

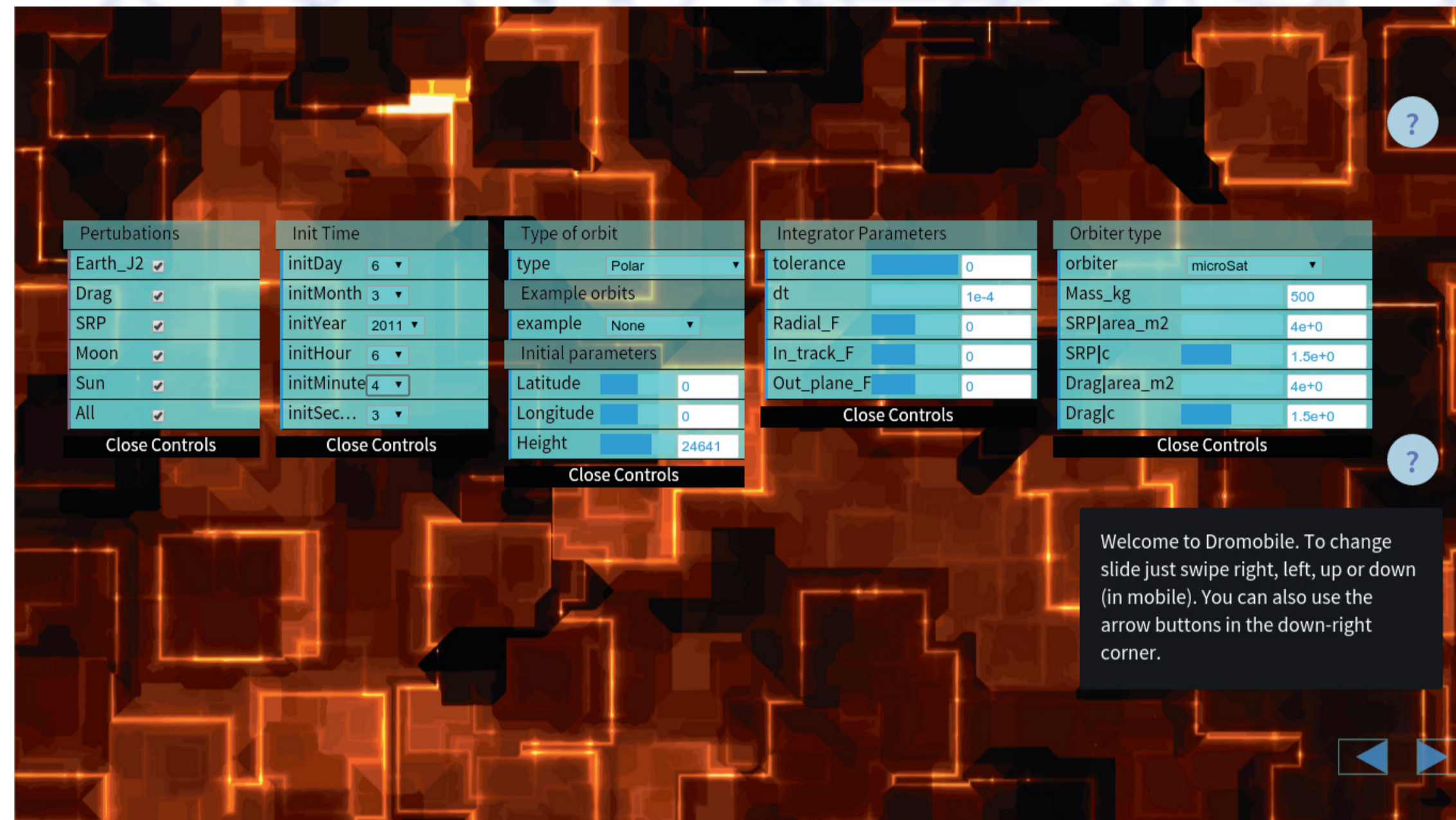


Dromobile

A multi-platform tool for orbit propagation on mobile devices

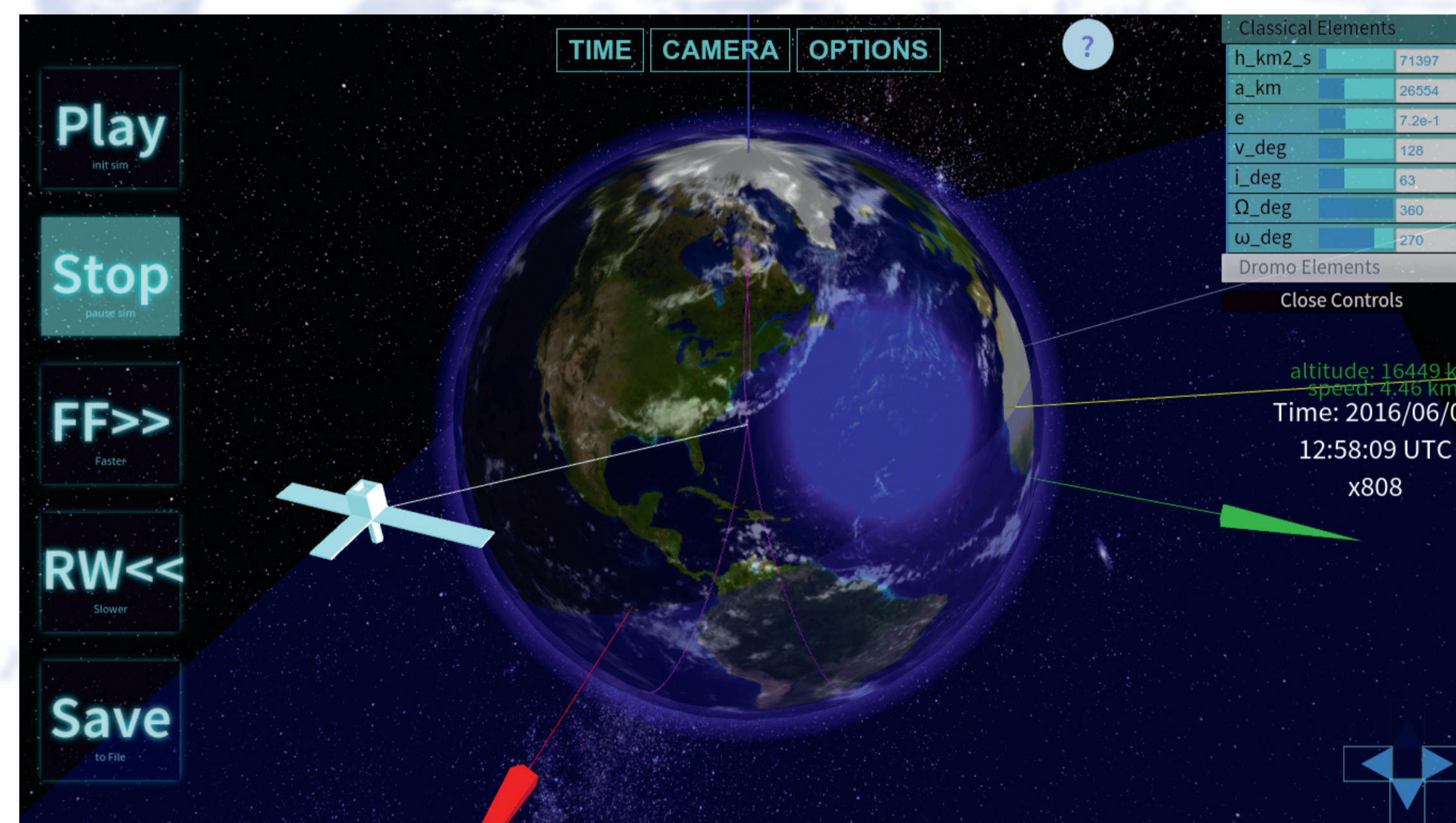
J. Hernando-Ayuso, J. Alonso-Pardo

User-friendly interface for configuration view



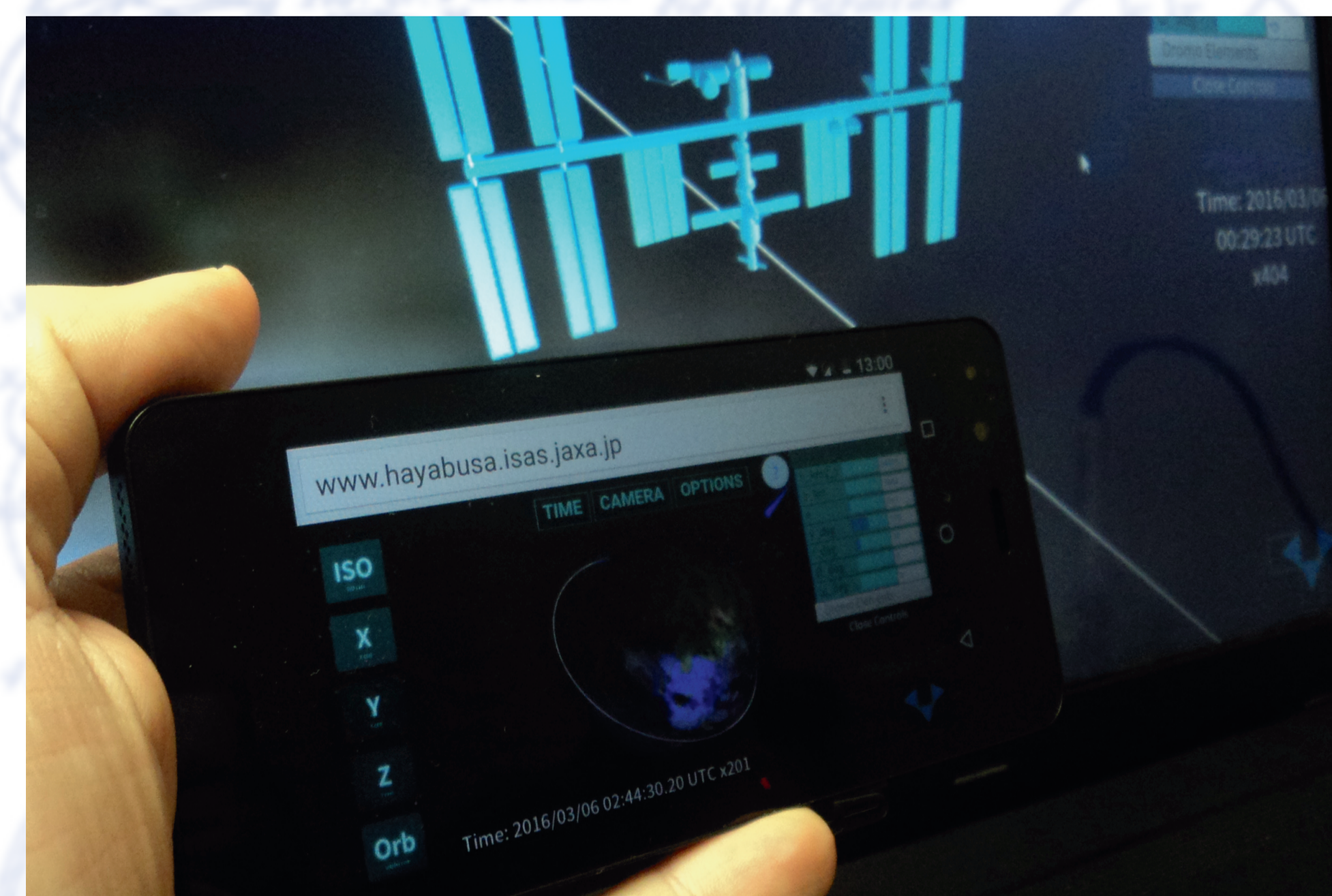
Configuration view. Orbiter type, initial time, perturbations and constant thrust can be set here. Orbital parameters tuning can be made directly on simulation view.

User can freely control simulation view



3D view of a microsatellite model in a Molniya orbit. Different camera options and visual aids are available.

Dromobile can run on mobiles devices



Laptops, tablets and smartphones are supported. It is preferred to use updated versions of major browsers such as Chrome or Firefox.

Introduction

- Mobile devices technologies are mature for orbital mechanics applications.
- Professional, educational and academic users may benefit from the use of mobile devices.
- We propose an open web-app called Dromobile.
<http://www.hayabusa.isas.jaxa.jp/kawalab/dromobile/>

Dromobile

- Dromobile adds a new level of portability in satellite mission design.
- Use of JavaScript, WebGL, CSS and open source libraries.
 - THREE.js, THREE.planets
- Numerical integration performed on demand using a Runge-Kutta Dormand-Prince 5(4)7FM method.
- Dromo Special perturbation method was chosen.

