

What is Psimu

De Wiki

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PSIMU is a **CNES** tool allowing to propagate trajectories around the Earth

PSIMU is provided as a Freeware under a **CNES** specific license via this [site](#).

As it is coded in **Java**, this product is available for any kind of platforms owning **Java**. An executable jar (launching the **GUI**) including all dependencies is provided.

Kind of orbits

These trajectories may be:

- **Elliptical** ones (all kind of orbits, from **LEO** to **GEO** passing through **MEO** or **HEO**),
- **Hyperbolic** ones,
- **Atmospheric** ones (in particular in case of debris reentries).

Three user modes

PSIMU is usable via three modes:

- **GUI**: its utilization is made user-friendly thanks to a graphical user interface (developed using [[GENIUS](#)] and [[GENOPUS](#)]),
- **Batch** using a context file (in **XML** format),
- Library via its **Java interface**.

Input data

Its initialization is made by:

- The initial **orbital parameters** definition (epoch, frame, coordinates) with a great number of available options.
- The **vehicle** modelling:
 - Vehicle shapes (sphere, cylinder and parallelepiped) with or without solar panels,
 - Dimensions or surfaces,
 - Aerodynamic characteristics and/or radiative pressure ones,
 - Propulsive characteristics (engines, tanks).
- A **maneuver sequence** (optional) including impulsive maneuvers and/or continuous ones
- A sequence of **attitude laws** (optional) ; indeed, if PSIMU does not manage 6 DDL motion, it owns as input data, attitude laws depending on orbital events, allowing to know at every moment the vehicle attitude and thus, to deduce from it the forces applied to the vehicle.
- **Numerical integrator** parametrization (**Runge Kutta** or **Dormand Price**) with, for usual applications, by default settings.
- Choice of **force models** within:

- Potential with several models available as the possibility to manage degree and order of zonal and tesseral terms,
- Other bodies attraction : Moon and Sun via analytical or numerical ephemeris,
- Atmospheric forces using different atmospheric models and their associated settings,
- Solar radiative pressure (direct or rediffused one)
- Oceanic and terrestrial tides

Output

PSIMU also allows to set its output data within **several tens of variables**, the output frame and, of course, the output step.

A **graphical interface** for plots is also integrated.

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