



Southern Michigan Adventure Club

Using & Plotting UTM Coordinates

By Paul Piorkowski

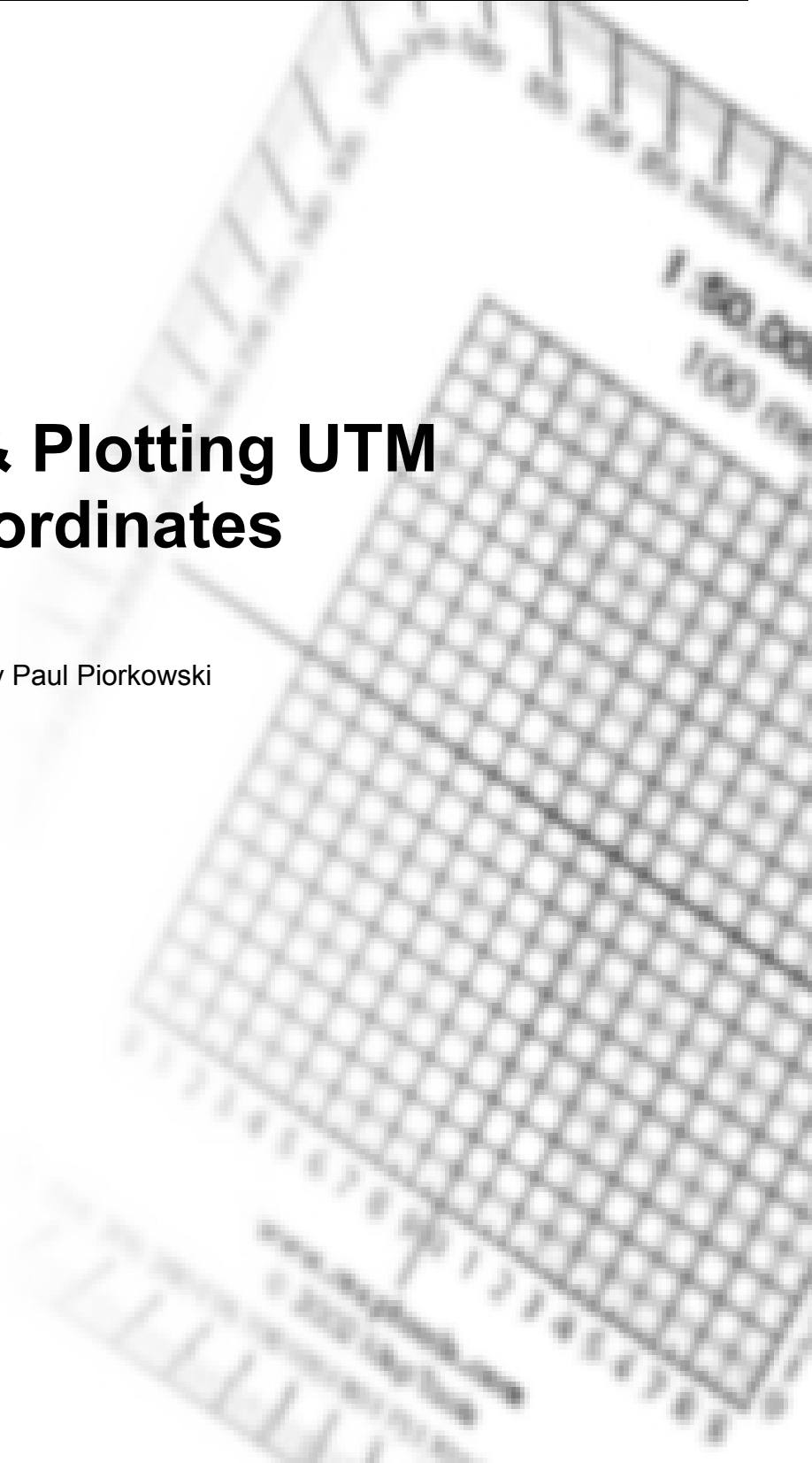




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Why UTM Coordinates Are Used In Adventure Racing

Although text alone is used in some races to describe the position of CP's and TA's, UTM coordinates take away any chance of misinterpretation on the part of the racer. The use of UTM in a race is one of the things that should be considered when choosing events. Typically, races that use UTM are more technical in nature and should be considered to be of a higher standard. In addition, UTM is used worldwide and crosses language and international barriers, which can be important when racing abroad. The UTM system allows the coordinate numbering system to be tied directly to a distance measuring system. There are no negative numbers or East-West designators; grid values increase from left to right and bottom to top. This is just like the X Y Cartesian coordinate system in math class.

