ÖSTERREICHISCHES WELTRAUM FORUM
AUSTRIAN SPACE FORUM

FEB 2018 – Arabian Desert, Oman

# AMADEE-18
## Press Kit

Oman Desert Mars Simulation

MARS MISSION SIMULATION SULTANATE OF OMAN
AMADEE-18

#SIMULATEMARS

oewf.org

# 1. Summary and Contact Information

**Mission period:** 1. –28. February, 2018

**Mars analog location:** Arabian desert, Oman (See figure 1 for an approximate visual representation of location on map)

**Lead organisation:** Austrian Space Forum (OeWF)

**Participants:** International research organisations with aerospace engineering and human space exploration

**Media representatives are welcome to cover AMADEE-18 during the mission's bridgehead phase in the first week of February. For more Information contact the OeWF's Media Team Lead, Monika Fischer.**

In February 2018 the Austrian Space Forum (OeWF) in partnership with international research organisations, will conduct a four-week mars simulation mission in the Arabian desert in Oman. Directed by a Mission Support Center in Austria, a small field crew will conduct experiments preparing for future human mars missions in the fields of engineering, planetary surface operations, astrobiology, geophysics/geology, life sciences and other.


*Location of the AMADEE-18 test site*

All human activities on the Martian surface will be simulated by the OeWF's**Analog Astronauts** (short CVs: chapter 5):

- Stefan Dobrovolny, MD, Austria
- Carmen Köhler, PhD, Germany
- Kartik Kumar, MSc, The Netherlands
- João Lousada, MSc, Portugal
- Iñigo Muñoz Elorza, MSc, Spain

## MEDIA CONTACTS AUSTRIAN SPACE FORUM

**Mag. Monika Fischer,** ÖWF Media Officer
Telephone: +43 (0)699 1213 4610
Email: monika.fischer@oewf.org

**Reinhard Tlustos,** ÖWF Media Officer Deputy
Telephone: +43 (0)699 81304844
Email: reinhard.tlustos@oewf.org

# 2. Mission Description

AMADEE-18 is a Mars simulation mission led by the Austrian Space Forum in partnership with the Oman National Steering Committee and international research organizations. The four-week mission will take place in the Oman desert during February 2018 and will serve as an analog to prepare future manned missions to the planet Mars.

## AMADEE-18 OBJECTIVE AND INTENT:

- Study and test (under mars analog conditions) equipment, procedures and workflows that could be used on future manned missions.
- Provide a platform to test and evaluate life detection or geophysical techniques, rover mobility on Mars analog terrain and situational awareness of remote support teams
- Studying the test site as a model region for Martian deserts and extreme life within
- Serve as an outreach platform to enhance visibility and raise interest in planetary sciences

## MARS ANALOG FIELD SIMULATION IN OMAN

"*The purpose of a Mars simulation on Earth is to prepare for future crewed missions on the Red Planet. To perform the experiments, the OeWF is one of the five research groups worldwide to develop the prototype spacesuit "Aouda" which is worn by OeWF's Analog-Astronauts during its mission. In the Dhofar region in Oman we have found the perfect site for AMADEE-18*", says Dr. Gernot Grömer, President of the Austrian Space Forum and head of the expedition.

"*The Sultanate of Oman is proud to be selected as the host country for Austrian Space Forum's Mars Analog Mission. This project will open up a host of opportunities for those who have a passion for space, to develop an active and independent networking space association with a broad range of activities and experiences. It will enable them to connect with a global network of space scientists*," states Prof.Sheikh Al Khattab Ghalib Al Hinai, Vice Chairman of the State Council of Oman, Chairman of National Steering Committee for AMADEE-18.

The Austrian Space Forum will conduct its Mars simulation in partnership with Oman Astronomical Society and with active and valuable contributions from several governmental and specialized entities represented in AMADEE-18 National Steering Committee.



