its core technology were integrated into Google Maps.^[13] In September 2004 Google acquired ZipDash, a company that provided realtime traffic analysis.

2005

The application was first announced on the Google Blog on February 8, 2005, and was located at Google. It originally only supported users of Internet Explorer and Mozilla web browsers, but support for Opera and Safari was added on February 25, 2005, but currently [Wikipedia:Manual of Style/Dates and numbers#Chronological items](#) Opera is removed from the system requirements list. It was in beta for six months before becoming part of Google Local on October 6, 2005.

In April 2005, Google created Google Ride Finder using Google Maps. In June 2005, Google released the Google Maps API. In July 2005, Google began Google Maps and Google Local services for Japan, including road maps. On July 22, 2005, Google released "Hybrid View". Together with this change, the satellite image data was converted from plate carrée to Mercator projection, which makes for a less distorted image in the temperate climates latitudes. In July 2005, in honor of the thirty-sixth anniversary of the Apollo Moon landing, Google Moon was launched. In September 2005, in the aftermath of Hurricane Katrina, Google Maps quickly updated its satellite imagery of New Orleans to allow users to view the extent of the flooding in various parts of that city. (Oddly, in March 2007, imagery showing hurricane damage was replaced with images from before the storm; this replacement was not made on Google Earth, which still uses post-Katrina imagery.)

2006

From January 2006, Google Maps featured road maps for the United States, Puerto Rico, Canada, the United Kingdom, Japan, and certain cities in the Republic of Ireland. Coverage of the area around Turin was added in time for the 2006 Winter Olympics. On January 23, 2006, Google Maps was updated to use the same satellite image database as Google Earth. On March 12, 2006, Google Mars was launched, which features a draggable map and satellite imagery of the planet Mars. In April 2006, Google Local was merged into the main Google Maps site. On April 3, 2006, version 2 of the Maps API was released. On June 11, 2006, Google added geocoding capabilities to the API, satisfying the most developer-requested feature for this service. On June 14, 2006, Google Maps for Enterprise was officially launched. As a commercial service, it features intranet and advertisement-free implementations. Also in June, textured 3D building models were added into Google Earth.

In July 2006 Google started including Google Maps business listings in the form of Local OneBoxes in the main Google search results. In December 2006 Google integrated a feature called Plus Box into the main search results. On December 19 Google added a feature that lets one add multiple destinations to their driving directions. Beginning in February 2007, buildings and subway stops are displayed in Google Maps "map view" for parts of New York City, Washington, D.C., London, San Francisco, and some other cities.

2007

On January 29, 2007 Local Universal results were upgraded and more data included in the main Google results page. On February 28, 2007, Google Traffic info was officially launched to automatically include real-time traffic flow conditions to the maps of 30 major cities of the United States. On March 8, 2007, the Local Business Center was upgraded. On May 16, 2007 Google rolled out Universal search results, including more Map information on the main Google results page. On May 18, 2007 Google added neighborhood search capabilities. On May 29, 2007, Google driving directions support was added to the Google Maps API. On May 29, 2007, *Street View* was added, giving a ground-level 360-degree view of streets in some major cities in United States.

On June 19, 2007, reviews were allowed to be added directly to businesses on Google Maps. On June 28, 2007, draggable driving directions were introduced. On July 31, 2007, support for the hCard microformat was announced. Unfortunately, the implementation is broken. [Wikipedia:Citation needed](#) On August 21, 2007, Google announced a simple way to embed Google Maps into other websites. On September 13, 2007, 54 new countries were added to Google Maps in Latin America and Asia.

