

EU project to build Electric Solar Wind Sail

December 9 2010

The European union has selected the Finnish Meteorological Institute to lead an international space effort whose goal is to build the largest and fastest man-made device.

The electric sail is a Finnish invention which uses the solar wind as its thrust source and therefore needs no fuel or propellant. The solar wind is a continuous plasma stream emanating from the Sun.

The working principle of the so-called electric solar wind sail was invented in 2006 by Finnish Meteorological Institute researcher Pekka Janhunen.

In December 8-9, 2010, the kickoff meeting of the electric sail EU project was held at the Finnish Meteorological Institute. The meeting gathered space scientists and engineers from Finland, Estonia, Sweden, Germany and Italy. The ESAIL project will last for three years, its EU funding contribution is 1.7 million euros and its goal is to build the laboratory prototypes of the key components of the electric sail. In the EU evaluation, the ESAIL project got the highest marks in its category.

The electric solar wind sail may enable faster and cheaper access to the solar system. In the longer run it may enable an economic utilisation of asteroid resources. A related but simpler device (the so-called plasma brake) can be used for deorbiting satellites to address the [space debris](#) issue. The working principles of the electric sail and the plasma brake will be tested in the coming years by the Estonian ESTCube-1 and the Finnish Aalto-1 nanosatellites.

According to estimates, a full scale electric sail will produce one newton continuous thrust and weigh only 100 kg. In certain missions the performance level of the electric sail is 100-1000 times larger than that of present chemical rockets and ion engines. The electric sail consists of long and thin metallic tethers which are kept in a high positive potential by an onboard solar-powered electron gun. The charged tethers repel solar wind protons so that the solar wind flow exerts a force on them and pushes the spacecraft in the desired direction.

Provided by Finnish Meteorological Institute

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