

MAKING SURE THAT A WORLD IS UNINHABITED PRIOR TO EXPLORATION AND EXPLOITATION – A QUESTION OF ETHICS AS WELL AS SCIENCE E. Persson¹, ¹Lund University (The Pufendorf Institute of Advanced Studies, P.O. Box 117, 221 00 Lund Sweden, erik.persson@fil.lu.se).

Introduction: If we find life during the exploration of a planet or other celestial body we will have to update the rules for planetary protection to adapt to our finding, but if we do not find life at the first, second, third or thirty-third mission? When are we justified in relaxing the rules or even saying that “there is no life, we can stop worrying about it”?

When the time comes to actually send humans to Mars or any other extraterrestrial body there will no doubt be a demand for more relaxed planetary protection measures. These demands will be even stronger when the time comes to start mining or tourism or other commercial enterprises. It will be argued that we have already searched for life there and not found any.

The obvious questions that will no doubt be at the center of the debate are:

- How sure do we need to be that Mars or any other extraterrestrial world is lifeless before it is OK to stop worrying (or at least relax a bit) about planetary protection?
- How do we connect that degree of certainty to actual research setup?
- How do we balance the need for scientific certainty with the need to get on with the exploration or exploitation within reasonable time?

How certain can we be and how certain do we need to be?: Establishing that a world is uninhabited is a different kind of task than showing that it is inhabited. The latter task can be accomplished through one positive finding while it is not entirely clear what it takes to accomplish the former. In my presentation I will suggest that to establish that a planet is uninhabited we need to answer the first two questions above. That means we have to decide how certain we need to be and we have find a method for connecting degree of certainty with research setup.

There is no strictly objective way of answering the first question. It is a decision we have to make based on ethical considerations and also depending on our plans for the world in question. The degree of safety will differ depending on for instance whether we plan to send humans there or not and whether we plan to perform geoengineering there or not. It will also depend on which degree of protection we morally owe to possible extraterrestrial life and to the humans and other earth life that might be exposed to the extraterrestrial life.

The other question is about how to connect degree of certainty with research set up. I will suggest that in this particular case, the degree of certainty is decided by three factors: The number, diversity and quality of observations. These factors can be measured or at least ordered with respect to certainty in a fairly objective way.

Being in time versus being right: A complicating factor is that practical decision making usually involves a time constraint. This is also true for decisions regarding exploration and even more so for decisions regarding exploitation. This can lead to demands that we settle with a lower degree of certainty in order not to delay the missions. On the other hand, we also have moral obligations to consider the safety of both extraterrestrial life and earth life. These obligations demand a higher degree of certainty. How can this conflict be dealt with in a constructive way? First of all, the fact that there is a time constraint means that we cannot postpone the answer indefinitely. If we did, it would mean one of two things. Either the death sentence to all exploration and exploitation plans of other worlds, or a carte blanche for any kind of activity on other worlds as long as no one has positively shown that it is inhabited. Both alternatives seem unreasonable.

The values (scientific, commercial or other) that can be obtained from exploration or exploitation provide us with a duty not to postpone our judgment on whether the world in question is uninhabited for too long. On the other hand, it seems equally clear that our duties to protect the life on another world as well as on our own world are at least as strong and they tell us not to be too premature in our decision.

What we need is thus a reasonable and justifiable standard for how certain we need to be that a world is uninhabited.

Exactly how sure we need to be and where to strike the balance between certainty and timing have to be the subject of thorough and well-informed discussions and these discussions have to start as soon as possible. When the time comes, there will no doubt be very different opinions about both these questions. A constructive and well-informed discussion about what it takes to establish that a world is uninhabited as well as some idea about how to do it in practice, therefore needs to be initiated as soon as possible. The main purpose of this presentation is to do just that.