Robot Tracking

In addition to downloading historical GPS data into your computer for various applications, it is possible to obtain GPS data in real time.

Explorer's Guide

Before You Start

Using the robot that you've created through some of recent activities, send it to a mission in an outdoor environment. Attach a piece of chalk to the robot in order to mark its path on the ground. Will it repeat the path exactly if you do this again?

Learning by Doing

1. Equip your robot with iBT GPS receiver provided and assure the robot is able to accomplish its outdoor mission course. Switch the receiver in Nav position and connect it with your computer via Bluetooth and ask instructor to assure proper connection.

2. Track your robot using Google Earth Pro. Open software and go to Tools > GPS to set the GPS real time connection as shown below.


After clicking Start button, observe the screen showing location of your robot at any time.

3. Track the path of your robot by using a DNRGarmin and ArcGIS software for real time tracking. Open *Nebraska* project in ArcMap and zoom to the area of your activity. Click on DNR Garmin Toolbar (refer to Activity 22 for setting this up). *Click GPS > Set Port* to connect to GPS. Make sure GPS is connected to the right port (here PORT 6). Click GPS > Open Port

Go to GPS > Set Baud Rate > 4800 (NMEA mode) to set up for real time tracking. Go to Real Time > START Real time tracking. In the real time window choose Point and click Load File and save as an ArcView Shapefile (projected) to start saving real time data to a shapefile in ArcMap. Specify the path as given by your instructor.
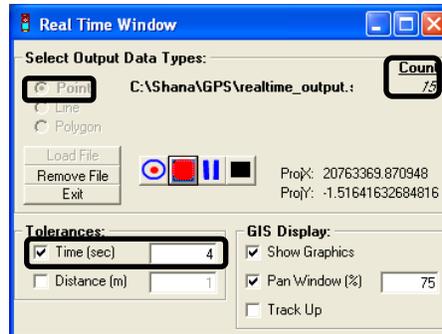
Click Start recording data to start recording your real time data. Check Time and set it to 1 sec. You can see the count of your data collection as indicated above.

When done, click Stop collection data to stop recording. Click Real Time > STOP Real time tracking to end tracking. You can save your tracked file by clicking File > Save To > ArcMap.

How Does It Work

When tracking a robot in real time, GPS receiver constantly sends information containing its geographic coordinates to a computer or another data logging instrument. Standard developed by National Marine Electronic Association, called NMEA-0183 is currently the most popular way to communicate between a receiver and another instrument. The standard defines meaning of numbers, symbols and letters transferred one by one in a sequence of sentences. The software (in our case Google Earth and DNRGarmin) is able to understand these messages and display position of the GPS receiver in geographic coordinates. It is important to remember that most GPS receivers communicate using NMEA with 4800 baud rate of communication. Setting up connection between the receiver and a computer is the most challenging aspect of real-time data communication. The number of steps you need to take depends on previous setting as well as configuration of your computer.

Additional Challenge

Use the GPS tool in ArcMap for real time path tracking (log a file).

Vocabulary

Real-time data *represents information that is delivered immediately after collection.*
Historical data, *also called archived, data is a recorded set of data collected and stored in the device prior to downloading.*

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