M.A.R.S. UCLouvain

SPONSORSHIP PROPOSAL

Simulation of a human mission on Mars, conducted by UCLouvain students

Mars Desert Research Station
Utah, United States

Welcome

Dear Madam, Sir,

Thank you for considering the sponsorship of the **M.A.R.S. UCLouvain** project. This year and for the ninth time, our crew will fly out to Mars, simulating a scientific expedition to the Red Planet. By sponsoring this crew, you will be part of this big project sending 8 students and researchers at the Mars Desert Research Station (MDRS) in the Utah desert.

M.A.R.S. stands for **Mars Analog Research Simulation**. Indeed, our project consists of simulating a martian mission in a analog facility, the MDRS, in order to conduct scientific research. During the mission in Utah, each member has a specific task related to the proper functioning of the MDRS : food production, tool maintenance, health care, communication, etc. More importantly, each member will conduct a **scientific experiment** to learn more about the extreme environment of Mars. An experiment that humans could replicate on the planet itself. These experiments have to be creative and feasible in such an extreme environment. M.A.R.S. UCLouvain exists since 2010 and many Belgian and international companies have sponsored the design and the implementation of these experiments. It would be a real asset for the success of this mission to involve your company as a sponsor.

Youth, motivation and energy will only get us so far. To reach our goals, we need YOU !
Your **material, intellectual and/or financial support** could play a crucial role in the success of our mission abroad. Without the generous support and necessary supplies provided by sponsors, we would not be able to carry out this exciting expedition.

Thank you again for considering this sponsorship and we hope to be able to **proudly count your company among our sponsors**. Further information is provided in this folder, but if you are left with any unanswered question or concern, please visit our website *marsuclouvain.be* or contact us at *contact@marsuclouvain.be*.

Sincerely,

The M.A.R.S. UCLouvain 2021 crew

Introduction

« I wasn't destined to be an astronaut. I had to turn myself into one. »
- Chris Hadfield, An Astronaut's Guide to Life on Earth

A motivated and dynamic team

Since 2010, the crews of M.A.R.S. UCLouvain, previously known as "UCL to Mars", participate in a life-on-Mars simulation in collaboration with the Mars Society. These crews are composed of PhD, Master and Bachelor students of the Université catholique de Louvain (UCLouvain) and are coming from various scientific fields.

Our crew for the 2021 mission is composed of 8 Master and PhD students. We cover a wide range of interests : from the microscopic scale of microbiology to the kilometric scale of telecommunication and satellites. Our crew will of course benefit from the previous teams' experience, allowing us to further develop the project.

In 2018, M.A.R.S. UCLouvain became a non-profit organization and developed several scientific collaborations with companies from the public and private sectors. We would to like increase the number of scientific collaborations to obtain more valuable results from our experiments.

A scientific project

The Mars Society has established in 2001, with the support of NASA, a Mars analog habitat in the Utah desert, called the Mars Desert Research Station (MDRS). This station aims at educating researchers, students and the general public about the many challenges humans will face to survive on the Red Planet and how they may be overcome. Aside from this first objective, the MDRS crews have to propose, elaborate and perform several experiments during their stay in the station, providing answers to some of the key challenges of a Martian mission. The location of the station and its design have been carefully selected to get as close as possible to the true Martian environment with a Mars-like terrain in the area surrounding the station, spacesuits for extravehicular activities, a GreenHab to grow fresh vegetables and a recycling system for wastewater. Our diverse backgrounds will help us to fulfill the two main goals behind the development of the MDRS.

Education and awareness

Our goal also consists in promoting the many topics related to space exploration via several interviews, articles in newspapers, seminars and workshops in schools.

We try to reach a younger audience via social media and via seminars at the UCLouvain and in schools. Indeed, we will present several seminars in high schools to promote the many interesting job opportunities offered in Belgium in the scientific fields. A range of topics will be discussed during these seminars. A closing seminar will also be organized after the mission at the MDRS, allowing us to present our main results and to invite actors of the Space and Technologies sectors.

