



Insights into Austrian Space Forum and Analog Missions



Dr. Seda Özdemir-Fritz

ÖSTERREICHISCHES WELTRAUM FORUM
AUSTRIAN SPACE FORUM







The Austrian Space Forum

Research organization since 1998, citizen science institution led by professionals (220 members), has led 13 international Mars analog expeditions



- **Hardware**

- AOUDA-SERENITY spacesuit simulators
- Mars analog rovers

- **Research**

- Planetary surface operations
- Optimizing remote science support
- Educational Outreaches

- **International Mars simulations**

- International collaboration for space exploration



esa -Projects

European Space Agency

PexTex
Raumanzugtextilien-Materialforschung



BACTeRMA
Biologische Textilbehandlung



DEAR (eg mit OHB)
Mondstaub & Mechanismen



EU Projects

LaScil



ÖWF Flight Projects



ÖWF Robotics



The Austrian Space Forum



- 13 Mars Analog Field Campaigns

- Field-Test 1-**Comissioning** - July 2009, Kramsach, Austria
- Field-Test 2-**Pasterze-Glacier**, August 2009, Austria
- Field-Test 3-**Cryo-Test**, September 2009, Seefeld, Austria
- Field-Test 4-**Eifel-region**, September 2009, Germany
- Field-Test 5-**Koppenbrueeller-Cave**, January 2010, Austria
- Field-Test 6-**Innsbruck**, May 2010, Austria
- Field-Test 7-**Kaunertal Glacier**, July 2010, Austria
- Field-Test 8-**Rio Tinto Integrated Sim**, April 2011, Spain
- Field-Test 9-**Dachstein Ice Caves**, May 2012, Austria
- Field-Test 10-**MARS2013**, February 2013, Morocco
- Field Test 11-**AMADEE-15 Glacier**, August 2015, Austria
- Field Test 12-**AMADEE-18 Dhofar**, February 2018, Oman
- Field Test 13-**AMADEE-20 Negev Desert**, October 2021, Israel

