

# Preface

I had entertained the idea of writing a book about the development of the VASIMR® engine for many years but, somehow, the proper timing never quite arrived; that is, until Erik Seedhouse contacted me with a proposal to jointly undertake the project. He was an experienced writer and had been researching the topic of human space travel for years. I immediately accepted. Originally, the concept was to feature the technology as a means to accomplish ultrafast missions to Mars and beyond; however, while the VASIMR® team considers this as the ultimate application of the technology, we felt strongly that tying the feasibility of fast missions to Mars and beyond solely to the propulsion system would trivialize the myriad of other technologies that must be brought to bear on the success of such missions.

Nonetheless, aware of the strength of the VASIMR® contribution to helping solve the space transportation problem, and of our intimate familiarity with the technology, we chose to focus on its development, staying true to the facts and the hard experimental data along its long historical path. The historical path is also useful to show how non-technical forces often drive the development of a disruptive technology. In the case of VASIMR®, the segregation of plasma physics groups in electric propulsion and magnetic fusion gave rise to the struggle to bring about a convergence of these two cultures, along with that of traditional chemical rocket scientists. Many misconceptions were engendered along the project's nearly 40-year journey, primarily from quick and biased snapshots, by many who were skeptical of VASIMR®, which were never updated and became stale over time. It is also our goal here to dispel or clarify these misconceptions with hard and well-vetted scientific data. We present the evolution of the technology, from its most basic principles and earliest conceptualization, to the high technology readiness, high-power system undergoing tests today. The VASIMR® is being developed by Ad Astra Rocket Company as a high-power electric propulsion system for multiple users; from solar-electric cislunar robotic cargo tugs to nuclear-electric fast human transports. For fast human transport in deep space, however, nuclear-electric is the option of choice. We make this case, as the “Nautilus Paradigm,” at the beginning of the book and present a sample mission at the very end. To all of our readers, we hope you enjoy reading this book as much as we have enjoyed writing it.

**Franklin R. Chang Díaz**

To Mars and Beyond, Fast!

How Plasma Propulsion Will Revolutionize Space  
Exploration

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