Sponsoring

Our team is composed of extremely motivated students, but a project of this scope requires also external support. We estimate a total budget of around 22 000 EUR for the logistics, MDRS fees, scientific equipment and project promotion.

Being a Sponsor of our project will increase your visibility to a broader audience and boost your image to tomorrow's scientists, decision-makers and space enthusiasts.

We have several thousand people following us on our social media (Facebook, LinkedIn, Instagram), excited to get news from this unique experience, and your name will be linked to this. In addition, we will make our best to promote your company in public and scientific communications.

Budget

Travel cost	7 200 €
MDRS fees	6 000 €
Experiments	4 800 €
Logistics	2 000 €
Activities & Advertising	2 000 €
Total Budget	**22 000 €**

Sponsoring Packages

"Spirit Rover" Sponsor (from €1000)

- referencing on social media
- your logo on our website

"Opportunity Rover" Sponsor (from €2000)

- includes previous package
- your logo on our mission flag
- your description on our website
- referencing in our promotion videos

"Curiosity Rover" Sponsor (from €4000)

- includes previous packages
- dedicated reference on social media
- referencing in publications
- referencing as sponsors during seminars
- access to a stand to promote your company during our closing seminar

"Perseverance Rover" Sponsor (from €8000)

- includes previous packages
- referencing of striking news of the company in social media
- your logo on our mission clothing (appearing on most of our photos and videos)
- seminar or similar activity at your company

Do not hesitate to contact us for further details about our organization, the experiments or the sponsor packages at contact@marsuclouvain.be .

Members

Kilian Dekoninck *Microbial Biochemistry*
Crew Commander

Graduated as a Bio-Engineer. I have started a PhD program in Microbiology and Biochemistry. Although I am highly passionate about the microscopic world, I always had a deep interest in the mysteries of the universe. This mission is the occasion to show how bacteria will allow humanity to explore space

Experiment at the MDRS :

By using cyanobacteria, I plan to show that these microorganisms are a perfect tool for an early Mars colonization stage. I will use them to treat the wastewater of the station and as a fertilizing compound for the greenhouse.

Brieuc de Voghel *Computer Science & Engineering*
Crew Executive Officer

I'm in my fifth year Computer Sciences & Engineering, specializing in artificial intelligence. This experience will let me dive deeper into the technologies used in space missions. My objective is to explore the possibilities of data collection and monitoring, applicable to this Mars analog mission.

Experiment at the MDRS :

By installing a series of low-powered sensors and transmitters, I will try to model the station's environment and extra-vehicular activities (temperature, humidity, pressure, brightness, etc.) in order to detect variations in the habitat, the greenhouse and along expeditions. The objective is to collect, transmit and analyze the data as efficiently as possible as I try to adapt to the harsh Martian conditions. The data can be used to prepare and monitor other experiences.

Ophélie Remy

Microbiology

Crew Scientist

Passionate about science, I am currently in the second year of my Biomedical Sciences PhD in microbiology in the LalouxLab. My research focuses on a fascinating predator, the bacterium *Bdellovibrio bacteriovorus*, and its atypical cell cycle that causes the death of other bacteria.

Experiment at the MDRS :

Due to its particularity of killing other bacteria without killing human cells, *Bdellovibrio bacteriovorus* is being studied as a serious alternative to antibiotics, especially against resistant strains. Moreover, unlike antibiotics, its effectiveness over time does not diminish, which is particularly relevant for long-term travels such as the transport and establishment of a colony on Mars. In order to test if the culture of these bacteria is easily achievable outside of the ideal conditions of a laboratory, I will isolate bacteria from the environment and the crew members, identify them and put them in contact with the predator bacteria under various conditions.

Cyril Wain

Electrical Engineering

Crew Astronomer

Currently completing my master's degree in Electrical Engineering at the Louvain School of Engineering. Specialized in telecommunications and cryptography as well as passionate about space, I am currently producing my master's thesis on Synthetic Aperture Radar (SAR).

Experiment at the MDRS :

As the astronomer of the crew, I will make observations of solar flares as well as various celestial objects thanks to the absence of light pollution in the middle of the Utah desert. My engineering spirit will also lead me to perform imaging tests via SAR to map the surroundings of the station as well as the realization of an artificial intelligence aimed at regulating energy consumption of the vital points of the station (the greenhouse and main habitat).