- > 750 hours simulated EVA*

*Extravehicular Activity

- > 200 peer-review selected experiments

ÖWF



wf.org

Image Credits: OeWF

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



oewf.org

Image Credit: OeWF



Image Credit: OeWF

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

*MARS Desert Research Station

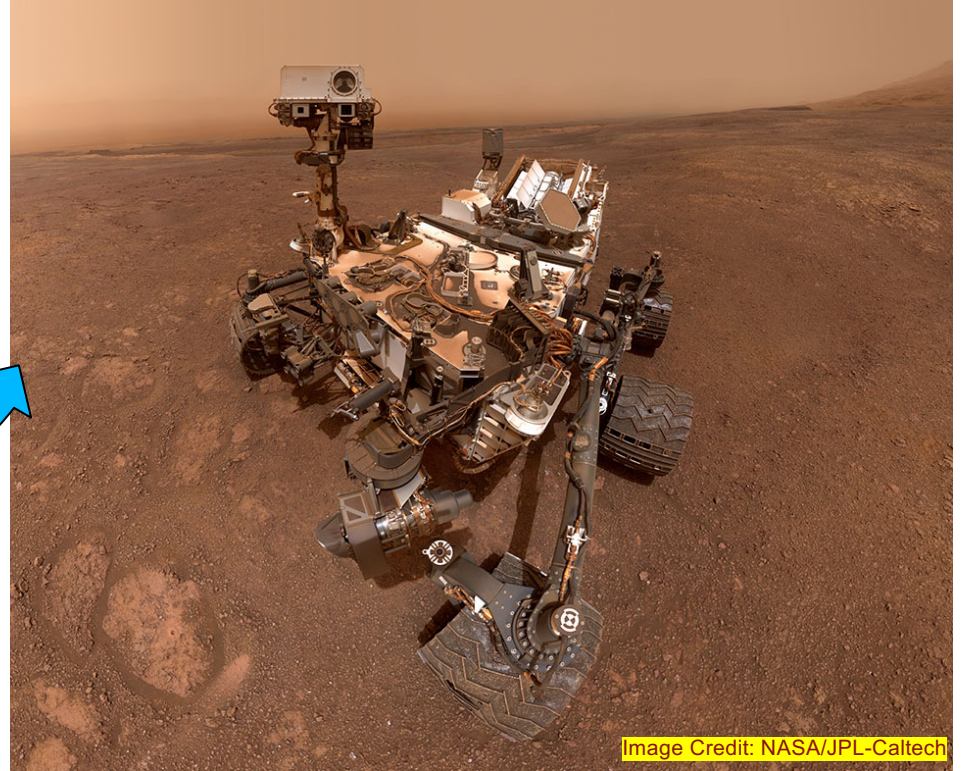
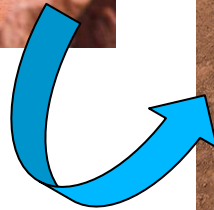
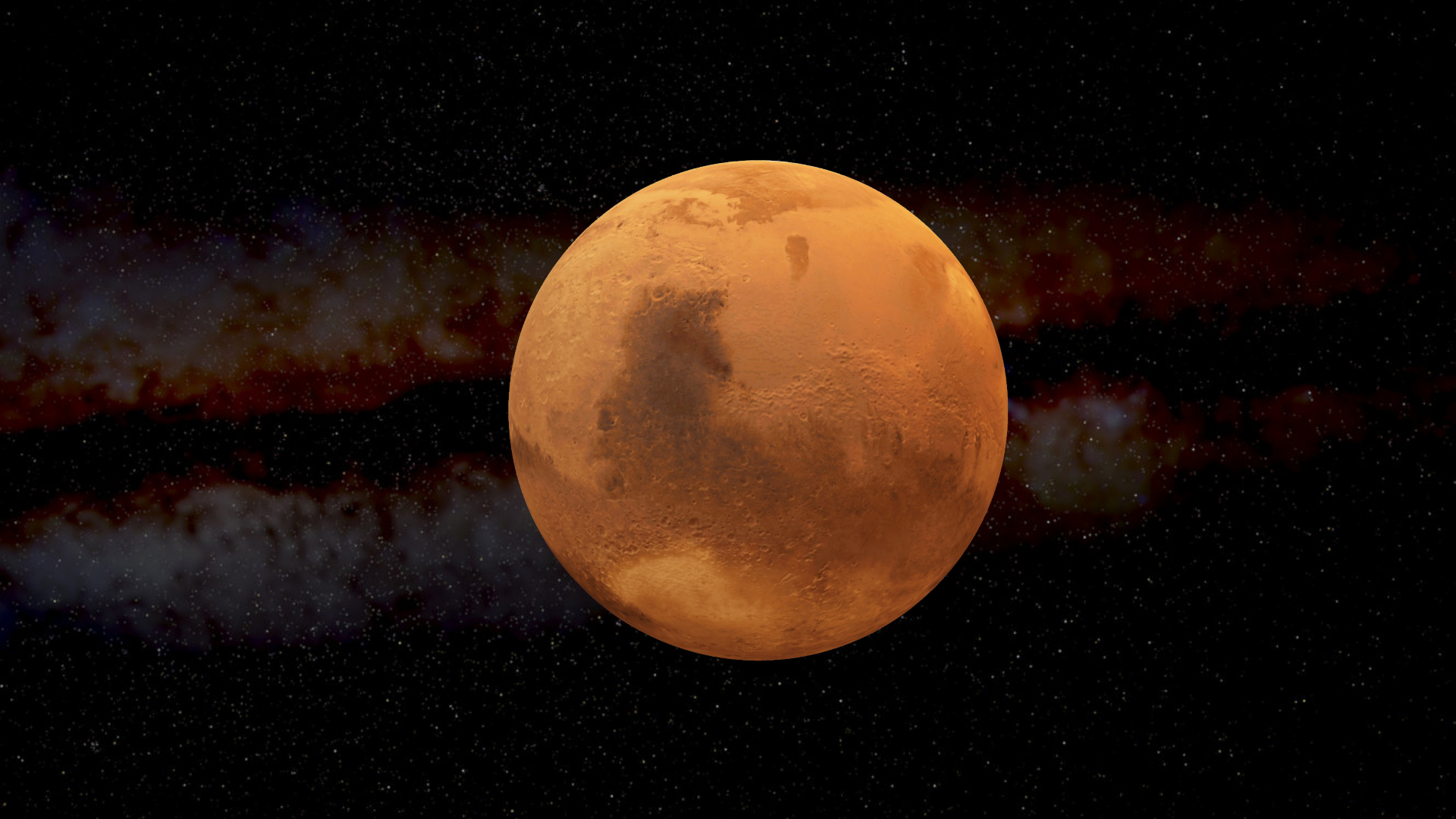
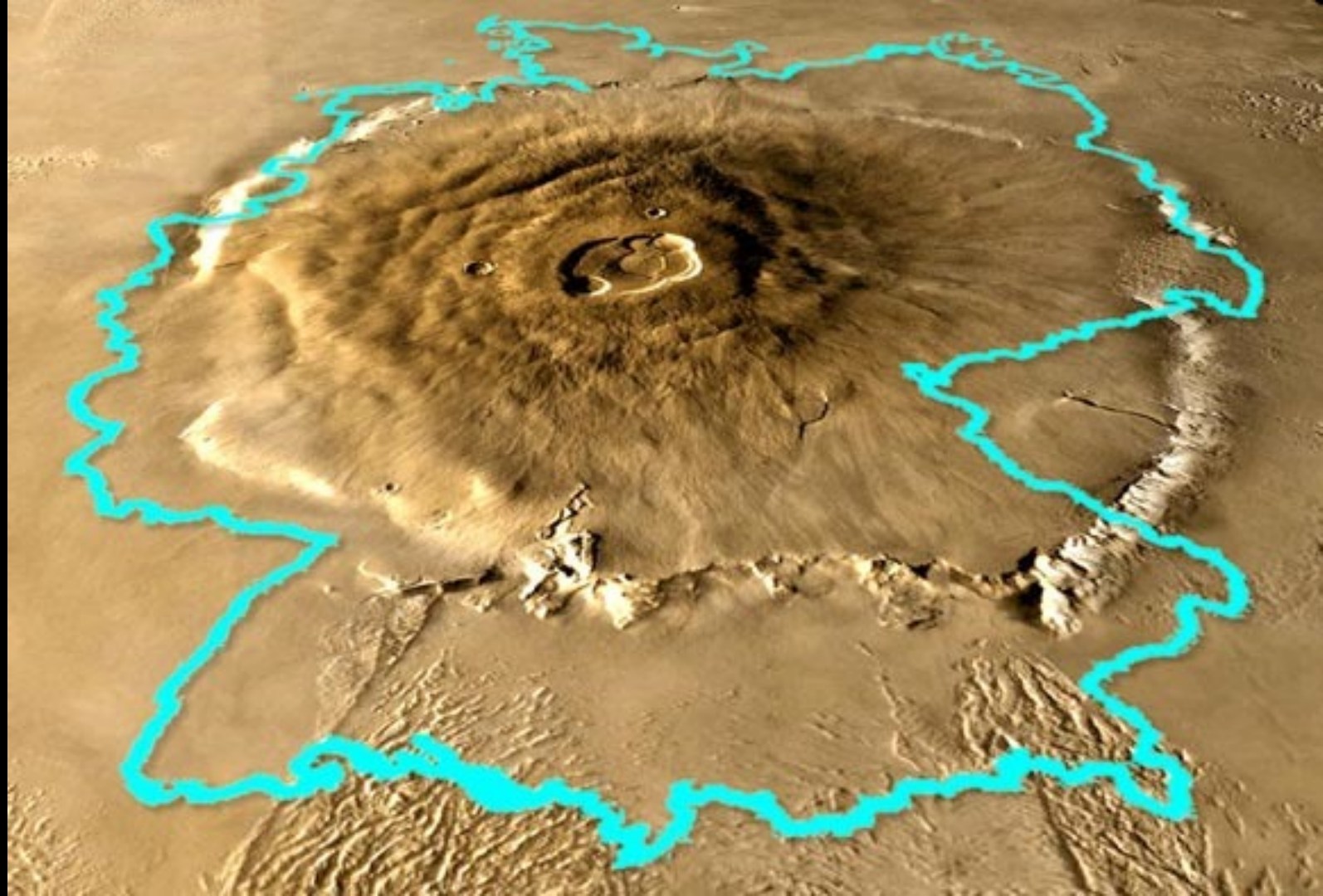


