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AUSTRIAN SPACE FORUM

FEB 2018 - DHOFAR REGION, SULTANATE OF OMAN

AMADEE-18
Final Report

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Contents

1. AMADEE-18 AT A GLANCE 5
The AMADEE-18 Test Site in Oman 5

2. IMPORTANT CONTACT COORDINATES 7
2.1. A18 leadership 7
2.2. MSC Flight Directors & Field Commanders 7
2.3. OeWF key personnel 8
2.4. Oman National Steering Committee 8

3. TIMELINE AND MILESTONES 9
3.1. MoU Signing Ceremony Muscat 10
3.2. AMADEE-18 Timeline 11

4. CAMPAIGN SITE: THE DHOFAR REGION 13
4.1. General geological descriptions: 13
4.2. Climate and Environmental records 13
4.3. Hazards 14
4.4. Analog features Oman and Mars 14
4.5. Visual impressions from the test site 16

5. MISSION SUPPORT CENTER 17
5.1. MSC rooms 18
5.2. MSC organization and positions 19
5.3. Standard Operating Procedures 23

6. MSC ORGANIZATION AND WORKFLOWS 24
6.1. Physical layout of the Mission Support Center 24
6.2. Communication pathways from outside to the MSC and Field 25

7. KEPLER STATION OMAN & FIELD INFRASTRUCTURE 26
7.1. Base station layout 26
7.2. Medical provisions & Security 26
7.3. Mobility & Vehicles 27
7.4. Communication with/within the field 28

8. FIELD CREW 29
8.1. Field Commander (FC) 29
8.2. Operations Station (OPS) 29
8.3. SCIOPS (“Field Science Officer”) 30

8.4. Medical Officer (MEDO) & SAFETY 30
8.5. Quartermaster 30
8.6. Analog astronauts 30

9. EXPERIMENT OVERVIEWS 31
9.1. Peer-review selected experiments 31
9.2. Junior explorers' experiments 32
9.3. Non peer-review selected experiments 33
9.4. Exploration Cascade 33

10. EXPERIMENT DESCRIPTIONS 35
10.1. MIMIC 35
10.2. TEAM 36
10.3. A3DPT-2-Mars 39
10.4. AVI-NAV 40
10.5. EOS 41
10.6. Fatigue 42
10.7. Hortextreme 43
10.8. HUSKY Autonomous Rover 46
10.9. MSTAT 48
10.10. SITAS 50
10.11. Field spectrometry 53
10.12. Water explorer experiment 54
10.13. Tumbleweed 55
10.14. V(R)ITAGO 57
10.15. ScanMars 59

11. AS-WAS DAILY ACTIVITY PLAN 61

12. EDUCATION ACTIVITIES 123
12.1. Junior Researchers Program 123
12.2. Kids2Mars program 123
12.3. AMADEE-18 expedition outlets 124
12.4. Audioversum Science Center Program 125
12.5. Planetarium Vienna lecture series 125
12.6. Ars Electronica Center Linz program 126
12.7. Oman official Kepler station site visits 127

13. INDUSTRIAL PARTNERS 128
13.1. OeWF Partners (Europe and US) 128
13.2. Omani Partners 129

14. MEDIA ACTIVITIES 130

14.1. AMADEE-18 KEY MESSAGES 132
14.2. Social Media 132
14.3. Numbers/Stats 133
14.4. Complementary Outreach and Media activities 137
14.5. National Media review (Best of) 138
14.6. AMADEE-18 TV – national (best of) 140
14.7. Media international (best of) 142
14.8. Best of AMADEE-18 in TV 147

Photos in this report were taken by the expedition photographer Florian Voggeneder unless stated otherwise.

1. AMADEE-18 at a glance

In February 2018, the Austrian Space Forum, in cooperation with the Oman Astronomical Society conducted an integrated Mars analog field simulation in the Dhofar region, Sultanate of Oman. Directed by a Mission Support Center in Austria, a small field crew performed experiments preparing for future human Mars missions in the fields of engineering, planetary surface operations, astrobiology, geophysics/geology, life sciences and other.

Conducting field research in a representative environment is an excellent tool to gain operational experience and understand the advantages and limitations of remote science operations on other planetary bodies. AMADEE-18 (in short "A-18") was designed to …

- be an opportunity to study equipment, procedures and workflows under Mars analog conditions with humans-in-the-loop.
- serve as a platform for testing life-detection or geophysical techniques, terrain tests for rovers and increase the situational awareness of remote support teams,
- study the test site as a model region for Martian deserts and extreme life,
- enhance the visibility of planetary sciences

The field mission took place between 01-28Feb2018. Based upon 12 preceeding Mars analog missions, the Austrian Space Forum has established a mission support infrastructure, trained and certified flight controllers and field crew members as well as a programmatic roadmap to implement a coherent strategy.

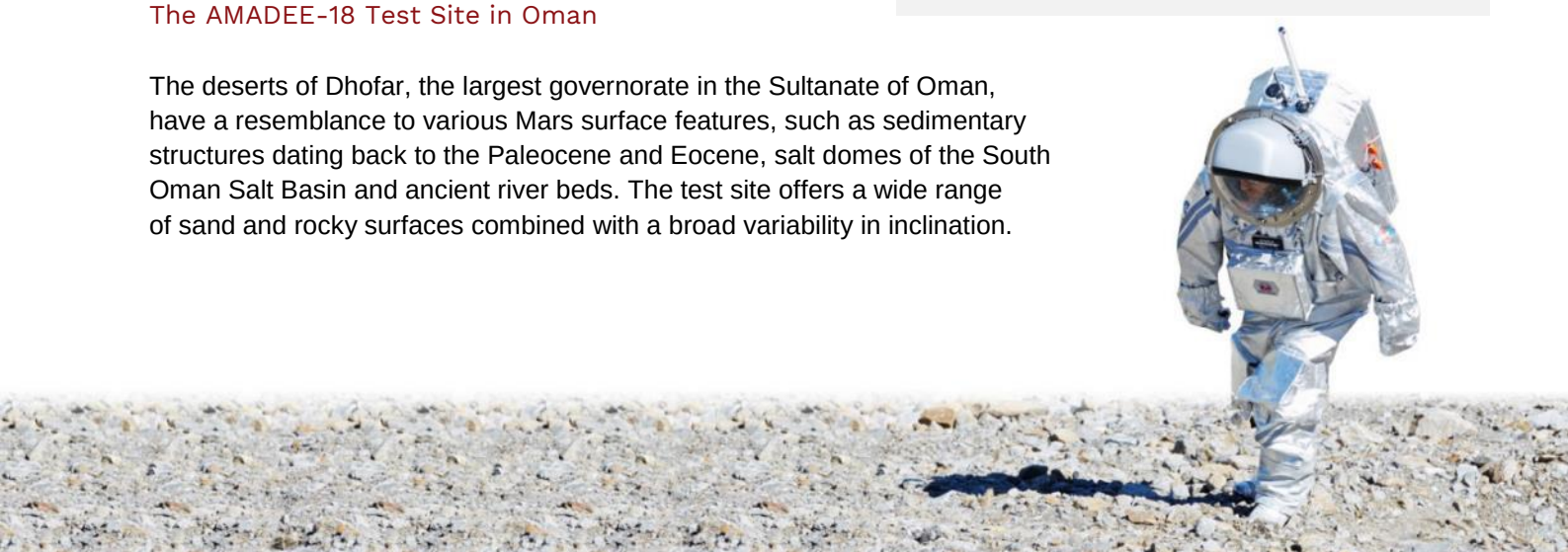
Field activities were scheduled through a "flight plan", supported by a remote science team and directed by flight controllers at the Mission Support Center in Austria.