On October 3, 2007, Google Transit was integrated into Google Maps making public transportation routing possible on Google Maps. On October 27, 2007, Google Maps started mapping the geoweb and showing the results in Google Maps. On October 27, 2007, Google Maps added a searchable interface for coupons in the business listings. On November 27, 2007, "Terrain" view showing basic topographic features was added. The button for "Hybrid" view was removed, and replaced with a "Show labels" checkbox under the "Satellite" button to switch between "Hybrid" and "Satellite" views.Wikipedia:Citation needed

2008

On January 22, 2008, Google expanded the Local Onebox from three business listings to ten. On February 20, 2008, Google Maps allowed searches to be refined by User Rating and neighborhoods. On March 18, 2008, Google allowed end users to edit business listings and add new places. On March 19, 2008, Google added unlimited category options in the Local Business Center. On April 2, 2008, Google added contour lines to the Terrain view. In April 2008, a button to view recent Saved Locations was added to the right of the search field.Wikipedia:Citation needed In May 2008, a "More" button was added alongside the "Map", "Satellite", and "Terrain" buttons, permitting access to geographically related photos on Panoramio and articles on Wikipedia.Wikipedia:Citation needed On May 15, 2008, Google Maps was ported to Flash and ActionScript 3 as a foundation for richer internet applications.Wikipedia:Citation needed On July 15, 2008, walking directions were added. On August 4, 2008, Street View launched in Japan and Australia. On August 5, 2008, the user interface was redesigned.

On August 29, 2008, Google signed a deal under which GeoEye would supply them with imagery from a satellite, and introduced the Map Maker tool, which allows any user to improve the map data seen by all. On September 9, 2008, a reverse business lookup feature was added. On September 23, 2008, information for the New York City Metropolitan Transit Authority was added. On October 7, 2008, GeoEye-1 took its first image, a bird's-eye view of Kutztown University in Pennsylvania. On October 26, 2008, reverse geocoding was added to the Maps API. On November 11, 2008, Street View in Spain, Italy, and France was introduced. On November 23, 2008, AIR support for the Maps API for Flash was added. On November 25, 2008, a new user interface for Street View was introduced. On November 27, 2008, maps, local business information, and local trends for China were introduced. On December 9, 2008, 2x Street View coverage was introduced.

2009

On Mar 19, 2009 Street View was launched in the United Kingdom and the Netherlands. In May, 2009, a new Google Maps logo was introduced. In early October 2009, Google replaced Tele Atlas as their primary supplier of geospatial data in the US version of Maps and use their own data. In October 2009, the railroads were redone, featuring a slightly new look and updated, removing older lines.Wikipedia:Citation needed Also in the same month, maps in several areas were changed to include paper streets and other odd roads that don't exist, as well as lot lines showing up on the map interface.Wikipedia:Citation needed

2010

On February 11, 2010, Google Maps Labs was added. On March 11, 2010, Street View in Hong Kong and Macau were launched. On May 25, 2010, public transportation routing for Denmark was added by integrating with Rejseplanen.dk. As of December 2010[7] Internet Explorer 7.0+, Firefox 3.6+, Safari 3.1+, and Google Chrome are supported.

2011

On April 8, 2011 Google announced that it would begin charging for API usage by commercial sites over a limit. They also introduced a premium licensed service.

On April 19, 2011, Map Maker was added to US Google Maps, allowing any viewer to edit and add changes to Google Maps. This provides Google with local map updates almost in real time instead waiting for digital map data companies to release more infrequent updates.

2012

On January 31, 2012, Google, due to offering its Maps for free, was found guilty of abusing the dominant position of its Google Maps application and ordered by a court to pay a fine and damages to Bottin Cartographes, a French mapping company.

On May 30, 2012, Google Places was replaced by Google+ Local, which now integrates directly with the Google+ service to allow users to post photos and reviews of locations directly to its page on the service. Additionally, Google+ Local and Maps also now feature detailed reviews and ratings from Zagat, which was acquired by Google in September 2011.

In June 2012, Google started mapping Britain's rivers and canals in partnership with the Canal and River Trust. The company has stated that it will update the program during the year to allow users to plan trips which include locks, bridges and towpaths along the 2,000 miles of river paths in the UK.

It was announced on October 11 that Google updated 250,000 miles of roads in the US.

In December 2012, the Google Maps application was separately made available in the App Store, after Apple removed it from its default installation of the mobile operating system version iOS 6. In the face of numerous complaints about the newly released Apple Maps application, Apple CEO Tim Cook was forced to make an apology and recommend other similar applications.

2013

On January 29, 2013, Google Maps was updated to include a map of North Korea.

