FORTUNE EIGHT

Aerospace Industries, Inc.

International Technical Services

Original Lecture: 2002 March 13

MEMORANDUM

To: CMA Class

From: Chauncey Uphoff/Blair Thompson

Subject: Class Notes for Lecture #9

I was on pre-arranged travel for this lecture and could not move the event. I had a back-up lecturer for this week but he, too, had a conflict he couldn't get out of. Blair Thompson offered to give an introduction to the "Main Problem of Artificial Satellite Theory" from the theories of Brouwer and Kaula (pronounced as in Paula, not Cowla, as is common). Blair gave a nice concise review of the material in Kaula's book "Theory of Satellite Geodesy" and provided a good handout to supplement his lecture.

I am grateful for this addition to the content of my course as it provided an excellent introduction to my own way of solving the problem and it provided a more conventional point of view and a good discussion of resonance caused by the interaction of the motion of the spacecraft in its orbit with the motion of the Earth (or other central planet) about its spin axis. My discussion of resonance will consist mostly of the phrase "be careful."

My only criticism of Brouwer's and Kaula's approach is that it is assumed, from the outset, that the mean elements are known. Then, the perturbations of the orbital elements are derived from those mean elements. In the real world, one is usually given the osculating elements of a real spacecraft and is expected to perform a miracle that transforms the osculating elements into mean elements whose definitions are often unclear. That will be one of the subjects of my next lecture,

Included as part of the Class Notes for Lecture 9 is a copy of Blair's handout.

Best regards,

Chauncey Uphoff 2002 April 20

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