Before You Start Plotting Coordinates On USGS Maps

Although Canadian topographical maps already have pre-printed grid lines most USGS topographic maps printed in the last 30 years or only have UTM blue grid tick marks in the margins. In 1978 USGS started printing a fine lined UTM grid on their topographic maps unfortunately they have since discontinued this practice. We all wish the USGS would go back to printing the grid on the map and I encourage all of you to contact them. Since most USGS 1:24,000 scale topographic maps do not have grid lines printed on them, you will need to draw them in by hand. First, find a flat surface to work on use a straightedge that is long enough to draw a line across your map. Line the straightedge up between two corresponding UTM tick marks along the line the edge of the map. Remember that UTM grid lines are not exactly true to North-South or East-West. This means that the grid lines will not be parallel to the edges of the map. Use a mechanical pencil or a fine pointed pen draw a line between the two tick marks. If you are using pen, select one that has waterproof ink. Keep in mind gridding maps is tedious work but you only need to do the grids you'll need. As you can see this is not the kind of thing you want to do on the hood of a truck or your hotel room's bed. In a pinch you can fold the map over on itself and use the edge of the paper as a straightedge.

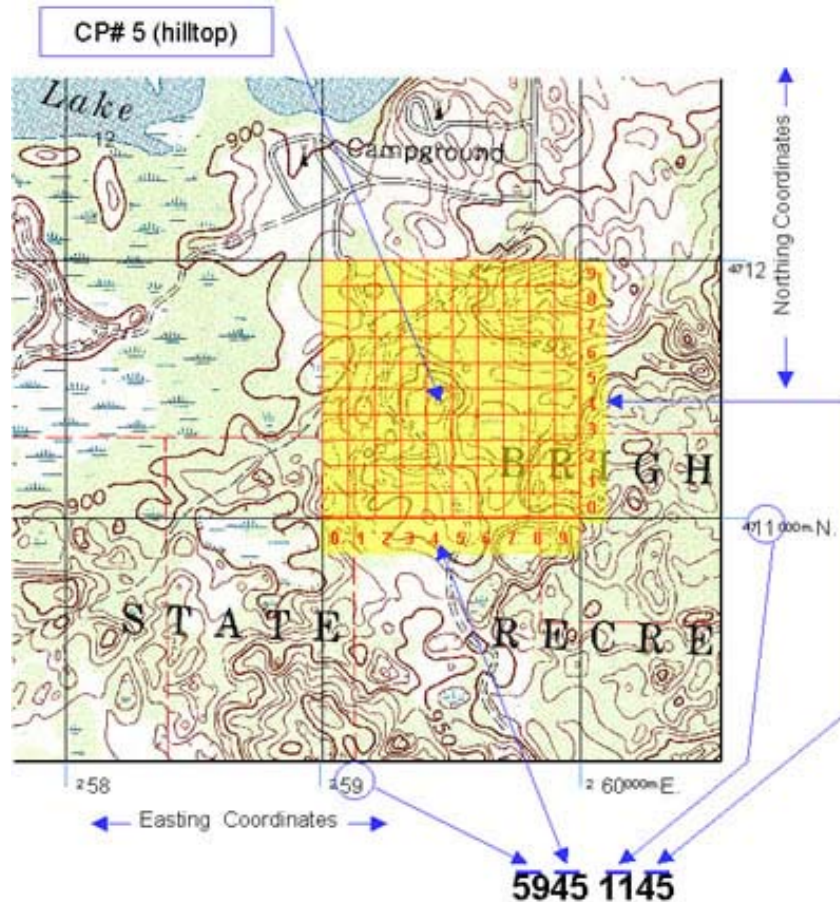
More Stuff You Will Need To Know Before You Start Plotting

Adventure Races focus on an area, which is less than 20 miles on a side. This focus on a small area allows for the abbreviation UTM coordinates. The zone information and the digits representing 1,000,000m, and 100,000m are dropped. The 1m, 10m and 100m digits are used only to the extent of accuracy desired. Coordinates will be given in the 4,6, 8 or 10 digit format. The 100m abbreviated format, 597 821, and the 10m abbreviated format, 5974 8218, are the most commonly used in adventure racing. Notice that the easting is reported first, followed by the northing. Remember the phrase "read right up" to help you remember to read the easting from left to right, followed by the northing from the bottom up. The most accurate way to plot the coordinates with the specified grid square is by the use of a UTM grid tool. They come in two styles - the Grid Overlay and Corner type. The Grid Overlay type is placed over the entire square grid its edge aligned with the grid lines. The Corner Ruler type is positioned within the square grid and the corner of the tool will indicate the position of The CP

