

FAR FUTURE (D4)
Human Exploration Beyond Mars/Interstellar Precursors Missions (1.-D4.3)

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REALISTIC TARGETS AT 1,000 AU FOR INTERSTELLAR PRECURSOR MISSIONS

Abstract

The nearest stellar system, the Alpha Centauri three stars system, is located about 4.40 light-years away. This amounts to 278,261 AU. But at only 550 AU, or, more generally, at only about 1,000 AU, the focus of the gravitational lens of the Sun is found, that is then 278 times closer than our nearest interstellar target. In other words, assuming equal engineering problems, the trip to the Sun focus takes 278 times less than the trip to the nearest stellar target. This makes the Sun focus a reasonable target for our probes to reach within this century. It also plainly appears that, before we send a probe towards anyone of the nearest stellar systems, we'll need a detailed radio map of that stellar system. In other words, we need a huge radio magnification of all objects located in that neighborhood, and nothing is better than the huge magnification provided by the gravitational lens of the Sun. Thus, sending a preliminary probe to 1,000 AU in the direction opposite to the target stellar system clearly must be done before any interstellar flight to that stellar system is even designed, not to say attempted. In this paper a status review is presented about the "FOCAL" probe to 550 or 1000 AU. The relevant scientific, propulsion and telecommunication issues are briefly summarized and updated.

Keywords: Sun gravitational lens, space probe, special relativity, propulsion, telecommunications.

Reference: The recent book by the author: Claudio Maccone, Deep Space Flight and Communications, Praxis-Springer, 2009.