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## Interstellar Probe: A Mission to the Heliospheric Boundary and Interstellar Medium for the Next Decade

**Pontus Brandt**<sup>1</sup>, Ralph McNutt<sup>1</sup>, Elena Provornikova<sup>1</sup>, Carey Lisse<sup>1</sup>, Kathleen Mandt<sup>1</sup>, Kirby Runyon<sup>1</sup>, Abigail Rymer<sup>1</sup>, Parisa Mostafavi<sup>1</sup>, Robert DeMajistre<sup>1</sup>, Edmond Roelof<sup>1</sup>, Drew Turner<sup>1</sup>, Matthew Hill<sup>1</sup>, James Kinnison<sup>1</sup>, Gabe Rogers<sup>1</sup>, Clayton Smith<sup>1</sup>, Glen Fountain<sup>1</sup>, David Copeland<sup>1</sup>, Peter Kollmann<sup>1</sup>, Reza Ashtari<sup>1</sup>, Robert Stough<sup>2</sup>, and the The Interstellar Probe Study Team\*

<sup>1</sup>The Johns Hopkins University Applied Physics Laboratory, SRP, Laurel, Maryland, United States of America

([pontus.brandt@jhuapl.edu](mailto:pontus.brandt@jhuapl.edu))

<sup>2</sup>Marshall Space Flight Center, Spacecraft / Payload Integration and Evolution (SPIE) Office, Huntsville, Alabama, United States of America

\*A full list of authors appears at the end of the abstract

An Interstellar Probe mission to the Very Local Interstellar Medium (VLISM) would bring new scientific discoveries of the mechanisms upholding our vast heliosphere and directly sample the unexplored Local Interstellar Clouds that our Sun is moving through in relatively short galactic timescales. As such, it would represent Humanity's first explicit step in to the galaxy and become perhaps NASA's boldest step in space exploration. Such a mission has been discussed and studied since 1960, but the stumbling block has often been propulsion. Now this hurdle has been overcome by the availability of new and larger launch vehicles. An international team of scientists and experts are now progressing towards the final year of a NASA-funded study led by The Johns Hopkins University Applied Physics Laboratory (APL) to develop pragmatic example mission concepts for an Interstellar Probe with a nominal design lifetime of 50 years. Together with the Space Launch System (SLS) Office at the NASA Marshall Space Flight Center, the team has analyzed dozens of launch configurations and demonstrate that asymptotic speeds in excess of 7.5 Astronomical Units (AU) per year can be achieved using existing or near-term propulsion stages with a powered or passive Jupiter Gravity Assist (JGA). These speeds are more than twice that of the fastest escaping man-made spacecraft to date, which is Voyager 1 currently at 3.59 AU/year. An Interstellar Probe would therefore reach the Termination Shock (TS) in less than 12 years and cross the Heliopause into the VLISM after about 16 years from launch.

In this presentation we provide an overview and update of the study, the science mission concept, discuss the compelling discoveries that await, and the associated example science payload, measurements and operations ensuring a historic data return that would push the boundaries of space exploration by going where no one has gone before.

**The Interstellar Probe Study Team:** Stuart Bale, William Kurth, Andre Galli