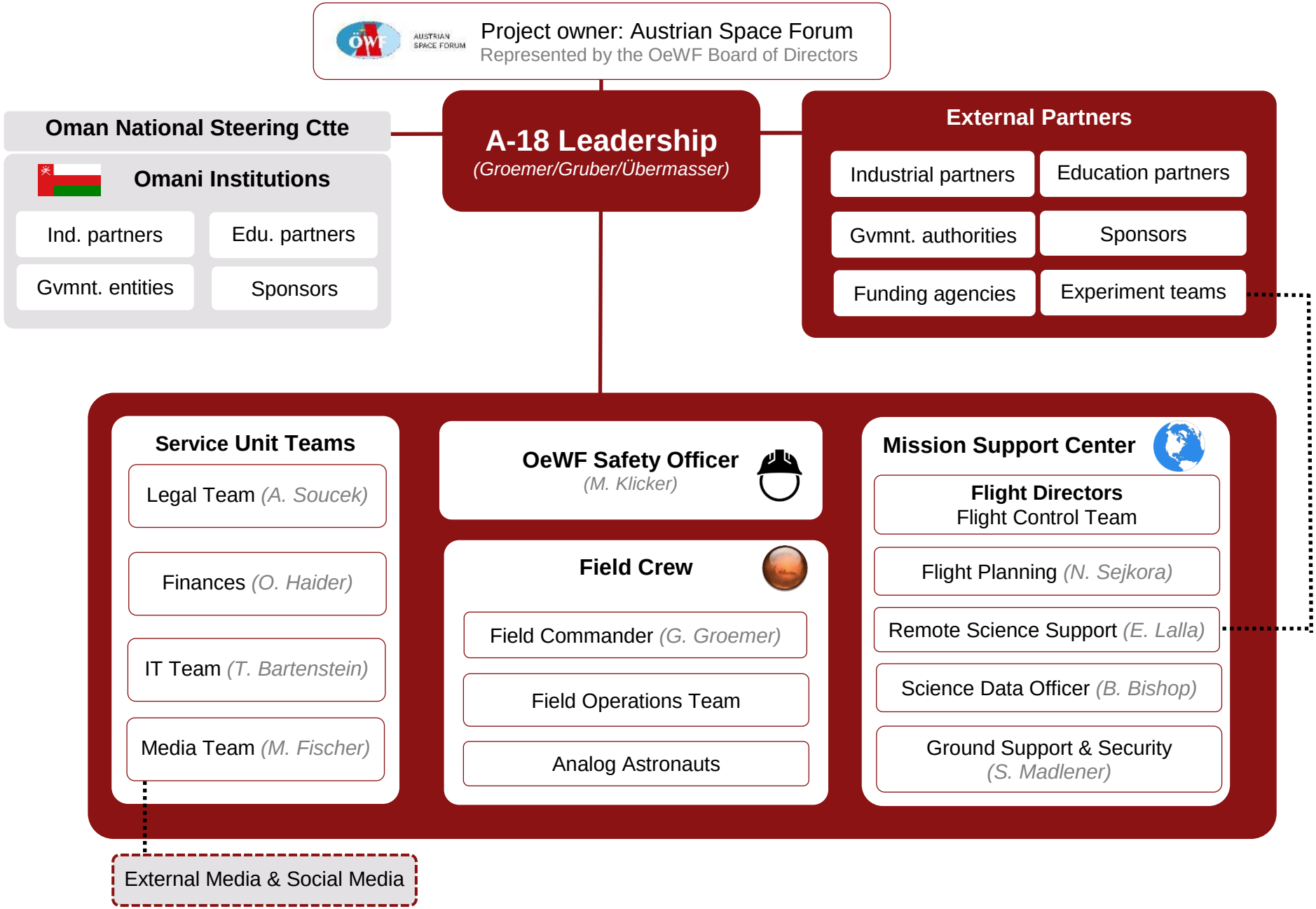
- 15Jul2017: Announcement of experiment selection
- 08-10Sep2017: A-18 Qualification & Operations Rehearsal (infrastructure training)
- 03-05Nov2017: A-18 Procedure & Contingency Dress Rehearsal
- 08-10Dec2017: A-18 Scientific Dress Rehearsal (science training)
- 01Feb-28Feb2018: A-18 Mission
- 08Feb2018: A-18 "Landing Day"
- 25-27May2018: A-18 Science Workshop

Location of the AMADEE-18 test site

The AMADEE-18 Test Site in Oman

The deserts of Dhofar, the largest governorate in the Sultanate of Oman, have a resemblance to various Mars surface features, such as sedimentary structures dating back to the Paleocene and Eocene, salt domes of the South Oman Salt Basin and ancient river beds. The test site offers a wide range of sand and rocky surfaces combined with a broad variability in inclination.




Project owner: Austrian Space Forum
Represented by the OeWF Board of Directors
A-18 Leadership
(Groemer/Gruber/Übermasser)
Oman National Steering Ctte
Omani Institutions
Ind. partners
Edu. partners
Gvmnt. entities
Sponsors
External Partners
Industrial partners
Education partners
Gvmnt. authorities
Sponsors
Funding agencies
Experiment teams
Service Unit Teams
Legal Team (A. Soucek)
Finances (O. Haider)
IT Team (T. Bartenstein)
Media Team (M. Fischer)
OeWF Safety Officer
(M. Klicker)
Field Crew
Field Commander (G. Groemer)
Field Operations Team
Analog Astronauts
Mission Support Center
Flight Directors
Flight Control Team
Flight Planning (N. Sejkora)
Remote Science Support (E. Lalla)
Science Data Officer (B. Bishop)
Ground Support & Security
(S. Madlener)
External Media & Social Media

2. Important contact coordinates

Do not share this contact information outside the project – especially do NOT pass on this information to media representatives, private individuals or other organizations without prior consulting the leadership. We kindly request all experimenters, MSC personnel and industrial partners, to channel any inquiry between Oman (especially regulatory, customs and immigration authorities) and Austria via the leadership team to ensure a single-point-of-contact.

Physical address of the OeWF Spacesuit Laboratory & Mission Support Center:

Österreichisches Weltraum Forum / Austrian Space Forum
Sillufer 3a, 6020 Innsbruck
Austria

Mission website: amadee18.oewf.org

2.1. A18 leadership

Name	Affiliation	Email & Telephone number
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Sophie Gruber	OeWF	Sophie.gruber@oewf.org
Stefan Uebermasser	OeWF	Stefan.uebermasser@oewf.org

2.2. MSC Flight Directors & Field Commanders

Name	Position	Email & Telephone number
Alexander Soucek	Lead FD	Alexander.soucek@oewf.org
Laura Zanardini	FD	Laura.zanardini@oewf.org
Reinhard Tlustos	FD	Reinhard.tlustos@oewf.org
Simone Paternostro	FD	Simone.paternostro@oewf.org
Willibald Stumtner	FD	Willibald.stumptner@oewf.org
Gernot Groemer	Field CDR	Gernot.groemer@oewf.org
Joao Lousada	Dpty Field CDR	Joao.lousada@oewf.org
Sebastian Sams	Dpty Field CDR	Sebastian.sams@oewf.org

2.3. OeWF key personnel

Name	Position	Email & Telephone number
Nina Sejkora *Dpty: Silvio de Carvalho*	Flight Planning	Nina.sejkora@oewf.org
Emmanuel Lalla *Dpty: Christine Czakler*	Remote Science Support	Emmanuel.lalla@oewf.org
Monika Fischer *Dpty: Reinhard Tlustos*	Media team lead	Monika.fischer@oewf.org
Olivia Haider	Social media team lead	Olivia.haider@oewf.org
Rudolf Albrecht	OeWF International Relations at UNCOPOUS	Rudolf.albrecht@oewf.org

2.4. Oman National Steering Committee

Name	Position	Email & Telephone number
Khattab Al Hinai	VP State Council of Oman	Khattabghalib@me.com
Saleh Al Shidhani	Oman Astronomical Society, president	Shidhani@falakoman.org
Osama Al Busaidi	Project manager Oman National Steering Ctte	Osama.albusaidi@gmail.com

