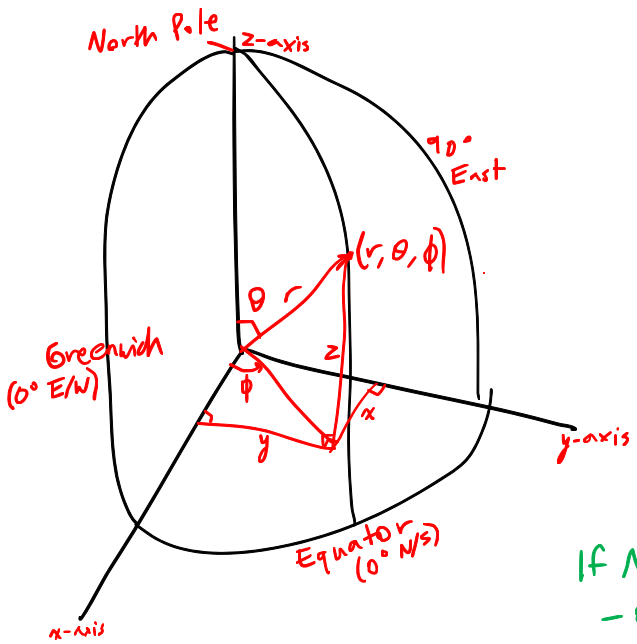

Suppose we get longitude $d_1^\circ m_1' s_1''$ and latitude $d_2^\circ m_2' s_2''$, plus a NS and an EW bit.

If NS > 0, then $\theta \in (0, \frac{\pi}{2})$
- otherwise, $\theta \in (\frac{\pi}{2}, \pi)$

If EW > 0, then $\phi \in (0, \pi)$
- otherwise $\phi \in (0, -\pi)$

Convert $d_1^\circ m_1' s_1''$ to radians: θ° → E/W of Greenwich
Convert $d_2^\circ m_2' s_2''$ to radians: ϕ° → N/S of Equator

If NS > 0, then $\theta = \frac{\pi}{2} - \theta^\circ$.
- otherwise, $\theta = \frac{\pi}{2} + \theta^\circ$.

If EW > 0, then $\phi = \phi^\circ$
- otherwise, $\phi = 2\pi - \phi^\circ$

$$z = r\cos\theta$$
$$x = r\sin\theta\cos\phi$$
$$y = r\sin\theta\sin\phi$$

$$\theta = \cos^{-1}\frac{z}{\sqrt{x^2+y^2+z^2}}$$
$$\phi = \tan^{-1}\frac{y}{x}$$

Note that for the program, we set $r = R + h$, since the vehicle has an altitude component.