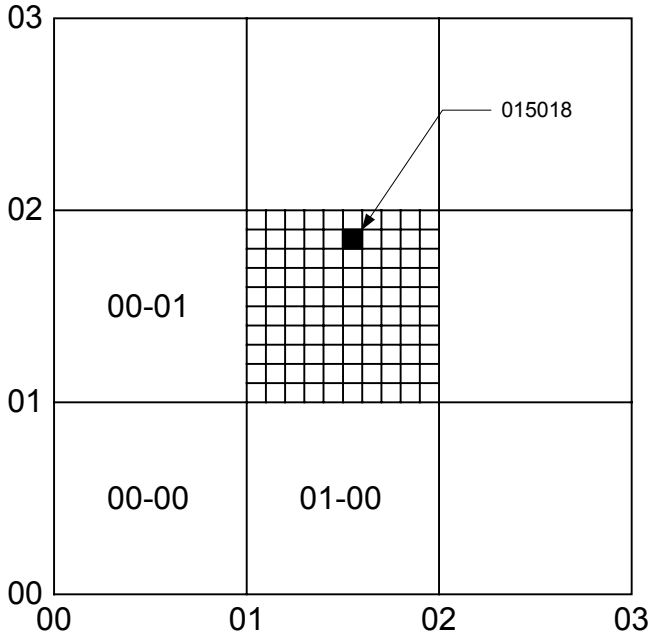
Understanding and Using UTM Grid Coordinates

Using latitude and longitude is OK if you are navigating over long distances such as when flying a plane or navigating a ship. But for people using maps to navigate on foot, bicycle, or even in motor vehicles for short distances, latitude and longitude are impractical.

For land navigation, the grid system most commonly used is the Universal Transverse Mercator or, as it is commonly called, UTM system. The UTM system was developed by the military during World War I for long-range artillery, but its practicality for any type of land navigation soon made it the universal standard for all military uses, and it quickly migrated to non-military use.

In the UTM system, the world (except for the extreme northern and southern regions) is divided up into thousands of squares, each one being 100,000 meters on a side. These squares are further divided into 1,000-meter squares. Numbers ranging from 00 to 99 identify each of the lines that form the 1,000-meter squares. The leftmost line of the square is 00 and increases by one for each line to the right. These vertical lines are known as ***Eastings*** because they increase as you move east across the grid. 00 also identifies the bottom line of the square, and each line above it also increases by one. The horizontal lines are called ***Northings*** because they increase as one moves north on the grid. Its Easting and Northing identify a particular grid square. Therefore, the coordinate 00-00 identifies the first 1,000-meter square in the 100,000-meter square. The square to its immediate right is 01-00 and the one immediately above it is 00-01. Each of the 1,000-meter squares can be divided into 100-meter squares, and each of those squares can be divided into 10-meter squares and so on, down to 1-meter squares if need be, although 10-meter squares are the smallest practical subdivisions. When reading or applying a UTM grid coordinate, remember the rule, ***read right, then up***. In the figure below, the six-figure (100-meter) grid coordinate for the black square is 015018, with 015 being the Easting and 018 being the Northing.

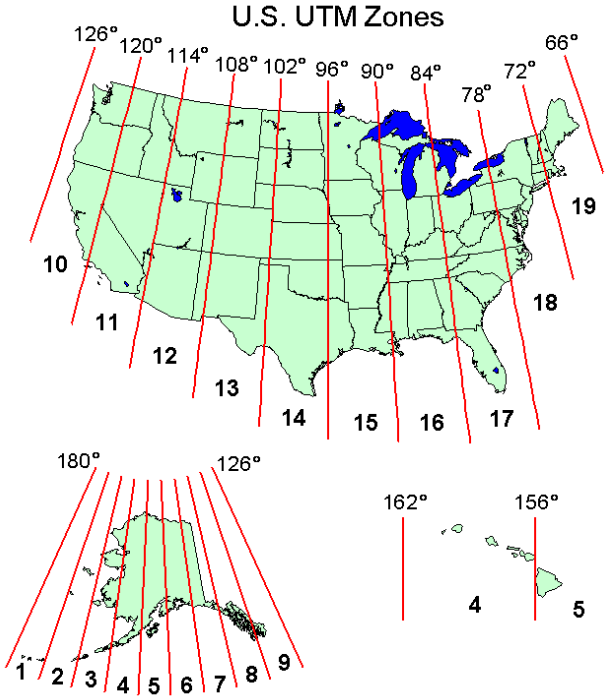


In a GPS display you will see the UTM coordinates displayed something like this:

15 S 0418834 or **15 0418834** or **15 418834**
3564707 **3564707** **3564707**

In some GPS displays, the longer row will be on the bottom. The coordinates are the same in all three examples. The thing to remember is that the longer row represents the ***Easting*** and the shorter row the ***Northing***.

In the examples above, the numbers 15 S (or just 15 on some GPS displays) indicate the UTM Zone. The letter, if present, indicates a north/south subdivision of the zone and is generally not important unless you are dealing with an area spanning more than one state. The zone number is only important if you are converting UTM coordinates into latitude and longitude. The continental U.S. (excluding Alaska) spans 10 UTM grid zones (zones 10-19). Most of Louisiana, all of Arkansas, and the eastern one-fourth of Texas and Oklahoma are in Zone 15.



The numbers 04 in the top row and 35 in the bottom row indicate the 100,000-meter square and are not important when dealing with a single mapsheet. (Since each 100,000-meter square covers almost 4000 square miles, it's not likely that we'll get confused about which square we are in.) Some GPS units do not display leading zeroes (as in the third example). If the numbers are all run together (i.e., 15S04188647 or 1504188647 or 15 4188647), remember that the local GPS coordinate consists of the ***last 5 digits***. Therefore, if you count from ***right to left***, any figures to the left of the fifth digit are the UTM grid zone number and 100,000-meter square identification.

The 10-digit map coordinate from the examples would be 18834-64707. In general practice, only six- or eight-digit map coordinates are used, i.e., 188647 (accurate to within 100-meters) or 18836470 (accurate to within 10 meters). When plotting a coordinate on a map (or reading a coordinate from a map), remember the rule to ***read right (Easting), then up (Northing)***.