## ASTRODYNAMICS SYMPOSIUM (C1) Orbital Dynamics - Part 1 (3)

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## AN EXTENDED DISCUSSION ON THE DOUBLESTAR ORBITS

## Abstract

The DoubleStar is a joint China/ESA project to study the Earth's space environment. The TC-1, one of the DoubleStar satellite launched at the end of 2003, decayed into atmosphere in less than 4 years while the other one TC-2 launched in mid-2004 is still steadily working in its polar highly eccentric orbit today. This paper will continue our previous work (Liu et al. 2007) to investigate the satellites' orbit and explain the distinct orbit lifetimes from various aspects. The problem concerning the orbital evolution of Earth's highly eccentric orbit will also be extended and studied primarily under the perturbations of Earth oblateness and lunar gravitation. We discuss both satellites with various perturbation scenarios and different orbits. The results show different roles that these forces play on satellite orbits especially for different eccentricities.