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BB# 25

Arcjet deorbiting (and auxiliary propulsion) system

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24/05/2016

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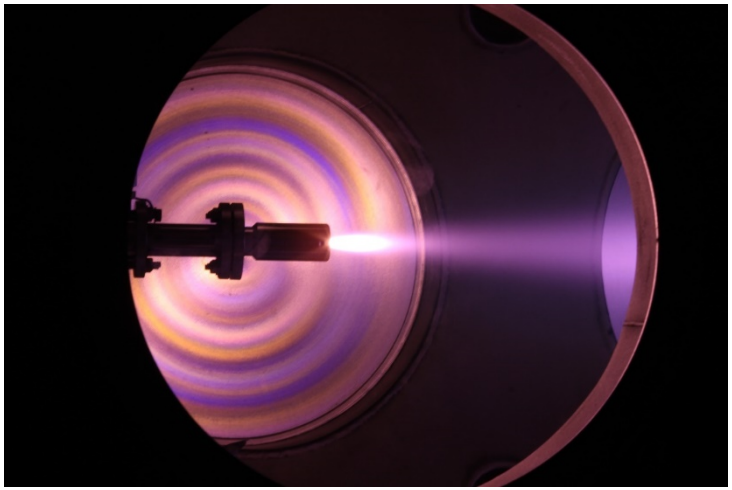
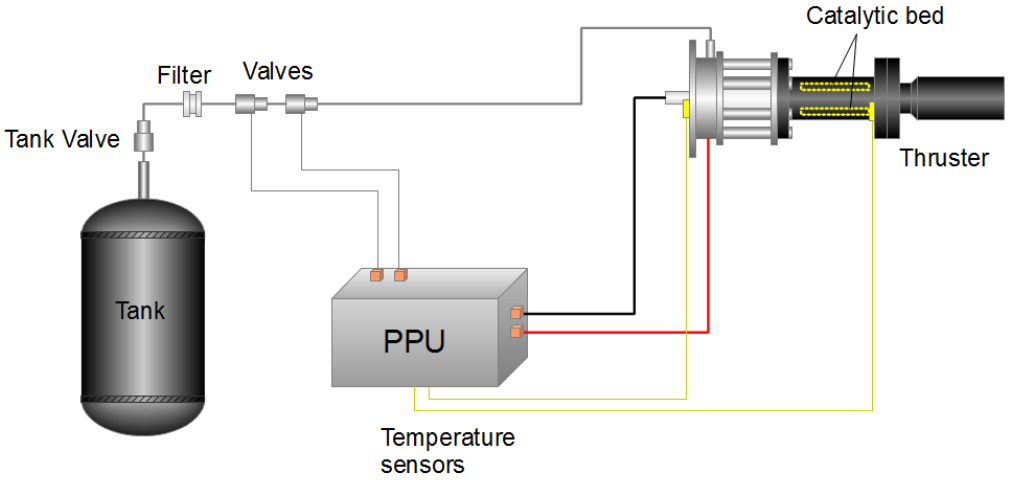
Description of proposed technology Building Block

This study intends to explore feasibility of using a **gas-fed** or **liquid green propellant-fed** **arcjet** as deorbiting device for **small satellites** (up to 1,000 kg of mass) in LEO region. As an option, the same building block can also be used "as it is" to raise orbit of EoM large GEO satellites, up to a safe graveyard orbit.



— Trade offs are foreseen for what concerns electrodes materials, since the idea is to design a system able to handle a large variety of propellants, including highly oxidizing ones as the hydrogen peroxide.



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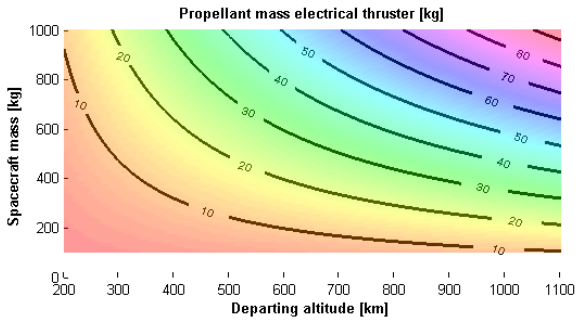
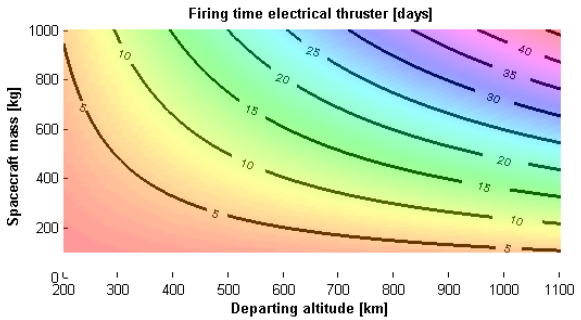
Description of proposed technology Building Block

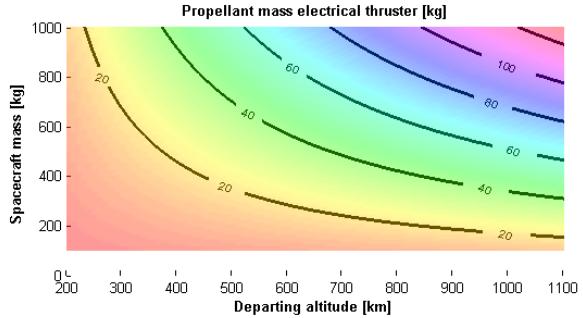
- Baseline applicability range: LEO orbit for satellites up to 1000 kg
- Option: GEO orbit for larger platforms (graveyard orbit positoning) & collision avoidance

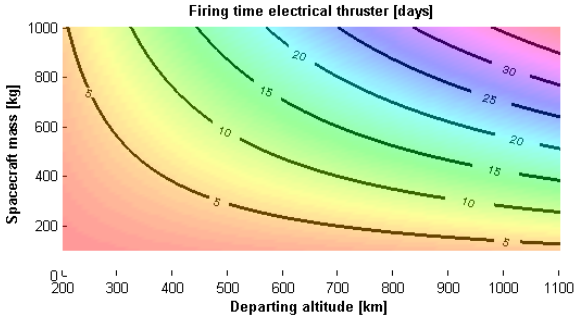
Helium





H_2O_2





- A compact system will be designed, with very limited impact in terms of mass (max. 10 kg) and volumes (max. 0,015 m3) on a wide range of satellites types.
- Required power will be in the order of 300-400 W minimum, which is achievable for a small platform in LEO.

Development

- **Materials compatibility** with oxidising propellants is the major challenge for this building block. Idea is to preliminarily assess compatibility in laboratory environment, and then try with a test in a more representative environment in terms of temperature and –if possible- atmospheric pressure.
- Other challenges are **efficiency**, **reliability** and **robustness** of the catalytic bed in case of liquid propellant utilisation, and last but not least, most of feeding line's components shall be assessed against highly oxidising liquids. For these two issues the study will benefit from the results of PulCheR, a recently finished FP7 project.