

ASTRODYNAMICS SYMPOSIUM (C1)
Attitude Dynamics (1) (5)

Author: Prof. Simone Battistini
Universidade de Brasília, Brazil, battistini@unb.br

Prof.Dr. Chantal Cappelletti
University of Brasilia, Brazil, chantal@aerospace.unb.br
Prof. Filippo Graziani
G.A.U.S.S. Srl, Italy, filippo.graziani@gausstteam.com

ATTITUDE DETERMINATION FOR THE UNISAT-6 MICROSATELLITE

Abstract

The Unisat-6 satellite was launched on the 19th of June, 2014. Its main mission was the in-orbit release of a number of on-board carried cubesats and the transmission to the Unisat-6 ground station of telemetry data and images from an on-board mounted camera. The release of the cubesats applied a torque to Unisat-6 and caused a redistribution of its inertia matrix, which of course had an impact on the attitude motion.

The importance for future similar missions of a precise reconstruction of Unisat-6 attitude motion lies in the dual possibility of:

- controlling the direction of ejection of the on-board carried satellites;
- having an accurate pointing for remote sensing operation.

The Unisat-6 satellite is equipped with a three-axis magnetometer and a set of gyroscopes which provide with information on the satellite's motion along the orbit. Moreover, it has a passive magnetic attitude control system.

Sensors data are processed in order to reconstruct the attitude. To this end, a suitable filter has been implemented, which involves a quaternion representation for the attitude of the satellite. Generalized Rodrigues parameters are used in order to preserve the unitary norm property of the quaternions within the filter.

This paper shows the reconstruction of the attitude of Unisat-6 using on-board measurements, and allows to draw important conclusions on Unisat-6 attitude motion and control.