The following ministries were involved in AMADEE-18

- Ministry of Defense
- Ministry of Tourism
- Ministry of Higher Education

3. Timeline and Milestones

As for the field operations, the schedule was as follows:

Before 30Nov2017	Experiment Hardware arrived in Innsbruck/Austria for inspection, clearance, crew operations and contingency training and the Dress Rehearsal III
19+20Dec2017	Shipment left Innsbruck; ca 4 weeks' transit time, ca 1 week in customs, ca 3 days for deployment at the test site.
29Jan2018	Transfer Crew to Oman (2 nights in Mascat)
31Jan2018	Transfer to base station, arrival early afternoon
01Feb2018	Ground operational & begin of bridgehead phase
08Feb2018	Landing Day & begin of isolation phase; non-essential crews left base station
28Feb2018	Demobilization Base station
01Mar2018	Transfer Crew to Mascat
02/03Mar2018	Transfer Crew to Europe
Apr/May2018	Hardware arrives back in Innsbruck/Austria and re-distribution to PI's starts
25-27May2018	AMADEE-18 Science Workshop, Graz University of Technology, Austria

SHIPMENT AUSTRIA-OMAN

MSC ELOANE Voy. 752E
ETD Bremerhaven 30Dec2017
Arrival Salalah 17Jan2018

The shipment was significantly delayed due to a severe storm in the Atlantic, where 40 containers were lost. The ELOANE arrived at Salalah harbor on 31Jan2018 and –thanks to the significant support of DB Schenker and the Oman National Steering Ctte as well as the Royal Oman Policy's Customs Department, left almost immediatey for the test site. The containers finally arrived on the 02Feb2018 at Kepler Station.

SHIPMENT OMAN-AUSTRIA

MAERSK SALTORO" Voy. 1804
ETD Salalah 08 Mar2018
ETA Bremerhaven 26 Mar2018
ETA Innsbruck: first half of Apr2018

3.1. MoU Signing Ceremony Muscat

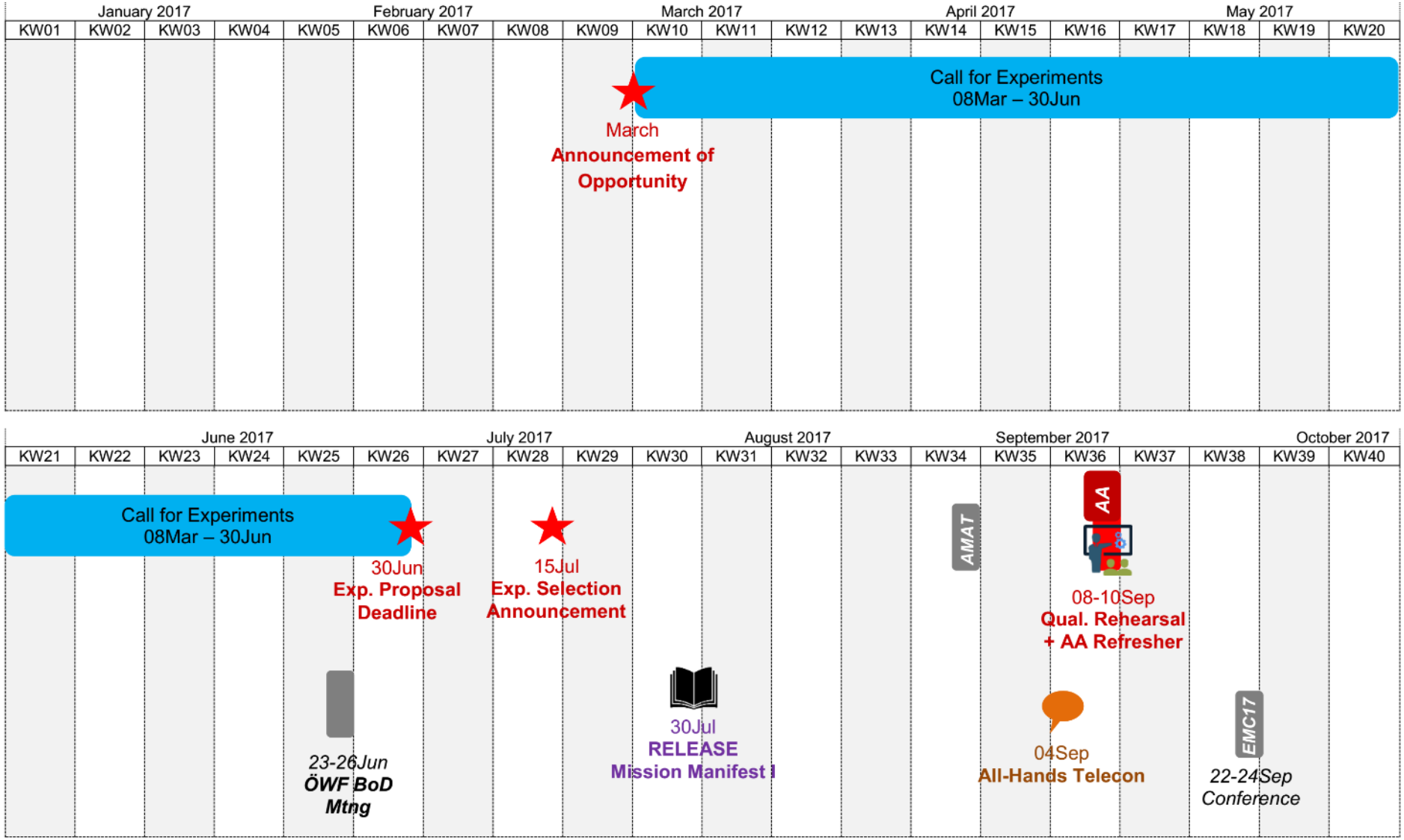
After the selection of Oman as the host country for the AMADEE-18 mission, a series of negotiation rounds was arranged between the Austrian Space Forum and the Oman National Steering Committee which was specifically setup for the project under the leadership of His Excellency Dr. Khattab Al Hinai and Dr. Saleh Al Shidhani.

