

ASTRODYNAMICS SYMPOSIUM (C1)  
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APPLICATION OF A MULTI-OBJECTIVE EVOLUTIONARY ALGORITHM TO THE SPACECRAFT  
STATIONKEEPING PROBLEM**Abstract**

Satellite operations are becoming an increasingly private industry, requiring increased profitability. Efficient and safe operation of satellites in orbit will ensure longer lasting and more profitable satellite services. This thesis focuses on the use of a multi-objective evolutionary algorithm to schedule the maneuvers of a hypothetical satellite operating at geosynchronous altitude, by seeking to minimize the propellant consumed through the execution of stationkeeping maneuvers and the time the satellite is displaced from its desired orbital plane. North-South stationkeeping was studied in this thesis, through the use of a set of orbit inclination change maneuvers each year. Two cases for the maximum number of maneuvers to be executed were considered, with four and five maneuvers per year. The results delivered by the algorithm provide maneuver schedules which require 40 to 100 m/s of total for two years of operation, with the satellite maintaining the satellite's orbital plane to within 0.1 between 84 and 96 percent of the two years being modeled.