# First comments on NASA draft EIS – NOTE for private use only don’t have permission to publish

From first 18 comments:

Test first: 5

Stop mission: 5

Study in space or not at all

Don't return until we know it is 100% safe

Are you certain the mission is safe?

Return to above GEO and return sterilized subsamples immediately

Need clarity about security measures

Asking for a compilation of kookiest comments

Proposal for new spacecraft design

[Comment Submitted by Richard Spotts](https://www.regulations.gov/comment/NASA-2022-0002-0177) - [stop mission, unprecedented harm](https://www.regulations.gov/comment/NASA-2022-0002-0177)

I appreciate this opportunity to provide comments.

I am extremely concerned that this proposed action could potentially contaminate native life forms on Mars and/or bring back alien virus, bacteria, or other life forms from Mars to Earth.

I understand that there are planetary protection protocols. However, Murphy's Law says that if something horrible could happen, it eventually may indeed occur. History is filled with examples where Acts of God and/or human arrogance caused otherwise unforeseen disasters.

When we think about foolproof containment, waste storage from nuclear power plants is a good example. Our nation still has not found a completely safe location to store this deadly waste for many thousands of years. Even geological formations are subject to change over time, whether through earthquakes, tectonic plate shifts, or water seepage.

Nuclear detonations, meteor strikes, or terrorist attacks could also breach a containment facility.

The Earth is already dealing with increasingly serious problems from invasive or alien species being transported to new locations, and viruses mutating and causing deadly pandemics. We have not been able to solve many of these problems.

What happens if a Mars life form escapes containment and, without evolving in Earth's ecosystems, spreads uncontrollably and devastates Earth's species including us humans? There might be no way to reverse or even mitigate for that devastation.

I support scientific research when it is safe and in the public interest. However, I oppose research when there is no absolute guarantee of safety and when the risks outweigh the potential benefits.

Our search for other life in the universe should not potentially jeopardize all life on Earth. In addition, our limited federal dollars should be much better spent on responding to the mounting climate and extinction crises here on Earth. In most cases, we know how to solve these crises but we have not yet invested properly to pursue those solutions. Our top priority should be saving the life we know and need on Earth.

Thank you very much for your consideration.

[Comment Submitted by Anonymous](https://www.regulations.gov/comment/NASA-2022-0002-0178)- [test first](https://www.regulations.gov/comment/NASA-2022-0002-0178)

Don’t bring samples back before testing.

[Comment Submitted by Linda Harding](https://www.regulations.gov/comment/NASA-2022-0002-0179)- **[study in separate module attached to ISS](https://www.regulations.gov/comment/NASA-2022-0002-0179)**

Since ignorance is rampant concerning how extra terrestrial microbes might effect life on Earth; I seriously think that such things should be studied in situ. But since that is at the present time not feasible; it would seem that the next best thing is to have a special section built off of something like the ISS with protocols similar to ones described in the Andromeda Strain, minus the nuclear device.

[Comment Submitted by Anonymous](https://www.regulations.gov/comment/NASA-2022-0002-0180)- [test first](https://www.regulations.gov/comment/NASA-2022-0002-0180)

Test the samples!

* Summary: [stop mission, unprecedented harm](https://www.regulations.gov/comment/NASA-2022-0002-0177) - [test first](https://www.regulations.gov/comment/NASA-2022-0002-0178) - [protect Earth](https://www.regulations.gov/comment/NASA-2022-0002-0179) - [test first](https://www.regulations.gov/comment/NASA-2022-0002-0180) q

[Comment Submitted by Anonymous](https://www.regulations.gov/comment/NASA-2022-0002-0181)- [stop mission](https://www.regulations.gov/comment/NASA-2022-0002-0181)

No!

[Comment Submitted by Anonymous](https://www.regulations.gov/comment/NASA-2022-0002-0182)- [Stop mission](https://www.regulations.gov/comment/NASA-2022-0002-0182)

Please do not do this.

[Comment Submitted by Sharon Brashears](https://www.regulations.gov/comment/NASA-2022-0002-0184)- [test first](https://www.regulations.gov/comment/NASA-2022-0002-0184)

Why do we need Mars samples brought back to Earth with no testing? Protect life here. Please.
I believe the monies spent on this program would be better spent right here on Earth.

[Comment Submitted by Evelyn B](https://www.regulations.gov/comment/NASA-2022-0002-0183)- [test first, unprecedented harm](https://www.regulations.gov/comment/NASA-2022-0002-0183)

The mission to Mars will be a great achievement! Bringing a sample to Earth without testing first could be a mistake...be safe without apologizing for an unforeseen error in judgement which could affect our entire planet. It's just one step at a time.

[Comment Submitted by G. Martin](https://www.regulations.gov/comment/NASA-2022-0002-0186)- [Study in space or not at all, keep Earth100% safe, our efforts to contain the samples may seem lax a generation from now](https://www.regulations.gov/comment/NASA-2022-0002-0186)

I have been a strong supporter of the space program since the 1960s, including the various Mars missions. That being said, I cannot support the plan to return Mars samples to the surface of the Earth. Any risk of contamination above zero is unacceptable in my view. Although I understand the great efforts that will be undertaken to keep the samples isolated and secure, it is possible that a generation or two from now, those efforts will be viewed as lax, as science, including or understanding of life forms, continues to evolve. For example, a hundred years ago, the survivability of any living organism at deep sea hydrothermal vents would have been scoffed at. In addition, there always is some risk of human error. At a minimum, at least initially, Mars samples should be studied in a space station or lunar station setting under appropriate safeguards or, unfortunately, not at all. Thank you for the opportunity to comment.

* [stop mission](https://www.regulations.gov/comment/NASA-2022-0002-0181) - [stop mission](https://www.regulations.gov/comment/NASA-2022-0002-0182) - [test first](https://www.regulations.gov/comment/NASA-2022-0002-0184) - [test first, unprecedented harm](https://www.regulations.gov/comment/NASA-2022-0002-0183) – [keep Earth 100% safe](https://www.regulations.gov/comment/NASA-2022-0002-0186)

[Comment Submitted by Frank D.](https://www.regulations.gov/comment/NASA-2022-0002-0188)- [test first](https://www.regulations.gov/comment/NASA-2022-0002-0188)

Please do not bring back untested samples from Mars to Earth. The risk of a germ is too great.
The arrogance of scientists thinking their containment system is unbreakable reminds me of how the Titanic was supposedly unsinkable. The difference is that at least the Titanic had some lifeboats when it sank; the Earth has none.

[Comment Submitted by Lori H.](https://www.regulations.gov/comment/NASA-2022-0002-0190)- [stop mission](https://www.regulations.gov/comment/NASA-2022-0002-0190)

Please don’t do this! After suffering through the COVID catastrophe, the last thing we need is to bring any kind of bacteria or virus from Mars. And we are constantly reminded of the dangers of invasive species - the Lantern fly is the latest one we are dealing with. Please don’t add to our worries of whether anything you or China bring back will be accidentally released. We are all human and fallible.

[Comment Submitted by Ralf Senger](https://www.regulations.gov/comment/NASA-2022-0002-0187)- [need clarity about security measures](https://www.regulations.gov/comment/NASA-2022-0002-0187)

While I understand the huge interest of the scientific community to study the samples obtained in Mars, I'm quite concerned about the safety of Earth's environment. What containment measures can be applied to avoid environmental contamination should one of the samples break on impact on the ground? What security measures will be applied to avoid that the samples are retrieved by anyone (i.e., non-authorized persons)? Also, during transportation, what security measures will be applied so that the samples cannot be stolen on the way to the UTTR facility? How can the samples be effectively disposed off after the studies (is heat or pressure effective)?

On a separate aspect, whilst I understand that most of the project is financed by NASA (and ESA), at least the results of the studies should be made publicly available.