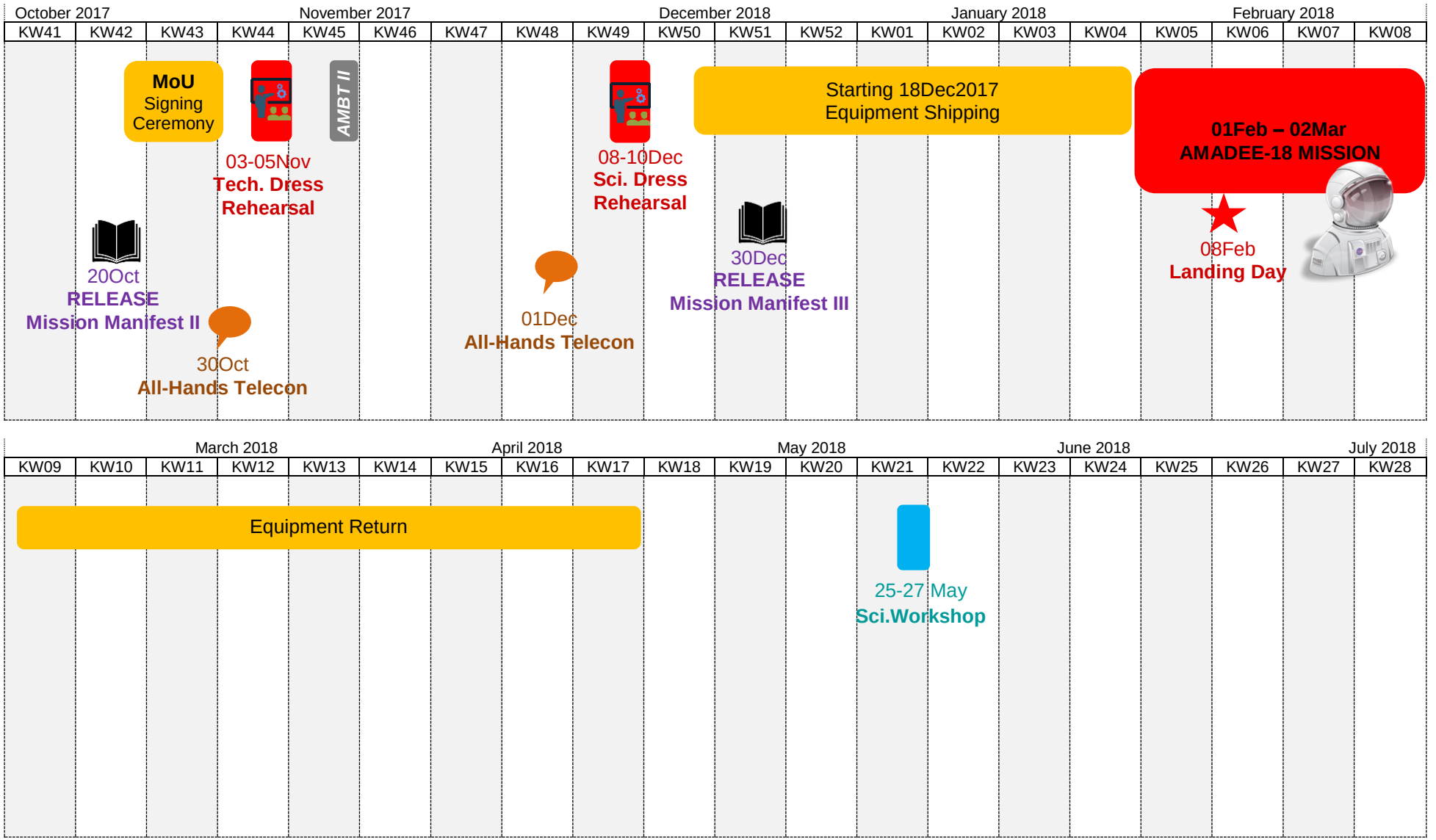
The negotiations culminated in the signing ceremony of the Memorandum of Understanding which is the legal framework for the project, on 30Oct2017 in the magnificent State Council building, Muscat.

Impressions from the MoU Signing Ceremony at the State Council, Muscat.

In the days of the MoU signing ceremony, the OeWF delegation presented a number of public lectures about the AMADEE-18 mission and Mars exploration in general. This included presentations at the main industrial partners locations, such as Oman Broadband and PDO, as well as a total of ca 1200 Omani students.

3.2. AMADEE-18 Timeline




October 2017
November 2017
December 2018
January 2018
February 2018
KW41 KW42 KW43 KW44 KW45 KW46 KW47 KW48 KW49 KW50 KW51 KW52 KW01 KW02 KW03 KW04 KW05 KW06 KW07 KW08
MoU
Signing
Ceremony
AMBT II
03-05Nov
Tech. Dress
Rehearsal
08-10Dec
Sci. Dress
Rehearsal
Starting 18Dec2017
Equipment Shipping
01Feb – 02Mar
AMADEE-18 MISSION
20Oct
RELEASE
Mission Manifest II
30Oct
All-Hands Telecon
01Dec
All-Hands Telecon
30Dec
RELEASE
Mission Manifest III
08Feb
Landing Day
March 2018
April 2018
May 2018
June 2018
July 2018
KW09 KW10 KW11 KW12 KW13 KW14 KW15 KW16 KW17 KW18 KW19 KW20 KW21 KW22 KW23 KW24 KW25 KW26 KW27 KW28
Equipment Return
25-27 May
Sci.Workshop

4. Campaign site: The Dhofar Region

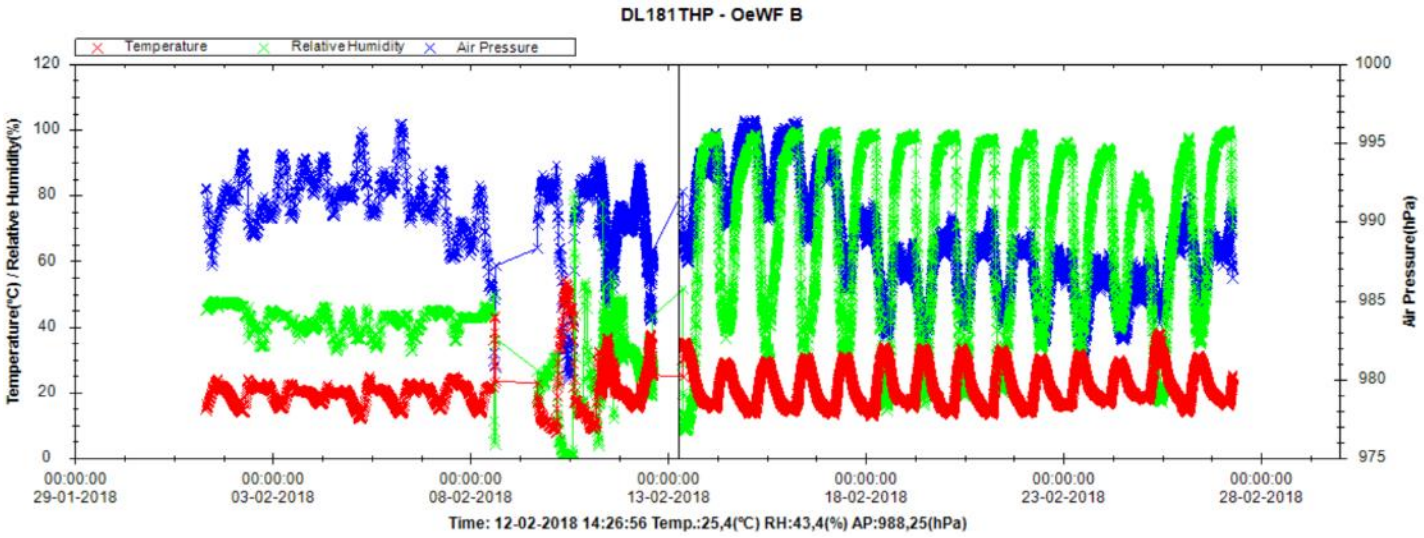
4.1. General geological descriptions:

The geology of Oman includes landscapes which are a blend of its geological history, and its climate over the past few million years. Rock outcrops in the Al Hajar Mountains, the Huqf and Dhofar are a point of interest for international geologists. The rock record spans about 825 million years and includes at least three periods when the country was covered by ice. The interior plains of Oman are of young sedimentary rocks, wadi gravels, dune sands and salt flats. Beneath them is a several kilometer-thick stack of older sedimentary rocks that host the country's hydrocarbon resources. Ancient salt, which comes to the surface in several salt domes such as Qarat Kibrit, plays an important role in forming many of these oil and gas accumulations.

4.2. Climate and Environmental records

The Climate of Oman can be described as subtropical dry, hot desert climate with low annual rainfall. A hot, dust-laden wind, the Shamal, blows in the spring and summer-period, from March till August. Sparse low perennial vegetation is growing on the high rim hillslope and wadis (dry streams). Small bushes are located in in the wadis in the region.

Measured with a Voltcraft DL181TP, temperature, humidity and pressure were recorded throughout the mission. For detailed data sets, we refer to the Multi-Mission Science Data Archive of the Austrian Space Forum.
The peak temperature recorded was 38°C (lowest: 13,1°C), which was above the projected temperature profiles.



4.3. Hazards

The environment is inhabited by several venomous snake and scorpion species. Flash floods may occur during winter and the transient season over the duration of typically 4-6 hours. In the vicinity of selected gas harvesting fields, there was a risk of gas traps. These were clearly marked with warning signs and outside the AMADEE-18 operations area.

