

4/8/2008

TOMS EP Total Ozone Mapping Earth Probe.

Mapping the ozone layer.

Launched ~1996. July.

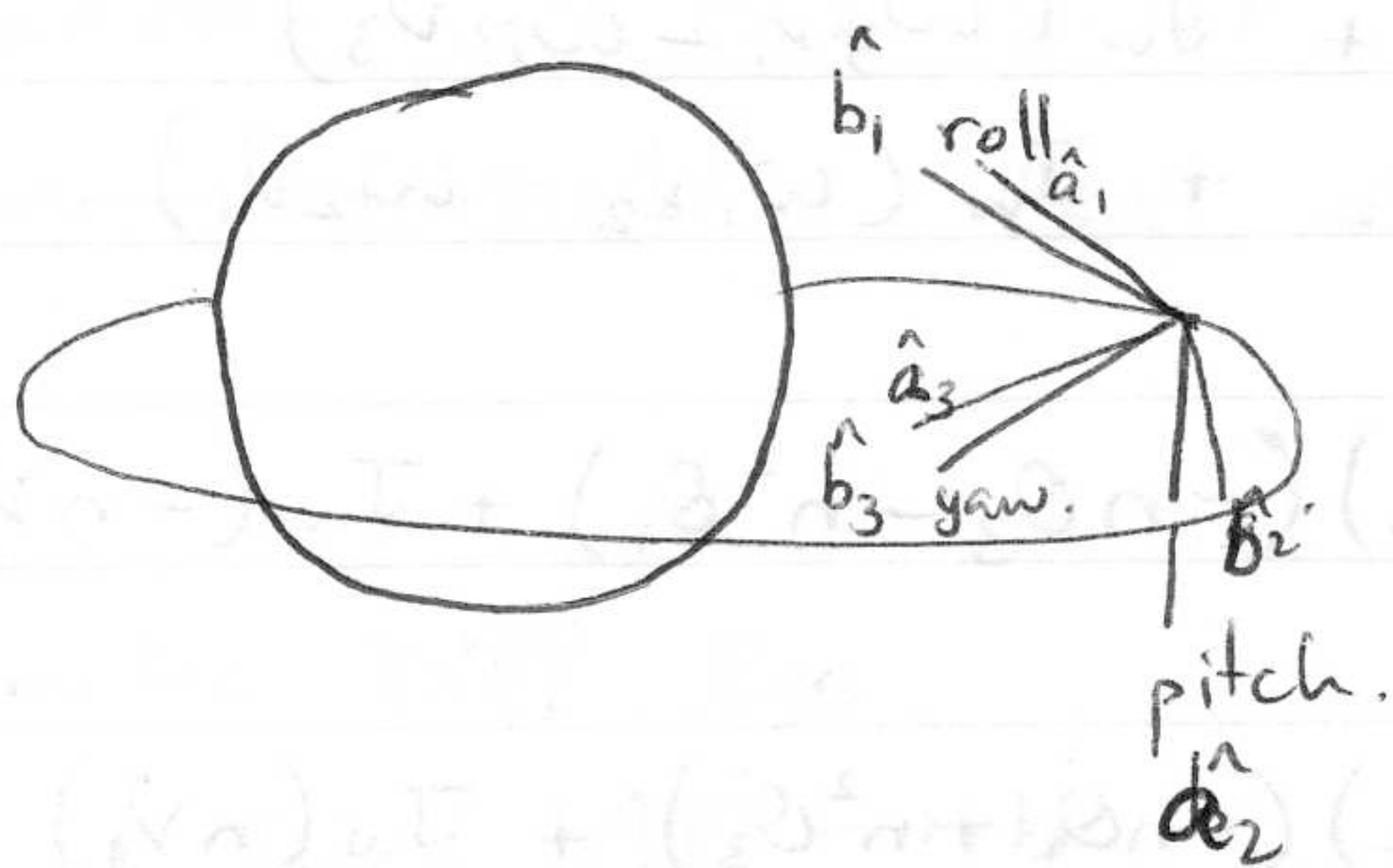
3-axis control.

Sun synchronous orbit at 500 km

2 Horizon Sensors.

Total mass on launch 300 kg.

Failed after 2 years.



N - inertial frame.

A - orbit frame.

B - body fixed frame.

n is the orbital angular rate.

~ 0.011 rad/sec. (?)

$$\begin{aligned} {}^N\vec{\omega}^B &= {}^N\vec{\omega}^A + {}^A\vec{\omega}^B \\ &= -n\hat{a}_2 + {}^A\vec{\omega}^B \end{aligned}$$

1-2-3 Euler angle seq.

$$\begin{bmatrix} \omega_1 \\ \omega_2 \\ \omega_3 \end{bmatrix} = \begin{bmatrix} C_2C_3 & S_3 & 0 \\ -C_2S_3 & C_3 & 0 \\ S_2 & 0 & 1 \end{bmatrix} \begin{bmatrix} \dot{\theta}_1 \\ \dot{\theta}_2 \\ \dot{\theta}_3 \end{bmatrix}$$

$$-n \begin{bmatrix} C_3S_1S_2 + C_1S_3 \\ C_1C_3 - S_1S_2S_3 \\ -C_2S_1 \end{bmatrix}$$

$${}^N\vec{\omega}^B = -n \begin{bmatrix} C_3S_1S_2 + C_1S_3 \\ C_1C_3 - S_1S_2S_3 \\ -C_2S_1 \end{bmatrix} + \begin{bmatrix} C_2C_3 & S_3 & 0 \\ -C_2S_3 & C_3 & 0 \\ S_2 & 0 & 1 \end{bmatrix} \begin{bmatrix} \dot{\theta}_1 \\ \dot{\theta}_2 \\ \dot{\theta}_3 \end{bmatrix}$$