Audrey Comein

Microbiology

Crew Health and Safety Officer

I graduated with a master's degree in Biomedical Sciences and am currently pursuing my studies with a PhD in microbiology at the "Louvain Drug Research Institute". I am also a teaching assistant in molecular and cellular biology in the Medicine faculty.

Experiment at the MDRS :

If we colonize Mars one day, we will not come alone: the microorganisms of the intestinal, oral, cutaneous flora, etc. will accompany us. It is therefore essential to predict what type of microorganisms in these floras would be able to survive and colonize Mars. I propose to carry out experiments to study the survival of some human flora bacteria and the efficacy of several antibiotics under Martian environmental conditions found on the mission site.

Maxime de Streel

Computer Science & Engineering

Crew Engineer

I am currently completing my master degree in Computer Science & Engineering at the Louvain School of Engineering. Passionate about astronomy and networks, I decided to link the two for my master thesis: "Temporary infrastructures and ad-hoc networking for Mars explorers".

Experiment at the MDRS :

Ad-hoc networks suffer from one principal limitation: they are limited in coverage by the range of individual devices. A solution is to regularly set up fixed beacons that will form a temporary infrastructure. Deciding when and where to place a beacon is a challenge: too close to an infrastructure, its range will be limited. Too scattered, the connectivity will not be not guaranteed.

Elisabeth Mauclet

Environmental Sciences

Crew Journalist

Graduated in 2017 as a bio-engineer, I have started a PhD research project on the Arctic permafrost and vegetation (WeThaw ERC project). I am investigating the mineral composition of permafrost soils and vegetation at a study site in Central Alaska. The aim is to characterize element release from minerals that are freshly exposed as a result of permafrost degradation upon thawing, elements uptake in vegetation, and the subsequent impact on the carbon cycle.

Experiment at the MDRS :

The Mars environment, like its analog at the Mars Desert Research Station, is an extremely arid ecosystem. The presence of water plays a major role in the alteration and element mobility. I will address the question of mineral element mobility in this specific ecosystem by measuring the alkalinity evolution through soil profiles resulting from different soil conditions and processes: old river channel, down and uplands and uphill soils.

Arthur Monhonval

Environmental Sciences

Crew GreenHab Officer

I am a PhD student currently working on the WeThaw project whose goal is to provide the first comprehensive assessment of the mineral weathering response in permafrost regions subject to thawing. Enhanced thawing of permafrost due to global warming exposes previously frozen soil organic carbon to microbial decomposition, liberating carbon to the atmosphere. I aim at augmenting the capacity to develop models that can accurately predict the fate of soil organic carbon and mineral elements upon thawing permafrost.

Experiment at the MDRS :

Use of a portable X-Ray fluorescence (pXRF) device to provide a rapid assessment of Martian soil mineralogy. In this experiment, I will use the portable XRF to detect the absence or presence of elements that are toxic to plants and so understand if it is suitable to grow crops in controlled conditions in Martian soils. Additionally, this large-scale pXRF fieldwork would highlight heterogeneities in the mineral composition of the Martian surface allowing us to better predict the presence of ancient liquid water on the Martian surface.

Financial Support Form

To be returned to M.A.R.S. UCLouvain:
M.A.R.S. UCLouvain
Place Louis Pasteur 1 - 1348 Louvain-la-Neuve - Belgium

E-mail: contact@marsuclouvain.be

Full Name (Person of Contact): .....

Company: .....

Address: .....

.....

Phone: ..... Fax: .....

Email: .....

Amount of your contribution: ..... (€)

☐ I would like to get updates regarding the spending of my contribution

Date: ..... Signature: .....

How to make the contribution:

M.A.R.S. UCLouvain
Place Louis pasteur 1
1348 Louvain-la-Neuve

IBAN: BE74 0689 3186 7307
BIC: GKCCBEBB

Communication: **" [Full Name/Company Name] - Sponsorship MARS 2021"**