Image Credit: NASA/JPL-Caltech

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









AMADEE-18

25 nations, 200 team members,
15 experiments





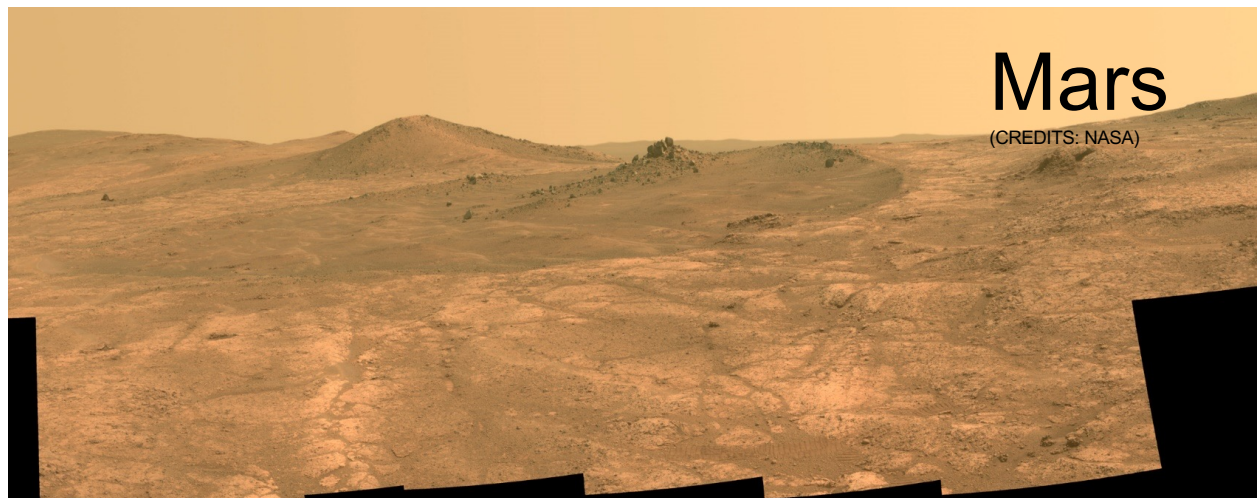
AMADEE-18 test site

ÖWF



Oman

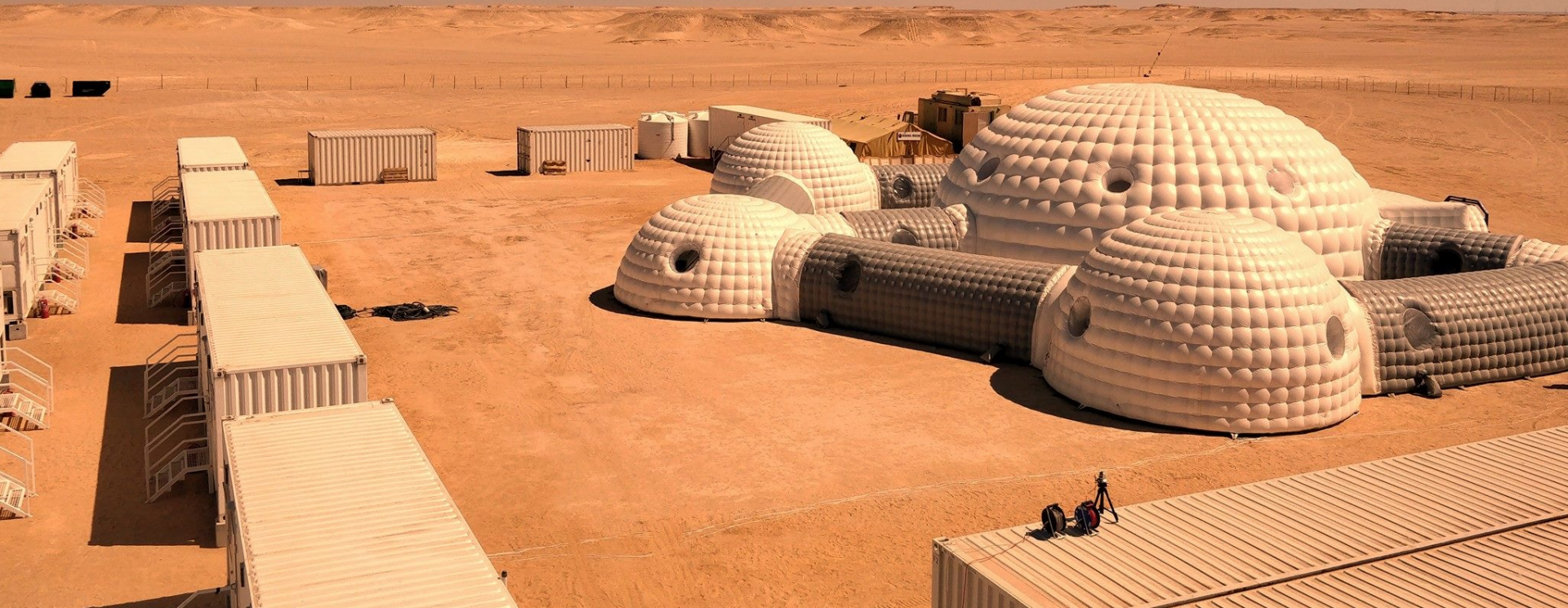
(CREDITS: ÖEWF)



