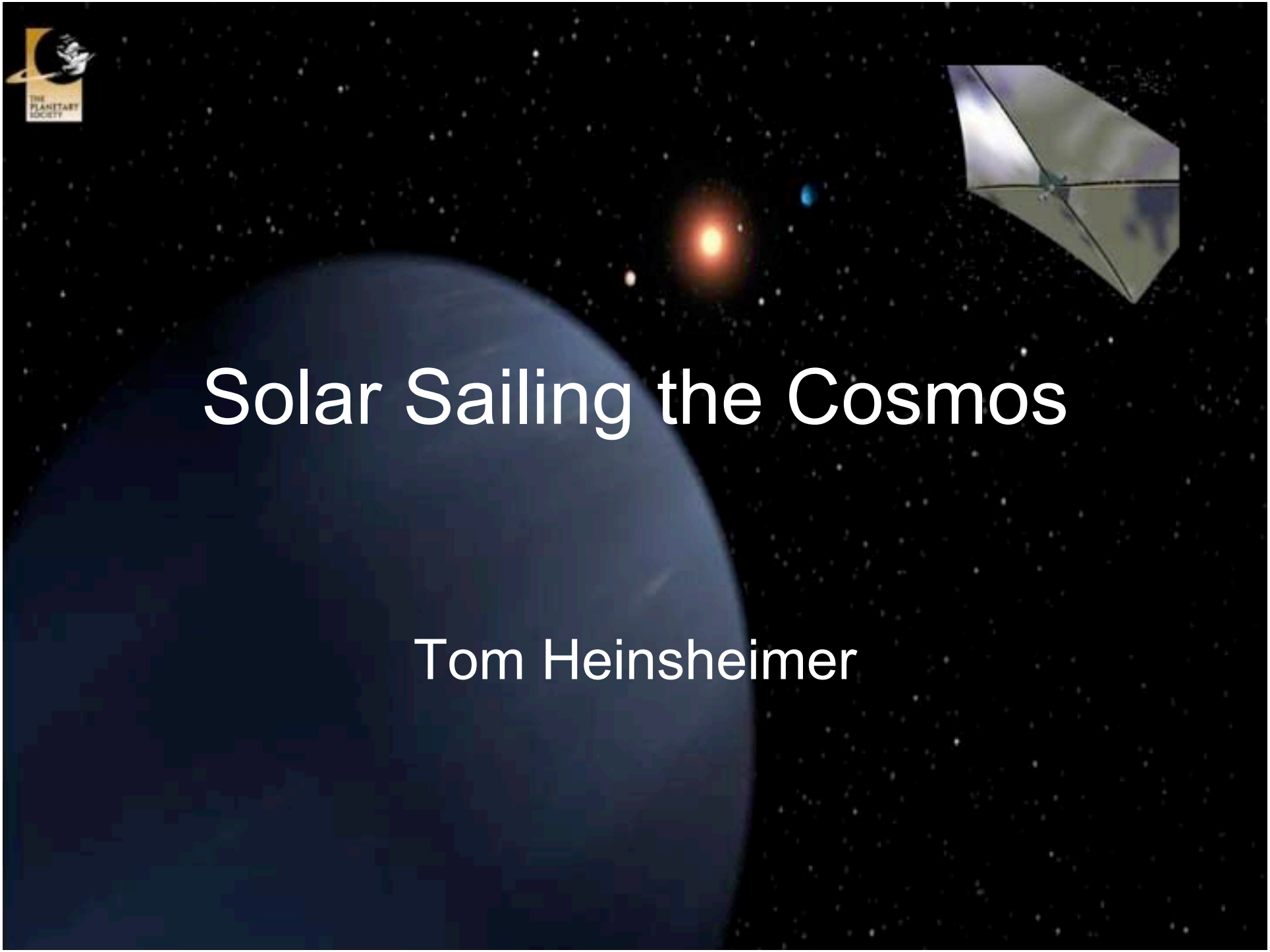
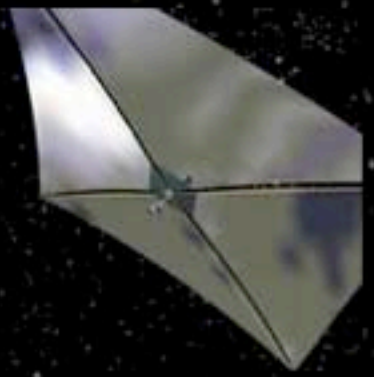
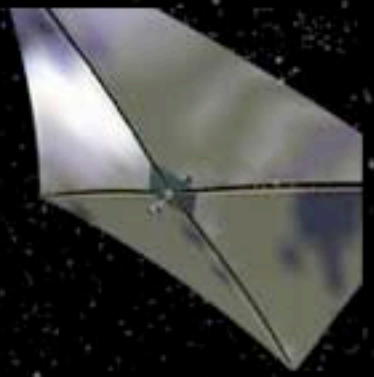

