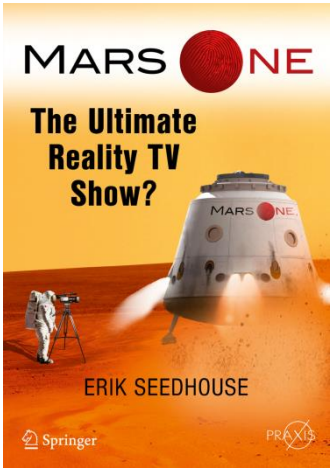

Mars One

By Erik Seedhouse, Springer-Praxis Book
ISBN 978-3-319-44496-6, or
ISBN 978-3-319-44497-0 e-book

I was drawn to the book because I was afraid the author would try to find some convincing arguments for carrying out such a mission.

In particular as the book is opened with the quotation:

"This project seems to me the only way to fulfill dreams of mankind's expansion into space. It sounds like an amazingly fascinating experiment. Let's get started!" (*Professor Dr. Gerard 't Hooft, winner 1999 Nobel Prize in Physics*).

But after having read the preface it became clear that this book, being called a "chronology", is the opposite – Erik Seedhouse shreds the Mars One mission to pieces.

On May 31, 2012 Bas Landsdorp, Mars One founder and CEO explained the purpose of Mars One "to establish a human settlement on the Red Planet in 2017 by first sending a crew of four every two years. To cut down on the mission complexity and costs, none of the Mars One contestants will return to Earth. Instead they will live and work on Mars, using resources from the soil growing plants, and being filmed 24/7 for the worldwide media event that will become Mars One Reality TV" (P.S.: By 2016 the negotiated media contracts failed, but funding currently is secured by going public – see below, recent developments).

The book could be considered as a handbook for the finally selected Mars One astronauts to convince themselves **not to embark on this mission**. It is done in a non-polemic, technical argumentative way taking all accumulated human spaceflight know-how into account and referring to space-expert opinions, experiences and to experiment measurement results.

The author, Dr. Erik Seedhouse is a very interesting person himself, an Assistant Professor and research scientist specializing in environmental life sciences and physiology, the subject in which he obtained his Ph.D. while working for the European Space Agency (ESA) between 1996 and 1998. In 2009, he was one of the final candidates for selection as an astronaut in the Canadian Space Agency's (CSA) Astronaut recruitment campaign. He is a certified commercial suborbital astronaut. Between 2008 -13 he was Director of Canada's Manned Centrifuge and Hypobaric Chamber (MCHC) operations. He is a spaceflight instructor for the American Astronautics Institute (AAI) and the Training Director for Astronauts for Hire. He works as manned spaceflight consultant, triathlon coach, author and public speaker, and admits that he was drawn to the project for "no try, no gain" reasons as a candidate for the Mars One mission himself, with the idea that, if all would fail to have some material for a book about the Mars One mission.

The book is structured like a "feasibility study" describing the Mars One plans and critically discusses all the known and published mission baseline assumptions by quoting acknowledged researchers, managers and other experts and of course Seedhouse offers his own opinion gained as a "one-way" candidate himself.

Addressing all Mars One mission aspects Seedhouse is drawing on his vast experience and on the results of almost all relevant human spaceflight studies as well as on NASA reports, mission analyses and budget calculations made available by space agencies. In addition short- and long term flight experiences accumulated and reported by many astronauts and cosmonauts since the beginnings of human spaceflight are quoted.
But the author does not stop there, he delves into ethical and legal matters citing from Arthur C. Clarke's work (oxygen problem) to UNO's Outer Space Treaty (OST) and relevant international treaties like the COSPAR rules of prohibiting contamination of planets and other agreements. He even investigates current "colonization" laws and the Civil Codes on matrimonial and family law …

The author makes a point about the astronaut selection process, emphasizes the required social and professional skills of future astronauts and recalls the significant amount of time and effort an astronaut has to spend in training and simulation activities to be qualified for a specific mission and/or task. That all seems to have been neglected for the Mars One mission astronauts as it is further demonstrated and expanded in annex-A. Selected profiles of the "first 100" chosen Mars One candidates are presented in annex-B. The Mars One astronaut selection and training concept known so far is also compared with the rigorous selection and training procedures being applied by space agencies like NASA, ESA and CSA.