On March 27, 2013, Google launched Google Maps Engine Lite, a simplified version of its commercial Maps Engine product which is meant to eventually replace the My Maps feature.

On April 23, 2013, Street View was launched in Hungary and Lesotho, expanding the coverage of Google Maps' 360-degree mapping imagery to fifty countries. During the same time period, Google also completed the "largest single update of Street View imagery" ever, with photos of over 350,000 miles (560,000 km) of road across fourteen countries.

As of May 3, 2013, Google Maps recognizes Palestine as a country, instead of redirecting to the Palestinian territories.

Google announced on its Google Maps blog on May 15, 2013 that a new upgraded version of Google Maps is available for use by those registered Google users who request an invitation. The new Google Maps can create a customized map that is specific to the behavior of each user, revealing highlights that are based on the information that is entered, and providing useful local information such as restaurants. A new feature is a carousel that gathers all

Google Maps imagery in one location and contains an Earth view that directly integrates the 3D experience from Google Earth into the new maps. The new version is also more closely connected to Google+ and the local businesses that are displayed are based on each user's Google+ network. Advertisements in the new Google Maps have been redesigned and short sections of advertisements are placed directly onto the map itself, alongside the business name.

In August 2013, Google Maps removed the Wikipedia Layer, which provided links to Wikipedia content about locations shown in Google Maps using Wikipedia geocodes.^[14]

2014

On March 21, 2014, Google rolled out a new Google Maps interface with additional 'features'. Unfortunately none of the product is visible to any user blocking cookies, or referrers, and the preview is restricted to 'logged in' users only.

On April 5, 2014, Street View was launched in Cook Islands, expanding the coverage of Google Maps' 360-degree mapping imagery to 58 countries. During the same time period, Google also completed the "largest single update of Street View imagery ever" with photos of over 370,000 miles (600,000 km) of roadways.

On April 12, 2014, Google Maps was updated to reflect the 2014 Crimean crisis. Crimea is shown as the Republic of Crimea in Russia and as the Autonomous Republic of Crimea in Ukraine. All other versions show a dotted disputed border.^[15]

Google's use of classic Google Maps

Google Moon

Main article: Google Moon

In honor of the 36th anniversary of the Apollo 11 moon landing on July 20, 1969, Google took public domain imagery of the Moon, integrated it into the Google Maps interface, and created a tool called Google Moon. By default this tool, with a reduced set of features, also displays the points of landing of all Apollo spacecraft to land on the Moon. It also included an easter egg, displaying a Swiss cheese design at the highest zoom level, which Google has since removed. Wikipedia:Citation needed A recent collaborative project between NASA Ames Research Center and Google is integrating and improving the data that is used for Google Moon. This is the Planetary Content Project. Google Moon was linked from a special commemorative version of the Google logo displayed at the top of the main Google search page for July 20, 2005 (UTC).

Google Mars

Main article: Google Mars

Google Mars provides a visible imagery view, like Google Moon, as well as infrared imagery and shaded relief (elevation) of the planet Mars. Users can toggle between the elevation, visible, and infrared data, in the same manner as switching between map, satellite, and hybrid modes of Google Maps. In collaboration with NASA scientists at the Mars Space Flight Facility located at Arizona State University, Google has provided the public with data collected from two NASA Mars missions, Mars Global Surveyor and 2001 Mars Odyssey.

Now, with Google Earth 5 it is possible to access new improved Google Mars data at a much higher resolution, as well as being able to view the terrain in 3D, and viewing panoramas from various Mars landers in a similar way to Google Street View.

Google Sky

Main article: Google Sky

On August 27, 2007, Google introduced Google Sky, an online space mapping tool that allows users to pan through a map of the visible universe, using photographs taken by the Hubble Space Telescope.

Google Ride Finder

Google launched an experimental Google Maps-based tool called **Ride Finder**, tapping into in-car GPS units for a selection of participating taxi and limousine services. The tool displays the current location of all supported vehicles of the participating services in major US cities, including Chicago and San Francisco, on a Google Maps street map. As of 2009[7] the tool seems to be discontinued. Not to be confused with carpooling.

