

# Navigation Information for SAR Planners and SAR Field Operations

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## Common Map and GPS Coordinate Formats

**Latitude and Longitude** Uses angular degrees to measure location.

- Lat/Lon is a common geographic location system
- Three lat/lon formats can cause confusion.
- Conversion from seconds to minutes and minutes to degrees must be made.
- Four different hemispheres to remember.
- Direction of measurement in each hemisphere is different. Measurement of ground distance (miles) compared to degrees of longitude varies since longitude lines squeeze together as they go north or south.
- Difficult to eyeball a coordinate on a topo map.
- Commonly used by aircraft, GM vehicle OnStar services, law enforcement dispatch centers, auto GPS systems, emergency beacons, and cell phone location systems.

### Three Latitude Longitude Formats

**As listed in a GPS receiver coordinate menu screen.**

**As seen on a GPS position screen**

Longitude example only shown.

<b>Decimal Degrees - hddd.ddddd</b>	Speak - West 111 point 68867 degrees.	<b>W 111 . 68867*</b>
<b>Decimal Minutes. - hddd. mm.mmm</b>	Speak - West 111 degrees 41 point 320 minutes.	<b>W 111 . 41.320'</b>
<b>Deg, Min, Sec - hddd mm ss.s</b>	Speak - West 111 degrees 41 minutes 19 point 2 seconds.	<b>W 111* 41' 19.2''</b>

**h=hemisphere**

**d=degrees**

**m=minutes**

**s=seconds**

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**Universal Transverse Mercator** – Grid system superimposed on a map and measured in meters.

- Not as familiar, but simple to learn grid system developed by military.
- Uses meters and numbered zones.
- Always measures meters over to the right (east) and up (north) no matter where you are. No hemispheres to remember.
- Easy to use 1000 meter grids uniformly spaced around the edges of a 7.5 min USGS topo map. UTM map measurement tools easy to use on a common topo map. Since UTM is a grid system in meters, easily used to measure distance on a common topo map. One format, with no conversions in minutes seconds or degrees.
- Easy to eyeball a coordinate.
- Recommended for ground SAR operations and planning.
- May not be understood by dispatch centers, aircraft, or cell phone location systems.
- Common use by hikers and backcountry users. Some hiking books and specialty hiking maps use UTM.

**As listed in a GPS receiver coordinate menu screen.**

**As seen on a GPS position screen**

**UTM/UPS** Do not confuse with "User UTM"

**12 S 0436755  
3917820**

**12 S = UTM Zones 0436755 = Measurement in meters to the east called an *Easting*  
3917820 = Measurement in meters to the north called a *Northing***

- \* Many GPS units will require 7 digits be entered in both strings of numbers. Therefore you will often need to enter a zero (0) at the beginning of the EASTING number. The zero on the EASTING will not appear on a map. Some GPS units will not require the entry of a zero on the EASTING number.