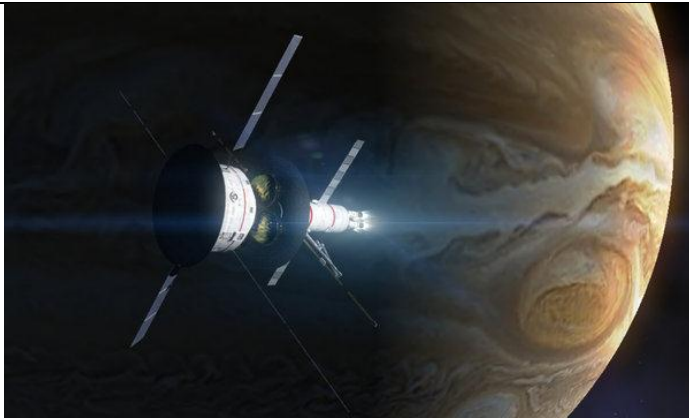


KINEMATICS

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Austin Tx 78746 jpcise@austincc.edu & NYTimes August 18, 2011 by Dennis Overbye. Send Dr Cise an e-mail on how you used this application.

Offering Funds, U.S. Agency Dreams of Sending Humans to Stars



An artist's rendering of a hypothetical interstellar craft on a test flight near Jupiter.

A rendering of an Interstellar Institute conceived by Kelvin Long, a physics graduate student.

The government agency that helped invent the Internet now wants to do the same for travel to the stars.

In what is perhaps the ultimate startup opportunity, **Darpa, the Defense Advanced Research Projects Agency**, plans to award some lucky, ambitious and star-struck organization roughly \$500,000 in seed money to begin studying what it would take — organizationally, technically, sociologically and ethically — to send humans to another star, a challenge of such magnitude that **the study alone could take a hundred years.**

“If you want to have a hobby, why can't it be designing an interstellar spacecraft?” said Andreas Tziolas, who teaches at the University of Alaska and **directs Project Icarus, a worldwide volunteer effort to design a spacecraft that could carry a scientific probe to a nearby star —**

perhaps ((1)) Alpha Centauri, 4.4 light-years from here — in a trip that would take less than 100 years.

People like Dr. Tziolas say the technology already exists or will soon exist to send instruments and perhaps even people to nearby stars, although **a human flight could cost hundred of trillions of dollars.** The half-million dollars Darpa will award is not enough to build a starship or even to buy a modest office in which to imagine one — but it is enough to start serious fund-raising and, perhaps to invite ridicule from critics of government spending. **An actual human launching is at least a couple of centuries away and,**

barring the invention of Star Trek-like warp drives, could take additional centuries to complete. Whoever goes on such a journey will not be coming back. Interstellar travel is a tall order. **It would take Voyager 1, humanity's fastest**

artifact, now traveling ((2)) 38,000 miles an hour relative to the Sun, more than 70,000 years to reach Alpha Centauri, if it were headed in that direction.

The British Interplanetary Society used a more benign form for this propulsion idea in its interstellar spaceship study, Project Daedalus, in the 1970s. Their spacecraft would be powered by tiny thermonuclear explosions caused by

compressing pellets of deuterium and helium-3 with laser blasts. It would carry a 500-ton scientific **((3)) probe to Barnard's Star, 5.9 light-years away, in about 50 years, reaching a top speed of 12 percent of the speed of light along the way.**

INTRODUCTION: A light –year = the distance traveled by light in one year at 186,000 mi/s.

HINTS: 365 d/yr , 24 hr/day , 3600 s/hr, $x = v t$, $v = x/t$

QUESTIONS: (a) The speed of light is 186,000 mi/s. Convert to mph? (b) Show in ((1)) below that that to get to Alpha Centauri (4.4 Light-years away) in 100 years... you would have to travel at ~ 29,462,000 mi/hr .? (c)What fraction of the speed of light is ~29,462,000 mi/hr. ? (d) Show statement ((2)) below is approximately true in that it is stated it would take 70,000 years to get to Alpha Centauri at 38,000 mi/hr. Knowing Alpha Centauri is 4.4 light-years from the sun, find the speed the spacecraft must travel at to get to Alpha Centauri in 70,000 years? (e)In statement ((3)) below find the speed you must travel at to go 5.9 light-years in 50 years? (f) Show answer (e) for the speed is 12 % the speed of light? **ANSWERS:** (a) 670×10^6 mph (b) _____ (c) 4.4% (d) ~42,000 mph (e) 80×10^6 (f) _____.