Google Traffic

Main article: Google Traffic

In 2007, Google Maps began offering traffic data in real-time, using a colored map overlay to display the speed of vehicles on particular roads. Crowdsourcing is used to obtain the GPS-determined locations of a large number of cellphone users, from which live traffic maps are produced.

Google Traffic is available in over 50 countries.

Google Transit

Further information: International availability of Google Transit

See also: Google Transit Feed Specification

In December 2005, Google launched public transport route planner Google Transit on Google Labs, a 20% project of Chris Harrelson and Avichal Garg. Google Transit launched initially with support for Portland, Oregon, and now includes hundreds of cities in the United States, Canada, Europe, Asia, Africa, Australia, India and New Zealand. The service calculates route, transit time and cost, and can compare the trip to one using a car. In October 2007 Google Transit graduated from Google Labs and became fully integrated into Google Maps.

The coverage of Google Transit is publicly available. It is spread worldwide, in hundreds of cities and sometimes in entire countries such as China, Japan, Switzerland. The coverage of major cities in the United States and in Canada is almost exhaustive. In some areas (North East, North West, South West, Wales, West Midlands and Yorkshire) of the United Kingdom, Google Transit covers only part of the transit agencies. In other areas, Google Transit does not provide public transit directions, but still provides the Transit Layer which overlays the schematic of the transit lines on the map. Notable examples include Paris, Berlin, Mexico City and many other capitals around the world.

Google biking directions

On March 10, 2010, Google added the possibility to search for biking directions on Google Maps. Optimal routes are calculated from traffic, elevation change, bike paths, bike lanes, and preferred roads for biking. An optional layer also shows different types of biking paths, from bike-only trails to preferred roads. This service is available in the US and Canada, and is in beta testing in some other countries such as Singapore. In May 2013, Google Map's biking direction added 6 more European countries: France, Ireland, Germany, Liechtenstein, Luxembourg and Poland.

Google My Maps

In April 2007, My Maps was a new feature added to Google's local search maps. My Maps lets users and businesses create their own map by positioning markers, polylines and polygons onto a map. The interface is a straightforward overlay on the map. A set of eighty-four pre-designed markers is available, ranging from bars and restaurants to webcam and earthquake symbols. Polyline and Polygon color, width and opacity are selectable. Maps modified using My Maps can be saved for later viewing and made public or marked as unlisted, in which case a user will need the saved URL with a 42-character unique ID.

Each element added to a My Map has an editable tag. This tag can contain text, rich text or HTML. Embeddable video and other content can be included within the HTML tag.

Upon the launch of My Maps there was no facility to embed the created maps into a webpage or blog. A few independent websites have now produced tools to let users embed maps and add further functionality to their maps. This has been resolved with version 2.78. Wikipedia:Citation needed

Google Street View

Main article: Google Street View

On May 25, 2007, Google released Street View, a new feature of Google Maps which provides 360° panoramic street-level views of various locations. On the date of release, the feature only included five cities in the US. It has since expanded to thousands of locations around the world.

In July 2009, Google began mapping college campuses and surrounding paths and trails.

Street View garnered much controversy after its release because of privacy concerns about the uncensored nature of the panoramic photographs. Since then, Google has begun blurring faces and license plates through automatic face and character detection. As a by-product, many unrelated characters (traffic signs, road information, street advertising etc.) have often been blurred.

Google Aerial View

Main article: Google Aerial View

In December 2009, Google released Aerial View, consisting of angled aerial imagery, offering a "bird's eye view" of cities. The first cities available were San Jose and San Diego. This feature was available only to developers via the Google Maps API. In February 2010 it was introduced as an experimental feature in Google Maps Labs.

In July 2010, Aerial View was made available in Google Maps in select cities in the United States and worldwide.

Google Latitude

Main article: Google Latitude

Google Latitude was a feature from Google that lets users share their physical locations with other people. This service was based on Google Maps, specifically on mobile devices. There was an iGoogle widget for Desktops and Laptops as well. Some concerns were expressed about the privacy issues raised by the use of the service. On August 9, 2013, this service was discontinued.

Google Flu Vaccine Finder

Google retired its Flu Vaccine Finder in April 2012, but worked closely with HealthMap to launch HealthMap Flu Vaccine Finder.

