

# NASA NIAC funds swarming study

## Space Initiatives and i4is team to further their study of interstellar swarming mission

**John I Davies**

In this issue we celebrate another milestone for the i4is team which delivered an interstellar communications study to Breakthrough Starshot, see Principium 41 May 2023. An i4is-centred team has now received a NASA Innovative Advanced Concepts (NIAC) award to investigate this further. We now have support from both the most active funder of interstellar studies and one of the major world space agencies - both delivering results and receiving recognition as further support of our work.



The NASA Innovative Advanced Concepts (NIAC) programme has been running in various forms since 1998. Each year researchers submit proposals and i4is teams have been submitting proposals for interstellar studies since 2018. This year, 2024, we were successful. A team led by Thomas Marshall Eubanks (Space Initiatives Inc) proposed "Swarming Proxima Centauri: Coherent Picospacecraft Swarms Over Interstellar Distances" (23-NIAC24-B-0197). The proposal was accepted with the NASA evaluation concluding -

"The major innovation in this work is to explore interstellar communications and proposes a swarm technique using on the order of 1000 1-g spacecraft. The main objective for the work is developing the technology to coalesce and operate picospacecraft swarms autonomously in deep space in order to simultaneously and feasibly transmit a reasonable number of signal photons to Earth. The technologies being explored have the potential to revolutionize swarm communications and control for numerous missions in the solar system.

"This proposal is investigating one of the major challenges in space exploration from a new perspective. It improves on the Starshot concept by increasing return signal strength and eliminating single point failures. It is bold, novel, ambitious, and if successful, lays groundwork that could change the possible. The proposal has the potential to revolutionize a host of small/pico sat missions. The technologies to be developed/ investigated are very challenging but addressing is technically feasible."

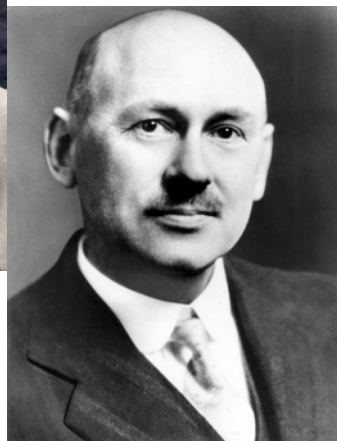
- ◀ The team is -
- Thomas Marshall Eubanks, Space Initiatives Inc - Principal Investigator
  - W Paul Blase, Space Initiatives Inc - Co-Investigator
  - Robert G Kennedy III, PE (K3TVO), i4is - Co-Investigator
  - Andreas Hein PhD, i4is & University of Luxembourg - Co-Investigator
  - Adam Hibberd, i4is - Co-Investigator
  - Manasvi Lingam, Florida Institute of Technology - Co-Investigator

## **See just one of the Interstellar Probes**

i4is is currently designing a full-scale replica of one of the thousand probes proposed by the Eubanks team. This will appear at the next SF Worldcon in Glasgow, Scotland, in August this year. To borrow the motto of the British Interplanetary Society "From Imagination to Reality".

The team will now be pursuing the next stage of this work which was initiated by a Breakthrough Starshot grant, as reported in Principium 41 May 2023, *News Feature: i4is delivers Communications Study to Breakthrough Starshot - Swarming Proxima Centauri: Optical Communication Over Interstellar Distances*, John I Davies and Robert G Kennedy ([i4is.org/principium-41/](https://i4is.org/principium-41/)) reporting the study *Swarming Proxima Centauri: Optical Communication Over Interstellar Distances* ([arxiv.org/abs/2309.07061](https://arxiv.org/abs/2309.07061)).

Interstellar missions using laser propulsion are becoming a mainstream thread in space technology. This is an endeavour which will last decades, even in this initial phase, but we aim to achieve the first mission later in the current century. The human species is now well set upon the interstellar road envisaged by Konstantin E Tsiolkovsky, Robert H Goddard, Arthur C Clarke and Robert L Forward. We will reach the stars!



Konstantin E Tsiolkovsky,  
Robert H Goddard,  
Arthur C Clarke and  
Robert L Forward.

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