Solar Sailing the Cosmos
Tom Heinsheimer

The Vision



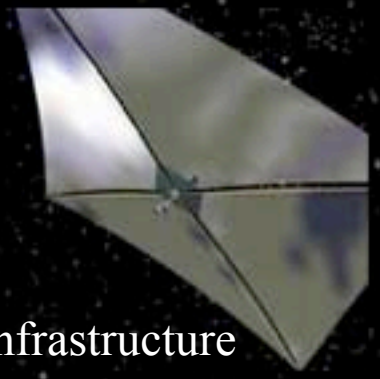
- TPS envisions and manages a program using private funds to develop the technologies and conduct the precursor flights needed to conduct multiple, simultaneous, autonomous, round-trip reconnaissance missions of extra solar planetary systems.



The Concept of Operations

- Missions are “fire and forget”
  - Single booster can launch solar sail missions towards many star systems
  - No space or ground infrastructure needed
  - Missions are on their own from booster burn-out
  - Leave micro-cairns at best locations and then return
- We only know they made it at the end
  - Payoff is end-of-mission reconnaissance data
- Typical flight times are decades or centuries

Vision Benefits



- Only solar sails can do this
- TPS-Centric
  - Affordable with private funds
  - Missions are cheap without costly ground or space infrastructure
- Exploits the buzz about extra-solar planets
  - Novel solar systems will generate interest in new and imaginative mission architectures to shorten flight timeline
- Makes no enemies in the space establishments
  - Does not compete with official government space programs
  - Requires no Congressional action
- Visionary enough to intrigue new breed of contributors
  - "My great-great grandfather paid for this"
  - Could include the ultimate X-Prize
    - » Awarded for the first mission that returns 1T-Bit of data collected from within from another solar system
    - » $1,000 today pays off $2B in 250 years (less TPS management fee)
- Supports leap-frog technologies
  - 1 gram, 1 cubic centimeter payloads to keep size and costs down
  - Solar sails capable of very close solar approach and long life
  - Intelligent, autonomous, creative on-board mission management

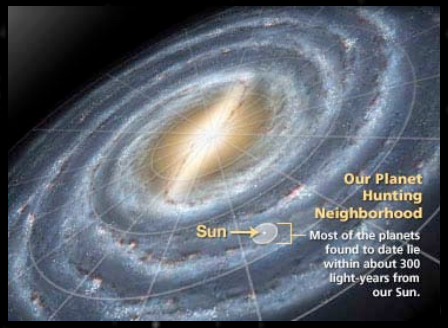
Build on NASA PlanetQuest Enthusiasm

Are we alone?

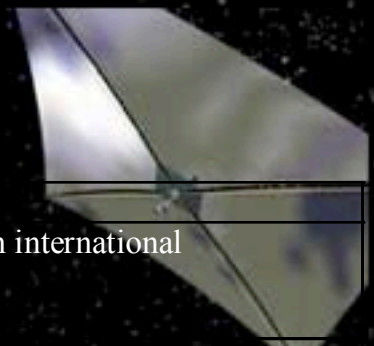
- For centuries, human beings have pondered this question.
- Medieval scholars speculated that other worlds must exist and that some would harbor other forms of life.
- In our time, advances in science and technology have brought us to the threshold of finding an answer to this timeless question.
- Over the next 15 years, NASA is embarking on a bold series of missions to find and characterize new worlds.
- These will be the most sensitive instruments ever built, capable of reaching beyond the bounds of our solar system.

