



**Austrian Space Forum
(OeWF)**

AMADEE-20 & Exploration Cascade

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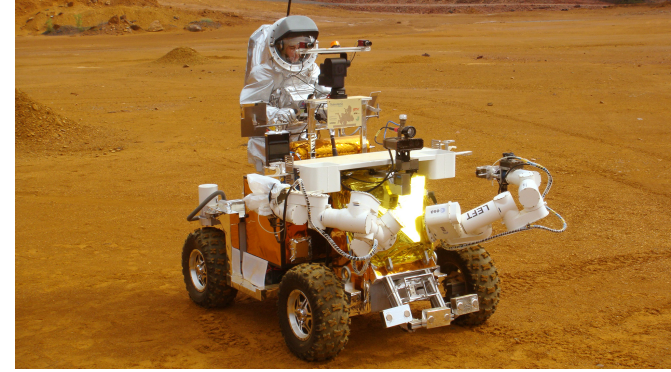
ÖSTERREICHISCHES WELTRAUM FORUM
AUSTRIAN SPACE FORUM

oewf.org

The Austrian Space Forum

Research organization since 1998, citizen science institution led by professionals (220 members), has led 12 international Mars analog expeditions

- **Hardware**
 - AOUDA-SERENITY spacesuit simulators
 - Mars analog rovers
- **Research**
 - Planetary surface operations
 - Optimizing remote science support
- **International Mars simulations**
 - International collaboration for space exploration



The Austrian Space Forum



- 12 Mars Analog Field Campaigns
 - PolAres
 - AMADEE

- > 750 hours simulated EVA*

*Extravehicular Activity

- > 100 peer-review selected experiments

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What are **Analog Missions**?

Analog mission are the activities and field tests occurred on Earth in different environments to simulate aspects of future space missions on different planetary bodies.

OeWF performs the Analog Missions

To investigate the potential of...

...instruments

...workflows

...materials

...human factors



Image Credit: OeWF

Example



Image Credit: OeWF

1st Mars analog rover „Sisi“
at MDRS* during AustroMars

*MARS Desert Research Station

NASA's Curiosity Mars rover
at the "Rock Hall" drill site,
located on Vera Rubin Ridge.