Certainly, these are banal concerns and likely to have been listed by many other commenters, however, it must be stressed out, that these are crucial to be addressed in order to have support from the general public.

[Comment Submitted by Peter Schorn](https://www.regulations.gov/comment/NASA-2022-0002-0191)– [off topic](https://www.regulations.gov/comment/NASA-2022-0002-0191) asking for a compilation of kookiest comments

Please provide the public with a compilation of the kookiest comments you get. Given the current level of conspiracy theorism and scientific illiteracy on the Internet, I'm sure an open forum on interplanetary travel will produce plenty of amusement to beguile the long winter nights.

[Comment Submitted by Ricardo Forde](https://www.regulations.gov/comment/NASA-2022-0002-0192)- [alternative design](https://www.regulations.gov/comment/NASA-2022-0002-0192)

Before I get started with what I deem necessary.
I would like to thank you for teaching me what not to do .
I've been studying flight and different types of engines not necessarily for space travel but what I've learned is from two historical documentations.

The first is the capsule test of maneuvering thrusters and the second came from the Orion project.

It seems like you've reached the top of your game with the SLS Artemis launch system and yeah it's definitely packs a mountain of thrust and enough to blast blastdoors .

Some would even say that they've seen this many times and in fact , this is true .

I like safe and fast. I know to conquer the vastness of space we need it to be fast .

A hybrid system is what's needed. I don't consider or even think that an 18 minute burn is something to be proud of. I basically laughed when I heard this .

Here are the two major issues aka problems that have you not capable of going beyond LEO in your supersized rocket and fighting gravitational forces.

Here's something that got funded and it's not even feasible or reliable.

Quebec's McGill University with its ground based laser system and hovering satellite to send a pin point burst to an awaiting craft just not the best thing either unless we can pretend that we don't have a discoball already up there as in lots of satellites.

It took me 30 years plus to get to this point of view and believe me I ran into many problems along the way.
Leik Myrabo's Lightcraft was the start but his system setup wasn't feasible either but over time we have improved in this area . I asked him (Leik Myrabo) while he was a professor at the University of New Mexico, can it be mounted ? Btw the government probably heard that because he did tell me that his calls were monitored. So quite a few years later I see my first mounted laser on a Humvee on Top Gear BBC series but that wasn't the end all , they were making a sign to put up in the studio and that's when I heard it.

Sequential firing is my favorite thing because your Rockets just don't have it and it reminds me of turning on the shower at full blast . It's nothing special about it.

Nuclear Rockets are also a waste of time but as you read above I did mention the Orion project because of the bang for a buck campaign it would have used . Can you imagine that if these bomb blasts were sequential, how much faster would it have propelled it in a zero gravity environment ?

Wernher Von Braun probably saw this but the technology wasn't available and in his era he made it a point to the direction we should have taken. He's in a pic with Walt Disney and within his hand is that direction. You all can Google it on images.

A hybrid Spaceplane consists of Jet propulsion, rocket propulsion ,ion thrusters and a hybrid system. It may sound like a lot but we've learned that a little goes a long way.

Ok so here's the breakdown of the hybrid system. It requires 8 disks much bigger than Leik first used . 8 lasers. Shielding provided by ceramics and reflective alloy also the cooling system from the JWST. The disks are mounted on a maglev system that allows for frictionless motion. This is where it gets tricky and also make sense. An airflow system with an active bulkhead. The secondary is the delivery of laser hitting the disks, it has to be protected from the constant bombardment within so like a gun barrel positioned directly to the zero point of the disks . Use your imagination to see those old muskets with the end that looked like a trumpet hanging on your daddy's wall .

Btw this craft is only 52 meters long and total weight wet would be that of a fuel tanker that the airforce uses. It's got a delta wing design because that alone embodies fast.

My rival and also a helping hand is the Parker Solar Probe because it knows fast . You can also Google that as well .
I even figured out how to get much more from ion thrusters and I also needed 8 of them as well for maneuverability. It won't be the same as many of you have tried . I'm a DJ at heart but definitely know how to volumize the ion thruster solution.

Here's my challenge to you and your engineers. I'll be the dummy with the dunce hat that is willing to challenge anyone who wants to challenge me on my findings and I'll make them a fan . My words are just words but my resolve is H.E.M.P which stands for Human Evolution Making Progress...I'm for forward progression and forward thinking, nothing more and nothing less.

Btw here's the first part of my puzzle and yes i know my grammar really sucks. I can't help that . [Rocketships Laser Propelled Light Craft](https://t.co/l7MMVoWQYu)

This isn't science fiction but science facts.
Have fun y'all

* [test first](https://www.regulations.gov/comment/NASA-2022-0002-0188) - [stop mission](https://www.regulations.gov/comment/NASA-2022-0002-0190) - [need clarity about security measures](https://www.regulations.gov/comment/NASA-2022-0002-0187) – [off topic](https://www.regulations.gov/comment/NASA-2022-0002-0191) - [alternative design](https://www.regulations.gov/comment/NASA-2022-0002-0192)

[Comment Submitted by Patricia D.](https://www.regulations.gov/comment/NASA-2022-0002-0189) - [keep Earth 100% safe](https://www.regulations.gov/comment/NASA-2022-0002-0189)

It does not seem wise to bring back anything from Mars until we know it is completely 100% safe

[Comment Submitted by Robert Walker](https://www.regulations.gov/comment/NASA-2022-0002-0195)- Return to above GEO and return sterilized subsamples immediately

NASA's proposed action seems likely to fail legal review, since a BSL-4 facility can't comply with the 2012 European Space Foundation study's limit (Ammann et al, 2012:14ff):

"The release of a single unsterilized particle larger than 0.05 µm is not acceptable under any circumstances".

Their rationale: viable starvation limited ultramicrobacteria can pass through a 0.1 micron filter (Miteva et al, 2005).

This limit is easier to achieve in water under high pressure. One study achieved 100% removal of 0.03 micron polioviruses using carbon nanotubes loaded with silver. (Kim et al, 2016) (Singh et al, 2020:6.3).

However aerosol filters are less effective. Even ULPA level 17 filters remove only 99.999995%. Also those filters are only tested to 0.12 microns (BS, 2009:4). At the ESF's 0.05 microns, an experimental 6-layer charged nanofiber filter for coronaviruses filtered out 88% of ambient aerosol particles (Leung et al, 2020), far from 100% containment.

The ESF also said the chance of release of even a single unsterilized particle at 0.01 microns must be less than 1 in a million, to stop gene transfer agents which readily transfer novel capabilities to unrelated species of archaea overnight in sea water (Maxmen, 2010).

The ESF said both requirements need regular review, as later research might reduce size limits further.

A review board could consider research since 2012 into small synthetic minimal cells (Lachance, 2019), and protocells (Joyce et al, 2018). Also, ideas for simpler "RNA world" cells without ribosomes or proteins (Benner et al, 2010: 37) could be revisited using new research on ribocells (Kun, A., 2021). Panel 4 for the 1999 "Size limits" workshop calculated that such a primitive free living lifeform could be as small as 0.014 microns in diameter and 0.12 µm in length, if there is an efficient mechanism for packing its RNA (Board et al, 1999: 117).

Biologists have searched for a shadow biosphere of nanobes (Cleland, 2019, pp 213-214) which could co-exist with modern life. They didn't find these nanobes, but they are biologically credible, because such small cells have an advantage in an environment with low nutrient concentrations, as they have a larger surface to volume ratio, and so take up nutrients more efficiently. They would also avoid protozoan grazing (Ghuneim et al, 2018).

If Mars has early life nanobes, even with less sophisticated biology, they might be able to compete in a shadow biosphere on Earth. In a worst case scenario, mirror numbers with the right enzymes (isomerases) would convert normal organics in an ecosystem into mirror organics that only mirror life can use, or rare terrestrial microbes with the ability to metabolize mirror organics.

