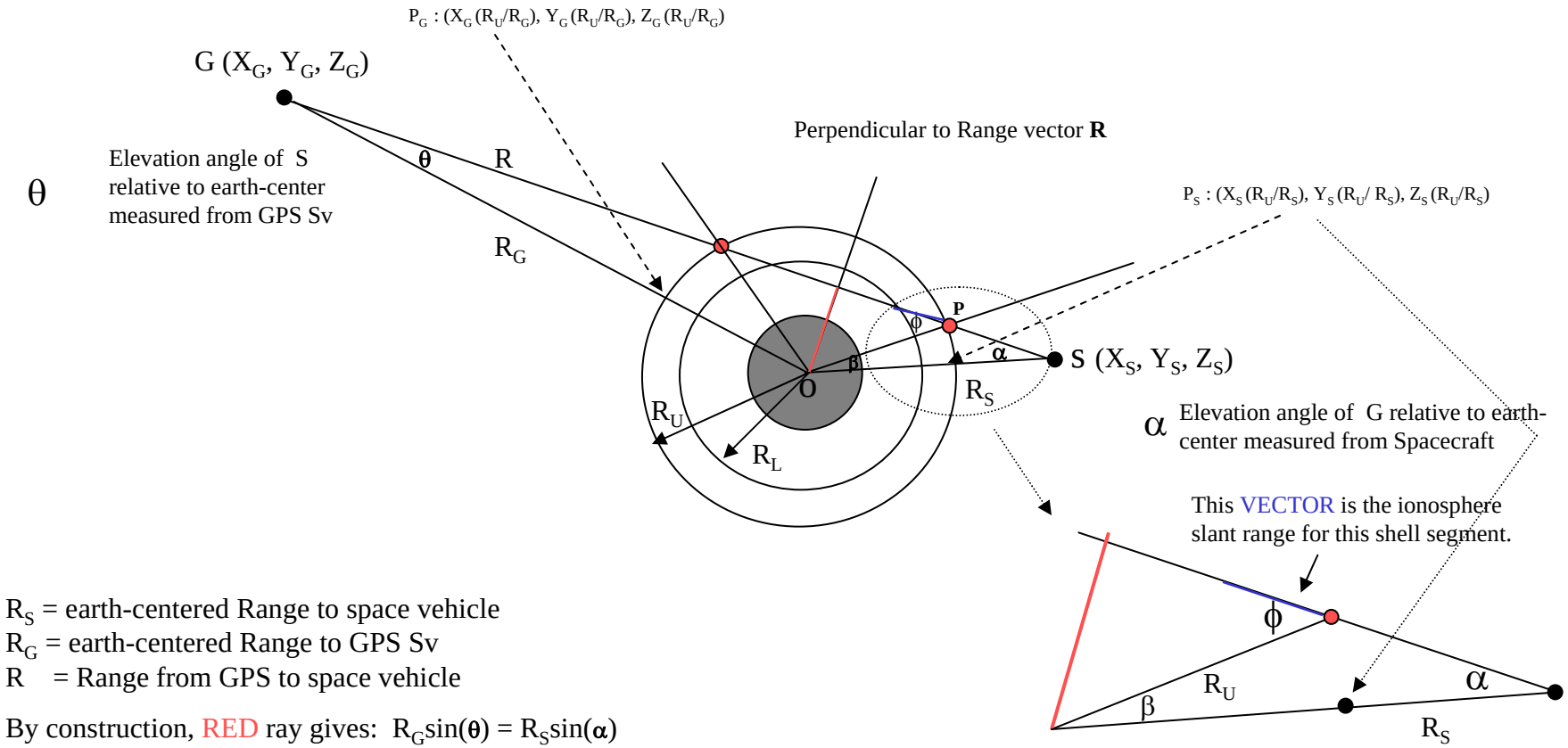
Illustration of Slant Range Algorithm for Ionosphere Shell Model



R_S = earth-centered Range to space vehicle
R_G = earth-centered Range to GPS Sv
R = Range from GPS to space vehicle

By construction, RED ray gives: $R_G \sin(\theta) = R_S \sin(\alpha)$

$\text{SIN}(\alpha) = \text{SIN}(\theta) R_G/R_S$

RED = $R_S \sin(\alpha) = R_U \sin(\phi)$

$\sin(\phi) = (\sin(\alpha) R_S/R_U) = (\sin(\theta) R_G/R_S)(R_S/R_U) = \sin(\theta) R_G/R_U$

$\cos(\phi) = (1 - \sin^2(\phi))^{1/2} = (1 - \sin^2(\theta)(R_G/R_U)^2)^{1/2}$

BLUE = Slant range Iono Delay = $V_{DELAY\ @\ P} / \cos(\phi) = V_{DELAY\ @\ P} / (1 - \sin^2(\theta)(R_G/R_U)^2)^{1/2}$

compute $V_{D\ @\ P}$: Compute Lat/Lon from R_S. Add β to Latitude and use α/β portion of GPS-200

note: $(\beta + (\pi - \phi)) + \alpha = \pi \longrightarrow \beta = \phi - \alpha$ add this to the Latitude and compute V

Do other segments similarly.