http://planetquest.jpl.nasa.gov

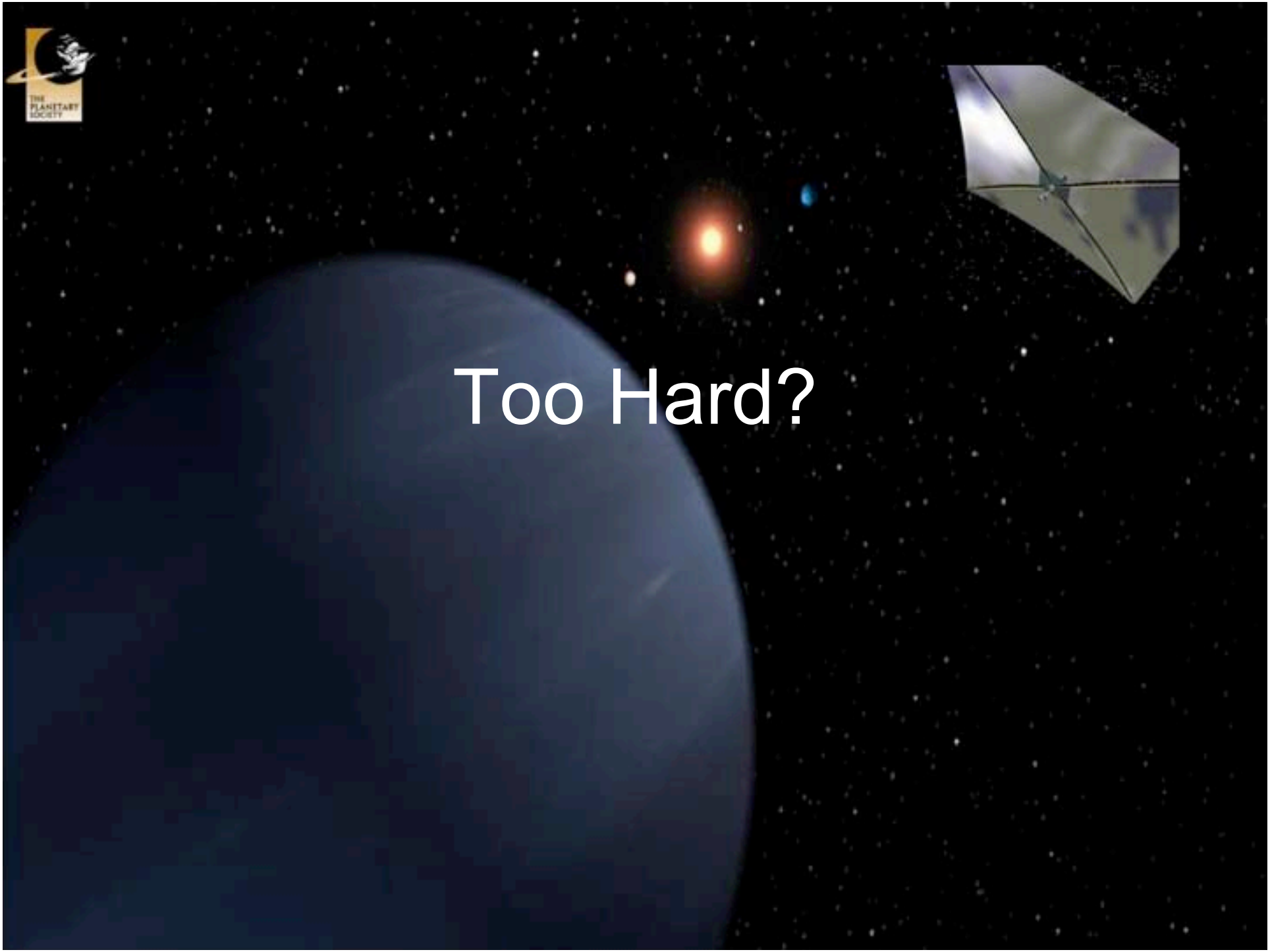
PLANETQUEST
Exoplanet Exploration



Strawman Milestones



Milestone	Year Range	Purpose
Cosmos 2 – first flight	2010-2012	First technology demonstration weith international cooperation
Analysis of flights to, through and back from novel solar systems	2010-2012	Show TPS-sponsored innovative approaches to interstellar flight trajectories and CONOPS
Technology projections towards 1 gram/1 cc payloads	2010-2012	Show TPS-sponsored innovative approaches to interstellar flight technology
Technology projections towards small solar sails capable of very close solar passes and long lifetimes	2010-2012	Show TPS-sponsored innovative approaches to solar sail technologies
Flight demos of three above items	2012-2022	Show TPS-sponsored innovative approaches to low cost flight proof of concepts
First launches to another solar system	2022-2030	Show TPS-sponsored innovative approaches to low cost flight
First launches to land micro-cairns on another solar system planet or moon	2035-2040	Show TPS-sponsored innovative approaches to contact with other stars' worlds
First launches of return trips to another solar system	2050-2070	Show TPS-sponsored innovative approaches to round trip missions
First launches of reconnaissance probes to another solar system with information return	2070-2090	Show TPS-sponsored innovative approaches to understanding other stars' worlds


Too Hard?