Geometrics Knowledgebase

How does MagPick use UTM Coordinates

GPS fixes are recorded as geographical coordinates, degrees latitude and degrees longitude. These coordinates describe your location on the surface of the globe in terms of angles (well, really curves). UTM locations are recorded as plane (also known as Cartesian) coordinates in Meters. These coordinates describe your location as a pair of linear offsets (in Meters) from a fixed location (UTM uses the intersection of the Prime Meridian and the Equator as the fixed location 0,0). The convention is to describe the position in first an Easting coordinate followed by a Northing coordinate, where Easting amounts to an X coordinate and Northing amounts to a Y coordinate.

A False Easting value can be added to the Eastings to change their average value. Similarly a False Northing value can be added to the Northings to change their average value. This is important to MagPick as MagPick uses single precision floating numbers to represent all values used by the program. Since the Eastings may be well in excess of 500,000 and Northings may be well in excess of 1,000,000, we must take some step to avoid loss of precision in location due to the fact that the dynamic range of single precision floating numbers is relatively limited. If we subtract a fairly large value from all the Eastings (False Easting) and a possibly different fairly well value from all the Northings (False Northing), we will end up with Eastings and Northings that have values fairly close to 0 (zero). In this case the dynamic range of a single precision floating point number is sufficient to provide a highly accurate fix. Then, as long as we remember the False Easting and False Northing numbers, it is always possible to report in original UTM by adding the numbers to the fix. MagPick Auto Short UTM does all this arithmetic and remembers the numbers for us.

http://support.geometrics.com/kb/questions.php?questionid=85