ÖSTERREICHISCHES WELTRAUM FORUM
AUSTRIAN SPACE FORUM
Sillufer 3a
6020 Innsbruck
info@oewf.org
oewf.org
DVR-Nr. 4012062 | ZVR 900838754
UID/VAT ATU66428902

## SCIENCE AND TECHNOLOGY


The science and technology deployed for the AMADEE-18 mission consist of a number of experiments proposedby numerous international research entities. In an extensive peer review process, the most promising instruments and workflows were selected. The experiments focus on geosciences, engineering, planetary surface operations, human factors and life sciences, including astrobiology.

Mission operation aspects, space suits and robotic systems, as well as flight planning and remote science support workflows pertinent to complex missions including delayed communication are also covered.

Observers from industry, space agencies and academia are welcome to witness AMADEE-18 first hand during two professional observer days at the mission support center and virtually.

## ANALOG ASTRONAUTS

The analog astronauts selected for this mission are carefully selected and trained to execute most of the science field activities. They also act as a public face and represent the mission as STEM-Ambassadors for media and educational activities.

The analog astronauts train to conduct spaceflight-simulation in Mars-like regions on earth, testing and evaluating procedures as well as human factors and workflows pertinent to human mars exploration.

They conduct experiments in field campaigns in an international and interdisciplinary environment, typically lasting from a few days up to one month. Analog astronauts contribute to the development of space suit simulators and many other relevant instruments and equipment.



ÖSTERREICHISCHES WELTRAUM FORUM
AUSTRIAN SPACE FORUM
Sillufer 3a
6020 Innsbruck
info@oewf.org
oewf.org
DVR-Nr. 4012062 | ZVR 900838754
UID/VAT ATU66428902

## MISSION LEADERSHIP

The AMADEE-18 is led by the Austrian Space Forum; the mission itself is managed by a Mission Support Center team based in the city of Innsbruck, Austria. This team emulates the Ground Segment of the mission, including a 10-min time delay between Oman and Austria, mimicking the signal-travel time between Mars and Earth.

The field crew will be comprised of 15 individuals (including the analog astronauts) from 8 countries.

### AMADEE-18 FLIGHT DIRECTORS

*Laura Zanardini*

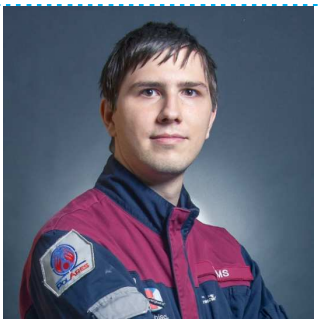
*Alexander Soucek*
*(Lead FLIGHT)*

*Simone Paternostro*

*Reinhard Tlustos*

### AMADEE-18 FIELD COMMANDERS


*Gernot Groemer*
*(Field Commander)*



*Sebastian Sams*
*(Deputy Field CDR)*


*Joao Lousada*
*(Deputy Field CDR)*



ÖSTERREICHISCHES WELTRAUM FORUM
AUSTRIAN SPACE FORUM
Sillufer 3a
6020 Innsbruck
info@oewf.org
oewf.org
DVR-Nr. 4012062 | ZVR 900838754
UID/VAT ATU66428902

# 3. Experiment Overview:

| FIELD | EXPERIMENT | ORGANISATION | DESCRIPTION |
|---|---|---|---|
| Astrobiology | **HortExtreme** | Italian Space Agency | Mobile and inflatable green house with hydroponics, to be used for the cultivation of microgreens. |
| Human Factors | **FATIGUE** | Medical University of Vienna, Austria, Dep. of Anaesthesia | Analysing physical and mental fatigue of Analog Astronauts |
| Human Factors | **TEAM** | Western University, Canada, Dep. of Psychology & Mission Control Space Services | Study on the level and fluctuation, over time, of team cohesion, conflict and performance and determination of "person" factors (e.g. personality) |
| Human Factors | **CHRONOS** | SWPS University of Social Sciences and Humanities, Poland | Investigating if time of day has an impact on efficiency of the functioning of working memory and the effectiveness of actions |
| Human Factors | **MSTAT** | Ben Gurion University, Earth and Planetary Imaging Facility | The situational awareness training aims to simulate two separated groups of astronauts on Mars |
| Human Factors | **SIT-AS** | University of Witten/Herdecke, Germany | Examination of the situational awareness in and between co-working |
| Human Factors | **MIMIC** | TU Graz, Austria, Signal Processing and Speech Communication Laboratory | A computerized analysis of verbal communication to study the mechanisms of psychological and physiological adaptation or maladaptation in extreme or stressful environments. |
| Material Science | **WARTOG** | Final Frontier Design, USA | Investigation of the abrasion of final frontier's space suit glove outer layer |
| Software | **THESEOS** | Mission Control Space Services, Canada | Deployment of the Autonomous Soil Assessment System (ASAS) on a tele-operated planetary rover prototype |