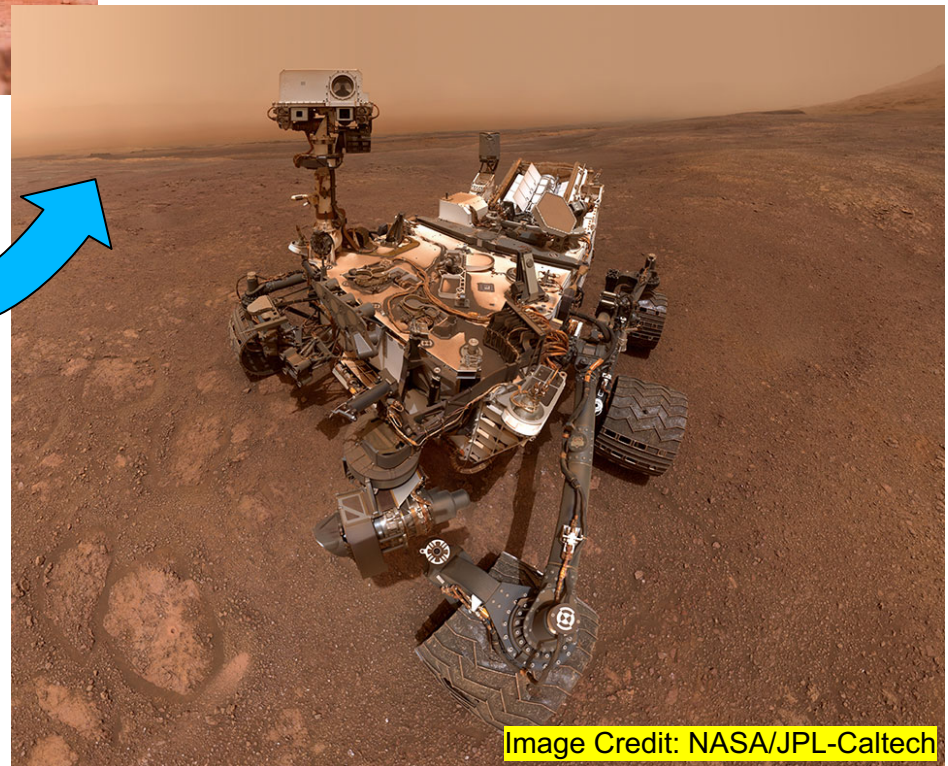


Image Credit: NASA/JPL-Caltech

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AMADEE Program

Greater fidelity, more simulation and
strong focus on life detection

**We are in preparation for future
MARS MISSIONS**

The AMADEE-20 Mars Simulation



- **WHERE?**

- Ramon Crater, Negev Desert, Israel

- **WHEN?**

- 15 October -15 November 2020

- **AIMS**

- Studying equipment behavior, e.g. robotic tools, instrument deployment
- Testing life-detection or geoscientific techniques
- Evolving “Know-how” on crewed planetary missions



Ramon Crater

Image Credit: OeWF



Mars

Image Credit: NASA

AMADEE-20 Mission Architecture



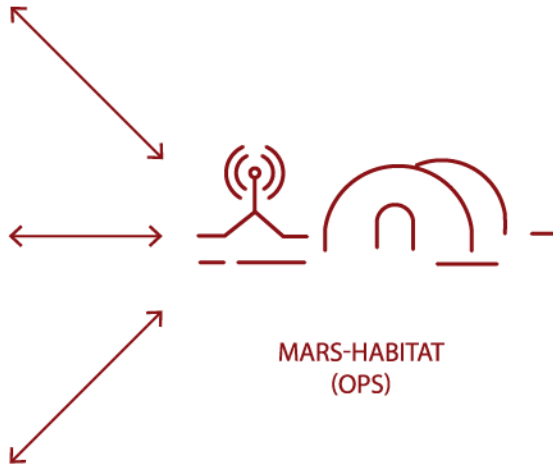
EXPERIMENT 1



EXPERIMENT 2



EXPERIMENT 3



MARS-HABITAT
(OPS)

10 MIN
COM-DELAY



MISSION SUPPORT CENTER
(MSC)



EXPERIMENT
TEAM 1



EXPERIMENT
TEAM 2



EXPERIMENT
TEAM 3

AMADEE-20 Mission Architecture

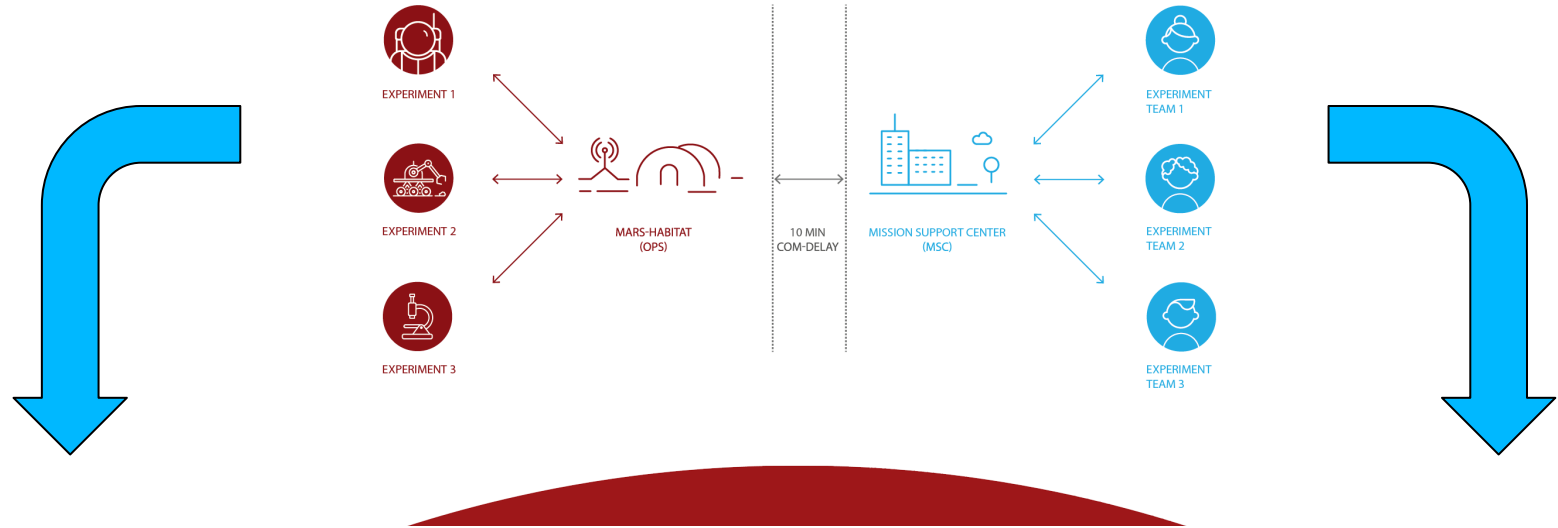


Image Credit: OeWF



AMADEE-18, Desert of Dhofar/Oman

Image Credit: OeWF



Mission Support Center, Innsbruck/Austria



The AMADEE-20 Experiments



The crew will conduct experiments preparing for future human Mars missions in the fields of

