

What is GPS?

The Global Positioning System (GPS) is a satellite-based navigation system made up of a network of 24 satellites placed into orbit by the U.S. Department of Defense. GPS was originally intended for military applications, but in the 1980s, the government made the system available for civilian use. GPS works in any weather conditions, anywhere in the world, 24 hours a day. There are no subscription fees or setup charges to use GPS.

How it works

GPS satellites circle the earth twice a day in a very precise orbit and transmit signal information to earth. GPS receivers take this information and use triangulation to calculate the user's exact location. Essentially, the GPS receiver compares the time a signal was transmitted by a satellite with the time it was received. The time difference tells the GPS receiver how far away the satellite is. Now, with distance measurements from a few more satellites, the receiver can determine the user's position and display it on the unit's electronic map.

A GPS receiver must be locked on to the signal of at least three satellites to calculate a 2D position (latitude and longitude) and track movement. With four or more satellites in view, the receiver can determine the user's 3D position (latitude, longitude and altitude). Once the user's position has been determined, the GPS unit can calculate other information, such as speed, bearing, track, trip distance, distance to destination, sunrise and sunset time and more.

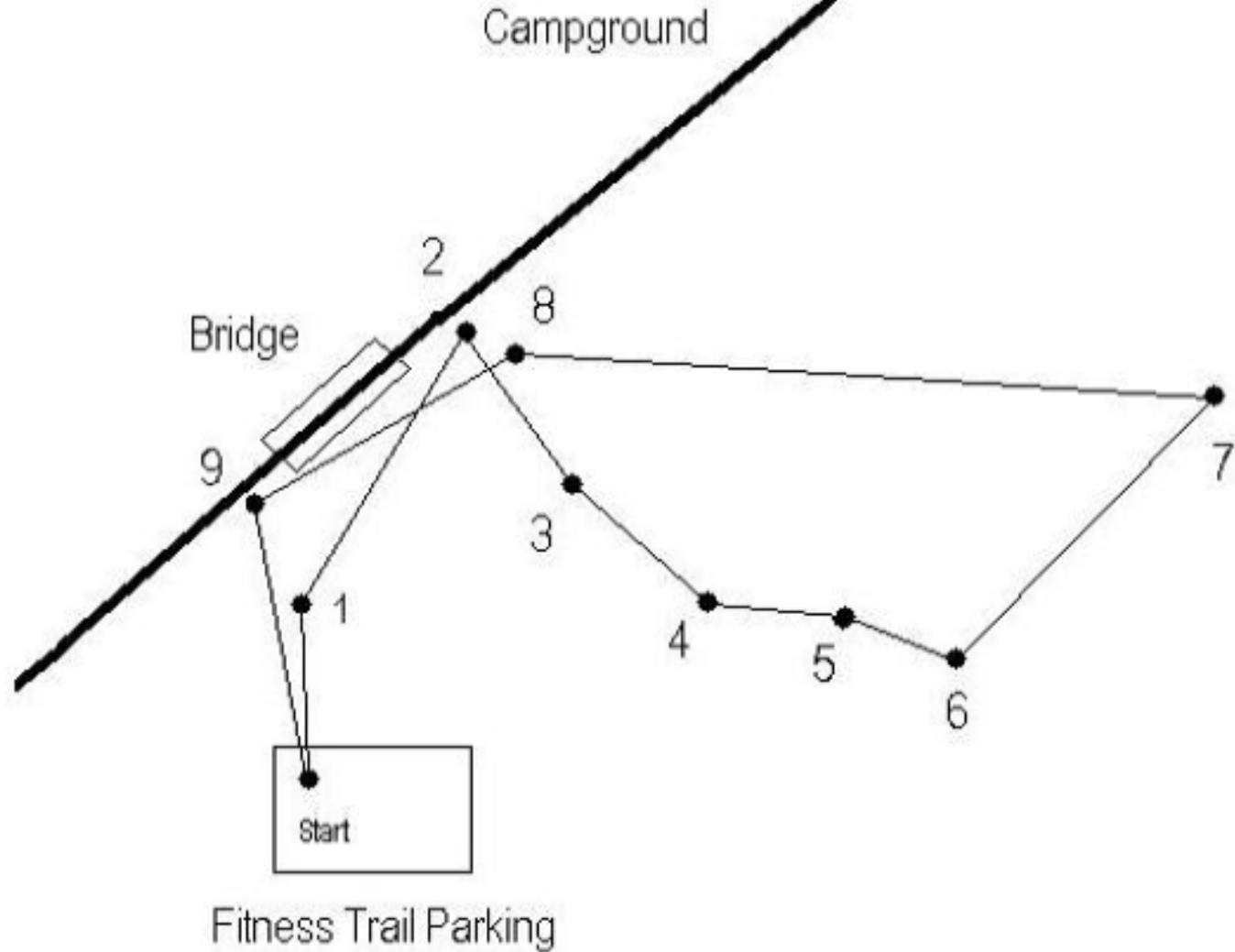
The GPS satellite system

The 24 satellites that make up the GPS space segment are orbiting the earth about 12,000 miles above us. They are constantly moving, making two complete orbits in less than 24 hours. These satellites are traveling at speeds of roughly 7,000 miles an hour.

GPS satellites are powered by solar energy. They have backup batteries onboard to keep them running in the event of a solar eclipse, when there's no solar power. Small rocket boosters on each satellite keep them flying in the correct path.

Here are some other interesting facts about the GPS satellites (also called NAVSTAR, the official U.S. Department of Defense name for GPS):

- The first GPS satellite was launched in 1978.
- A full constellation of 24 satellites was achieved in 1994.
- Each satellite is built to last about 10 years. Replacements are constantly being built and launched into orbit.
- A GPS satellite weighs approximately 2,000 pounds and is about 17 feet across with the solar panels extended.
- Transmitter power is only 50 watts or less.



Coordinates

Start: $38^{\circ}45.995\text{N } 077^{\circ}18.454\text{W}$

Point 1: $38^{\circ}46.109\text{N } 077^{\circ}18.475\text{W}$

Point 2: $38^{\circ}46.235\text{N } 077^{\circ}18.344\text{W}$

Point 3: $38^{\circ}46.125\text{N } 077^{\circ}18.273\text{W}$

Point 4: $38^{\circ}46.030\text{N } 077^{\circ}18.177\text{W}$

Point 5: $38^{\circ}46.012\text{N } 077^{\circ}18.040\text{W}$

Point 6: $38^{\circ}45.974\text{N } 077^{\circ}17.905\text{W}$

Point 7: $38^{\circ}46.166\text{N } 077^{\circ}17.679\text{W}$

Point 8: $38^{\circ}46.235\text{N } 077^{\circ}18.302\text{W}$

Point 9: $38^{\circ}46.166\text{N } 077^{\circ}18.549\text{W}$