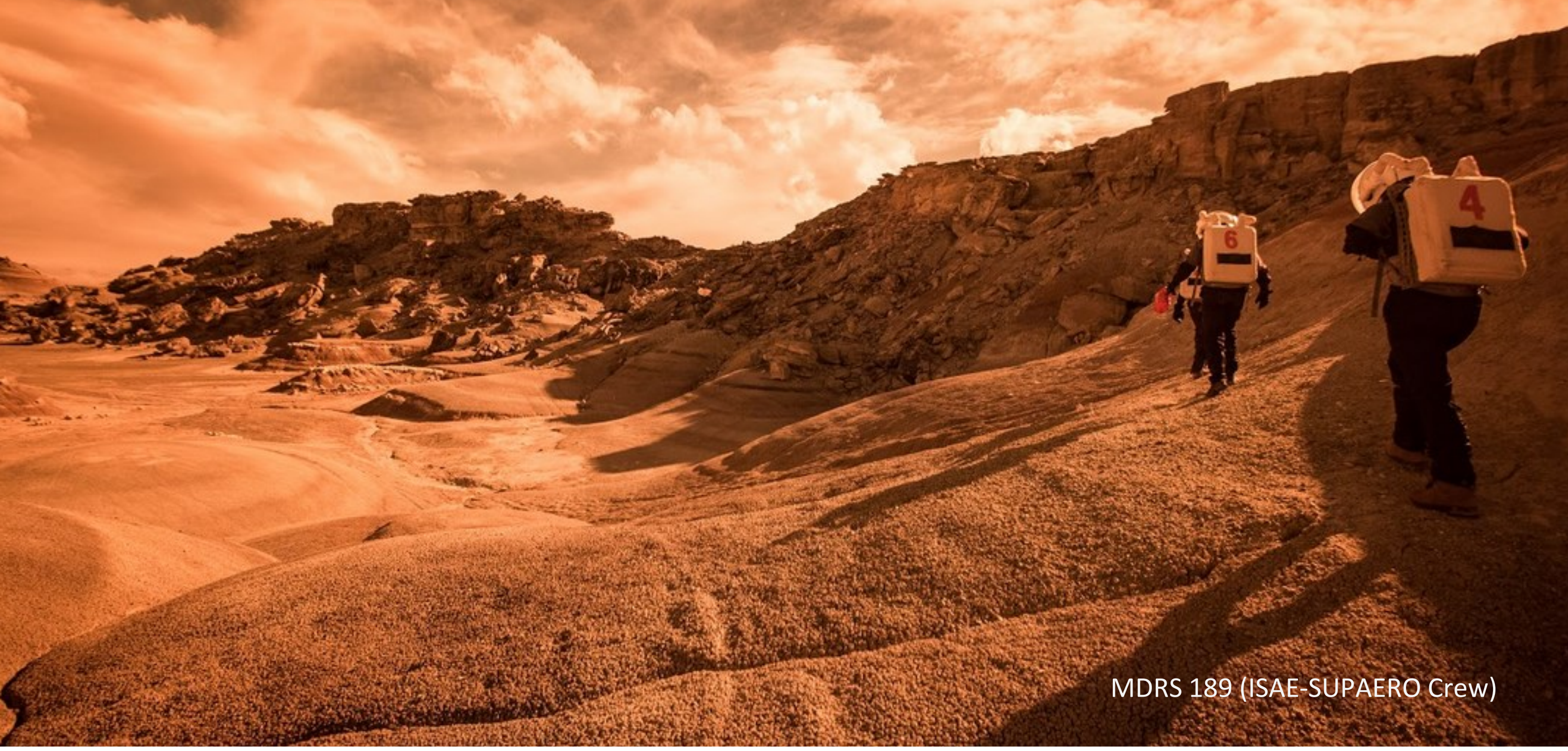
MDRS 189 (ISAE-SUPAERO Crew)

International call for scientific projects

Mars analog mission

For the fifth year in a row, a crew of seven from ISAE-SUPAERO, french leader in aerospace engineering, has been selected to be part of a martian mission simulation in the MDRS station -Mars Desert Research Station- located in the Utah desert from February the 23th to March the 17th of 2019. The purpose of this mission is to carry out scientific experiments in a simulated martian habitat. This is why a call for projects is launched.

The Crew

The mission is organised by the crew via the M.A.R.S association (Mars Analog Research and Simulation) under guardianship of Doctor Stéphanie Lizy-Destrez. The core activity of the association is the martian like mission. Beside, the members work on various projects :

- Martian suit conception and development
- Survival kit development for astronauts on EVAs -extra vehicular activities-
- Design of a positioning system adaptable to martian conditions
- Science popularization for teenagers from underprivileged areas
- Taking part in french public events regarding the subject of space exploration -Researchers nights, Cité de l'Espace (Toulouse) …-

The MDRS mission of ISAE-SUPAERO

This three week mission will take place from 23rd February to 17th March 2019 at the MDRS station - see http://mdrs.marssociety.org/ - of the Mars Society - american association which promotes space exploration-. The station is based in the desert of Utah, an area which best resembles Mars because of its geological features and its climate.

