Olympus XII Mission

MARS INNOVATION CHALLENGE 2025

Angela Patricia Pérez Henao, advisor to the astronomical observatory; Diana González, professor of physics; Alejandro Angulo Domínguez, Emilio Díaz Villegas, Hanna Brahm Castillo, Juan Martín Erazo Morales, María Camila Huertas Escobar, Mariana Alarcón Márquez, Matías Bedoya, Santiago Uribe Ardila, Sebastián Jaramillo Calvo, Middle School students in Leonardo da Vinci School.

About the patch: generated with ChatGPT with the prompt made by María Camila Huertas Escobar and that after a group deliberation we concluded that patch express we want to say. It was also the result of several initial prototypes made by everyone in the crew and analyzed in search of similarities and their relationship with the selected challenge. What does the name of our mission contain, democratically elected within an internal selection process of the group.
Slogan: The followers of Artemis – I seguitori d'Artemisa

CONTENT

SITUATION TO BE RESOLVED

Human Medicine and Genetic Modifications

Objective: To address the physiological challenges that humans will face during extended stays on Mars, including how we can adapt the human body to Martian conditions.

ABOUT THE WORK TEAM

Ground Support

1. Juan Martín Erazo Morales, mission controller
2. Angela Patricia Pérez Henao, commander
3. Diana González, commander

Crew

1. Sebastián Jaramillo Calvo, pilot
2. Hanna Brahm Castillo, Experiment Specialist
3. Emilio Díaz Villegas, specialist in experiments
4. Santiago Uribe Ardila, Mission Specialist - Psychoneurobiology
5. María Camila Huertas Escobar, biomedical engineer
6. Mariana Alarcón Márquez, Mission Specialist - Neuromedicine
7. Alejandro Angulo Domínguez, Mission Specialist - Neuromedicine
8. Matías Bedoya, specialists in risks and impossible situations

Conversation about muscle problems due to lack of exercise with Javier Becerra Ramírez, physical education teacher at the school

ABOUT THE PROPOSAL TO SOLVE CHALLENGE

OLYMPUS XII PROPOSAL

We count on the astronauts' spacecraft, for their movement between Mars and Earth and vice versa, to be able to simulate gravity. It must be a scalable gravity so that on the way to the red planet astronauts gradually get used to the third of Martian gravity compared to Earth. The same grading capacity in the intensity of gravity must be able to be graded for its return to Earth. In this way we can solve the issue of body fluids being kept in the place where they should be.

The pressure of the spacecraft's environment must also be adjustable so that the body acclimatizes to what it will find on Mars.

Software Olympus XII

It will be an Artificial Intelligence that is capable of measuring indicators of the human body through contact with the skin in its connection with the nanobots that will be located in red blood cells. With the light received from the human body, it should be possible to measure calcium levels in the bones, distribution of water in the body, heart function, muscle health, and blood levels. Taking into account the information of each astronaut in their normal state of health, the **Olympus XII AI** will have the ability to know what each astronaut requires to stay fit.

With machine training, the software will learn from the extremophile *Deinococcus radiodurans,* "Connan the Bacteria" that is capable of tolerating radiation thousands of times more intense than the lethal dose for humans, as it repairs the damage suffered in its DNA by repair mechanisms. In this way, the software will understand how to repair the changes in the human body and, by selecting the necessary organic ingredients, it will be able to repair the damage caused. The algorithm behind this programming is based first on the indicators of normality of each astronaut, then it will evaluate the best components to solve the medical situation and choose the best possible combination to improve the health and vital stability of the space traveler. With this information, each astronaut will know the dose of nutrients and repairers that they will have to self-supply.

The information on the normal and constant parameters of each astronaut will be measured by nanobots distributed in the astronauts' bodies so that they send the information through their spacesuits in real time.

The astronauts' psychology team will also train the AI to know how to better accompany each astronaut emotionally, taking into account that there are some substances that facilitate the process of loneliness and distance from family and Earth.