Besides a scorpion (potentially brought along with an early provisions delivery) encounter towards the beginning of the bridgehead phase no harmful animals were met.

4.4. Analog features Oman and Mars

From the analog research point of view, the following aspects were relevant for the test site selection:

- Geomorphology: (Places that are shaped as Mars: volcanoes, deserts, dried river formation but focused on late-Mars)
- Geochemistry: (Mineralization and environmental conditions that are similar to Mars: Sub-aerial, volcanic, hydrothermal, submarine (possible), etc.)
- Astrobiology: (possible trace of life preservation and bio-geo-mineralization processes)
- Exploration conditions: (extreme flux radiation, regolith wind, isolation, EVA, etc.)

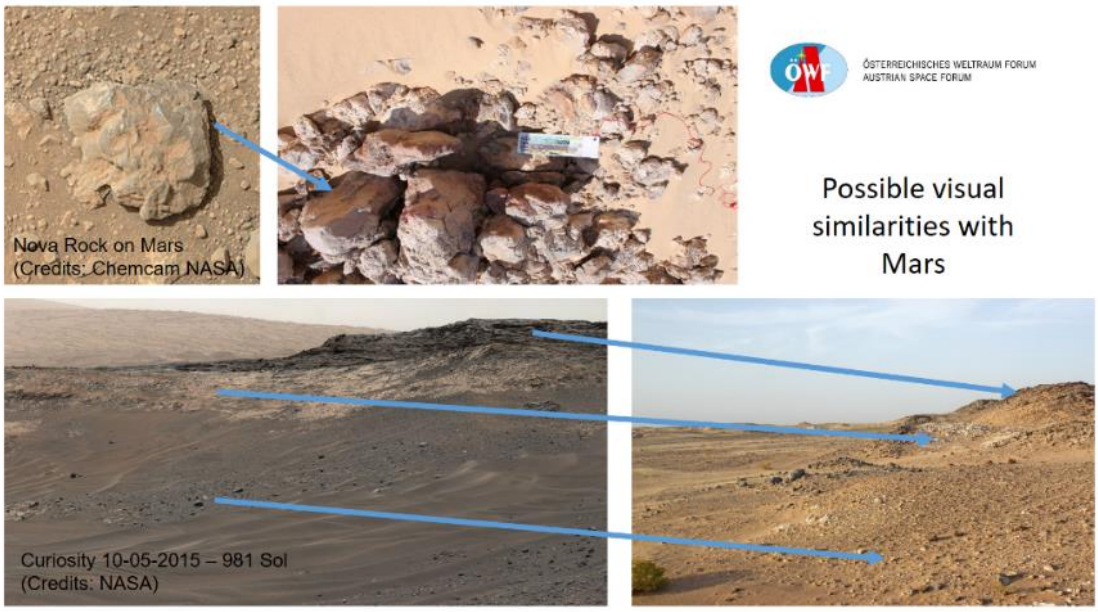
The Dhofar region offers the following geological setting:

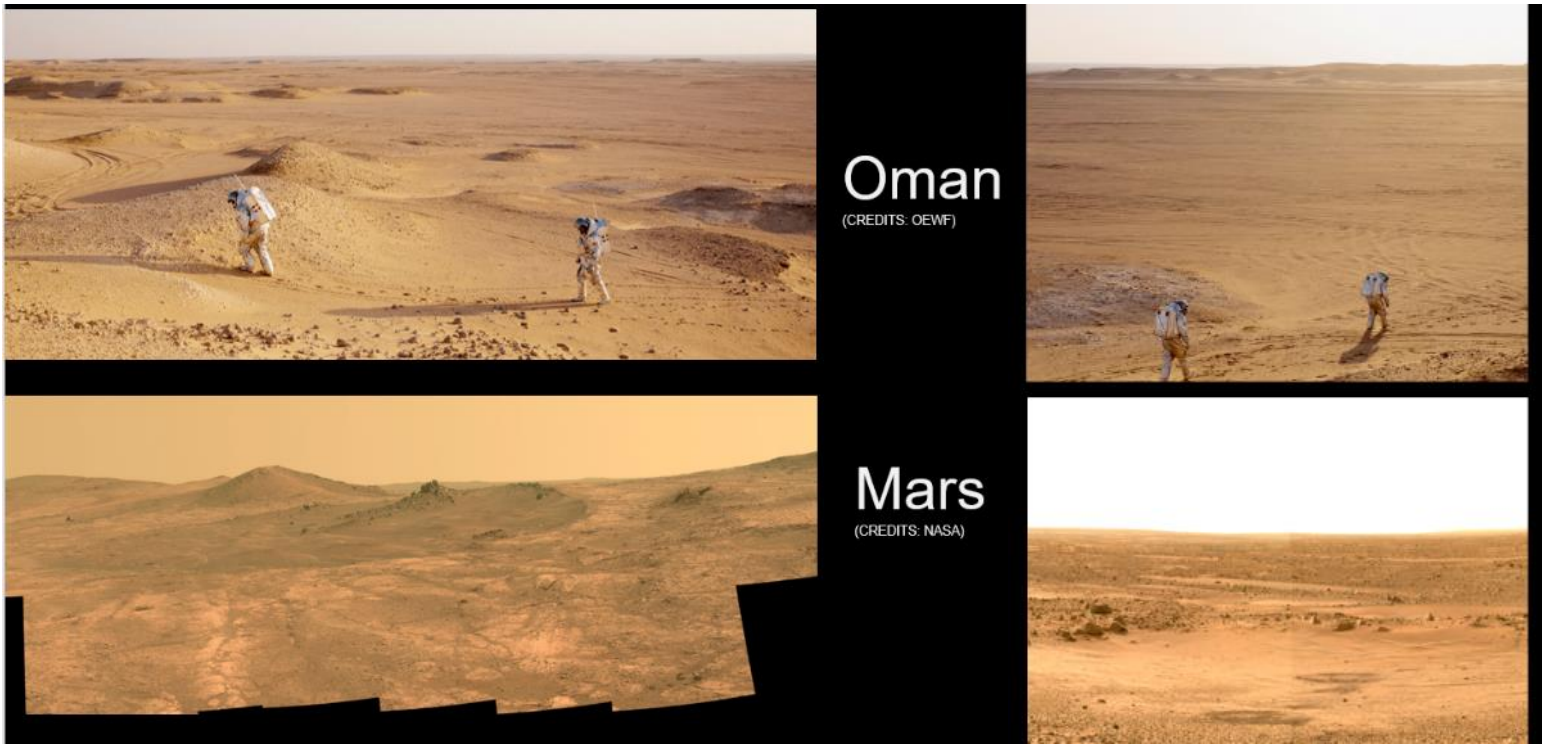
- Precambrian evaporitic sediments (silicylite)
- Phanerozoic biogenic cherts or hydrothermal sinters
- Ambient seawater hydrothermal or biogenic sources (source alteration of the silica)
- Basaltic MORB magmas (isolated exotic dykes)
- Peridotite (result from circulation of seawater and carbonated fluids) from past ocean

This is similar e.g. to the Hadriaca Patera–Promethei Terra region on Mars, which has undergone large-scale erosion of at least a few tens of meters to expose the dikes like our test region in Oman

Test site mineralogy	Corresponding martian features identified?
• Silica member minerals (Olivine, pyroxene, K-feldspar, etc.)	• Yes (ancient volcanic activity)
• Oxides (Fe-Oxides, Ti-oxides, Si-Oxides)	• Yes (red color of Mars)
• Carbonates (calcite, dolomite, etc.)	• Yes (sub-subsurface and water content)
• Sulfates (gypsum, anhydrites)	• Yes (specially jarosite – Hydrothermal)
• Clays and micas (white mica or illite)	• Yes (sub-aerial and hydrothermal)
• Other mineralization: sandstones, saltstones, potassium salts, halite	• Yes and no (on discussion – possible existence of Tuyas like earth, salts present on Bedrock)