The authors' blunt conclusion is, the Mars One mission is only a commercial reality show (24/7) without facilities or Research and Development (R&D) staff without a feasible timeline and no sufficient budget. The insufficiently prepared and equipped candidates will never make it, and even if they are lucky enough to make a safe landing on Mars they are not going to last long (68 days maximum). But all this might fuel the desired "quota" expected from a fame inducing, commercial reality show.

The invaluable benefit of the book is that it is also providing an unprecedented complete and thorough compilation of all current mission scenarios, studies and mission analyses about sending humans to Mars including the discussion of plans of Space X and NASA. In this respect the book can be considered as a "Guide to Mars" (and safe return)" for space enthusiasts interested in in human interplanetary space flight enabling them to intelligently form their own opinion about the myriads of difficulties and problems which yet have to be solved.
In this sense the book outlines how to "do it right" using Mars One as an example of how not to do it!

What I liked most is that not only all the technical problems are identified and state-of-the-art solutions "pushing the envelope" are investigated and discussed, but that the book also provides a unique summary of the medical experiments which have been conducted since the beginning of human spaceflight by the Russian space agency and NASA and also discusses the RESULTS and insights from those experiments. From this Seedhouse deducts in detail - using drastic examples - medical "mission killers". For Mars One they would be: radiation damage, eye cataracts, cancer induced by radiation, osteoporosis and discombobulation.

Of course – as mentioned above – the unsolved technical problems, comprising the lack of an adequate launch vehicle, missing Entry Decent and Landing (EDLS) strategies, In Situ Resource Utilization (ISRU) plans, a Mars "settlement logistics and maintenance" approach and the non-availability of a functioning space suit for working outside the habitats are addressed and discussed by the author, noting that all of them will require much more R&D efforts. The technical principles exist as demonstrated by the ISS, but it still is a long way from flying on the well supplied ISS to living off the "soil" of Mars.
But even if there would be enough time (the Mars One slogan is "within a decade"), the Mars One funding assessment of US$ 6 billion is by at least a factor 10 too low.

Erik Seedhouse has written an intelligent and necessary book with a profound knowledge about human spaceflight matters and a deeply rooted concern that enterprises like Mars One would discredit and jeopardize the slow but serious, methodical and expensive progress of human space exploitation.

"Human space exploration is driven by visions and hopes, but they must be grounded in facts and analysis. Fantasies don't get you in space." (Scott Pace, space policy expert, George Washington University).

Let's see how far it goes – at least someone told them.

Thank you Erik Seedhouse!

Recent Developments:

[1] **Amersfoort, November 7th, 2016** - Mars One and InFin Innovative Finance AG [FRA:KCC] ("InFin") are pleased to announce that a takeover agreement was signed between InFin and all shareholders of Mars One Ventures PLC ("Mars One Ventures"). InFin will acquire 100% of the shares of Mars One Ventures for €87 million with newly issued, fully paid up InFin shares. After

admission of the new InFin shares to trading on the Frankfurt Stock Exchange, the Mars One Ventures shareholders will hold 97.5% of the InFin shares. The boards of the companies have unanimously approved the agreement. InFin Innovative Finance AG will be renamed Mars One Ventures AG.
http://www.mars-one.com/news/press-releases/mars-one-going-public-at-frankfurt-stock-exchange

[2] **Australia ABC, 25 Nov 2016**: Meet Bas Landsdorp and Mars One astronaut candidate Tamara Davis in an Australian Brodcasting Corp. (ABC) TV interview by Matt Wordworth.
Bas Landsdorp announces a possible launch date in 2032

http://www.abc.net.au/lateline/content/2016/s4582172.htm