

1977b

“Analytic Investigation of the AEM-A/HCMM Attitude Control System Performance,” G. M. Lerner, W. Huang, and M. D. Shuster, Paper No. AAS 77-116, *AAS/AIAA Astrodynamics Specialists Conference*, Grand Teton National Park, Wyoming, September 7–9, 1977, 24 pp.

During my interview with the Computer Sciences Corporation in February 1977, I stuck around for two days to try the job on for size (possible because an old friend and graduate-school roommate, Jerry Lerner, was a manager there). For two days, I tried to understand theoretically the nature of the steady-state pitch rate for a bang-bang magnetic despun control law. I was able to develop a semi-analytic expression for this steady-state spin rate which agreed with full-blown computer simulations. I got the job, and was also able to leave academic Physics, of which I had begun to tire, with fewer fears. My work in this research effort is embodied in the appendix of this conference article (See also 2001c and 2006f).

One might think that nuclear physicists might be ill-suited to work on problems of spacecraft attitude, but I don’t think that is the case. Because most nuclear states are rotational states, nuclear physicists tend to be well versed on rotations and rotational motion. Theoretical physicists in general must have the capability of isolating the important degrees of freedom of a physical problem and to make models which contain the most important aspects of the system. Thus, theoretical physicists are well-suited to spacecraft attitude work, which may explain why there were so many of them in the Attitude Systems Operation at CSC. Two weeks after I returned to the Department of Physics and Astronomy at Carnegie-Mellon University, I received a preprint of a CSC conference report, which had my name on it. CSC kindly delayed my job offer by a few months, so that I could finish the term at CMU. I ceased to be a nuclear physicist on Friday, May 14, 1977, and on Monday, May 17, I became a rocket scientist. My Physics research (but not reading) ceased abruptly during that weekend. I have kept in touch with my old Physics friends, but otherwise, I have never looked back.

One may dispute whether this should be considered a publication, because no proceedings were ever produced. This conference took place a few years before Univelt, Inc., began publishing the proceedings of the AAS Astrodynamics Specialists Conference regularly as volumes of the *Advances in the Astronautical Sciences*. Nonetheless, the work is available though csa.com.

This is my only publication on spacecraft attitude dynamics and control. All of my other publications in Astronautics are squarely in the area of the attitude estimation and the attitude representations.