Mars

(CREDITS: NASA)

Austrian Space Forum
Kepler Station, Dhofar desert/Oman





AMADEE-20

25 rations, 210 researchers and
volunteers, 24 Experiments





Image Credit: OeWF



Ramon Crater



Image Credit: NASA

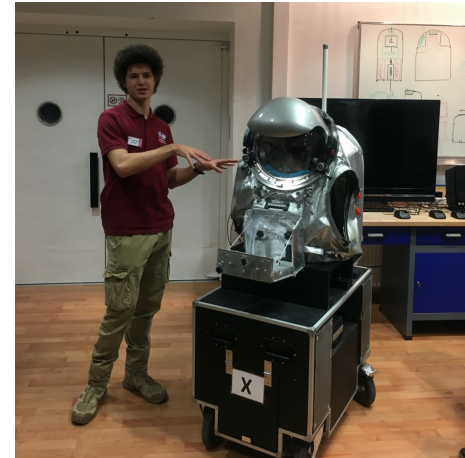
Mars

oewf.org

Analog Astronaut Training

SELECTION PROCESS

- 3 stages of selection
- 637 parameters evaluated
- Physical, psychological, social, mental tests.







Cryotests at -110°C



6 MV Tesla-Coil

Analog Astronaut Training

COURSE

- Astronomy & Planetology
- Geology & Astrobiology
- Space flight
- Spacesuit & equipment
- First Aid
- Navigation / Outdoor
- Physical training & education
- Space Psychology
- Organization structure & Mission planning
- Public speaking



Analog Astronaut Training

MISSION SPECIFIC TRAINING:

- 5 Dress Rehearsals 2020+2021
- Experiments – protocols and equipment
- Team building and simulations









E FORUM
LABORATORY



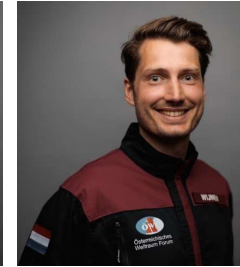
AOUDA.X
RESEARCHER

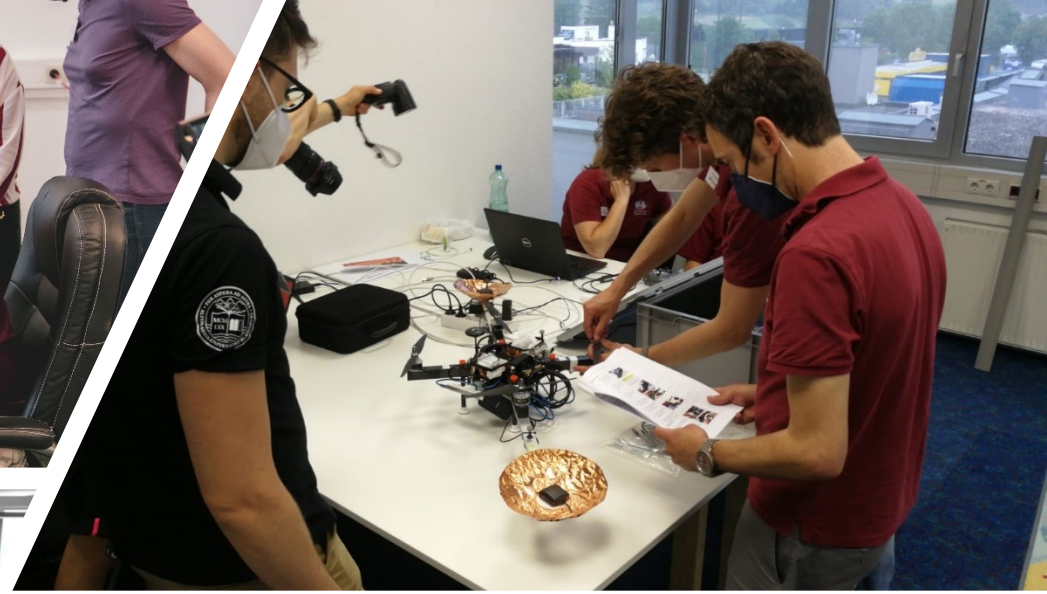
AUSTRIAN SPACE FORUM
SPACESUIT LABORATORY



The Flight Crew

- **Field Commander:** João Lousada (Portugal)
- **Dep. Field Commander:** Iñigo Muñoz-Elorza (Spain)
- **Analog Astronauts:**
 - Anika Mehlis (Germany)
 - Alon Tenzer (Israel)
 - Thomas Wijnen (The Netherlands)
 - Robert Wild (Austria)





Dress Rehearsals I-IV



AMADEE-20

- 04-31 October 2021 @ Negev-Desert
- 6 Analog Astronauts
- 24 peer-reviewed experiments;
Geoscience, Robotics & Human Factors
- 210 Researchers and volunteers



#simulateMars
#AMADEE20
#ExploringTomorrow





The AMADEE-20 Experiments



The crew will conduct 21 experiments preparing for future human Mars missions in the fields of



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





E-18 – Feb 2018, Oman

EXPERIMENT 1



EXPERIMENT 2



EXPERIMENT 3



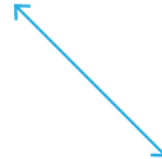
MARS-HABITAT
(OPS)



10 MIN
COM-DELAY



MISSION SUPPORT CENTER
(MSC)