This size limit review, and the following legal process, may change requirements. They are best completed before we launch the Earth return orbiter, Earth Entry Vehicle, and Mars Ascent Vehicle or build the return facility.

The legal process can also conclude that the required technology doesn't yet exist.

Uhran et al estimate a minimum of 6-7 years to complete the legal process starting from the Environmental Impact Statement date, so that's 2028 at earliest. This can be significantly extended if challenged in the courts. International bodies like the WHO and FAO likely get involved and international treaties triggered (Uhran et al, 2019).

Also, NASA is required to provide preliminary design and engineering details for the Sample Return Facility before they start a build, and with a life-cycle cost over $250 million must also commit to Congress on cost and schedule (NASA, Science Engineering Handbook: section 3.5).

Uhran et al estimate 9 years to build or repurpose the facility. It needs 2 years to train scientists because of many lapses in Apollo sample handling.

So, if the build starts in 2028, the earliest the facility can be ready is 2039.

I propose two solutions.

1. sterilize samples first, e.g. during the return journey with low energy nanoscale X-ray emitters. Any present day life would be recognizable after sterilization,
OR
2. return unsterilized samples to a safe orbit where astrobiologists study them remotely using miniature instruments such as those designed for life detection on Mars. Return sterilized sub-samples to Earth immediately;

My paper recommends airborne dust samples (Jakovsky et al, 2021) and other ways to increase chances of returning viable spores. This makes solution 2 attractive.

2. needs care. A return to the ISS doesn't break the chain of contact with Mars, and COSAPAR say the Moon must be kept free of contamination for future astronauts and tourists (COSPAR, 2011).

My paper solves both issues with a return to the Laplace plane above GEO. This is where ring particles orbit in a ring system, and a stable orbit for any satellite debris.

For details and cites, see my preprint at: <https://osf.io/rk2gd> (in progress). DOI 10.31219/osf.io/rk2gd

[Comment Submitted by Logan Greger](https://www.regulations.gov/comment/NASA-2022-0002-0194)- are you certain the mission is safe? – [unprecedented harm](https://www.regulations.gov/comment/NASA-2022-0002-0194)

How safe is it to carry out this kind of mission? Many scenarios depict a Martain microscopic lifeform, like an amoeba or virus, infecting and dooming the entire planet to death, with no stopping them as Earth is not adapted to fix this kind of thing. A few years back, my father even suggested that the usual containment of microbes might not work because we don't know how mars microbes could behave. For example, he said keeping them locked in a flask might not work, and that the germs just might phase through the glass. One other concerning thing was they were planning on making a return capsule without a parachute. I know NASA is designing it to be indestructible, but with this kind of risk, it sounds like playing with fire. If the capsule breaks open on return to Earth, and there is a dangerous pathogen inside, it will doom the entire planet. Many scientists also think that these Microbes could stay dormant on harsh surfaces like Mars (as in hibernation) but then reawakened when introduced to a hospitable environment like Earth's. Are you certain that in any way, this mission won't end with the total annihilation of the entire planet, or force us to live in biomes for the rest of time? What about possible human missions to Mars? There's no way to ever contain Mars microbes that are infected into humans or on their spacesuits. Does NASA care about all these scenarios, and should people panic about this? How low or high is this probability, and how can you draw your conclusions?

[Comment Submitted by Gabor Bihari](https://www.regulations.gov/comment/NASA-2022-0002-0193)- [stop mission, unprecedented harm](https://www.regulations.gov/comment/NASA-2022-0002-0193)

There is a certain probability that terrestrial life was not created on Earth, but on Mars, as the conditions on Mars in the early Solar System were more favorable for life than on Earth. If this is the case, the ancient life, that we may find on Mars is a distant relative to our terrestrial biological system. It means, that primitive Martian life forms may infect terrestrial living beings - but not as selectively as earthly pathogens. It could have an enormous impact on human life and life as it is on Earth. Martian bacteria or Archaea might infect a wide range of hosts on Earth, without any resistance, thus causing mass extinction, when accidentally destroying plant and animal life in a parallel manner. So I think, perhaps it is one of the worst ideas in history to bring Martian samples back to Earth in a spacecraft.

[[Comment Submitted by Ajoy George](https://www.regulations.gov/comment/NASA-2022-0002-0196)](https://www.regulations.gov/comment/NASA-2022-0002-0196)  [– [alternative design](https://www.regulations.gov/comment/NASA-2022-0002-0196)](https://www.regulations.gov/comment/NASA-2022-0002-0196)

Send a light weight vaccum container in a module to Mars, the container would be designed to collect a number of test-tube sized samples.

On landing on Mars, a flight rover should carry this container and fly over the designated terrain to find the sample test tubes. The beacon or signals from the test-tubes would be sensed by the flying rover to pick the test tubes and place them neatly into the container. Once the samples are collected, the container would be returned back to the module for its return flight.

Rather than returning it to Earth directly, it should be delivered to the International Space Station, where the container is to be picked and returned on the next supply mission or astronauts travel back to earth. In this way the additional costs of returning the samples back to earth independently could be saved. Also over a period of time the samples could be sorted direclty on the ISS and only chose to send those of intrest back to earth.

[Comment Submitted by Anonymous](https://www.regulations.gov/comment/NASA-2022-0002-0202) - [test first](https://www.regulations.gov/comment/NASA-2022-0002-0202)

Please test the samples off World first. Do not bring samples to earth without testing them first.

* [keep Earth 100% safe](https://www.regulations.gov/comment/NASA-2022-0002-0189) – [unprecedented harm](https://www.regulations.gov/comment/NASA-2022-0002-0194) - [stop mission, unprecedented harm](https://www.regulations.gov/comment/NASA-2022-0002-0193) – [alternative design](https://www.regulations.gov/comment/NASA-2022-0002-0196) - [test first](https://www.regulations.gov/comment/NASA-2022-0002-0202)

[LEAVING OUT MY COMMENT]

[Comment Submitted by Robin S.](https://www.regulations.gov/comment/NASA-2022-0002-0207) – [test first](https://www.regulations.gov/comment/NASA-2022-0002-0207)

Samples should be tested off earth. It’s not worth the risk.

[Comment Submitted by Rachel Startzel](https://www.regulations.gov/comment/NASA-2022-0002-0203) – [test first](https://www.regulations.gov/comment/NASA-2022-0002-0203)

Don’t return the samples without testing them for anything dangerous!

[Comment Submitted by Anonymous](https://www.regulations.gov/comment/NASA-2022-0002-0206) – [unprecedented harm](https://www.regulations.gov/comment/NASA-2022-0002-0206)

This could be very dangerous

[Comment Submitted by Brittany Anderson](https://www.regulations.gov/comment/NASA-2022-0002-0204) – [test first](https://www.regulations.gov/comment/NASA-2022-0002-0204)

I’d encourage you to test the samples before bringing them back to earth.

[[Comment Submitted by Derek Schwartz](https://www.regulations.gov/comment/NASA-2022-0002-0197)](https://www.regulations.gov/comment/NASA-2022-0002-0197) - [Test first](https://www.regulations.gov/comment/NASA-2022-0002-0197)

Please test first!

* [test first](https://www.regulations.gov/comment/NASA-2022-0002-0207) – [test first](https://www.regulations.gov/comment/NASA-2022-0002-0203) – [unprecedented harm](https://www.regulations.gov/comment/NASA-2022-0002-0206) – [test first](https://www.regulations.gov/comment/NASA-2022-0002-0204) - [Test first](https://www.regulations.gov/comment/NASA-2022-0002-0197)

[Comment Submitted by Ronald Startzel](https://www.regulations.gov/comment/NASA-2022-0002-0210) – [Don’t return unless 100% safe – or sterilize first](https://www.regulations.gov/comment/NASA-2022-0002-0210)

Don’t bring back sample without knowing what they are and ensuring they are safe and/or sterilized. No one knows what dangerous items or organisms exist on Mars. If 100% isolation cannot be guaranteed, please don’t bring anything back.