59 11	Four Digit Resolution Describes a 1000m by 1000m square.
594 114	Six Digit Resolution Describes a 100m by 100m square 100m square.
5945 1145	Eight Digit Resolution Describes a 10m by 10m square.
59453 11452	Ten Digit Resolution Describes a 1m by 1m square.

Figure #1

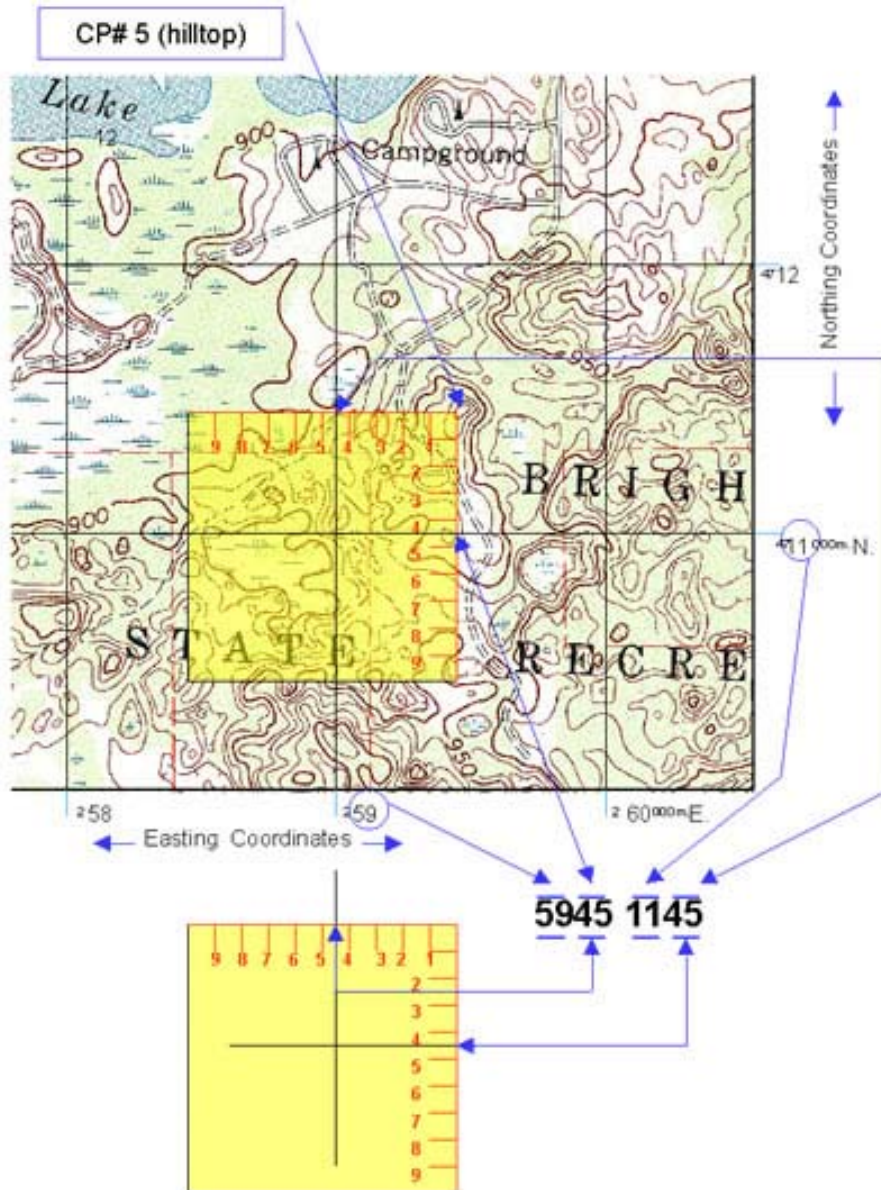
Using a UTM Overlay Tool



A UTM Overlay Tool is a grid that covers the grid square that contains the CP. Start by placing the Overlay Tool over the grid square in question. Make sure the edges of the tool are lined up with the grid lines. Plot the UTM coordinates by first counting over left to right (East) and then down to up (North) per the coordinate values. This will determine the square within the grid square that the CP is located. If the square grid you need to plot in is covered by two or more maps you may need to count backward starting from a corner other than the southwestern corner of the grid square, remember that UTM coordinate values increase from West to East and from South to North.

