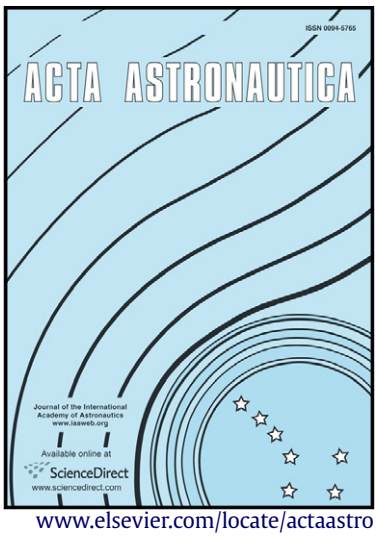

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PII: S0094-5765(14)00312-9
DOI: http://dx.doi.org/10.1016/j.actaastro.2014.08.005
Reference: AA5167

To appear in: *Acta Astronautica*

Received date: 13 February 2014
Revised date: 26 July 2014
Accepted date: 4 August 2014

Cite this article as: Abraham M. Leigh, Navigation solution to maneuver a spacecraft relative to multiple satellites and ground locations, *Acta Astronautica,* http://dx.doi.org/10.1016/j.actaastro.2014.08.005

Navigation Solution to Maneuver a Spacecraft Relative to Multiple Satellites and Ground Locations

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A dynamic differential correction algorithm is presented to deliver an impulsive maneuver to a satellite to place it within overlapping spheres, with user defined radii, centered around multiple non-maneuvering satellites and ground location's user defined line-of-sight within a constrained time. The solution is further constrained by elevation considerations for the ground locations. The differential correction algorithm develops and utilizes the state transition matrix, along with the equations of motion and multiple satellite's state information and ground location state information to determine the optimum trajectory to achieve the desired results. The results from the differential correction algorithm are very accurate for prograde orbits, as presented. The results allow for orbit design trade-offs, including the maneuvering satellite's initial inclination. The results deliver an analytical method to determine the optimum ΔV solution for the provided problem. This work ultimately establishes the generalized framework for applying the algorithm to a unique maneuvering spacecraft scenario which includes multiple satellites and ground locations.

Nomenclature

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