Reference: K. Ramseyer et al. 2013, M. Python et al., 2010, Rauninga et al., 2007



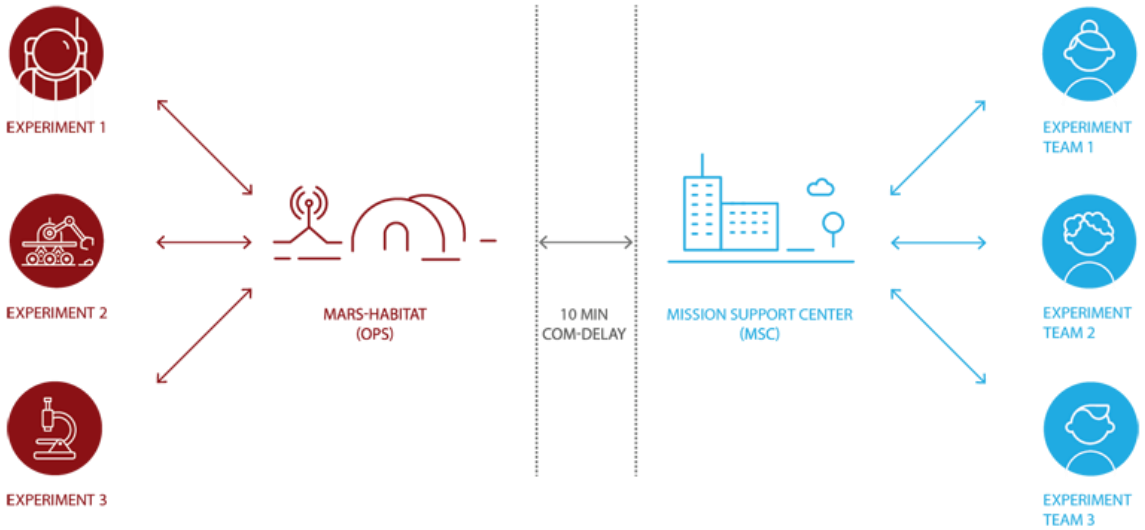


4.5. Visual impressions from the test site

5. Mission Support Center

The Mission Support Center was located in Innsbruck at the Austrian Space Forum's premises. It was the centerpiece of the "Ground Segment" of the mission, interacting with numerous external organizations. It was the single point of contact for the field crew.

During the bridgehead-phase, it was connected to the field in real-time. During simulations starting after the landing day on 08Feb2018, a 10min time delay was introduced, to account for the average signal travel time between Earth and Mars.



5.1. MSC rooms

- **Entry point / registration desk:** Every visitor or MSC team member was required to register at the registration desk when entering the MSC building. After that he or she would receive a badge, which allowed that person to enter.

- **Flight Control Team Room:** The heart of the Mission Support Center was the Flight Control Team Room (“FCT”), where the Flight Controllers managed the mission. Also located in the FCT room, the Science Data Officer was responsible for the data pipeline between the field and the MSC, including the management of the data archive.

- **Ground Support & Security:** This room hosted the team managing the facility and security aspects, ensuring the access control and handling logistics, including transportation.

- **IT/Server-room:** This team was responsible for operating the IT infrastructure, assisted with trouble shooting at the consoles, ensured IT security and interacted with the Science Data Archive team. The IT infrastructure including the science data archive was located in a secure facility of the Austrian Space Forum spacesuit laboratory.

- **Flightplan:** Based upon input from the RSS, operational needs, safety considerations and external requests, the Flightplan team scheduled the activities for the field crew, authorized by the Flight Director.

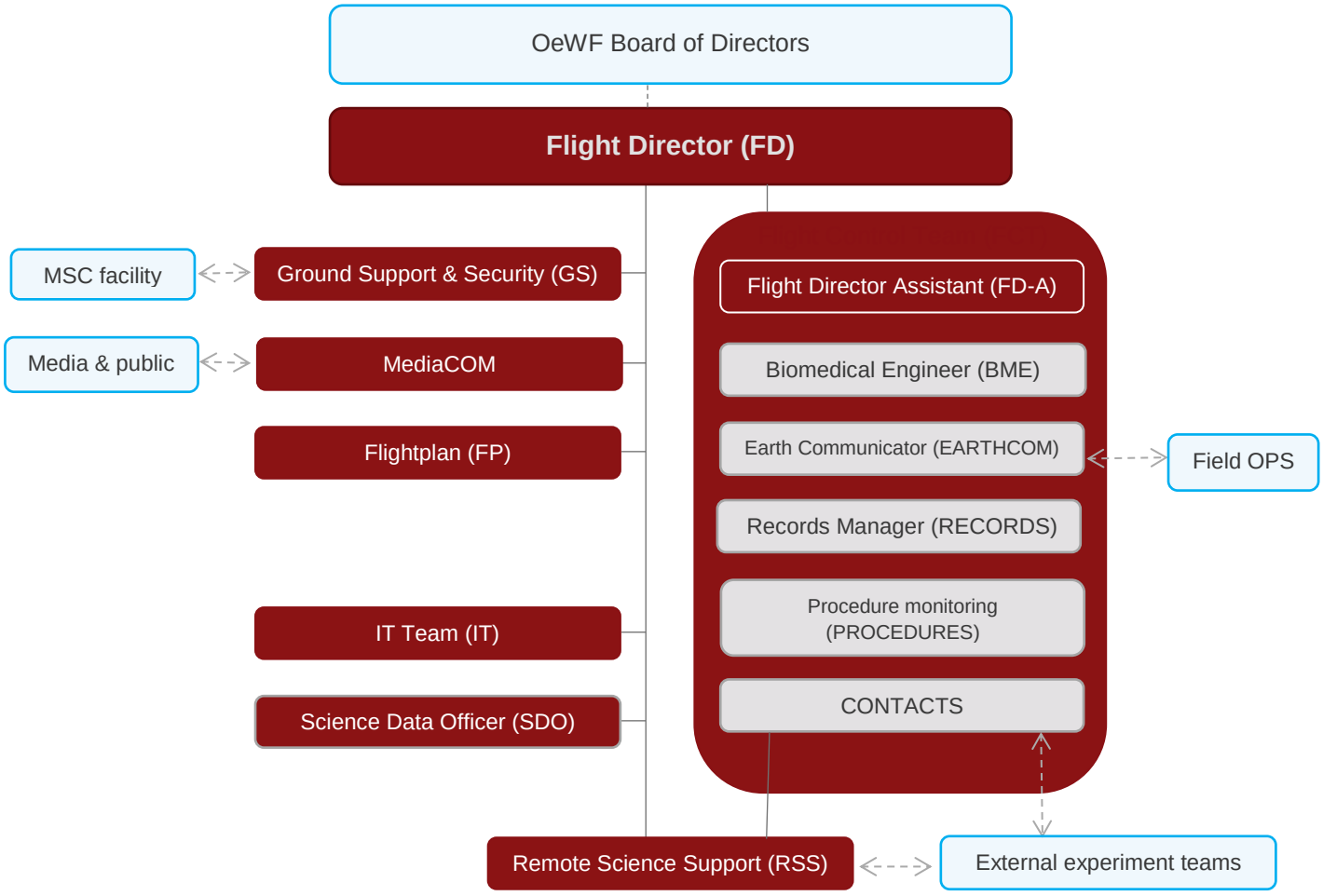
- **RSS:** This room was the center of the scientific operations, where the science data was received, analyzed and interpreted in near real-time.

- **MediaCOM:** This room housed the traditional and social media teams and was the gateway to the public. The teams' duties included image or text releases, blogs, video editing and the management of media and visitor inquiries.