Monopoly City Streets

Monopoly City Streets was a live worldwide version of the game Monopoly using Google Maps as the game board. It was created by Google and Hasbro. The game has since ended.

Indoor Google Maps

In November 2011, indoor maps were added to Google Maps for Android, giving users the ability to navigate themselves within buildings such as airports, museums, shopping malls, big-box stores, universities, transit stations, and other public spaces (including underground facilities). In July 2013, a revised version of Google Maps added support for Apple iOS devices, including iPads and iPhones. Google encourages owners of public facilities to submit floor plans to their buildings in order to add them to the service.^[16]

Google Maps Business View

Originally called Google Business Photos, initially offered in April 2010 to select cities around the United States, Google Business View has expanded to 27 different countries,^[17] including over 180 cities in the United States. The program is run by Google but the photography is taken by specially certified photographers (called Google Trusted Photographers). The regions currently being served are the US, Canada, Spain, Italy, the UK, France, Netherlands, Sweden, Denmark, Switzerland, Ireland, Australia, Germany, Russia, Japan, Taiwan, Singapore, Hong Kong, Bulgaria, Czech Republic, Poland, Belgium, Indonesia, South Korea, Malaysia, India and New Zealand. Photographers can take up to 200 panoramas per business location. Google has set up a website^[18] where interested businesses can get more information.

My Places

Previous versions of Google Maps (now called "classic maps") had a feature called 'My Places', allowing users to create maps with many locations saved as markers or 'pins'. These maps were used to reference places frequently visited or planned to be visited, planning or recording trip itineraries, etc. For example a person could create a map of their favorite restaurants and share it with friends. Users could customize the look of markers, add comments to each marker, create routes, etc. These maps could easily be shared and were accessible from any browser when signed in, and from the mobile app for android. Multiple users could also collaborate on editing maps, and formerly maps could be made public to search by other users.

In 2013 Google started phasing out the 'My Places' features, including 'my maps'. My Places is not included in the 'New Google Maps' for browsers, or in the Android app since version 7 launched in July 2013. Currently users can revert to 'Classic Maps' from web browsers to access, edit, and download their maps, this will not be possible once the option to revert to classic maps is removed. Google initially stated that the feature would be returned to future versions of the mobile app when version 7 was launched.^[19] However since then there have been no indications that google plans to do so, and as of version 7.7 in March 2014, the feature has not been added. Many users have complained about the lack of this feature, with no response from Google.^[20] Some users have downloaded prior versions of the Google Maps app, before version 7, which still support 'My Maps', though the feature can be unreliable.^[21]

Currently users can download their maps as .kml files which can be used by Google Earth and third-party apps, and also import the maps into Google Maps Engine.

NSA's and GCHQ's use of Google Maps for user surveillance

On 27 January 2014, documents leaked by Edward Snowden revealed that the NSA and the GCHQ intercepted Google Maps queries made on smartphones, and used them to locate the users making these queries. One leaked document, dating to 2008, stated that "[i]t effectively means that anyone using Google Maps on a smartphone is working in support of a GCHQ system."^[22]

Mashups

Main article: Mashup (web application hybrid)

Google Maps interface links through the "Wikipedia layer" to the geo-tags placed in English Wikipedia articles, but does not support non-English ones, reducing its usefulness in non-English languages and in non-English speaking territories. It also links to photos with GPS tags from Panoramio.Wikipedia:Citation needed

Isochrone maps can be generated using the Google Maps API.

Copyright

The Google Maps terms and conditions state that usage of material from Google Maps is regulated by Google Terms of Service and some additional restrictions. Google has either purchased local map data from established companies, or has entered into lease agreements to use copyrighted map data. The owner of the copyright is listed at the bottom of zoomed maps. For example street maps in Japan are leased from Zenrin. Street maps in China are leased from Mapabc. Russian street maps are leased from Geocentre Consulting and Tele Atlas. Data for North Korea is sourced from the companion project Google Map Maker.

