

CHAPTER 14 RADIATION PRESSURE REFLECTANCE MODEL

For a near-Earth satellite the solar radiation pressure acceleration, $\ddot{\vec{r}}$ is given by:

$$\ddot{\vec{r}} = \kappa \left[\frac{A}{R} \right]^2 C_R \frac{a}{m} \frac{\vec{R}}{R},$$

where

$\kappa = 4.560 \times 10^{-6}$ newtons/m² (1367 watts/m²),

A = astronomical unit in meters,

R = heliocentric radius vector to the satellite,

a = cross-sectional area (m²) of the satellite perpendicular to \vec{R} ,

m = satellite mass,

C_R = reflectivity coefficient, usually an adjusted parameter.

The radiation pressure due to backscatter from the Earth is ignored. The model for the Earth's shadow should include the umbra and the penumbra (Haley, 1973).

Earth Radius	6402 km
Moon Radius	1738 km

REFERENCES

Haley, D., 1973, Solar Radiation Pressure Calculations in the Geodyn Program, EG&G Report 008-73, Prepared for NASA Goddard Space Flight Center.

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