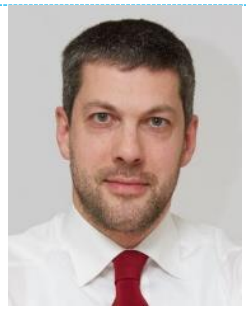
- Social rooms, storages and mechanical and electronics workshops.

5.2. MSC organization and positions

The figure below represents the MSC configuration; designations were given in full and their abbreviation (e.g. Flight Director (FD) as “FLIGHT”, which was also his/her call-sign). Boxes in blue represent external parties not present in the MSC together with their point of contact in the MSC respectively.



Flight Director (FD, call sign "FLIGHT")

AMADEE-18 Flight directors			
			
Laura Zanardini	*Alexander Soucek* *(Lead FLIGHT)*	*Simone Paternostro*	*Reinhard Tlustos*

The Flight Director (FLIGHT) was responsible for the overall AMADEE-18 mission operation. (Some responsibilities were shared with the Field Commander). During mission/simulation preparation, the FLIGHT was responsible for ensuring (at a management-level) that the resources of the MSC and the supporting operational ground segment were adequate to conduct mission operations. For each day, a Flight Director was on call 24 hours every day throughout the mission.

Flight Director Assistant (FD-A)

The FD-A acted as the "first officer" to FLIGHT. In principle, FLIGHT could delegate any task to the FD-A. However, the final responsibility and decision-making authority stayed with FLIGHT. During the mission, the Flight Director Assistant was responsible for updating the daily reports as part of the outreach activities of the MSC as well as to ensure the situational awareness for all MSC teams.

Biomedical Engineer (BME)

The Biomedical Engineer (BME) had the overall responsibility at the MSC for crew health related issues. The BME provides support for all issues related to crew health and medical data management, including monitoring of medical data, pre-flight preparation and post-flight rehabilitation. The BME also assisted in medical policy making.

Earth Communicator (EARTHCOM)

The Earth Communicator (EARTHCOM) was responsible for coordinating the communications between the MSC and the field crew (via chat during the time delayed mission phase and via voice during the preparatory phases). The position gave the communications a necessary comradely touch amongst all the pressures of mission schedule. EARTHCOM also conveyed to the field crew or MSC staff the respective point of view of the other group.

CONTACTS

The science console and contact manager (CONTACTS) was responsible for the communication between the FCT and the PIs and researchers (supported by the RSS team).
During ongoing experiments, CONTACTS would supervise the connectivity and ensure readiness and a high level of situational awareness of the external parties. The decision on allowing external parties who are not experiment teams to access the telemetry stream beyond the public stream was taken by the Flight Director and the MediaCom.

Records Manager (RECORDS)
The Records Manager (RECORDS) ensured continuous log file of what was happening in the field as well as in the Mission Support Center. This position was vital for the recording of the “as run flight plan”, which in turn was an element of the science data archive (maintained by SDO). The position also provided the input for updating the PIs on the progress of their activities. Biomedical recordings were NOT part of the RECORDS logfiles, but were maintained by the BME due to their personal and sensitive nature.

Procedure monitoring (PROCEDURES)
The procedure monitoring position (PROCEDURES) maintained the compilation of the standard operating procedures as well as experiment procedures to ensure that the field crew as well as the MSC had access to the most recent editions. During the simulation, PROCEDURES observed if the sequence of events was according to the given procedures and informed FLIGHT in case any deviations (both time- or procedure-wise) occur that might have endangered the operations.

Remote Science Support (RSS)
The Remote Science Support (RSS) Team had the responsibility of supporting the experiments being conducted in the field as well as to represent research teams not present in the MSC. During missions, scientific data from the field was analyzed in near real-time and checked for its completeness and accuracy. Based on that analyses, RSS also provided input to the FP Team and served as the first point of contact for the CONTACTS position in case questions about the experiments arose.
In the preparatory phase of the mission, the RSS Team was responsible for the communication of the mission to the scientific community, via the Announcement of Opportunity, and was part of the experiment proposal reviewing process.

After the mission, the RSS Team also ensured the scientific output of the mission and its experiments through workshops, publications in peer reviewed journals and conference participations.

Flightplan Team (FP)
The Flightplan (FP) Team scheduled the activities to be conducted in the field, based on the input from the Remote Science Support Team, external experiment teams and the Media Communication Team.

The pre-mission planning included establishing a working relationship with the Principal Investigators of the selected experiments. FP then coordinated the procedure writing and SEIF compilation (Standard Experiment Information Form = summary of all operational requirements relevant for experiment conduction) for all experiments. Based on that information FP created the Mission Plan (MP), a rough schedule of all Field activities for the entire mission.

The in-mission operations included the development of the Field Activity Plan (FAP), a more detailed schedule based on the Mission Plan. The FAP was combined with auxiliary information to form the Daily Activity Package (DAP), which was sent to the field crew after its completion. For AMADEE-18, a 3-day-in-advance planning strategy was be used, i.e. these planning products were deployed three days prior to the day they are intended to be executed.

Ground Support & Security (GS)
The Ground Support and Security (GS) Team was responsible for managing the MSC facility and ensuring a high level of security, necessary to support mission operations. GS also supported MediaCom in public outreach activities and visitor receptions. The GS team was responsible staffing the entrance gate and handling access-control in the MSC.

Science Data Officer (SDO)
The science data officer's (SDO) long-term responsibility is to ensure that all data collected during a mission (both experimental and operational) is archived to keep it safe and accessible to as many people as possible whilst maintaining controlled access .

The SDO was a liaison between the Remote Science Support team, the Flight Control team as well as the respective Principal Investigators of an OeWF mission and was supported by the IT team. He/She ensured that the data generated in the field are properly transferred and managed from the MSC perspective and stored in the Multi-mission Science Data Archive.

The SDO hence played a crucial role in transferring, managing and preserving the data acquired in the field, which might be relevant for future generations of researchers and students.

Media Communication (MediaCOM)
The Media Communication Team (MediaCom) was responsible for the coordination of media activities and the management of media inquiries. It generally handled the communication of the mission to the general public via social media channels and traditional press, together with the generation of imagery by the Visuals Team. MediaCom was also responsible for event planning, especially involving interaction with VIPs.

Information Technologies (IT)
This team was responsible for the operations of the IT infrastructure. Their tasks included server and electronic communication maintenance, security and defense from cyber-attacks, user account management and the administration of hardware assets.
The IT team was a core group of specialized IT operators, managing and safeguarding data flows at both the Mission Support Center and other OeWF facilities, outsourced server infrastructure as well as the field activities relevant to IT.

