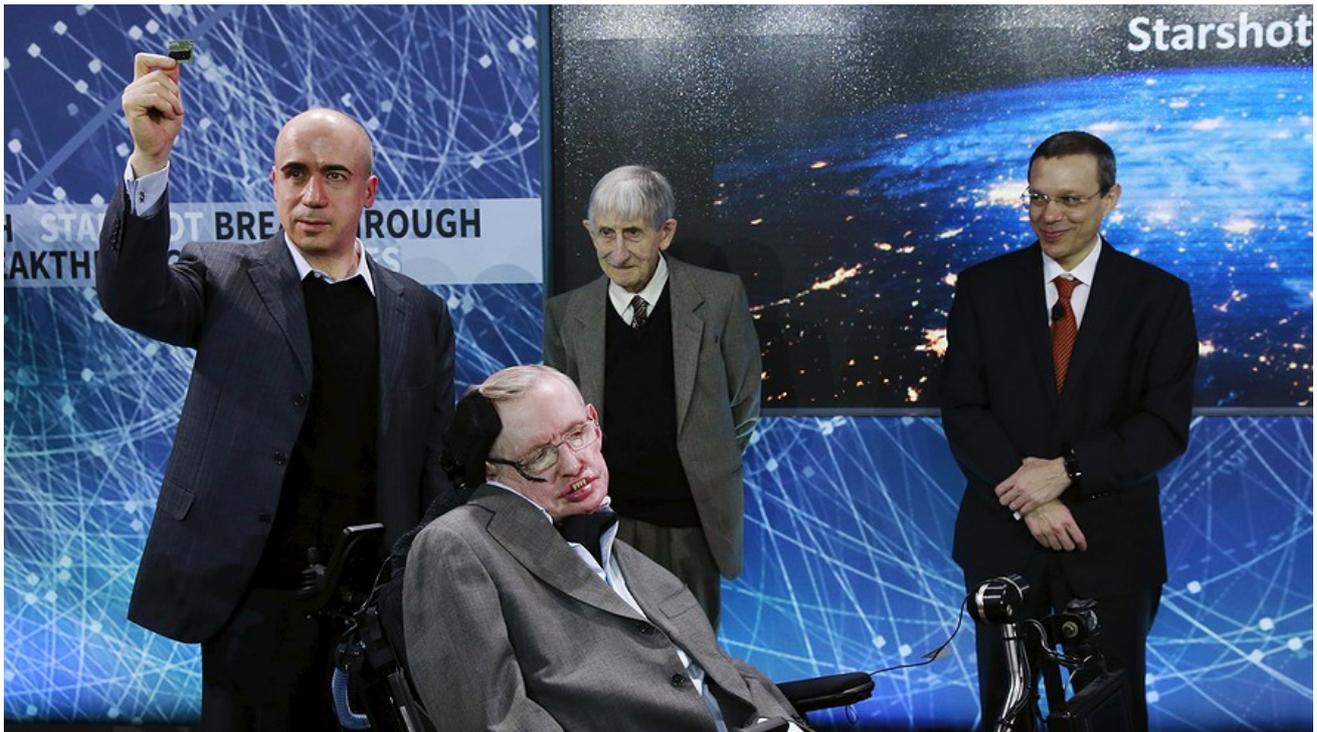


Is anyone out there? 20-year interstellar voyage proposed

By Tim Radford, The Guardian, adapted by Newsela staff on 05.13.16

Word Count **822**



Physicist Stephen Hawking sits in front of investor Yuri Milner (L), physicist Freeman Dyson (C), and physicist Avi Loeb on stage during an announcement of the Breakthrough Starshot initiative in New York April 12, 2016. Photo: REUTERS/Lucas Jackson

The likelihood that humans might soon reach the stars has just greatly increased.

Billionaire investor Yuri Milner and British scientist Stephen Hawking are responsible for this big leap forward. Hawking is the world's most famous expert on the origin and development of the universe.

The pair just announced they will provide \$100 million to help mount a 20-year voyage to the nearest stars.

The new project has been named Breakthrough Starshot. Its goal is to send featherweight robot spacecraft to the three nearest stars in the Alpha Centauri star system. Alpha Centauri is located some 25 trillion miles from Earth.

Miniature Marvel

The proposed vessels would be superlight spacecraft known as “nanocraft.” They would weigh little more than a sheet of paper and would be driven by a sail not much bigger than a child’s kite.

The vessels would travel at a fantastic speed — around one-fifth the speed of light, or 37,200 miles per second. They would be powered by a 100 billion-watt laser-created light beam.

