

Helicon Propulsion Technology perspective for Minisatellites

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Propulsion technology based on helicon thruster was always considered promising because in principle it allows for long life time and versatility in using different type of gases. It is relatively compact with respect to other thruster technologies and thus is also considered promising for high power applications.

Moreover, helicon thruster technology has some remarkable features which makes it cheaper with respect to other propulsion technologies and thus attractive for very small satellites. Most relevant features are: (i) simple structure, (ii) no neutralizer, (iii) PPU does not need to provide high DC output. Such a technology would introduce mobility to small spacecrafts, providing new unconventional opportunities for low cost missions.

However, to be implemented, reasonable performances need to be achieved in the range 15-50 W, which is a challenging target considering that most of the other electric engines have a performance-drop below 50W.

To achieve such demanding results, a strong research effort has been initiated in 2008 at University of Padua through an international consortium (HPH.com), which led in 2012 to the development of a first engineering model operating at 50 W. After four more years of development, a completely new miniaturized unit based on a helicon thruster has been developed and characterized with extensive performance test, showing remarkable results in the power range between 15-50 W.

In this presentation, the numerical and experimental work performed is presented and the achieved results are described.

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