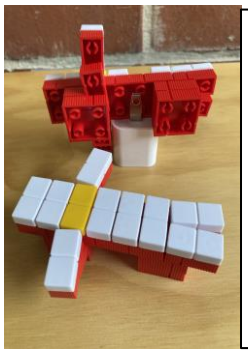
Technological innovation Olympus XII spacesuit

Olympus XII will be a new technology that will be available in spacesuits that will become a protective shield for astronauts, as they have been, in addition to fully monitoring the health indicators of the body of the astronaut wearing the suit. In this way, the suit will be able to look at the astronaut's levels in various indicators through in-body meters or nanobots such as: water distribution in the body, calcium levels in the bones, sugar levels, muscle lactose among others.

Technological innovation Olympus XII Nanobots

Emilio diaz Villegas

Hanna Brahm Castillo



Production of 50 Nanobot for each astronaut

The biomedicine area will complete the development of a machine that prints nanobots in the required way and with the necessary materials for the body to receive them.

Additionally, and with the aim of saving astronauts' energy, the human hibernation system will be developed during the Earth's journey to Mars, although we also evaluate the tardigrade's ability to freeze-dry and reanimate itself, and we continue with the idea that in humans it may be better to lead a controlled hibernation. With a diet rich in the nutrients needed to keep muscles in good condition and optimal energy for the mission. Additionally, the cabins in which the astronauts will sleep will have a passive gymnastics system if symptoms of atrophy appear in any muscle due to lack of exercise.

Hibernation will be scheduled for round trips to Mars and Earth. In this way, part of the group will hibernate, while another part advances necessary tasks on the trip for a 6-week season and the entire crew will be working together for two weeks, and so on at intervals up to a month before arrival on Mars or Earth.

ETHICAL CONSIDERATIONS OF THE PROPOSAL

We agree with the premises of the contest of not genetically altering the human beings that will open the manned exploration to Mars, so that humanity as a species prevails and that it is the representation of peaceful and respectful exploration of the Solar System. However, we know that the conditions of space outside planet Earth, both on the surface of other worlds and in the interplanetary vacuum, do not have the conditions that the human species requires for its normal development and full physical and mental potential, hence we hope that space agencies and world science continue to evaluate human capabilities and how to strengthen them to face the challenges of environments for which we were not Created. The brain has a great potential for adaptation, but not many of our organs and vital systems, which will need to be enhanced by taking as an example some living references that do.

MISSION BUDGET

Strategy	Description	Investment per unit		investment
TOTAL INVESTMENT FOR FIVE YEARS OF MISSION		**quantity**	**Unit Value**	**$618,240.00**
SOFTWARE IA OLIMPUS XII				$15,060.00
	Development and training	1		$200.00
	Work team	1		$170.00
	Maintenance	1		$100.00
	Backrest	1		$90,00
	Psychology and Biomedicine Team			$14.500,00
NEW TECHNOLOGY - PROTOTYPING				$501.200,00
	Nanobot development and training			$500.000,00
	Spacesuit development - indoors	8	3	$24,00
	Spacesuit development - outdoors	8	22	$176,00
	Astrokit development of radiative supplements	1000	0,5	$1.000,00
TEAM EXPERIMENTATION AND TESTING				$300,00

	Functional tests	1		$100,00
	3D Machinery	1		$50,00
	filament	1		$100,00
	cooling	1		$50,00
MISSION TO MARS AND SOJOURN				$101.680,00
	Ground Equipment	3	90	$270,00
	Astronauts	6	180	$1.080,00
	Life Support System	6	100	$600,00
	ROUND TRIP	2	1	$100.000,00

LIST OF UNRESOLVED QUESTIONS

1. How to have the power of a tardigrade in a human?
2. How to achieve a self-sustaining economy on Mars?
3. What is the strangest thing an astronaut has ever experienced in space?
4. How do we become immune to radiation?
5. How to lower costs in a space project?

REFERENCES

1. Training for teachers carried out by Misión Educativa Libertad in Colombia on: mathematics on a flight from Earth to Mars, and budgets for space projects. https://www.youtube.com/@MisionEducativaLibertad/featured
2. Training for teachers organized by Javier Montiel within the framework of the Mars Exploration Challenge https://youtube.com/@theaerospaceacademy?si=vSKH6ztPT7DS7jLg
3. A history of the cosmos, search for life in the Universe since the beginning of time. Chris Impey. Planet
4. What happens if we go to live on Mars? https://www.youtube.com/watch?v=3S9HCWujEWg