Milner and Hawking said they were determined to step up the search for extraterrestrial life beyond our solar system.

Looking To The Stars

“The human story is one of great leaps,” Milner said. “Today we are preparing for the next great leap — to the stars.”

Professor Hawking said: “Earth is a wonderful place, but it might not last forever. Sooner or later we must look to the stars. Breakthrough Starshot is a very exciting first step on that journey.”

Near-light-speed flight by a spacecraft would have been unthinkable just 15 years ago. The gamble is that it could become possible within 15 years, as new materials and technologies are developed.

The attempt to see if such superlight craft can be built will be led by Pete Worden. Until last year, Worden was the head of the NASA Ames research center (National Aeronautics and Space Administration).

“It’s time to open the era of interstellar flight,” Worden said.

Tiny And Lightweight

Two ideas are key to the goal of achieving a superlight craft - the starchip and the lightsail.

Through advances in miniaturization, it might soon be possible to pack a spacecraft's entire control system and all its equipment onto a tiny silicon wafer — a starchip. The starchip could then be mounted on a lightsail, an ultra-thin sail weighing a few ounces. The ultralight craft would be powered by light.

Scientists have long known that light could theoretically power a space mission. By 1989 they had calculated that solar radiation alone could power a spaceship with vast lightweight sails. Such a vessel would be able to zoom through space at speeds greater than any spacecraft have yet achieved.

The problem was that even at such never-before-seen speeds a journey to the nearest star would still take thousands of years. For the trip to be practical, a more directed light source would be needed, and the craft would have to be smaller and lighter than seemed possible.

Linking Lasers

The Breakthrough Starshot team is betting that new developments will allow spacecraft to become ever smaller and lighter. If that happens, tiny vessels could be launched by the thousands from a mothership. They would be driven by a proposed Light Beamer, a billion-watt cluster of lasers. The Light Beamer would be mounted somewhere high and dry such as the Atacama Desert in Chile.

The Light Beamer could potentially send the tiny spacecraft zooming toward the stars at one-fifth the speed of light. The journey to Alpha Centauri could then be completed in as little as 20 years.

Nobody thinks these goals will be easy to achieve, however. Scientists will have to figure out how to link many lasers together to form the massive Light Beamer. Since the range of focus of a big laser on a small target would be no more than 622,000 miles, the spacecraft would have to reach top speed in just two minutes.

The tiny, fragile craft would also need to be able to survive the pressure created by its rapidly increasing speed. The pressure exerted on the craft would be 60,000 times the force of gravity.

Retrieving Information Is A Challenge

A vessel that reached the stars would be able to record images and take readings. The big challenge, however, is figuring out how that information could be sent back across a distance of more than four light-years.

Speaking at the project's launch, Hawking said overcoming our limits is what makes humans unique. "Gravity pins us to the ground, but I just flew to America," he said. "The limit that confronts us now is the great void between us and the stars."

Soon we will be able to overcome that limit, Hawking said. "With light beams, light sails, and the lightest spacecraft ever built, we can launch a mission to Alpha Centauri within a generation. Today we commit to this next great leap into the cosmos, because we are human and our nature is to fly."

Quiz

1 How have advances in miniaturization made project Breakthrough Starship possible?

- (A) A high-powered laser can be created.
- (B) The spacecraft can now survive the pressure of the journey.
- (C) The spacecraft can travel fast enough to reach Alpha Centauri.
- (D) A tiny control panel for the spacecraft can be built.

2 Why is it important for the spacecraft to reach its top speed in two minutes?

- (A) That is how long the spacecraft will be within the laser's range.
- (B) The spacecraft needs to reach Alpha Centauri within 20 years.
- (C) The spacecraft needs to travel quickly to withstand the force of gravity.
- (D) The spacecraft needs to quickly get outside of Earth's atmosphere.

3 Read the following sentence.

The tiny, fragile craft would also need to be able to survive the pressure created by its rapidly increasing speed.

Which of the following is the BEST synonym for the word "fragile"?

- (A) miniscule
- (B) sturdy
- (C) spherical
- (D) delicate

4 Read the following sentences.

"With light beams, light sails, and the lightest spacecraft ever built, we can launch a mission to Alpha Centauri within a generation. Today we commit to this next great leap into the cosmos, because we are human and our nature is to fly."

Which answer choice would BEST replace the word "cosmos"?

- (A) planets
- (B) stars
- (C) spaceships
- (D) gravity