

1. How do you calculate (or model) drag in the analytical model?

The model used here is a simple model called *US76* which is used to compute the delta-V budget during the coasting phase. In addition to providing a better estimation of the delta-V needed, to take drag into account for the coasting phase removes strategies which are targeting low orbits if the coasting duration is long.

2. Can I use the scripting interface to extend the modelling in ExoOPS? For instance, to use my own Drag Model?

It is not available now as the scripting interface is dedicated to adding custom *output* variables. In the next couple of releases, we will unlock an "advanced users" mode. In this mode, advance settings (e.g. the drag model) can be changed.

3. Is there any API to communicate with ExoOPS or the only way is through the GUI?

The only way for now to use ExoOPS™ is through the web interface. However, the web interface is also only an API, so you can contact our team at support.exoops@exotrail.com for more information and discussions about this topic.

4. What integration models are available in Numerical Model?

Exotrail is using the integration model of the OREKIT

5. Will there be an option for local deployment or is the tool purely cloud based?

A local deployment is possible. Please contact us for more information at support.exoops@exotrail.com

6. It is not possible to define orbits about other bodies, is it?

It is not at the moment and not foreseen in a near future unfortunately :(

7. Will there be/Is there a way to do multi-criteria optimization with ExoOps?

The optimizations are only performed on the missions described in the software.

8. What is the price for a license with all the modules included?

The price of the software can be discussed with our business development team (sales@exotrail.com, or Federico.torrini@exotrail.com). We already have discounts for early birds in 2020 and for small companies.

9. What optimization algorithms are used in the parametric studies?

The optimization algorithms used in the parametric studies are used because they are robust, quick and give very precise results in the analytical modeling used in ExoOPS™. Through their simplicity, they are proved to converge to optimal solutions in a reasonable time (dozens of milliseconds for most cases).

10. Could you calculate hybrid constellation deployments with rideshare and dedicated launches (microlauncher)?

Sure, it can be done. Any launch can be selected (rideshare or dedicated) and the results will consider both possibilities.

In the version presently available (early April 2020), the RAAN of rideshares cannot be chosen, it will be available from May 2020, but still in a beta version.

11. I did not understand if in future releases, it will be possible to place ground stations in constellation module?

From the release 2.1 at the end of April 2020 it will be available.

12. Can multiple users use the same license or does one need to purchase a single license per user?

This is decided case by case, but in general several users can be attached to a single license. Please contact sales@exotrail.com or Federico.torrini@exotrail.com for more information.

13. One more question on how the data is shared between users. If there are multiple users on the same license, do they see the same data?

Each account is linked to individuals and to a contract signed with a company. A functionality called "Groups" enables to share data between different users.

14. What we didn't see is the speed of the numerical model.

A simulation of change of 50 km in altitude has been performed live, computation time was lower than 2 minutes. The computation time depends heavily on the number of perturbations and number of systems. For the majority of missions where the numerical module is used, the computation time is lower than 10 minutes.

On top of this, several computation can be made in parallel to reduce the impact of this computation duration.

15. When will the new April version release be available?

The version 2.1 will be available before the end of April 2020.

16. What is the price of the license for Academia or students?

The price for Academia or students will be done on case-by-case. Please contact support.exoops@exotrail.com for more information.

17. Is it possible to visualize a maneuver once planned?

Two options are available:

- A 3D view can be generated which takes into account the orbit and the attitude of the satellite;
- Attitude commands, firings of the thruster and other systems related data can be plotted and downloaded.

18. How can you change the attitude? I thought you only provide thrusters. Do you also provide attitude control means?

The attitude is not "controlled" in ExoOPS™ at the moment. However, to perform a maneuver, the attitude of the satellite must be controlled so that the thruster fires in the correct direction.

A thruster impacts the attitude control of a spacecraft. However, Exotrail doesn't provide typical actuators such as magnetorquers or reaction wheels.