- engineering,
- planetary surface operations,
- astrobiology,
- geosciences,
- life sciences
- medical applications



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The AMADEE-20 Experiments



Engineering / Robotics



- AEROSCAN
- AMAZE
- EXOSCOT
- MEROP
- TUMBLEWEED

Image Credit: NASA

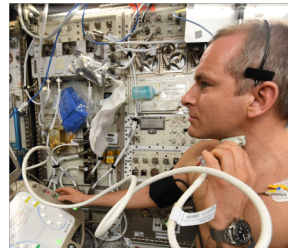
Human-Robot Interactions



- SHARE
- HUMAN

Image Credit: Project MOONWALK

Health Sciences



- ACT
- MSG
- MOVE
- PSYCHSCALE
- VFR-eFAST

Image Credit: NASA

Life Sciences



- MICROBIOME
- MICRO-POTENTIAL

Image Credit: Adam Arkin-UCB

Geosciences



- GEOS
- SANDEE

Image Credit: OeWF

The Exploration Cascade

The AMADEE-20 Exploration Cascade (A20-EC) constitutes an algorithm defining an efficient deployment sequence, providing the framework for the following question:

“which instrument needs to be active where and when, leading to what kind of data sets, leading to what kind of knowledge, leading to which type of input for the tactical flight planning”,

to detect the impacts of environmental dynamics, infrastructure limitations, instrument anomalies, human factors and data processing pipeline limitations on each time period of the mission.

The Scientific Aim of A20-EC

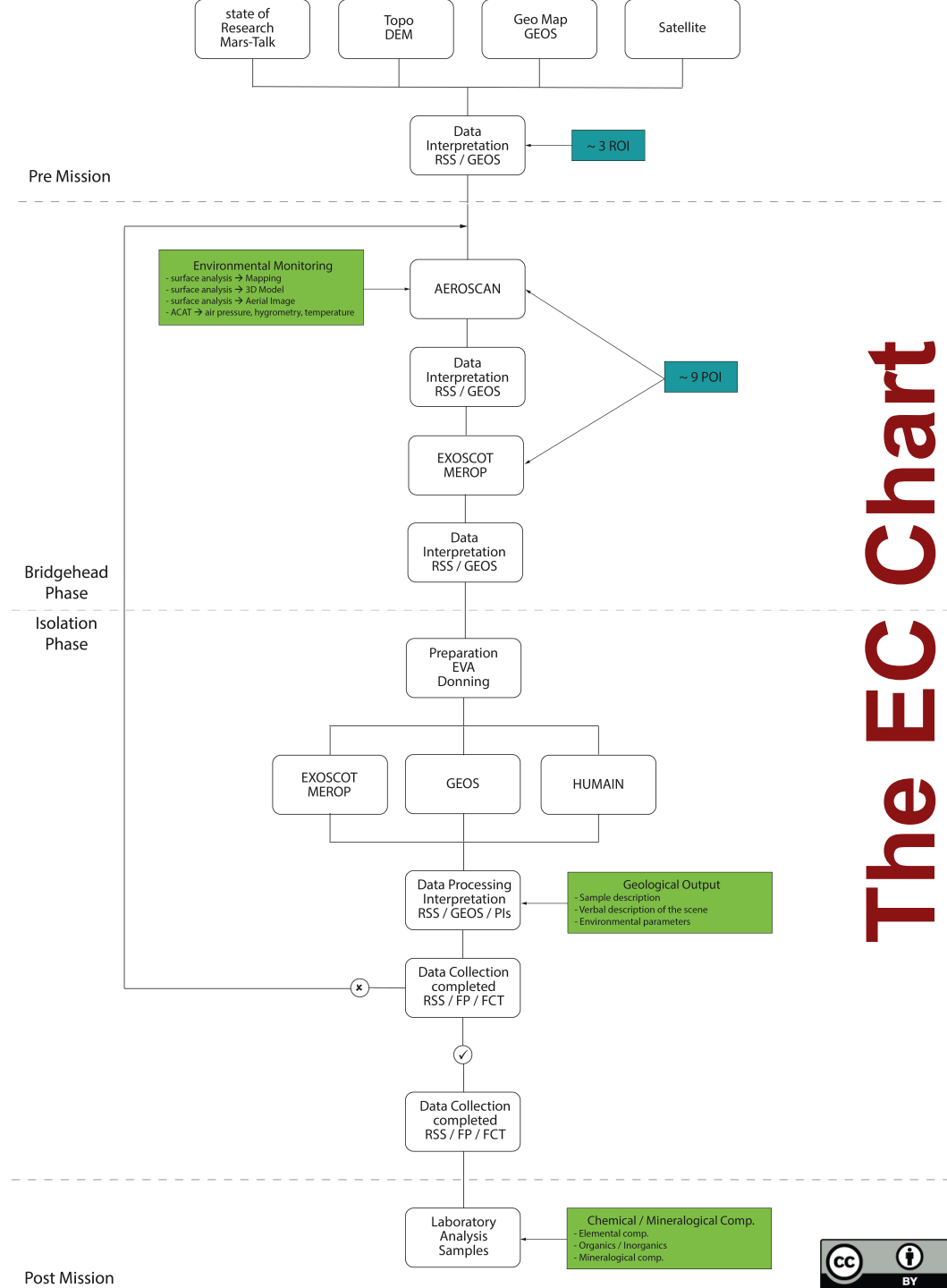
- ✓ Being a one of the selection criteria for experiment proposals at pre-mission phase
- ✓ Creating a network between different science experiments based on similar data flow
- ✓ Combining multiple scientific applications in order to:
 - study **the geology** of the test site (e.g. perform field work and following petrographic and geochemical analysis, define previous environment(s), enlighten the geological history of the area)
 - obtain what **forms of life** have been present or did dominate the different periods of time
- ✓ Identifying and analyzing **lessons learned** for the future missions