ÖSTERREICHISCHES WELTRAUM FORUM
AUSTRIAN SPACE FORUM
Sillufer 3a
6020 Innsbruck
info@oewf.org
oewf.org
DVR-Nr. 4012062 | ZVR 900838754
UID/VAT ATU66428902

| | | | |
|---|---|---|---|
| Virtual Reality | **V(R)ITAGO** | Mars Planet, Italy | Virtual Reality tool for astronaut training and to aid the RSS (Remote Science Support) team in analyzing geological features. |
| Robotics | **HUSKY** | TU Graz, Austria Institute of Software Technology | An autonomous rover that supports astronauts and aids in area mapping |
| Robotics | **AVI-NAV** | Institute of Smart System Technology, Alpe-Adria Univ. Klagenfurt, Austria | Drone with vertical take-off and landing capabilities for efficient area exploration and low latency visual feedback to the crew or/and ground personnel |
| Geoscience | **SCANMARS** | Università degli Studi di Perugia (Italy) - Dipartimento di Fisica e Geologia&Istituto di Astrofisica e Planetologia Spaziali (IAPS) | Subsurface Characterization of a Martian Analog through 2D/3D Ground Penetrating Radar datasets |
| Geoscience | **FIELD SPECTROMETRY** | Italian Space Agency (ASI/URS) | Acquisition of reflectance and radiance spectra in an environment analogous to Mars |
| JUNIOR ESEARCHERS PROGRAM | **WATER EXPLORER** | Um Alkhair school, Oman | Water detection via a geophone mounted on a rover, which measures thereflection of ultrasound waves |
| | **TUMBLEWEED** | Sir Karl Popper school, Vienna, Austria | A wind propelled compact rover to be used for efficient Mars exploration |
| | **A3DPT MARS** | TU Graz, Austria & Texas A&M University | 3D printing operational workflow experiments for crewed Mars expeditions |
| | **EOS** | HTL Eisenstadt, Austria | Radio Navigation System for EVAs on GPS- less planet |

## 4. OeWF's Analog Astronauts:



ÖSTERREICHISCHES WELTRAUM FORUM
AUSTRIAN SPACE FORUM
Sillufer 3a
6020 Innsbruck
info@oewf.org
oewf.org
DVR-Nr. 4012062 | ZVR 900838754
UID/VAT ATU66428902

## STEFAN DOBROVOLNY, MD


Analog Astronaut class of 2015,
**Mars-Simulations:** AMADEE-15, > 13 EVA h

**Career:** Born 1990, originally from Mürzsteg, Austria he studied medicine at the Medical University in Vienna. In his free time he is volunteering as paramedic at the Red Cross Austria as well as at the Austrian Mountain Rescue Team, where he is not only in charge of the medical training and of medical equipment but also is trained Squad Leader. He speaks German, English, as well as some Swedish and Spanish.

## CARMEN KÖHLER, PHD


Analog Astronaut class of 2015,
**Mars-Simulations:** AMADEE-15, > 14 EVA h

**Career:** Born in Berlin, Germany, in 1980. She is a graduate of the German-American High School in Berlin, afterwards studying Mathematics and Meteorology at the Free University of Berlin. In 2014 she completed her PhD thesis magna cum laude on cloud ice particle nucleation. Currently, Carmen Köhler is a researcher at i-EM (Intelligence in Energy Management) in Livorno, Italy. i-EM supports her work as an analog astronaut. In 2014 she did a course in Constructive Conflict Management. She is fluent in German and English and speaks French.