[Comment Submitted by Barbara D.](https://www.regulations.gov/comment/NASA-2022-0002-0199) – [Don’t return](https://www.regulations.gov/comment/NASA-2022-0002-0199)

Please do not bring samples back from Mars!!!! We need to keep safety as paramount, test what you are bringing back!!!!! I’m am against bringing back samples!!!

[Comment Submitted by Shelly O.](https://www.regulations.gov/comment/NASA-2022-0002-0205)  - [don’t return until 100% safe](https://www.regulations.gov/comment/NASA-2022-0002-0205)

Don’t bring back samples until you know they are 100% safe.

[Comment Submitted by H. Toegel](https://www.regulations.gov/comment/NASA-2022-0002-0208) – [test first](https://www.regulations.gov/comment/NASA-2022-0002-0208)

Please, don't return the Martian samples before thorough testing has been conducted to affirm safety to our planet and it's human and environmental systems.

[Comment Submitted by Michael H.](https://www.regulations.gov/comment/NASA-2022-0002-0209) – [test first](https://www.regulations.gov/comment/NASA-2022-0002-0209)

Please do not return the Mars samples to earth before they have been tested

* [Don’t return unless 100% safe – or sterilize first](https://www.regulations.gov/comment/NASA-2022-0002-0210) – [Don’t return](https://www.regulations.gov/comment/NASA-2022-0002-0199) - [don’t return until 100% safe](https://www.regulations.gov/comment/NASA-2022-0002-0205) – [test first](https://www.regulations.gov/comment/NASA-2022-0002-0208) – [test first](https://www.regulations.gov/comment/NASA-2022-0002-0209)

[Comment Submitted by Anonymous](https://www.regulations.gov/comment/NASA-2022-0002-0198) – [test first](https://www.regulations.gov/comment/NASA-2022-0002-0198)

Don’t do it! Please test first!

[Comment Submitted by Nathan Dehel](https://www.regulations.gov/comment/NASA-2022-0002-0200) – [ISS first](https://www.regulations.gov/comment/NASA-2022-0002-0200)

Life on mars is confirmed. We just had Covid, please take the samples to the ISS first.

[Comment Submitted by Melinda Penland](https://www.regulations.gov/comment/NASA-2022-0002-0201) – [test first](https://www.regulations.gov/comment/NASA-2022-0002-0201)

I believe it would be prudent to test any samples from mars for potential dangerous biological activity prior to returning them to earth.

[Comment Submitted by Frank Dehel](https://www.regulations.gov/comment/NASA-2022-0002-0213) – [test first](https://www.regulations.gov/comment/NASA-2022-0002-0213)

Please test any samples for microorganisms before returning them to earth. Let’s be safe rather than sorry!

[Comment Submitted by Anonymous](https://www.regulations.gov/comment/NASA-2022-0002-0214) – [unknown risk, test first](https://www.regulations.gov/comment/NASA-2022-0002-0214)

The earth although amazing is vulnerable in many ways. We have learned this through history including the latest pandemic. Bringing back materials from other planets exposes earth to unknown risk. If science feels there is value in doing so, we must limit the potential for risk to earth at all cost.

Samples if returned, should be limited to testing in our current space station or another one that has specific capabilities for that testing. Regardless of the cost, it will be far less expensive and damaging to the impact to earth if what does return is a negative impact to humans or our planet.

Phil

* [test first](https://www.regulations.gov/comment/NASA-2022-0002-0198) – [ISS first](https://www.regulations.gov/comment/NASA-2022-0002-0200) – [test first](https://www.regulations.gov/comment/NASA-2022-0002-0201) – [test first](https://www.regulations.gov/comment/NASA-2022-0002-0213) – [unknown risk, test first](https://www.regulations.gov/comment/NASA-2022-0002-0214)

[Comment Submitted by Eileen F.](https://www.regulations.gov/comment/NASA-2022-0002-0218) – [sterilize first](https://www.regulations.gov/comment/NASA-2022-0002-0218)

Please sterilize all samples from Mars before bringing them back to Earth.

[Comment Submitted by M. Iliescu](https://www.regulations.gov/comment/NASA-2022-0002-0215) – [extra precautions for EES reentry](https://www.regulations.gov/comment/NASA-2022-0002-0215)

Dear Colleagues

First, I’m impressed by the bottom-top campaign NASA is doing, allowing everybody, with or without a solid background in the field to contribute, and dedicating a lot of effort to extract useful ideas from the public.

I participated to the Public Comment Event on Plans for Mars Sample Return Campaign and I had two short interventions. Due to my accent, the automatic transcription is not very accurate, so I’m sending the current note to keep a record of the comments.

I’m aware the specific risks are extremely small and the scientific outcome is important. Most likely, there is no biohazard in the Mars probes and, moreover, the containment design exceeds any previous specification, while impact and failure tests are extensively developed.

Once the samples are retrieved from the landed capsule, I do not see any further (unconventional) risk; the transportation and the organized Lab satisfy all the requirements for potentially dangerous materials and the current scientific level in the field, dealing with major challenges, ensures a safe handling.

Still, since the smallest chance of incident might open the door to a serious event, NASA and ESA are considering the hypothesis that biohazard might come with the samples (very resistant bacteria or similar, possibly resource altering) and Earth contamination must be avoided.

Therefore, I’m venturing a couple of comments, under the same hypothesis (that such risks are real):

• The first regards the impact tests, to be extended to helicopter launches, which is excellent. I think further extending the testing to full EES reentry might provide a lot more confidence. One can take advantage of the ongoing Artemis/Gateway missions for carrying several EEV clones (on the accompanying quite empty Starships?) and accelerate them with small engines towards Earth. Two classes of tests can be done: normal reentry for system’s check and incident simulation. In the latter, descent parameters will be altered (attitude control, shielding failure or similar). Extremophile bacterial probes can be placed in the COS clone and sample integrity and contamination checks will follow the induced crash.

• Second, in case not any incident has zero structural integrity risk for the samples (information provided by the previous testing), given the reentry plasma blackout period in which human action is precluded, an onboard system for detecting dramatic conditions (attitude control lost, severe malfunctioning, structural damage due to a last-minute meteoroid or space debris, etc.) can be implemented using accelerometers, gas analyzers and other sensors, able to proceed to sample sterilization before air or soil contamination becomes a threat. A special case to be considered is when attitude misbehavior might point the EES to a different landing spot, possibly covered by risky items (hard rocks, metal structures, sea, etc.). Thanks to its exceptional structure, differently from a common capsule requiring many operational components for reentry and landing, EES is designed to reach the land without intervention or auxiliary systems. This puts stronger constraints on trajectory and aborting; once pointing to Earth’s atmosphere, if a bad event occurred (debris or similar) the landing/possible crash cannot be easily aborted, unless a thermal solution (with termite on board or shield decoupling during entrance) is adopted.

To make an example which does not imply attitude lost/wrong landing spot, let’s assume the TPS is pierced just before entry; this might bring to COS Interface Structure (CIS) damage (thermal or mechanical), without much (sterilizing) heat on COS; the CIS will not dump the landing shock anymore and the COS might break at impact.
I’m aware the second comment implis an almost complete failure of a huge mission and some extra payload in hardware and/or chemicals, but the action is to be taken only under very unfortunate and certified conditions.

More, some of the equipment required is already foreseen, for structural integrity checks before the last maneuver of pointing to Earth.