EXPERIMENT
TEAM 1

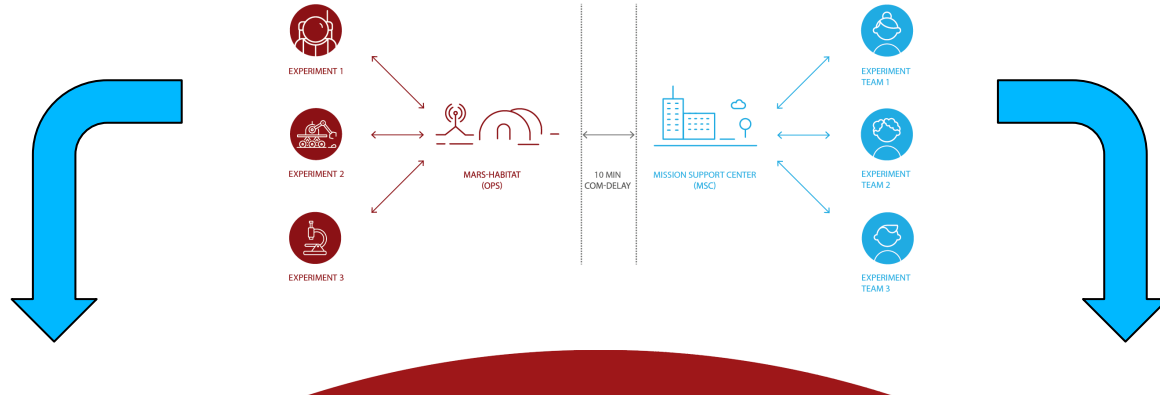


EXPERIMENT
TEAM 2



EXPERIMENT
TEAM 3

AMADEE-20 Mission Architecture



ÖWF

AMADEE-18, Desert of Dhofar/Oman



Mission Support Center, Innsbruck/Austria

Image Credit: OeWF

Mission Support Center

„Earth“

EINGANG NORD
→ → →

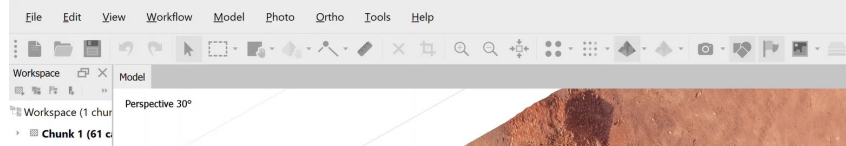




Habitat Negev-Desert

„Mars“





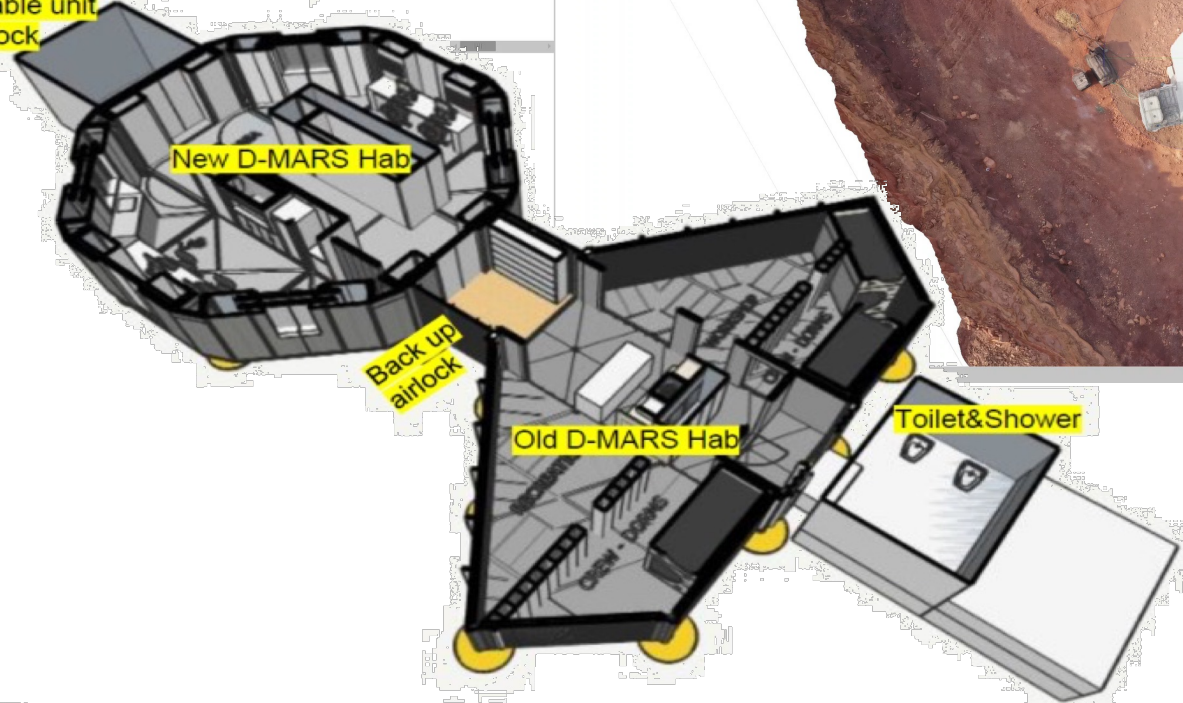
Portable unit
Air-lock

New D-MARS Hab

Back up
airlock

Old D-MARS Hab

Toilet & Shower





Gebrüder Weiss
Transport and Logistics



Weiss
Transport and Logistics







Boots On The Ground

Challenges & Learnings:

- Time Delayed Comm
- Flight Plan (training vs. reality)
- Malfunctions
- Isolation Protocol
- Scientific Output