Pre Mission activities provide information needed to formulate the missions first hypothesis – to narrow down the area of interest and to finally define the missions Region of Interest (ROI)

Bridgehead- / Isolation phase activities focus on (1) the definition of ~9 POI (Point of Interest) and in further consequence on (2) EVA (Extra Vehicular Activities)

- **ROI:** approx. 3 ROI will be defined within the geological map
- **POI:** approx. 9 POI will be defined during this phase, by performing pre- rover and drone missions
- **EVA:** at each confirmed POI one EVA will be performed for the planned experiments

Post Mission activities focus on laboratory analysis of the taken sand- and rock samples.



← → ↺ 🏠 <https://mission.oewf.org/archive/bin/view/Main/#> 🔍 :oming mars missions

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🏠 / OeWF Multi-Mission Data Archive

OeWF Multi-Mission Data Archive


Last modified by [Olivia Haider](#) on 2018/04/21 20:14

Welcome to the multi-mission Science Data Archive of the Austrian Space Forum.


This archive contains information about the scientific and engineering experiments of our field missions, the type and quantity of data collected as well as information about the Principal Investigators and how to contact them.

For questions, please send us a message via the [Contact Us](#) link.

Missions



2018 AMADEE-18
Location: Dhofar region, Oman
Duration: 01-28Feb 2018
[Science Archive AMADEE-18](#)



2017 Aouda Test Campaign 17C
Location: Tirol, Austria
Duration: 21Aug2017

Show tour

<https://mission.oewf.org/archive>



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The Cliff Reconnaissance Vehicle: A Tool to Improve Astronaut Exploration Efficiency

Alain Souchier

Important information about conditions that existed
tions, the Association Planète Mars (Franc
mented vehicles capable of being
ssance Vehicle (CRV) or
g project in M
stability

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The MARS2013 Mars Analog Mission

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Christoph Ragonig,¹ Sebastian Sams,¹ Thomas Bartenstein,¹ Sandra Häußlik-Maueh,^{1,3}
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¹Acta Astronautica 94 (2014) 736–748



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Scientific results and lessons learned from an integrated crewed Mars exploration simulation at the Rio Tinto Mars analogue site ☆

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ARTICLE

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the framework of the PolAres programme
of the Aouda.X spacesuit simulator was co
southern Spain. The field crew was suppo
'C) in Innsbruck, Austria. The field teleme





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