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Strategies for Rapid Implementation of Interstellar Missions: Precursors and Beyond (4)

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SUN FOCUS COMES FIRST, INTERSTELLAR THEN FOLLOWS

Abstract

How to exploit the Sun as a gravitational lens has been studied extensively during the last 20 years, especially by this author (ref. [1]).

A spacecraft dubbed FOCAL (an acronym for "Fast Outgoing Cyclopean Astronomical Lens") should be launched in the direction of the sky opposite to the area of the sky we wish to see highly magnified both at radio and other frequencies. After FOCAL reached the minimal focal distance of 550 AU from the Sun, highly magnified radio images of celestial objects located on the opposite side of the Sun will automatically be produced. In this paper we apply the FOCAL mission concept to the goal of exploring the neighborhood of the Alpha Centauri B star, where the nearest exoplanet to the Solar system was recently discovered.

We suggest that:

1) A first FOCAL 1 spacecraft is launched away from the Sun up to about 1000 AU in the direction of the sky opposite to Alpha Centauri B. This spacecraft will then act as a relay satellite to insure robust telecommunications across the 4.37 light year interstellar distance between the Solar System and Alpha Centauri B.

2) A second FOCAL 2 spacecraft is launched towards Alpha Centauri B as the truly interstellar spacecraft going to Alpha Centauri B. It may take quite a few years to get there of course (50 years ?), depending on the propulsion system, but its robust telecommunications with the Earth are insured by the gravitational lens of the Sun and the FOCAL 1 relay spacecraft.

3) After FOCAL 2 reached Alpha Centauri B, we suggest positioning it in the direction opposite to the Sun beyond the minimal focal distance of 452 AU for Alpha Centauri B, say at 800 AU beyond the star. Thus, the two stars (the Sun and Alpha Centauri B) and the two spacecrafts (FOCAL 1 and FOCAL 2) will make up a RADIO BRIDGE, insuring robust telecommunications for all future space missions to the Alpha Centauri system to come.

In conclusion, this paper goes beyond traditional papers only concerned with propulsion for the first interstellar mission, since it points out that a robust telecommunication system must be created by exploiting both stars' gravitational lenses plus two FOCAL spacecrafts on opposite sides.

REFERENCE

[1] C. Maccone, "Deep Space Flight and Communications – Exploiting the Sun as a Gravitational Lens", a technical treatise published by Praxis-Springer in 2009, ISBN 978-3-540-72942-6.