Figure #2

Using a UTM Corner Ruler



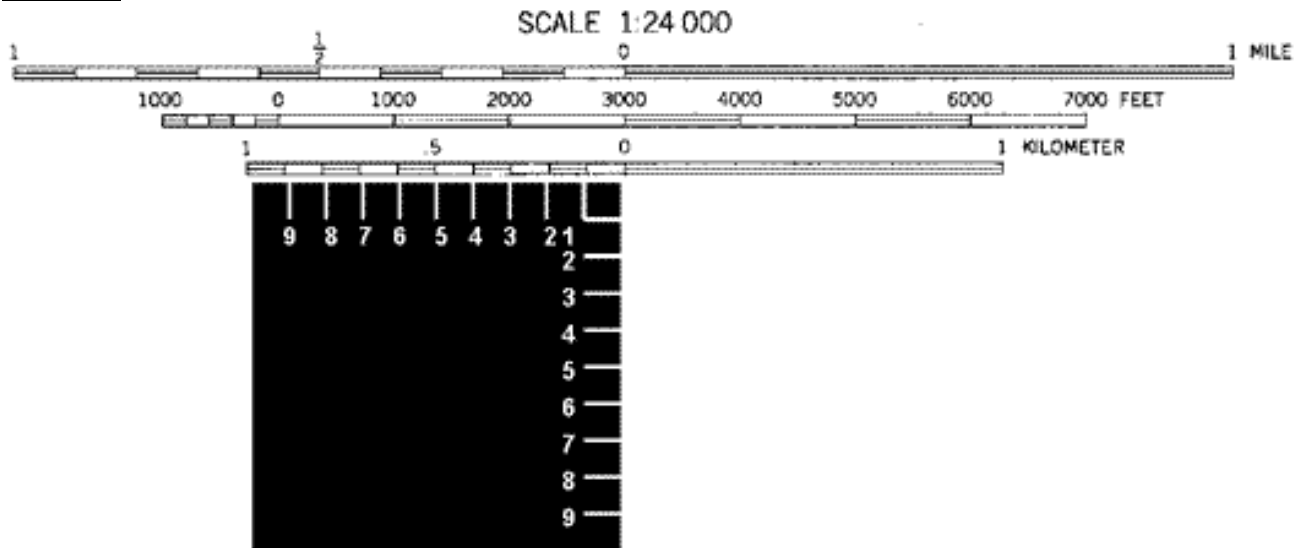
A UTM Corner Ruler consists of two scales at right angles to each other. UTM Corner Rulers will typically provide an additional digit of precision beyond a UTM Grid Overlay however the Corner Ruler is somewhat harder to use. Start by placing the top right corner of the Corner Ruler on the SW corner of the UTM square grid that contains the CP. The ruler edges should extend to the West and South. To plot the UTM coordinates slide the rulers East and then North per the coordinate values. If two or more maps cover the square grid you need to plot in, you may need to start from a corner other than the southwestern grid line. Remember that UTM coordinate values increase from West to East and from South to North.

Figure #3

Making Your Own Grid Tool

If you are using an odd scaled map or if you left your UTM tools behind, you can quickly make a simple corner ruler using the scale bars on the map. Start with the corner of a scrap of paper. Mark off a one-kilometer distance and the 100m subdivisions using the metric scale bar. Repeat this process along the other edge. Number both rules starting from the corner, which would be zero.

Figure #4



The Last Thing To Do

Always double check your plotting before starting on your course strategy and it's a good idea to have someone else double check your plotting. Take a look at the position of the TA or CP. If it just doesn't make sense - like a bike pick-up that is out in the woods with no access road - something is wrong. Check again to make sure you are on the right grid square. You will find mistakes made by most race organizers - in fact, some add them in just to keep you thinking. Common mistakes include having the Easting and the Northing mixed up or failing to use abbreviated coordinates. Typically, race directors are trying to make it less confusing for you. If you have a point that just does not make sense and all else fails just skip it and plot the next point. If it is OK, it can sometimes help you understand why the last point that did not. Also keep in mind that some points won't make sense because your map doesn't have all the roads or trails that actually exist.