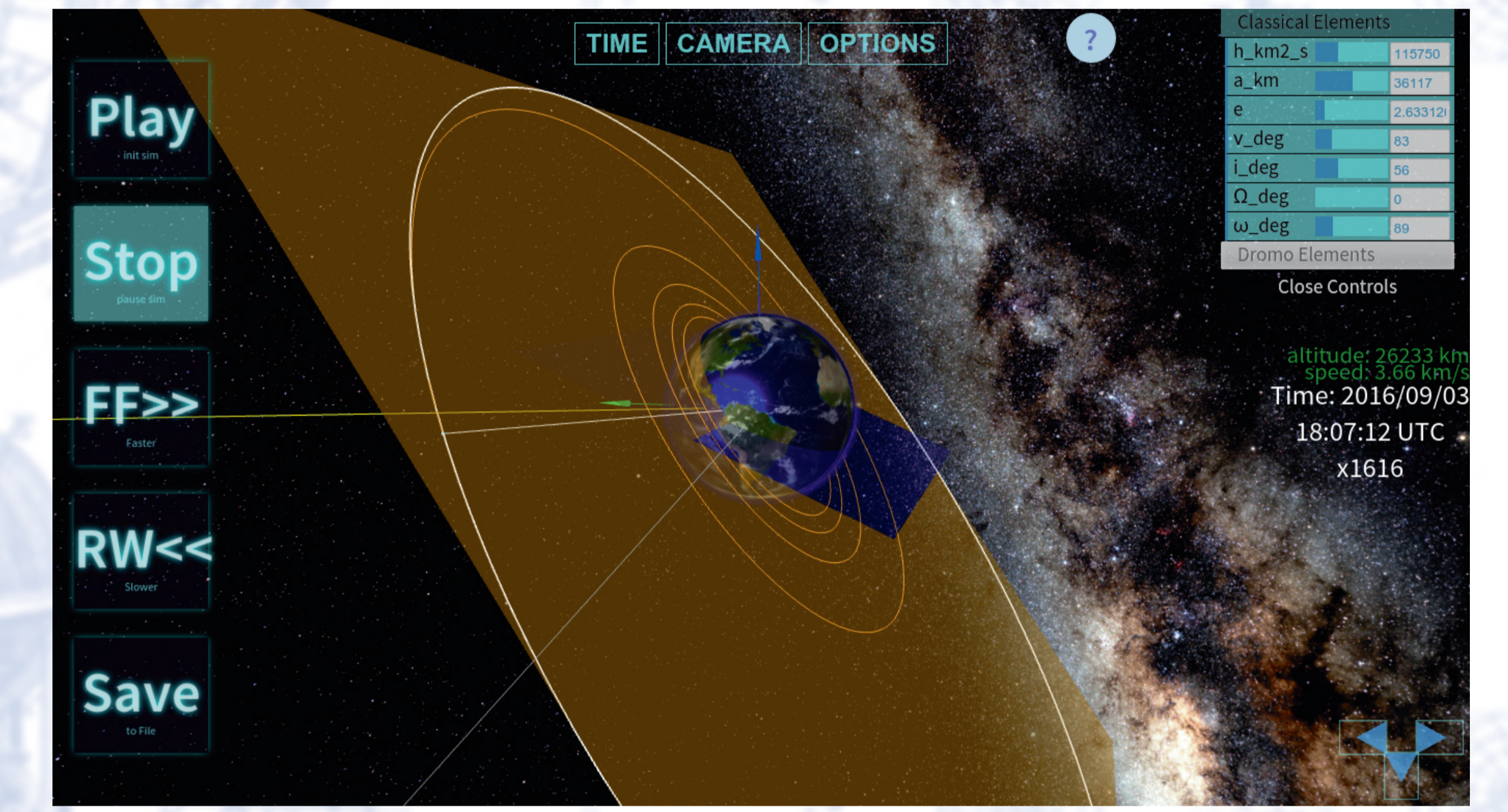
Dromo

- 2nd order Sundman transformation.
 - Introduction of a new independent variable σ .
 - Time is considered a dependent variable.
- 7 orbital elements constant for Keplerian Orbits.
 - 3 describe the in-plane motion.
 - The remaining 4 are a quaternion that defines the orbital plane.