Due to the localisation of the station, the crew will be isolated from the rest of the world, with drastic food - lyophilized powders - and water rationing, in order to make the simulation of life on Mars as accurate as possible. Every day, extravehicular activities (EVAs) will be organised to carry out the experiments in the desert. The crew will leave the station for an average of three to four hours, fully equipped with a replicated space suit. These will be intense work sessions : experimental devices will be deployed, tested, and data will be collected.

The station is made of four different modules. First the habitation module, called “Hab”, a two story 8 meter in diameter cylindrical building (the seven members spend most of their time on the top level), a repair and maintenance module on the lower level, a solar observatory, a greenhouse and a science dome with chemistry and biology equipment. If necessary, a detailed list of the scientific equipment can be sent.

Each member of the crew has a specific function. The commander is a “veteran” who has already participated to a simulation in the past. He is supported by a health and safety officer, a crew engineer, a GreenHab officer, a crew biologist, a crew astronomer, and a crew journalist.

A favorable framework for experiments

Every member of the crew is responsible of some scientific experiments - two or three according to their importance-. The schedule is precisely detailed and optimised, as in a real space mission. A period of time is allocated to each experiment. The variety of crew members’ functions enables it to carry out all kind of scientific experiments which are linked to space research or need an extreme environment. During previous missions, the crew worked with Jean-Baptiste Renard - Research director at the CNRS: National Center of Scientific Research in France- in 2018, Jean-Pierre lebreton from LATMOS -http://www.latmos.ipsl.fr/index.php/fr- in 2018. It operated the LOAC- an aerosol counting instrument which determine the concentration of aerosols in the air, classifying particles by size : https://loac.fr/intro.html- or the Mega-Ares -Atmospheric Radiation and Electricity Sensor, an equivalent, Micro-Ares, was an instrument in the mission ExoMars-.

This mission involves numerous costs : renting the station - nearly 3 800 €-, travel, equipments-, … The total budget of the mission is about **11 000 €.** A part of those costs is covered by sponsors (Association Planete Mars, home cities, …) and crowdfunding. Therefore, a financial participation of **600 €** per experiment is asked to the research team.

Each year, our participation to the mission is very publicized - national and international newspapers, national news television show-. If you want to, it’s an opportunity to give visibility to the projects which will be part of the mission.

The proposed offer :

The research team shall be responsible for the preparation of the experiment before the mission’s departure.

- The scientists in charge of the experiment are committed to train the student experimenter to the tasks that have to be carried out. More than one student can be trained if necessary - as a backup experimenter or if an experiment needs two or more operators -. It is important to note that outside work will be done by the students with their full suit on which reduces dexterity and maneuverability.
- The research team is committed to provide all of the equipment required for the realisation of the experiment. Equipment will be brought back at the end of the experiment (note that **some types of hardware can not be brought on the airplane** and need to be **bought in the United States or shipped beforehand** - like batteries for example). One of the crew members of the 2019 mission has the american citizenship, he can register the sensitive equipment under his name to facilitate the passage through US border customs.
- The experiment shall not last more than two hours per day per student. Like in the International Space Station, sunday is a rest day for the crew. Therefore, research teams shall take this into account when planning the experiment. The student responsible for the experiment is committed to strictly follow the experimental protocol.
- The research team is committed to participate to the costs of mission equivalent to **600 € per experiment.**
- Coordinators of the mission consider that the experimental work of the students have to be recognized if it’s good quality work. Therefore, if the experiment leads to a scientific publication, it is recommended that the name of the experimenter is linked with the publication.
- If the subject of the experiment is the human being, an ethics committee demand (french CERNI or equivalent) has to be accepted before the mission’s departure.

To submit your project, please fill **in the attached form and return** it to us before the 10th of October 2018. Please send it to :

Lucas.LANGE@student.isae-supaero.fr

The selection of the projects will be made by specialists, under the leadership of Dr. Stéphanie Lizy-Destrez, according to the scientific interest, the feasibility of the project, and the relevance of the experiment for the mission.

APPLICATION FORM

GENERAL PRESENTATION

Surname : ……………………………………………………………...………………………

First name : …..…………………………………………………………………………….....

Position and institution :
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PRESENTATION OF THE PROJECT

DISCIPLINARY FIELD / AREA OF APPLICATION :

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Please, present your project in the next pages.
These elements must be in your presentation :

- *Objectives of your project :*
- *Interests of the project :*
- *Time allocated to the experiment and distribution of the time during the three weeks.*
- *What added value does the framework of the MDRS bring to your project ?*

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