

## Why “Leaving the Cradle” is not an Option Reflections on Challenges of Human long-term Missions

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With the NASA Artemis program gearing up for its first crewed Moon flight, the Chinese operating their own permanently crewed space station, and the long term exploitation of the Moon, Asteroids and Mars still being discussed in earnest, I found a 2018 paper by Konrad Szocik, University of Information Technology and Management, and Bartłomiej Tkacz, Practicing attorney at law in Poland, Member of the Board of the Polish National Bar of Attorneys in Warsaw, Poland in Rzeszow, Poland, and was intrigued by the approach of the two authors and their analyses. [1]

I consider it worthwhile to reflect on the authors conclusions to make ourselves aware of what we have to cope with in the future from a human space-operations point of view.

Of course the following observations (*in italic*) reflect my own personal opinion, based on a 20 years of human space operations experience gained during Germany’s Spacelab, MIR and ISS co-operations.

In the paper the challenges are broken down in three categories: (1) rationale for manned missions to Mars, (2) legal challenges, and (3) medical, physiological, and psychological challenges.

### ***Rationale for Manned Mission to Mars***

- >Political Challenges (funding)
- >Human Mars Settlement as a New Homeland for Human Species
- >Internal Catastrophe
- >External Catastrophe
- >Private Companies and Commercial Exploration of Space

*Besides the funding challenge and the involved political prestige for the “winner” of the race to Mars, only one valid argument would be accepted by the authors: the attempt to look for a new human base when further life on Earth will not be possible.*

*For both, the internal or external catastrophe scenarios, the authors point out that a “human Mars base or settlement” will not be self-sustainable at least through many years. **A permanent support and supply chain from Earth will be necessary.** Paradoxically, catastrophe on Earth, considered as an argument for a human space base, will simultaneously be a huge obstacle and danger for such a mission. It is likely that if mankind is threatened by some kind of catastrophe on Earth it will not be able to take care of any space program, let alone such costly activities like sending humans and supplies to Mars.*

*I agree a hundred percent with this assessment: The **operations aspects** of Mars or Moon settlements are often neglected failing to recognize that the supply chain breaks down totally in case of a massive global wipe-out catastrophe.*

### ***Legal Challenges in a Mission to Mars***

- >Space Exploration and Space Research Development
- >Human Attitude towards Mars
- >Legal Rules within and Between Colonies on Mars

*One important conclusion of the above quoted three legal challenges is, that the 1967 Outer Space Treaty (Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space) must be updated, which is difficult as the main interest is of space exploitation is driven by commercial interest (exploitation of resources on Moon and Mars) usually the “res nullius” (“things belonging to no one”) applies, i.e., the nation (or country) first discovering “new land” brings its own*

law system with it.

An international institution that would be a **central authority for space** is suggested – but highly unlikely, considering the current 21<sup>st</sup> - century political situation.

### **Medical, Physiological, and Psychological Challenges**

>Ethical and Moral Concerns on Human Enhancement

>Value of Human Life

*In this chapter the authors discuss to use opportunities of generic and pharmacological modification of future deep space mission astronauts to make them more resistant to the life threatening space environment.*

*The authors further predict that social engineering and artificial sexual selection focused on preference for particular, carefully selected traits in future offspring may be a domain of social and bioethical life in human settlement on Mars.*

*According to current space exploration ethics, this is out of the question, and I am sure, a global consensus on these matters will never be reached in our century.*

### **Editor's Conclusion**

*As mentioned above, the challenges are multifarious and there are no practical solutions in sight.*

*In my opinion and from today's perspective (March 2024), taking into account the global political situation with massive unresolved crises, exploring foreign planets only seems to make sense from a pure **scientific** point of view.*

*In order to ensure the long-term survival of all humanity, from both a financial and technical perspective, ensuring the "operational viability" of the Earth, our planet, seems to be much more promising than the colonization and "terraforming" of foreign planets, be it the Moon, Mars or yet-to-be-discovered exoplanets.*

*"Leaving an even +2<sup>0</sup> C warmer Earth for Mars would be like leaving a messy room so you can live in a toxic waste dump". [2]*

Reference:

[1] studia humana, Quarterly Journal, Volume 7:2 (2018), pp. 24-30, DOI: 10.2478/sh-2018-008  
[https://www.academia.edu/85209113/Multi\\_Level\\_Challenges\\_in\\_a\\_Long\\_Term\\_Human\\_Space\\_Program\\_The\\_Case\\_of\\_Manned\\_Mission\\_to\\_Mars](https://www.academia.edu/85209113/Multi_Level_Challenges_in_a_Long_Term_Human_Space_Program_The_Case_of_Manned_Mission_to_Mars)

[2] "A City on Mars" Kelly & Zach Weinersmith ISBN-13 : 978-0241454930

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<https://opsjournal.org>