

## ZBO system concepts adapted for European Long Term Cryogenic Propulsion

J.Lacapere<sup>1</sup>, J.Tanchon<sup>1</sup>, T.Misuri<sup>2</sup>, T Tirolien<sup>3</sup>

<sup>1</sup>Absolut System SAS, France

<sup>2</sup>ALTA Spa, Italy

<sup>3</sup>ESA/ESTEC

### Abstract:

Cryogenic propulsion is now considered as mature to be used as a possible alternative to storable propellant for interplanetary missions. Some efforts should be yet provided on the different concept to master Boil-Off Masses and on the technology demonstration (on the relevant environment).

Zero Boil-Off systems adapted to LOX / LCH<sub>4</sub> and to LOX/LH<sub>2</sub> propulsion systems are presented in this paper. These Zero Boil-Off systems dedicated to several months duration missions include some solutions to reduce conductive and radiative heat transfer thanks to structural materials but also to passive cooling system. In order to completely eliminate propellant Boil-Off for some missions, a cryocooler can also be plugged to the passive system.

In near future step, these ZBO systems will be tested on large scale on ground

---

Jerome LACAPERE

Absolut System SAS

32 Rue de la Tuilerie, F-38170 Seyssinet-Pariset

Jerome.lacapere@absolut-system.com