Thanks for the consideration NASA gives to inexpert opinions like the ones I stated here, and my best wishes for
the exceptional mission you’re planning. I’m as eager as you to see the results.
Kind regards,
M. Iliescu

[Comment Submitted by Anonymous](https://www.regulations.gov/comment/NASA-2022-0002-0216) – [sterilize first](https://www.regulations.gov/comment/NASA-2022-0002-0216)

Do not bring anything back from Mars without sterilizing it first!

[Comment Submitted by Adam Vincent](https://www.regulations.gov/comment/NASA-2022-0002-0217) – [sterilize first](https://www.regulations.gov/comment/NASA-2022-0002-0217)

Sterilize samples before you bring them back!!!

[Comment Submitted by Anonymous](https://www.regulations.gov/comment/NASA-2022-0002-0222) – [sterilize first](https://www.regulations.gov/comment/NASA-2022-0002-0222)

Sterilize Mars samples before returning them to earth. Why have a space station if not to abate risks like this.

* [sterilize first](https://www.regulations.gov/comment/NASA-2022-0002-0218) – [extra precautions for EES reentry](https://www.regulations.gov/comment/NASA-2022-0002-0215) – [sterilize first](https://www.regulations.gov/comment/NASA-2022-0002-0216) – [sterilize first](https://www.regulations.gov/comment/NASA-2022-0002-0217) – [sterilize first](https://www.regulations.gov/comment/NASA-2022-0002-0222)

[Comment Submitted by Anonymous](https://www.regulations.gov/comment/NASA-2022-0002-0220) – [sterilize first](https://www.regulations.gov/comment/NASA-2022-0002-0220)

Please don’t bring anything back from mars without sterilizing it first. Thank you

[Comment Submitted by Barbara Schwartz](https://www.regulations.gov/comment/NASA-2022-0002-0221) – [do not return](https://www.regulations.gov/comment/NASA-2022-0002-0221)

While I have the greatest admiration for scientists and exploration of the “unknown”, I wholeheartedly do not want any samples from Mars being returned to earth. We are still discovering planet earth, a very vulnerable habitat, which is home to 7.8 billion people. Please consider the latest pandemic and the effects an unknown pathogen from Mars could do to civilization as we know it.
I firmly say “ No” to samples from Mars returning to Earth! Thank you for your consideration.

[Comment Submitted by William Agger](https://www.regulations.gov/comment/NASA-2022-0002-0223) – [do not return](https://www.regulations.gov/comment/NASA-2022-0002-0223)

I am opposed to bringing rocks from Mars to Earth. While some believe the risk can be kept to a minimum, the potential effects of accidentally introducing invasive Martian bacteria to the Earth’s biosphere is too great.

For instance, it has been scientifically shown that the Earth has been periodically showered through geologic time with Martian rocks, and yet “We are still here”. This is “anthropomorphic” reasoning.

Yes, we are still here, but the Earth’s geologic periods are replete with massive extinctions which changed the course of biologic history. Is it not possible that some, if not all, of the massive extinction events may have been related to panspermic meteoric showers?

Even if only one was the result of a Martian microbe finally surviving through interplanetary space to cause a massive change in the web of life on Earth, that alone should disqualify NASA from adding this risk to the ongoing human-caused mass extinction.

In addition, even a level 4 biosafety lab on Earth or even on the Moon, is of great concern to this Infectious Disease/Clinical Microbiologist. Even at the protection level of biosafety 4 labs have not been, nor will be, without accidents.

What would society do, for instance, if researchers in a Utah lab or research astronauts in a biosafety 4 lab on the Moon, were in a lab accident? What could be done for them and ethically with them?

Bring them back to earth and/or let them out of the lab, potentially contaminating our biosphere?

In short, it’s a scientific gamble with a small upside against a catastrophic downside for the living people on the Earth and to the only biosphere they will survive on.

Finally, I am not opposed to looking for life on Mars. If found, it should be left on Mars and studied there.

[Comment Submitted by Karen R. Emerle](https://www.regulations.gov/comment/NASA-2022-0002-0219) – [do not return](https://www.regulations.gov/comment/NASA-2022-0002-0219)

I feel it is totally unnecessary to bring Mars samples back to earth jeopardizing the human race. What positive outcome would this bring? I am concerned for our future generations to come. Just don’t do it- use the resources in a more productive venture to benefit mankind.

[Comment Submitted by Skippy Upshaw](https://www.regulations.gov/comment/NASA-2022-0002-0226) – [send to Russia first](https://www.regulations.gov/comment/NASA-2022-0002-0226)

If you bring something back from Mars send it to Russia first.

* [sterilize first](https://www.regulations.gov/comment/NASA-2022-0002-0220) – [do not return](https://www.regulations.gov/comment/NASA-2022-0002-0221) – [do not return](https://www.regulations.gov/comment/NASA-2022-0002-0223) – [do not return](https://www.regulations.gov/comment/NASA-2022-0002-0219) – [send to Russia first](https://www.regulations.gov/comment/NASA-2022-0002-0226)

[Comment Submitted by WeiHong Xiong](https://www.regulations.gov/comment/NASA-2022-0002-0230) – [issues with disinfection of earth entry site](https://www.regulations.gov/comment/NASA-2022-0002-0230)

For viruses on Mars, the method of disinfection is very questionable. They don't necessarily consist of carbohydrates. It is possible for any semiconductor material to form a PN junction. Any combination of PN junctions may form a gene sequence

[Comment Submitted by Robert Walker](https://www.regulations.gov/comment/NASA-2022-0002-0228)

With attachments

[Comment Submitted by Barry E. DiGregorio, Director, International Committee Against Mars Sample Return](https://www.regulations.gov/comment/NASA-2022-0002-0227)

When the entire biosphere hangs in the balance, it is adventuristic to the extreme to bring Martian life here. Sure, there is a chance it would do no harm; but that is not the point. Unless you can rule out the chance that it might do harm, you should not embark on such a course." - The late Dr. Carl Woese, the Nobel Prize-nominated biophysicist who while at the University of Illinois discovered the third domain of life - the Archaea.

The key phrase in Dr. Carl Woese's comment above is "Unless you can rule out the chance that it might do harm, you should not embark on such a course". This important step has been completely side-stepped by NASA as no other extant life detection mission to Mars has been mounted since the twin NASA Viking mission in 1976.Both Viking Landers obtained intriguing data that some on the biology team said (www.icamsr.org) was consistent with indigenous Martian microorganisms. Shouldn't this have required NASA to send additional life detection technology to Mars in order to render a final verdict before planning to return Martian soil samples directly to Earth? Unbelievably, they have not done so and are willing to risk our planets biosphere even though international space laws were set up in order to avoid such a consequence.

Since the Mars sample return capsule will directly enter Earth's atmosphere without a parachute and impact the soil at the U.S. Army Dugway Proving Grounds in Utah is NASA or the EPA going to pay the costs of the accidental introduction of an invasive microbial species from Mars? As Dr. Woese stated, sure there is a chance it may do no harm, but that is not the point, unless you can rule out the chance it will cause harm, NASA (or any space agency) should not embark on such a course. Yet NASA has done nothing in this regard.

There are new scientific studies that call for scientists involved in the study of invasive species on Earth to chime in on the Mars sample return mission and yet other studies have shown that that microorganisms found in 380 million year old salts on Earth still contain viable cells that some are trying to revive. Shouldn't this serve as a warning to examine Martian samples on Mars itself or at least in a lunar orbiting facility equipped for such a purpose? Or do NASA, the ESA, Russia and China all have a complete disregard for what the citizens of our planet feel should be mandatory safety protocols in place before samples are returned to directly to the surface of Earth? This protocol should include an examination of Martian samples off-Earth, preferably in orbit around the Moon or on the lunar surface itself. NASA's new Artemis spacecraft could be modified for such a mission. So why risk the only biosphere we have in such a haphazard way?

