
Subject: Re: Latitude longitude and Image Navigation
Posted by [Brian Wolven](#) on Sat, 25 Jun 2011 04:03:19 GMT
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Well, *if* I remember correctly what I did there: Subcur is the vector of the initial sub-observer point on the planet/satellite before the rotations, given a coordinate system defined with respect to the center of that body. It's just the normalized planetocentric coordinates of the vector pointing toward the observer:

```
subcur = -1.*body.pos/length(body.pos)
```

The -1 comes in because body.pos contains the vector from the observer location (Earth in this case) to the body. subdes is the desired sub-observer location - the one specified in the image metadata or by SPICE, based on the observation time. We need to rotate our body centered coordinates such that the z-axis aligns with the specified north pole position vector, then rotate the body about the pole until our line of sight is passing through the proper sub-observer point. The various 'ang' variables were only used for diagnostic purposes to check that the desired result was being obtained.

To put it in more graphic terms, imagine that you have a globe of Venus sitting upright on your desk. In order to match your telescopic observations you need to tilt the globe until the pole axis is aligned properly, then rotate about the pole until you reach the correct observing geometry. We have a body centered lat-long grid instead of a globe, but once we know the rotation we can then project our rotated lat-long grid on the image and have it properly aligned, or infer the lat-long coordinates of a pixel in the image if we're working the other way.

There may very well be an easier way to do this, but that's what I cooked up years ago as a grad student, when presumably I was smarter than I am now. ;)
