Subject: Longstanding Map Overlay Problem Solved!
Posted by David Fanning on Fri, 14 Mar 2008 21:00:20 GMT
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Folks,

For well over a year I have been pondering a map overlay problem. The problem appears when trying to overlay continental outlines on a GeoTIFF image. If you use the UV_BOX that is returned in the map projection structure from MAP_PROJ_INIT to set up a data coordinate space, then the outlines are just ever so slightly wrong. However, it you use the UV_BOX that is returned from MAP_PROJ_IMAGE, even if you don't warp the image, the results are absolutely correct. The problem (and solution) is described here.

http://www.dfanning.com/map_tips/tiffoverlay.html

With a great deal of help from Matt Savoie, I have now identified the reason these two UV_BOXES are slightly different. The answer comes down to a limitation in MAP_PROJ_INIT.

Specifically, the limitation is that the LIMIT keyword to MAP_PROJ_INIT can only accept a four-element vector that describes two opposite corner points on the image. The assumption is that the other two opposite corner points can also be determined by this method. Unfortunately, that is not a valid assumption for images that are in some type of map projection already.

Rather, we need to use an 8-element LIMIT vector to describe the location of a projected image in lat/lon space. Something of this sort is available for MAP_SET, although you must specify the left, top, right, and bottom of the image, rather than its corners. But if you try to use an 8-element LIMIT vector with MAP_PROJ_INIT, it will accept it without argument, it will just *completely* ignore its values.

Fortunately, MAP_PROJ_IMAGE *does* calculate the 8-element limit correctly, and so does return the correct UV_BOX to set up the data coordinate space. But, as Matt discovered, it is also possible to set the data coordinate space directly from values calculated from geotiff information in the file.

So, now we have two solutions, and it is only the most commonly used method that is wrong. :-)

Anyway, I can't tell you how happy I am to know the reason
for this longstanding discrepancy and I look forward to
submitting a feature request to ITTVIS to get this cleared up.

Cheers,

David
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Coyote's Guide to IDL Programming: http://www.dfanning.com/
Sepore ma de ni thui. ("Perhaps thou speakest truth.")