Sincerely,

Barry E. DiGregorio - Director for the International Committee Against Mars Sample Return ([www.icamsr.org](http://www.icamsr.org))

With attachments

[Comment Submitted by Harry Rabb](https://www.regulations.gov/comment/NASA-2022-0002-0229) – [test first](https://www.regulations.gov/comment/NASA-2022-0002-0229)

The samples from Mars should not be returned directly to Earth.I see the both way contamination risk between Earth and Mars very real.
In my understanding Mars special regions have microbial life with high probability.

The samples should be investigated for example in a lab built on the Moon or on Moon's orbit. This way we would protect Earths biosphere from potentially serious contamination.

When considering possible risk of Martian microbes to the Earth, it is often stated that Martian microbes would not survive the higher temperature of the Earth. That statement may be completely wrong.

The average temperature of Mars is low. But during the day at equator of Mars, the soil temperature can be several hours + 36 degrees Celsius. So the Martian microbes survive large daily temperature variations of -80 C to +36 C. So they would survive well in most environments on the Earth. And the conditions at Earth could be actually excellent for Martian microbes to start aggressive expansion on Earth biosphere.

The price tag should not matter when we think of saving Earths biosphere from contamination by Martian microbes, which could, in worst case, convert Earths biosphere completely to something we could not recognize anymore. We can just think what has been the global price tag of COVID19.

I estimate from previous success rate of sample return missions, that the risk of failure, for contamination of Earth biosphere is as high as 20 percent, which is unacceptable. Our technology for making safe entry from space to surface of Earth is not mature enough yet.

Example: The NASA Genesis sample return mission crashed on Utah 2004 as the parachute did not open, spreading the samples on the desert.

My study on the subject is freely available on web, titled: "Life on Mars - Visual Investigation and implications to Planetary Protection"

Best regards - Harry Rabb, M.Sc. , Kirkkonummi – Finland

[Comment Submitted by Noah Barth](https://www.regulations.gov/comment/NASA-2022-0002-0231) – [support EIS](https://www.regulations.gov/comment/NASA-2022-0002-0231)

As a bachelors student of Natural Resource Management, I am proud of my scientific perspective. This PEIS drafted by NEMCON and NASA thoroughly discusses all the points of concern I would consider in the delivery of geologic samples from Mars. I believe the ROD for this EIS should be approved and continue as planned.

The UTTR has long been a location that experiences explosive impacts, and historically EIS documents have been approved for projects taking place in this ecosystem. The value of new scientific research far outweighs the minimal impacts proven and mitigated for in this PEIS.

A common thread I have seen in opposing comments deals with the fear of biotic contamination through bacteria and pathogens that could be dormant on the geologic samples. To counter these arguments, I would direct attention to pages 87 and 88 of the PDF (page 3-3 line 26 through page 3-4 line 19). This excerpt discusses the geologic history of Earth as it has experienced tons of natural impacts originating from Mars. There exists about 465 pounds of Martian geology catalogued and researched on Earth. The introduction of 1 pound in a controlled environment delivered via this MSR mission will not contribute any additional danger.

Thank you for the continued pursuit of astronomic knowledge, and I am eager to see the results of this mission in the coming decades.
Noah

[Comment Submitted by Shoshana Ebertz](https://www.regulations.gov/comment/NASA-2022-0002-0232) – [sterilize first](https://www.regulations.gov/comment/NASA-2022-0002-0232)

I do not want samples from Mars to be returned to earth without extreme safety protocols to keep any living microorganism from spreading on Earth. Once it is out, it is out. NASA should heed this peer reviewed journal and comments by experienced researchers. Don't cause problems, solve them and protect our Earth. Please read the article and follow up on cited researchers. Again I do not want unknown objects released on the Earth or placed in ANY situation or container where escape, leaking or any other form of release might happen. See this please: https://www.liebertpub.com/doi/10.1089/ast.2022.0065
and this: <https://m.youtube.com/watch?v=42OiK_-mbI0>

NASA can make the risk zero by continuing to study Mars with probes on Mars, or by bringing Mars samples to a space based lab, or can very very greatly reduce the risk by sterilization before the samples are returned to Earth.

the only life detection tests were on the Viking landers, back in 1976. And the experiment called Labeled Release actually returned positive results for microorganisms (but considered controversial). There are several signs that support the idea that Mars has microbial life, such as seasonally fluctuating methane in its atmosphere.
Dr. Gil Levin was the scientist in charge of the Labeled Release experiment, and he has discussed his experiments positive results many times throughout his life. He also spoke of the unnecessary risk of Mars Sample Return:

[Comment Submitted by Anonymous](https://www.regulations.gov/comment/NASA-2022-0002-0234) – [fully support, suggests more samples](https://www.regulations.gov/comment/NASA-2022-0002-0234)

The Mars Sample Return is an ambitious project and I fully support this brave initiative led by NASA; ESA, along-with other partner organizations. This is going to be another brilliant milestone in the history of human beings after the lunar landing five decades ago.

01) It would be great if the martian dust and aerosol particles can be collected and sent back to Earth. The reason for this is, analyzing these tiny particles will help us understand the behavior and its interaction with machines and technology (when the landing of humans happens). Prior information on this will also help us with the possibility of using the martian land for engineering (like agriculture, or research programs to convert the atmosphere to a partially habitable one, etc.,).
02) Collect some samples from beneath the rocks (or from some permanent shadows, where the solar influences are very much minimum), to understand the solar wind (particles and radiation) influences on the Martian soils (for this research, the samples collected for the first point (01) can be used as present-day references).
03) Samples collected from the rims and centers of impact craters may reveal how the meteorites and martian land-forms interact with each other in the tenuous atmosphere and how the shocks influence the martian land and modify it.
04) For understanding the soil transport during dust devils, it would be helpful if the samples contains representative collections from those areas, where the dust storms are common (or it occurred in the recent past).
05) collecting original rock samples to better understand the magnetic history of the red planet and to understand how the planet lost its inherent fields.

– [issues with disinfection of earth entry site](https://www.regulations.gov/comment/NASA-2022-0002-0230)

[Comment Submitted by the United States Environmental Protection Agency](https://www.regulations.gov/comment/NASA-2022-0002-0235)

[Comment Submitted by Alex Walson](https://www.regulations.gov/comment/NASA-2022-0002-0233) – [off topic (future missions need to be designed for reuse)](https://www.regulations.gov/comment/NASA-2022-0002-0233)

ALL FUTURE MISSIONS: Equipment ought be conceived and designed to function for reuse, even yet unplanned missions. In whole or part, full purpose or sub-section, alone or combined. Records of systems for specifically reuse, full systems down to screws and BB's. Panel Salvage, Batteries, Signal Boost, Storage Physical or Data, Gas Trapping for Pressured Atmosphere, Evaporators, Boards, Chips, Others?? Especially useful to add human habitation needs to be available for, two hundred years, a thousand? :: TIER 1-2 Module or Section w/ 3 service tool arms for rover repair. Clean, lube, repair, replace, circuit boards, tires, bearings, cutting tools, etc. etc. Three arms keep each other functional with full repair range. 3D printer. A micro drone to service central station. A Telescope pack. For after the return launch or separate box? Image the moons, study comets, other as it sounds fun. :: TIER 3-4 Advertising. Paint "MARS IS ON THIS TRUCK" "WARNING, THIS TRUCK CARRIES ALIEN SOIL" "YEAH, YOUR TRUCK HOLDS FURNITURE, BUT IT'S MARS WE'RE CARRYING!" or something. Get some cheap excitement about this and NASA via a paint job or a wrap. Invite a few Congress Critters for photo ops, with an astronaut and the team. :: Keep up the good work!