Errors

See also: Satellite map images with missing or unclear data

Fixing and reporting errors

In areas where Google Map Maker is available, for example, much of Asia, Africa, Latin America and Europe as well as the United States and Canada, anyone who logs into their Google account can directly improve the map by fixing incorrect driving directions, adding biking trails, or adding a missing building or road. General map errors in Australia, Austria, Belgium, Denmark, France, Liechtenstein, Netherlands, New Zealand, Norway, South Africa, Switzerland, and the United States can be reported using the Report a Problem link in Google Maps and will be updated by Google. For areas where Google uses Tele Atlas data, map errors can be reported using Tele Atlas map insight.

If imagery is missing, outdated, misaligned, or generally incorrect, one can notify Google through their contact request form.^[23]

Maps data

Google Maps has difficulty processing ZIP code data when dealing with cross-boundary situations. For example, users are unable to obtain a route from Hong Kong to Shenzhen via Shatoujiao, because Google Maps does not display and plan the road map of two overlapping places.

Sometimes the names of geographical locations are inaccurate. An example of this type of error could be found in Google Maps Laona, Wisconsin. In this instance Google Maps identified one of the town's two major lakes as "Dawson Lake";^[24] the USGS, State of Wisconsin, and local government maps all identify that map feature as "Scattered Rice Lake".^[25] Another example was Samoa, labeled with "Western Samoa", accurate only as recently as 1997.

In 2011, Google Maps mislabeled the entire length of US Route 30 from Astoria, Oregon to Atlantic City, New Jersey as being concurrent with Quebec Route 366.

Business listings

Google collates business listings from multiple on-line and off-line sources. To reduce duplication in the index, Google's algorithm combines listings automatically based on address, phone number, or geocode, but sometimes information for separate businesses will be inadvertently merged with each other, resulting in listings inaccurately incorporating elements from multiple businesses.

Google has also recruited volunteers to check and correct ground truth data.^[26]

Google Maps can easily be manipulated by businesses which aren't physically located in the area they record a listing. There are cases of people abusing Google Places to overtake their competition where they place a number of unverified listings on online directory sites knowing the information will roll across to Google (duplicate sites). The people that update these listings do not use a registered business name. Keywords and location details are placed on their Google Places business title which overtake credible business listings. In Australia in particular, genuine companies and businesses are noticing a trend of fake business listings in a variety of industries. Wikipedia:Citation needed

Imagery

Street map overlays, in some areas, may not match up precisely with the corresponding satellite images. The street data may be entirely erroneous, or simply out of date: "The biggest challenge is the currency of data, the authenticity of data," said Google Earth representative Brian McClendon. As a result, in March 2008 Google added a feature to edit the locations of houses and businesses.

Restrictions have been placed on Google Maps through the apparent censoring of locations deemed potential security threats. In some cases the area of redaction is for specific buildings, but in other cases, such as Washington, D.C., the restriction is to use outdated imagery. These locations are fully listed on Satellite map images with missing or unclear data.

Different domains

There are some differences in frontier alignments between Google Ditu and Google Maps. On Google Maps, sections of the Chinese border with India and Pakistan are shown with dotted lines, indicating areas or frontiers in dispute. However, Google Ditu shows the Chinese frontier strictly according to Chinese claims with no dotted lines indicating the border with India and Pakistan. For example, the South Tibet region claimed by China but administered by India as a large part of Arunachal Pradesh is shown inside the Chinese frontier by Google Ditu, with Indian highways ending abruptly at the Chinese claim line. Google Ditu also shows Taiwan and the South China Sea Islands as part of China. As of May 2009^[7], Google Ditu's street map coverage of Taiwan also omits major state organs, such as the Presidential Palace, the five Yuans, and the Supreme Court.

There are some differences between *ditu.google.cn* and *ditu.google.com*. For example, the former does not feature My Maps. On the other hand, while the former displays virtually all text in Chinese, the latter displays most text (user-selectable real text as well as those on map) in English. This behavior of displaying English text is not consistent but intermittent – sometimes it is in English, sometimes it is in Chinese. The criteria for choosing which language is displayed are not known publicly.