## KARTIK KUMAR, MSC


Analog Astronaut class of 2015,
**Mars-Simulations:** AMADEE-15, > 22 EVA h

**Career:** Born in Bangalore, India, 1984 but is a Dutch native. Kartik holds a Master in Aerospace Engineering at the TU Delft with honours and cum laude. He was awarded “TU Delft Aerospace Engineering Best Graduate 2008” and “NvVL (Dutch National Aeronautical Society) Best Graduate 2008”. Presently he works as researcher for the Stardust Programme, developing robust GNC strategies for Active Space Debris Monitoring and Removal and NEO deflection. He is fluent in English, Dutch and Tamil and has speaks Italian, Spanish, French and German.



ÖSTERREICHISCHES WELTRAUM FORUM
AUSTRIAN SPACE FORUM
Sillufer 3a
6020 Innsbruck
info@oewf.org
oewf.org
DVR-Nr. 4012062 | ZVR 900838754
UID/VAT ATU66428902

## JOÃO LOUSADA, MSC


Analog Astronaut class of 2015,
**Mars-Simulations:** AMADEE-15, > 17 EVA h

**Career:** Born in Portugal in 1989. He studied Aerospace Engineering in Lisbon, doing his master thesis at the University of Victoria, Canada, on satellite attitude determination and control. Presently he works as Electrical Assembly, Integration and Testing Engineer for the Meteosat Third Generation Project for ESA at OHB System AG in Bremen, Germany. João is fluent in English, Spanish and Portuguese and speaks German and French.

## IÑIGO MUÑOZ ELORZA, MSC


Analog Astronaut class of 2015,
**Mars-Simulations:** AMADEE-15, > 25 EVA h

**Career:** Born in Spain in 1979. He studied Economics in Karlsruhe, Germany and Aerospace Engineering in Madrid, Spain working on high-power hall effect thrusters for satellites. Initially he served as Operation Engineer at EUSOC, Madrid, where he was responsible for preparation and real time operation of several experiments onboard the Columbus module (ISS). Presently he works for HE Space Operations GmbH, serving as Galileo Mission Operations Preparation Engineer at DLR GfR (Galileo Control Centre) in Weßling. Iñigo is fluent in Spanish, German, English and speaks Italian.



ÖSTERREICHISCHES WELTRAUM FORUM
AUSTRIAN SPACE FORUM
Sillufer 3a
6020 Innsbruck
info@oewf.org
oewf.org
DVR-Nr. 4012062 | ZVR 900838754
UID/VAT ATU66428902

# 5. The Austrian Space Forum

The Austrian Space Forum (ÖsterreichischesWeltraum Forum, OeWF) is a national network for aerospace engineers, scientists and people with a passion for space. The citizen-science organization is involved in leading-edge space exploration research and serves as a communication platform between the space sector and the public; it is embedded in a global network of specialists from the space industry, research and policy.

Hence, the Austrian Space Forum facilitates a strengthening of the Austrian space sector through enhancing the public visibility of space activities, technical workshops and conferences as well as Forum-related projects.

The Forum has a small, but highly active pool of professional members contributing to space endeavours, mostly in cooperation with other - national as well as international - space organizations. The spectrum of our activities ranges from simple classroom presentations to 15,000-visitor space exhibitions, from expert reports for the Austrian Federal Ministry for Technology to space technology transfer activities for terrestrial applications.

In summary, the Austrian Space Forum is...

- a volunteer space organization, led by space professionals,
- focusing on space research (e.g. human-robotic Mars exploration) and outreach/education,
- an independent organisation funded via research projects, donations and outreach activities.

## We are the Austrian Space Network.

**www.oewf.org**

facebook.com/spaceforum
twitter.com/oewf
instagram.com/oewf_org
youtube.com/oewf



ÖSTERREICHISCHES WELTRAUM FORUM
AUSTRIAN SPACE FORUM
Sillufer 3a
6020 Innsbruck
info@oewf.org
oewf.org
DVR-Nr. 4012062 | ZVR 900838754
UID/VAT ATU66428902