Perturbations

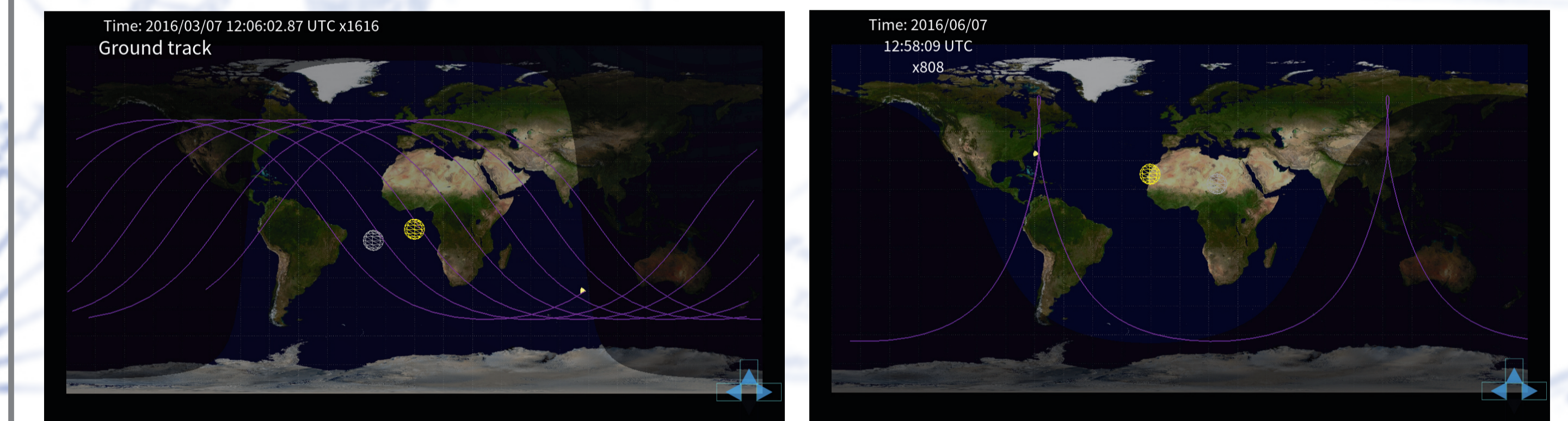
- Constant force.
- Earth's oblateness.
- Atmospheric drag.
- Lunisolar gravitational forces.
- Solar Radiation Pressure.

Constant thrust maneuver simulation



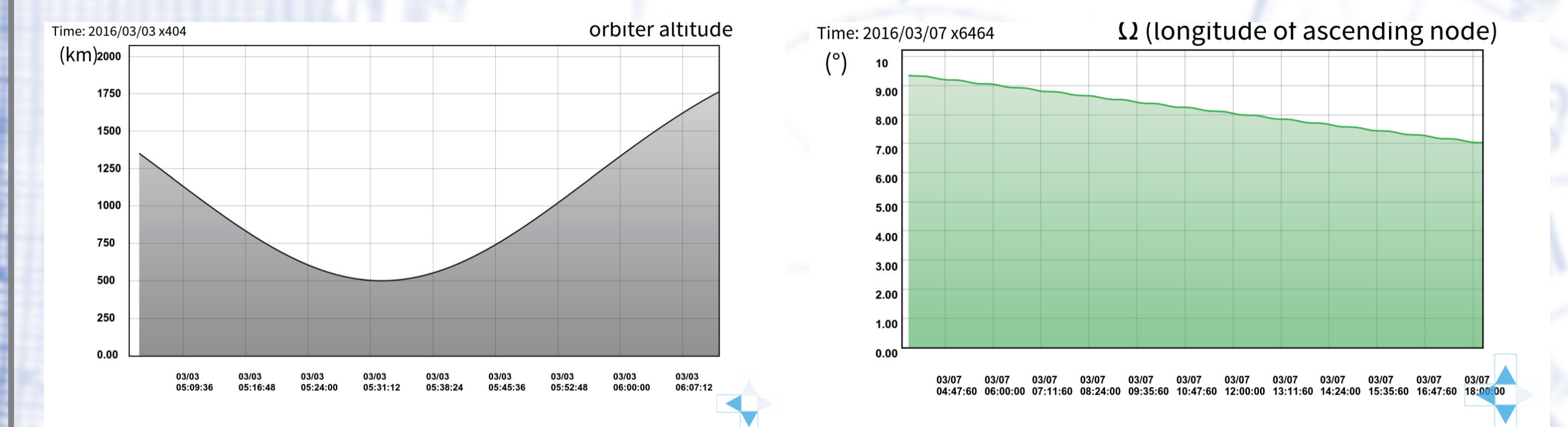
Constant thrust example. Trajectory is represented as an orange line; white line represents osculating orbit.

An Earth 2D view is provided for Ground-Track visualization



Ground-Track views for ISS example orbit (left) and Molniya example orbit (right). Solar terminator, Subsolar and Sublunar points are also represented.

Data is presented in charts and .CSV files



Orbiter altitude chart (left) and RAAN chart (right). Complete simulation data can be saved in .csv file form.

Online at:

<http://www.hayabusa.isas.jaxa.jp/kawalab/dromobile/>