

SPACE PROPULSION SYMPOSIUM (C4)
New Missions Enabled by New Propulsion Technology and Systems (6)

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INTERSTELLAR MISSION TO BETA PICTORIS: UTILIZATION OF A GAS CORE NUCLEAR
PROPULSION SYSTEM AND ANALYSIS OF MISSION PARAMETERS

Abstract

One of the driving forces of mankind is the *le r'ève d'etoiles*” or the dream of stars, which has been the dynamo of our civilization. Since the beginning of the dawn of the civilization, mankind has looked upon the heavens with wonder and he has tried to understand the meaning of those twinkling lights. As human history has progressed, the understanding of those twinkling lights has progressed, as we now know a lot of information about stars. However, the dream of stars or the dream of reaching those stars always remains within the expectations of mankind. In fact, the needs of the civilization constantly drive for better knowledge and the capability of reaching those stars is one such way that knowledge and exultation can be achieved. This paper takes a futuristic case study of an interstellar mission to Beta Pictoris , which is approximately 64.3 light years away from us. In terms of galactic distances, 64.3 light years is not much, but as far as present space technology capabilities are concerned, it is next to impossible for us to reach those distances. Several studies have been conducted on various missions to Alpha Centauri and other nearby stars such as Barnard’s star. However, taking a more distant star such as Beta Pictoris will help test the mankind’s drive for interstellar exploration, as exotic means of travel are needed. This paper will take a futuristic case study of the event and various possibilities of space travel will be discussed in detail. Comprehensive tables and graphs will be given, which will depict the amount of time that will pass at each mode of travel and more importantly some idea on the cost in terms of energy as well as money will be discussed within today’s context. In addition, prerequisites to an interstellar mission to Beta Pictoris will be given in detail as well as a sample mission which will take place to that particular destination. Furthermore, detailed analysis of the gas core nuclear propulsion system CFD analysis will be given along with essential design parameters. Even though the possibility of such a mission is probably non-existent for the 21st century, it is essential to do these exercises so that mankind’s understanding of the universe will increase. In addition, this paper hopes to establish some general guidelines for such an interstellar mission and technical specifications for a gas core nuclear propulsion will be discussed