Preparation/Set-up, Donning
Travel and Traverse
Scientific Experiments (Suit) Support
Safety
Doffing/Packing, Checking/Repairs
Permanently Stationing
All Hands Activity
Media

color for separation lines



Thu, 21-Oct-2021	UTC	02:00	03:00	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12:00
Mission Day 18	UTC+2 (MSC)	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00			
	UTC+3 (Field)	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12:00			
PERSON:	POSITION:											
Irigo Muñoz Elorza	Aouda X				Donning			AMAZE	Dofting SCI	IGH	lun&VAS	
Thomas Wilren	Aouda S				Donning			AMAZE	MicroPotential (w/ROVO for resting)			
Alon Tenzer	SoOps								Suit Ops and Communication			
Anka Mehlis	OPS				Support Donning & Photo for DEAR				Suit Ops & Comm	Housekeeping	lun&VAS	
João Lousada	CREW CDR	Housek.			MarsLock Preparation / Support Donning				Doft DEAR	MEROP troubleshooting	lun&VAS	
Robert Wild	Flight Crew	Housek.			Support Donning				VL Sep/Doft	Housek.	Leisure	lun&VAS
Judith Kummel	OSS				Breakfast	Shifting	TTF	Ranger1	WiFi On	Ranger1	Leisure	Safety A.S
Deepa Raju	OSS / SafetyS				Breakfast	Shifting	TTF	Ranger1	WiFi On	Ranger1	Leisure	Safety A.S
Marlene Cherrault	MEDO / SafetyS				Breakfast	Shifting	TTF	Ranger1	WiFi On	Ranger1	Leisure	Safety A.S
Florian Voggeneder	OSS CDR											lunch
Danny Mattes	OSS											lunch
Christian Schwarz	OSS / SafetyX											lunch
Michael Bergthold	OSS											lunch
Dominik Jäger	OSS											lunch
Simone Paternostro	OSS											lunch
Mikhail Ryazanskiy	OSS											lunch
OSO D-Mars Logistics												lunch
Car 1												
Car 2												
Ranger 1												
Ranger 2												

Abbreviations: MB-full = microbiome full sampling
 Brief&VAS = Briefing & MSG VAS questionnaire (takes 1 minute)
 lun&VAS = Lunch & MSG VAS questionnaire (takes 1 minute)

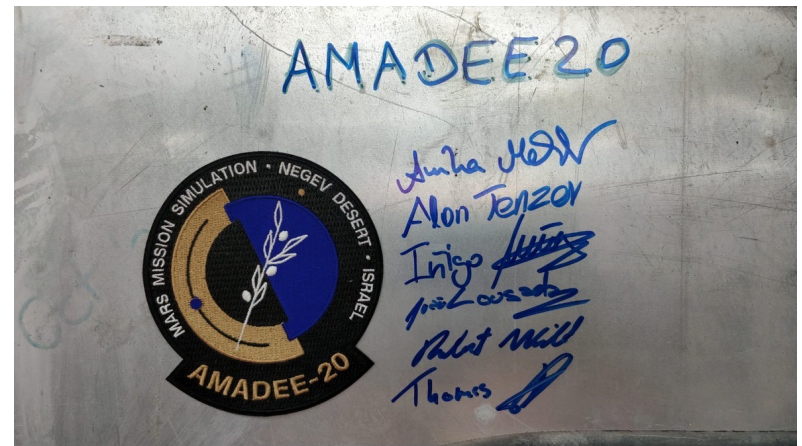
SCI = Suit cleaning
 VL = VideoLog



The Road Ahead

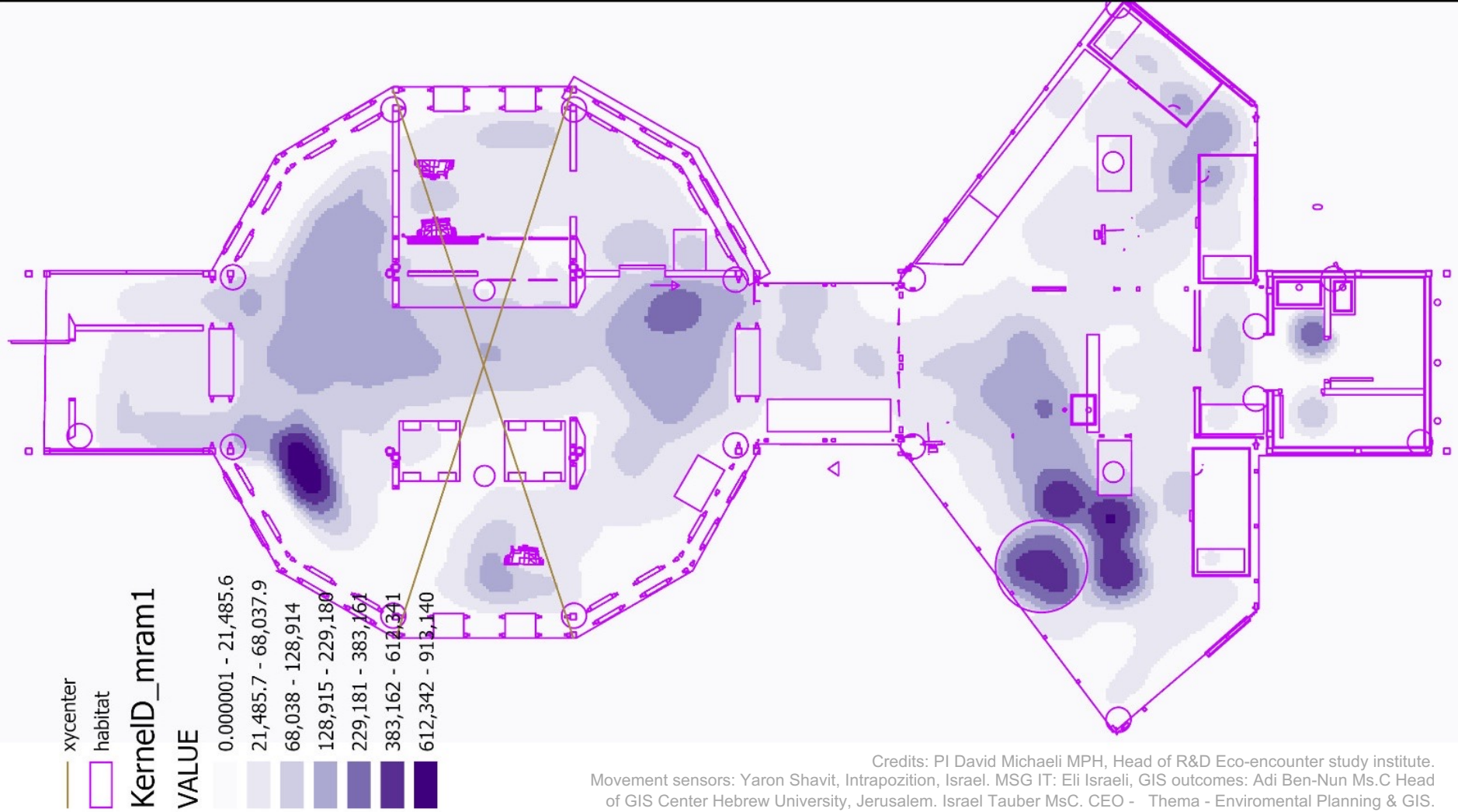
Using the valuable experience to develop:

- Analog missions hub
- STEM education
- International Collaborations
- Testing ground for Science & Technologies



Personal Aspirations

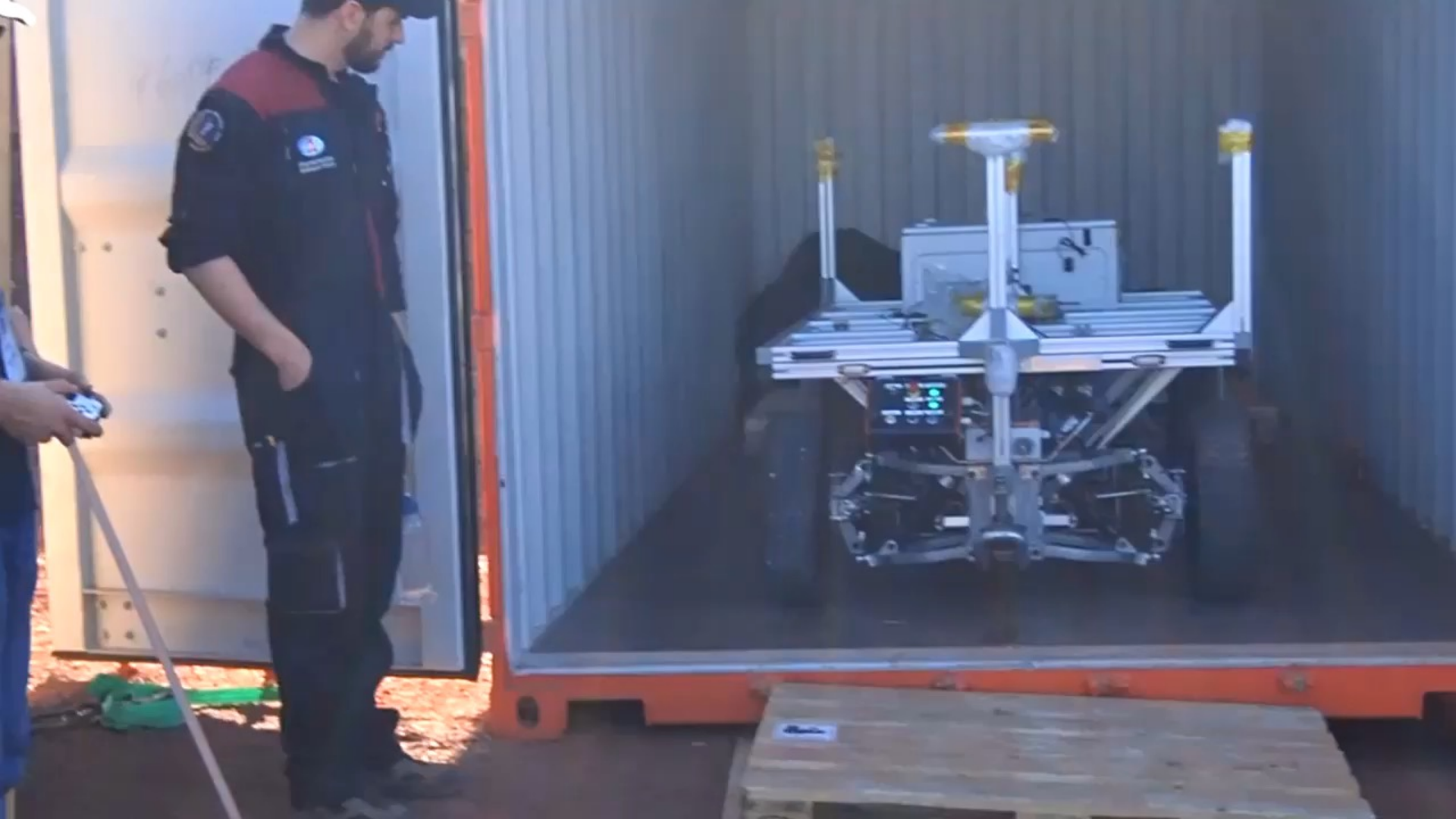




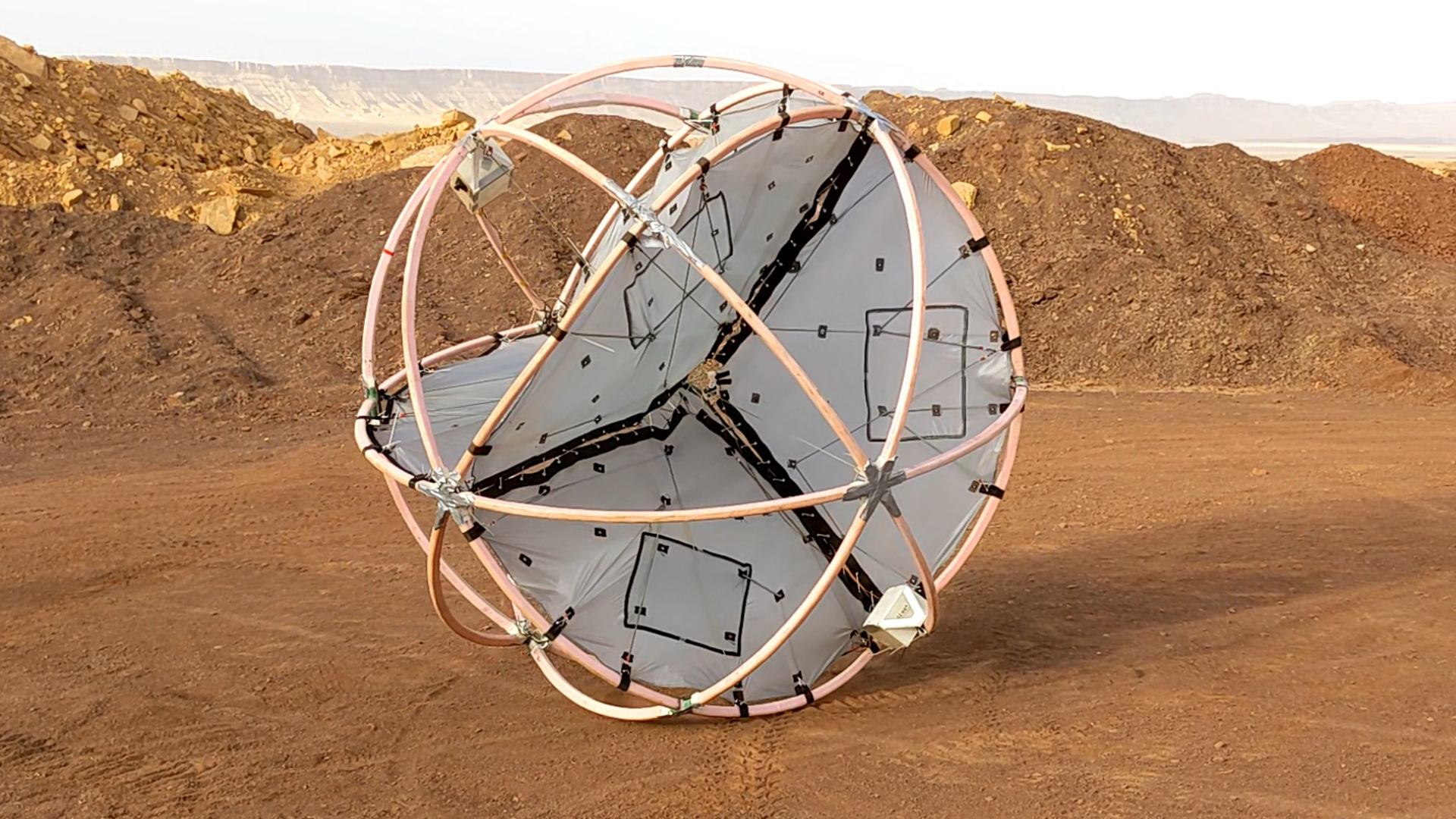












https://mission.owef.org/archive/bin/view/Main/#

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 tou

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



ASTROBIOLOGY
Volume 14, Number 5, 2014
© Mary Ann Liebert, Inc.
DOI: 10.1089/ast.2013.1070

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

Alain Souchier

...important information about conditions that existed
...the Association Planète Mars (France)
...vehicles capable of being
...ance Vehicle (CRV) or
...project in M
...abilit

ÖWF



AST-2013-1062-ver9-Groemer_1P
Type: research-article
Research Article

The MARS2013 Mars Analog Mission

Gernot Groemer,¹ Alexander Soucek,^{1,2} Norbert Frischauf,¹ Willibald Stumptner,¹
Christoph Ragonig,¹ Sebastian Sams,¹ Thomas Bartenstein,¹ Sandra Häudlik-Meisner,^{1,3}
Polina Petrova,³ Simon Fuchs,⁴



Contents lists available at ScienceDirect

Acta Astronautica

journal homepage: www.elsevier.com/locate/actaastro



...the MARS2013
...conducted
...by a Mission
...real time, pro
...ce suit sim
...network flo
...ers for ro
...ellite coi
...t. The
