The point-mass dimensionless equations of three dimensional motion over a spherical rotating Earth are:

$$\dot{r} = V sin\gamma \tag{1}$$

$$\dot{\theta} = \frac{V cos\gamma sin\psi}{r cos\phi} \tag{2}$$

$$\dot{\phi} = \frac{V cos\gamma cos\psi}{r} \tag{3}$$

$$\dot{V} = -D - (\frac{sin\gamma}{r^2}) + \Omega^2 r cos\phi (sin\gamma cos\phi - cos\gamma sin\phi cos\psi) \tag{4}$$

$$\dot{V} = \frac{1}{V}\{L cos\sigma + [V^2 - \frac{1}{r}](\frac{cos\gamma}{r}) + 2\Omega V cos\phi sin\psi + \Omega^2 r cos\phi (cos\gamma cos\phi - sin\gamma cos\psi sin\phi)\} \tag{5}$$

$$\dot{\psi} = \frac{1}{V}[\frac{L sin\sigma}{cos\gamma} + \frac{V^2}{r} cos\gamma sin\psi tan\phi - 2\Omega V \times (tan\gamma cos\psi cos\phi - sin\phi) + \frac{\Omega^2}{cos\gamma} sin\psi sin\phi cos\phi \tag{6}$$

TEAM point constraints are:

$$r(\tau_f) = r_f, \qquad \theta(\tau_f) = \theta_f, \qquad \phi(\tau_f) = \phi_f \tag{7}$$

$$V(\tau_f) = V_f, \qquad \gamma_{min} \leq \gamma(\tau_f) \leq \gamma_{max}, \qquad \psi(\tau_f) = \psi_f \tag{8}$$

The following trajectory constraints are imposed:

$$|L cos\alpha + D sin\alpha| \leq n_{z_{max}} \tag{9}$$

$$q \leq q_{max} \tag{10}$$

$$\dot{Q_s} \leq \dot{Q_{max}} \tag{11}$$

$$[\frac{1}{r} - V^2](\frac{1}{r}) - L \leq 0 \tag{12}$$