Miscellaneous

The Wikipedia option of Google Maps has introduced interesting errors by incorporating incorrect or wildly misleading data:

- Chennai district of India found in the Arctic's Kara Sea ^[27]
- Giraavaru (Kaafu Atoll) ^[28] in the Arctic instead of Male' Atoll ^[29] in the Indian Ocean
- South Magnetic Pole ^[30] located very near the North Magnetic Pole

In October 2010, Nicaraguan military commander Edén Pastora stationed Nicaraguan troops on the Isla Calero (in the delta of the San Juan River), justifying his action on the border delineation given by Google Maps. Bing Maps depicts the island to be on the Costa Rican side of the border. Google has since updated its data which it found to be incorrect.

Map projection

Google Maps is based on a close variant of the Mercator projection. Even if the Earth were perfectly spherical, the projection would not be the same as the Mercator because the Spherical Mercator projection uses an average Earth radius. Google Maps uses the formulæ for the spherical Mercator, but it uses the semi-major axis of the WGS 84 datum as the radius of the sphere. The difference between this sphere and the WGS 84 ellipsoid causes the resultant projection not to be precisely conformal. The discrepancy is imperceptible at the global scale but causes maps of local areas to deviate slightly from true ellipsoidal Mercator maps at the same scale. This deviation becomes more pronounced further from the equator, and can reach as high as 35 km. For these reasons the United States Department of Defense through the National Geospatial-Intelligence Agency has declared this map projection to be unacceptable for any official use.

Assuming that dE and dN are the components of infinitesimal local ENU coordinates, their breadth and length projected on the map are described as follows:

$$dx = a_{\text{map}} \left(\frac{a}{\sqrt{1 - e^2 \sin^2 \varphi}} \right)^{-1} \sec \varphi dE,$$

$$dy = a_{\text{map}} \left(\frac{a(1 - e^2)}{(1 - e^2 \sin^2 \varphi)^{3/2}} \right)^{-1} \sec \varphi dN,$$

where φ is geodetic latitude, e is the first eccentricity of the ellipsoid of the Earth, a is the semi-major axis of the Earth, and a_{map} is that at the scale of the map as drawn (see "Geodetic system" and "Mercator projection"). However, since Google Maps uses a sphere instead of an ellipsoid, e is equal to zero which greatly simplifies the above equations. Google Maps uses

$$a_{\text{map}} = \frac{256 \times 2^{\text{zoom Level}}}{2\pi} \text{ pixels.}$$

Because the Mercator projects the poles at infinity, Google Maps cannot show the poles. Instead it cuts off coverage at 85.051125° north and south which is $\text{atan}(\sinh(\pi)) \times 180/\pi$, a requirement that the map is a square. This is not considered a limitation, given the purpose of the service.

Comparable services

- Apple Maps – Apple's map service was launched in 2012 with iOS 6 to replace the Google Maps application on iOS devices.
- Bing Maps – Microsoft's mapping service with road maps and aerial/satellite imagery
- MapQuest
- OpenStreetMap – a royalty free, editable map of the world
- Géoportail – a French rival offering detailed aerial photographs of French territories
- NearMap - Australia specific aerial photography, regularly updated (paid subscription service).
- Nokia Maps – a service offered by Nokia that allows synchronizing with user's mobile phones
- Seat Pagine Gialle – an Italian competitor offering detailed satellite pictures of Italian territories and navigable street level panoramas similar to Street View
- Terralink International
- ViaMichelin
- Waze
- Yahoo! Maps
- Yandex Maps - maps by Yandex, Google's major competitor in Russia and ex-USSR

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How Google Builds Its Maps—and What It Means for the Future of Everything (<http://www.theatlantic.com/technology/archive/2012/09/how-google-builds-its-maps-and-what-it-means-for-the-future-of-everything/261913>)

External links

- Google Maps (<https://maps.google.com>)
 - Mobile phone version (<https://www.google.com/mobile/maps/>)
 - Google Sky (<https://www.google.com/sky/>)
 - Google Moon (<https://www.google.com/moon/>)
 - Google Mars (<https://www.google.com/mars/>)
 - Google Transit (<https://www.google.com/intl/en/landing/transit/>)
- Google Maps Development (<https://sites.google.com/site/gmapsdevelopment/>)
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