* [test first](https://www.regulations.gov/comment/NASA-2022-0002-0229) – [support EIS](https://www.regulations.gov/comment/NASA-2022-0002-0231) – [sterilize first](https://www.regulations.gov/comment/NASA-2022-0002-0232) – [fully support, suggests more samples](https://www.regulations.gov/comment/NASA-2022-0002-0234) – [off topic](https://www.regulations.gov/comment/NASA-2022-0002-0233)

[Comment Submitted by Yoshiro Yamada](https://www.regulations.gov/comment/NASA-2022-0002-0236) – [multiple cautious measures](https://www.regulations.gov/comment/NASA-2022-0002-0236)

We need multiple cautious measures to ensure no leaks in defense against unknown microbes.

[Comment Submitted by Thomas Dehel](https://www.regulations.gov/comment/NASA-2022-0002-0237)

[Comment Submitted by Robert Walker](https://www.regulations.gov/comment/NASA-2022-0002-0238)

[Comment Submitted by Thomas Butz](https://www.regulations.gov/comment/NASA-2022-0002-0240) – [support EIS](https://www.regulations.gov/comment/NASA-2022-0002-0240)

Risk is so small it is not worth it to go about this in a different way that wouldn't be incredibly expensive. The entire point of this mission is to get the samples back to our state of the art labs, not some makeshift lab in LEO or CISlunar space.

I am good with the miniscule risk in the name of science, for anything to go wrong there would A)need to be dangerous live pathogens b)Could interreact with us and c) need to get through all containment protocols. The chances of all that happening is is one tick above zero, we have found no life on mars so the idea these samples would contain dangerous life that can infect species from another planet(earth) is a bit absurd. Lets go get them!

[Comment Submitted by Christopher Gagliardi](https://www.regulations.gov/comment/NASA-2022-0002-0241) – [support EIS](https://www.regulations.gov/comment/NASA-2022-0002-0241)

The Mara Sample Return is a game changer and a HUGE STEP FORWARD. Full support here.

[Comment Submitted by Robert Walker](https://www.regulations.gov/comment/NASA-2022-0002-0250)

[Comment Submitted by A G](https://www.regulations.gov/comment/NASA-2022-0002-0251) – [test or sterilize first](https://www.regulations.gov/comment/NASA-2022-0002-0251)

Please do not risk the earth by returning unknown samples from Mars.
Please test or sterilize first.

[Comment Submitted by C K](https://www.regulations.gov/comment/NASA-2022-0002-0246) – [sterilize first](https://www.regulations.gov/comment/NASA-2022-0002-0246)

Please sterilize any samples from Mars or elsewhere before they're to be studied on Earth. They should be studied in a sterile containment facility, as well. No harm should be allowed to come to citizens.

* [multiple cautious measures](https://www.regulations.gov/comment/NASA-2022-0002-0236) – [support EIS](https://www.regulations.gov/comment/NASA-2022-0002-0240) – [support EIS](https://www.regulations.gov/comment/NASA-2022-0002-0241) – [test or sterilize first](https://www.regulations.gov/comment/NASA-2022-0002-0251) – [sterilize first](https://www.regulations.gov/comment/NASA-2022-0002-0246)

[Virtual Public Meeting Chat Log and Transcript, November 30, 2022](https://www.regulations.gov/comment/NASA-2022-0002-0242)

[Comment Submitted by Anonymous](https://www.regulations.gov/comment/NASA-2022-0002-0248) – [test in situ or don’t return](https://www.regulations.gov/comment/NASA-2022-0002-0248)

Any samples should be tested in situ, if this can’t be done then they shouldn’t be tested. The risk is too great

[Comment Submitted by Erin Abdelkhaliq](https://www.regulations.gov/comment/NASA-2022-0002-0247) – [EIS shouldn’t be allowed](https://www.regulations.gov/comment/NASA-2022-0002-0247)

Important read, this should not be allowed

https://www.science20.com/robert\_walker/naa\_do\_listen\_to\_public\_concerns\_about\_life\_in\_samples\_from\_mars\_your\_plan\_is\_like\_building\_us\_a\_house\_without

[Comment Submitted by Emily Whitehead](https://www.regulations.gov/comment/NASA-2022-0002-0245)

[Comment Submitted by Emily Whitehead](https://www.regulations.gov/comment/NASA-2022-0002-0244)

Please do not open mars samples here on earth risking the health of humanity and endangering the planet and health of billions!

[Comment Submitted by Emily Whitehead](https://www.regulations.gov/comment/NASA-2022-0002-0243) – [unprecedented harm, test first](https://www.regulations.gov/comment/NASA-2022-0002-0243)

Please do not open test samples from THE MOON, or MARS, space etc. here on EARTH!
You are carelessly endangering safety and life on earth including humanity itself and yourselves. This is absolutely against any policy, this is a crime! This is beyond scary for civilians and humanity!

[Comment Submitted by Robert Walker](https://www.regulations.gov/comment/NASA-2022-0002-0249)

[Comment Submitted by Paul Marks](https://www.regulations.gov/comment/NASA-2022-0002-0252) – [unprecedented harm, return to space station](https://www.regulations.gov/comment/NASA-2022-0002-0252)

he draft NASA MSR PEIS posted here, following the May 2022 NEPA comment period, confirms that nothing has changed on the risks MSR poses. It is still a clear and present threat to Earth's biosafety. What is clear from this recent draft PEIS is that NASA remains loftily aloof about any criticism of its $8bn Mars Sample Return plan and still plans to return samples to Earth, rather than a safer (to humanity) offplanet resource like a space station, for analysis, or the (Artemis?) lunar lab we are told we’ll have by 2033. Another option might be to send more advanced bioanalytical robots to Mars.

What is also clear is the PEIS confirms that NASA (and its partner ESA) seem willing to put the curiosity of a handful of space scientists above the rights of the billions of humans on Earth to live safely and without contagion.

Returning samples to Earth which may contain extant, revivable, pathogenic biology of a kind we may not understand, and which our best BSL-4 biocontainment lab technology might not contain, and which our microbiological antipathogen tools (eg antibiotics, vaccines) cannot combat, presents a risk to the safety of Earth’s biosphere.

This is a clear breach of the UN’s 1967 Outer Space Treaty and its provisions on backcontamination. Whilst COSPAR, the Committee on Space Research, is meant to police and prevent backcontamination: its members have been widely quoted as looking forward to making a name for themselves with the findings they make from Mars samples. The fox is in charge of the henhouse, here.

By spending more, NASA and ESA could design a mission that does not return an experimental, ballistic, parachuteless sample-carrying space vehicle to Earth but rather one which can have the onboard rocket power to brake and rendezvous with a space station. Yes it will cost a whole lost more – but it is the biosafety of the Earth we are talking about here, not NASA budgets.

The draft PEIS avoids key safety issues with many mission elements. The fact is that the Orbiting Sample (OS) Container, the Sample Capture, Containment and Return System (CCRS) and the Earth Entry System (EES) are all experimental. NASA Goddard and JPL cannot prove that the OS will not be contaminated, or that the CCRS will be able to robotically sterilize any contamination – not least because, if there is any Martian biology present, we have no idea what kind of an extremophile it might be – and so have no idea what temperatures might kill it.

So NASA's method for securing the samples without contamination on Mars, and maintaining biosecurity when retrieving them in Mars orbit, and containing them in a way that it claims “breaks the chain” is entirely experimental. It have have to work robotically, and perfectly, tens of millions of miles from Earth. They cannot say with any measure of certainty that it will work as designed.

The EPA, in its revealing comments here in this draft PEIS thread, pinpoints some key issues NASA has yet to be clear on with the experimental Earth Entry System. One (see page 2 of the EPA comment) is a burnup/breakup of the EES, leading to an atmospheric release and/or sample material being distributed outside of the landing site radius. A risk factor increasing the chances of a break up is the fact that by 2033, low Earth orbit will have 100,000 megaconstellation satellites in it - and somehow the ERO and EES will have to thread its way through all that (and the debris it will have caused). Time to think again.

