

News Feature: i4is Project Glowworm update

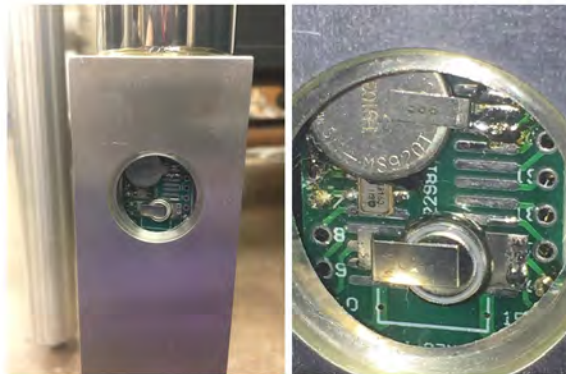
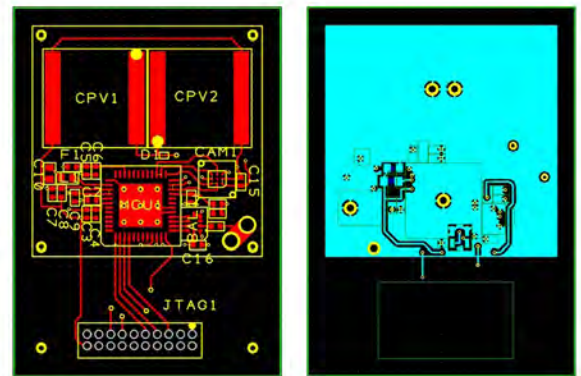
Dan Fries and John Davies

i4is Project Glowworm is a demonstrator of laser-push propulsion in low Earth orbit (LEO). Dan Fries, i4is Deputy Technical Director, and John Davies, Principium editor, report on recent work and related publications.

The i4is Technical Team (see article by Dan Fries elsewhere in this issue) are working towards the target of a LEO demonstrator mission with the objective of raising the orbit (semi-major axis) of a laser sail-equipped chipsat by 10 km. The team has shown that the parent cubesat will need to follow the chipsat to achieve this. Using this technique, simulations show that the laser in the parent cube sat will be sufficient to achieve the required orbit raise.

The group initiated at Drexel University, Philadelphia, and led by David Evynshtein, are working on the chipsat which will carry the sail, Project Pinpoint. They have a prototype design ready for assembly and testing.

Current iteration of Pinpoint electrical schematic,
Credit: i4is Pinpoint team



They have already tested the selected battery and capacitors in high vacuum for 2 months without any notable degradation.

Pinpoint components after extended vacuum testing
Credit: i4is Pinpoint team

A significant paper in the same field describes how a laser sail can be dynamically stable in the propelling beam - *Experimental Verification of a Bigrating Beam Rider*, Ying-Ju Lucy Chu (Rochester Institute of Technology, New York) et al, Physical Review Letters, December 2019 (journals.aps.org/prl/abstract/10.1103/PhysRevLett.123.244302)

Another of the major challenges for an ultra lightweight interstellar probe is to slow down in a target system. i4is Technical Team member Nikolaos Perakis has recently described a technique to permit this - thus increasing observation times and even enabling rendezvous manoeuvres - *Maneuvering through solar wind using magnetic sails*, Nikolaos Perakis, Technical University of Munich, Acta Astronautica, Volume 177, December 2020 (www.sciencedirect.com/science/article/abs/pii/S0094576520304471?via%3Dihub).

About the Authors

Dr Dan Fries is a postdoctoral fellow at the Center for Aeromechanics Research of the University of Texas at Austin. His first degree was from Universität Stuttgart and his PhD from Georgia Tech.

John Davies has been editor of Principium since Issue 9 in 2015.