

1989d

“Attitude Determination for the Star Tracker Mission,” H. L. Fisher, M. D. Shuster, and T. E. Strikwerda, Paper No. AAS 89-365, *AAS/AIAA Astrodynamics Specialists Conference*, Stowe, Vermont, August 7–10, 1989; Proceedings: *Advances in the Astronautical Sciences*, Vol. 71, 1990, pp. 138–150.

This work introduced the implementation of QUEST as a preprocessor of star-camera data in a Kalman filter, showing how the QUEST attitude quaternion was an effective measurement for the attitude with effective measurement covariance matrix the QUEST measurement covariance matrix. This led to QUEST being incorporated in many commercial star cameras. This work has been superseded by 1990d.

I cannot claim priority for this result, since the same ideas were presented by a group at INPE in Brazil at a Portuguese-language conference in that country in 1986. I did not discover the INPE work until 1989d was already scheduled for presentation, but I was able to alter 1989d to give priority to INPE. I learned about the INPE work not from the Brazilian conference paper of 1986 but from the 1987 master’s thesis of Sebastião Varotto, which was listed in a NASA scan in 1989 and noticed by Markley.

The 1986 INPE conference paper was specific to quaternions computed using the QUEST algorithm, while my 1989 conference paper was presented for any quaternion estimator. Naturally, I had QUEST in mind. The portion of this paper devoted to the use of an attitude estimator as a preprocessor for the Kalman filter received archival publication In 1990d.

After receiving Tião’s thesis and another work, I began a correspondence with INPE engineers which led to a very close relationship.