

SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)  
Poster Session (P)

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3D SIMULATION OF FINITE THRUSTER MANEUVERS (ORBIT TRANSFER) FOR BOLIVIAN  
SPACE EDUCATION PROGRAM**Abstract**

Bolivian Space Agency (Agencia Boliviana Espacial - ABE) was created in 2010 to manage Bolivia first communication satellite (Tupac Katari) launched in December 2013. As a novice in space sector is important to have education programs for teaching the knowledge and theory of space technology to Students of Bolivia. (Bolivia Community) One of the basic and important knowledge that the student need to know to begin the space career/education is the concept of the orbit, and how to transfer the satellite into desired orbit. It is important to make understand the difference between ideal impulsive orbit transfer using impulsive Thruster (engine) (Ideal Hohmann Transfer) and Real Orbit transfer using Finite Thruster (engine). It is very difficult to understand about orbit concepts and orbital maneuvers without graphic or 3D simulation. So, the simulation tool developed in this paper has the objective to make understand more easily the concept about orbit, Basic about Hohmann transfer, Bi-Elliptic Hohmann Transfer, the principle of the newton law equation of two body, and demonstrate how this simple equation can be the fundament of the orbit. The tool also consider Tsiolkovsky equation, mass consumption of the satellite, ISP and the thruster Force, gravity loss, firing direction and it allow us to add some perturbation to the orbit. (Like J2 perturbation, lunar solar attraction etc.) This tool based on Matlab software help students to convert all the theory concept of the orbit represented in equation into more easy understandable 3D graphic and with the advantage of Matlab flexibility it is easy to add new characteristic to simulate new theory or concept.