I believe NASA is placing itself, and the United States government, and its associates in the ESA-nation countries, in a position of facing huge financial liabilities if they introduce a Mars pathogen-based pandemic to Earth. As a comparator, the Covid-19 pandemic is expected to cost the USA alone $16 trillion (source: JAMA). Is an $8bn MSR mission worth it? Of course not. A more expensive but safer sample return mission to a space station would quash this risk.

* [**test in situ or don’t return**](https://www.regulations.gov/comment/NASA-2022-0002-0248) **–** [**EIS shouldn’t be allowed**](https://www.regulations.gov/comment/NASA-2022-0002-0247) **–** [**unprecedented harm, test first**](https://www.regulations.gov/comment/NASA-2022-0002-0243) **–** [**unprecedented harm, return to space station**](https://www.regulations.gov/comment/NASA-2022-0002-0252)

[Comment Submitted by Robert Walker](https://www.regulations.gov/comment/NASA-2022-0002-0254)

[Comment Submitted by Anonymous](https://www.regulations.gov/comment/NASA-2022-0002-0253)

[Chester Everline]

[MSR Draft PEIS Public Meeting Transcript 12/7/2022](https://www.regulations.gov/comment/NASA-2022-0002-0256)

[MSR Draft PEIS Public Meeting Transcript 12/6/2022](https://www.regulations.gov/comment/NASA-2022-0002-0255)

## FIRST ROUND OF COMMENTS, STERILIZE FIRST

# [Comment submitted by Terry Pitmon](https://www.regulations.gov/comment/NASA-2022-0002-0094) - [sterilize first](https://www.regulations.gov/comment/NASA-2022-0002-0094)

NASA officials,
I am very concerned about the samples being brought back to earth from Mars. These samples need to be sterilized and free of any bacteria or harmful germs. I understand wanting to study them, but extreme caution is warranted. Surely there are regulations in place to prevent the unsterilized specimens from being brought back to earth unsterilized. If there is not one, then use your brain and set the precedent that all specimens brought from outer space be sterilized.
We're dealing with the unknown so it is best to ere on the side of caution.

# [Comment Submitted by Anonymous](https://www.regulations.gov/comment/NASA-2022-0002-0064) – [sterilize or test first](https://www.regulations.gov/comment/NASA-2022-0002-0064)

Please sterilize the samples or test them before bringing them to EARTH.
Thank you for your consideration.

# [Comment Submitted by Anonymous](https://www.regulations.gov/comment/NASA-2022-0002-0029) – [sterilize first](https://www.regulations.gov/comment/NASA-2022-0002-0029)

NASA should test the samples before coming back to Earth to ensure they are safe to bring .
Sterilization out of precaution

# [Comment Submitted by Raquel Kapcala](https://www.regulations.gov/comment/NASA-2022-0002-0086) – [sterilize first](https://www.regulations.gov/comment/NASA-2022-0002-0086)

Please do NOT bring anything without sterilizing it!! This is our earth and we are already struggling to protect. Have caution and understanding for everyone who lives here.

# [Comment Submitted by Anonymous](https://www.regulations.gov/comment/NASA-2022-0002-0141) – [sterilize first](https://www.regulations.gov/comment/NASA-2022-0002-0141)

I would like to emphasize the risk of bringing unknown possible viable Mars life to Earth via MSR. After a 2 year Pandemic which has caused havoc to our world to this day and likely for years in the future, it seems somewhat frivolous to take the risk of bringing unknown life forms to Earth to possibly affect the Earth's biosphere. As opposed to COVID, there is a possibility Mars life could affect Earth in unknown ways. So, we have seen how COVID resulted in deaths (in humans and animals), short and long term illnesses (in humans and animals), financial/economic ruin, political/governing overreach, etc. But Mars life could affect Earth in subtle ways which are not predictable. For instance, an attack on chlorophyll based organisms would be unfortunate, resulting in famine and climate change. It may be easiest to completely sterilize the MSR samples prior to Earth return, if we know how to do so. Assuming sterilization methods that work for Earth life may not be adequate. Otherwise, the next safest option is to bring it back to a Moon orbiting or Moon surface facility only so that they may be sacrificed in case of problems. This means expensive containment facilities are needed in those locations, which are currently not planned.
Thus, the most reasonable approach is to not bring back Mars samples at all, but to wait until in situ Mars analysis can be done to quantify and characterize extant Mars life, if it exists. Technology is steadily being developed to enable this approach. Also, there is no hurry, is there?

# [Comment Submitted by Anonymous](https://www.regulations.gov/comment/NASA-2022-0002-0097) – [sterilize first, test method of sterilization on Mars life in situ](https://www.regulations.gov/comment/NASA-2022-0002-0097)

Given the risk of unknown possibly viable Mars life forms being returned to Earth, precautions are required that do not apparently seem to be taken in the Mars Sample Return Mission.

Despite the fact that Mars and Earth have exchanged material over millions of years, it takes many thousands of years for Mars material to reach Earth. Such materials would have been exposed to very high launch and arrival acceleration loads, thermal/temperature shocks, long term very low space temperature/vacuum/radiation. Even so, there is a very low, non zero chance that microbes or life from Mars could have been carried to Earth. Have these life forms had any impact on Earth life? Unknown. In the National Research Council 2002. “Safe on Mars: Precursor Measurements Necessary to Support Human Operations on the Martian Surface”, it states: "Finally, it must be acknowledged that there have been biological upheavals through the course of paleontological history here on Earth, including millions of species extinctions, with few explanations of cause. It is impossible to determine the cause of these upheavals with absolute certainty, be they physical (meteorite impact) or biological (life introduced onto Earth). While the possibility that life was introduced on Earth from elsewhere is unlikely, the uncertainty makes it impossible to prove that meteorites from another planet have never had an effect on Earth’s biosphere (NRC, 1997). These considerations, and the consideration that a goal of future human missions will be to search for life-forms in Martian oases, if those oases exist, negate the argument that there is no biohazard threat from Mars based on the existence of sterile Martian meteorites."

Thus the following recommendations are made:

1)The return capsules should be sterilized to eliminate the risk of dangerous Mars life forms. However, one problem is that all sterilization techniques are based on Earth life. We do not know for sure if any known sterilization method works to destroy Mars life. Thus, the only method of determining Mars life CAN be sterilized is to land a platform on Mars to identify extant Mars life and then test methods of successfully sterilizing such life. And of course, while we are at it, it would be good to perform a biological challenge (exposing Earth life to located Mars life on the Mars surface within the lander) as suggested in Safe on Mars 2002. To reiterate, the only way to properly sterilize Mars life requires a lander that can find extant Mars life and test sterilization methods. Biological challenge would help determine the risk level of the Mars life vs Earth life.
2)If it is insisted that we not sterilize the capsules in order to bring back viable Mars life, then due to the risk of exposure of the capsule to Earth, it should only be placed in facilities such as the lunar orbiting Gateway, or lunar surface. Note that there are significant risks of any Containment facility. Even Biosafety Level 4 facilities have at least 2 infection cases, not counting the possible one for COVID 19. Whenever humans are involved, there may be errors with unknown outcome.
3)What is the smallest Mars particle that is forbidden to be on the capsule carried to Earth? Dust level, bacteria level, virus level, prion level? What size is Mars life? Regardless of the diligence of creating a safe containment of the Mars sample, one is always limited based on technology. If the capsule has a Mars “life” particle smaller than our instruments ability to see and remove, then it is possible to be brought back to Earth uncontained. Sterilization again is limited based on knowledge if the Mars microbe/life can be harmed with he sterilization method used.

Comment ID