...ce, ex
...serv
...ear

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

Csilla Gerno

^a Editvös Lor
^b Konkoly A
^c Austrian Sp
^d Institute of

ARTICLE

Article history:
Received 28 Fe
Received in rev
28 August 2013



...the framework of the PolAres programme of the Austrian
...of the AoudaX spacesuit simulator was conducted at the
...southern Spain. The field crew was supported by a full-
...°C) in Innsbruck, Austria. The field telemetry data were

oewf.org

A RIDLEY SCOTT FILM

BRING

HIM

HOME

MATT DAMON

THE MARTIAN

MUSIC BY HARRY GREGSON-WILLIAMS PRODUCED BY SIMON KINBERG RIDLEY SCOTT MICHAEL SCHAEFER ADITYA SOOD MARK HUFFAM

REAL D 3D
DIGITAL 3D

IMAX

BASED UPON
THE NOVEL BY ANDY WEIR

SCREENPLAY BY
DREW GODDARD

DIRECTED BY
RIDLEY SCOTT

#TheMartian
TheMartianMovie.com

NOVEMBER

WARNER BROS. PICTURES
DOLBY DIGITAL
DOLBY DIGITAL
DOLBY DIGITAL





Wir ermöglichen
die Leidenschaft Weltraum
zu leben.

Seda Özdemir-Fritz/ seda.ozdemirfritz@oewf.org

facebook.com/spaceforum

twitter.com/oewf

instagram.com/oewf_org

[#simulateMars](https://twitter.com/simulateMars)

[#AMADEE20](https://twitter.com/AMADEE20)

[#ExploringTomorrow](https://twitter.com/ExploringTomorrow)

ÖWF





THANK YOU!

facebook.com/spaceforum

twitter.com/oewf

instagram.com/oewf_org

ÖWF



oewf.org