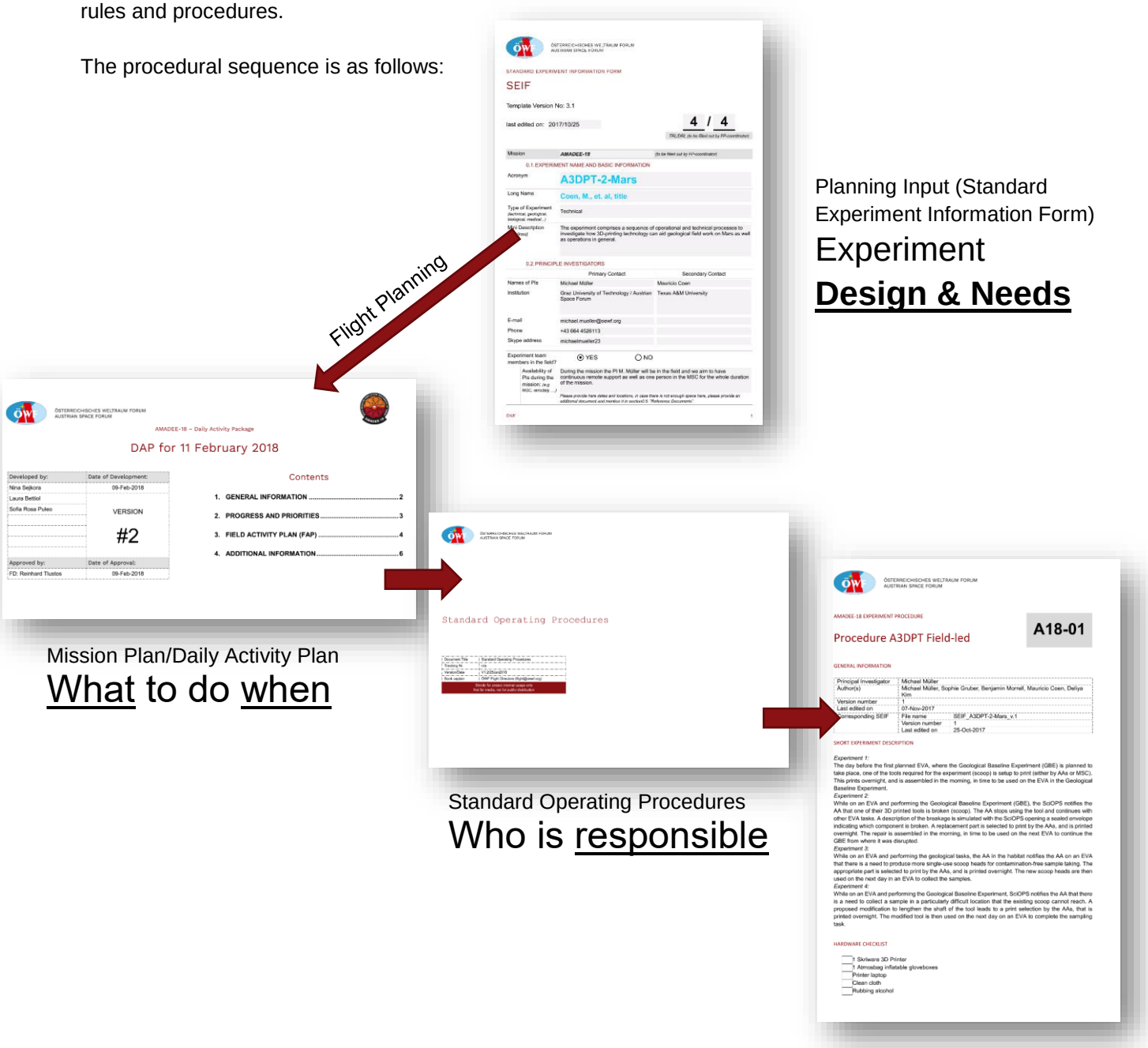
5.3. Standard Operating Procedures

The major workflows of the mission were defined via the OeWF Standard Operating Procedures (SOP). These were substantiated by experiment procedures, supported by background workflow documents of the respective science teams.

Several teams had extensions to the SOP's, such as the Biomedical Engineering Team or the Flight Directors, incuding access to privileged information (such as confidential medical records, or security-related matters).

The SOP's have been developed internally at the Austrian Space Forum and are documented in the AMADEE-18 SOP compendium, together with the experiment procedures, as well as the field crew rules and procedures.

The procedural sequence is as follows:



Planning Input (Standard Experiment Information Form)

Experiment **Design & Needs**

Mission Plan/Daily Activity Plan

What to do when

Standard Operating Procedures

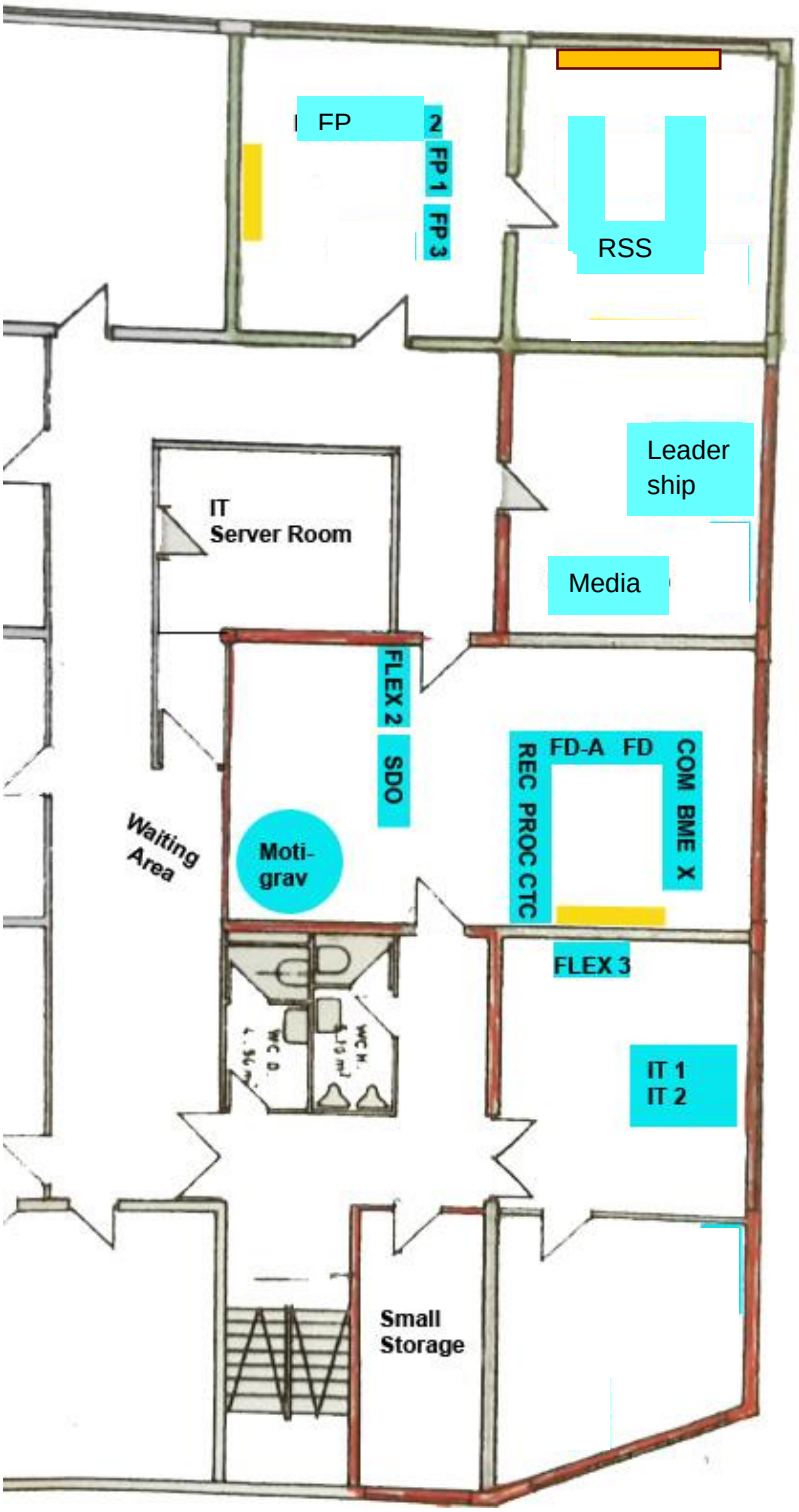
Who is responsible

Experiment procedures

How to do it

6. MSC Organization and Workflows

6.1. Physical layout of the Mission Support Center



Explanation

- RSS: Remote Science Support
- PI: Principal investigator
- Media: Media team
- SDO: Science Data Officer
- FD: Flight Director
- FD-A: Flight Director Assistant
- REC: Records console
- CTC: Contacts console
- PROC: Procedures
- COM: Earthcom
- BME: Biomedical Engineer
- Motigrav: V(R)ITAGO station
- X: Flexible flight controller position (back-up and flexi-console)
- FLEX: Flexible workspace (assigned depending on daily activities)

MSC/FCT Room

6.2. Communication pathways from outside to the MSC and Field

This is a slightly simplified overview on the pathways available for communicating between the field test site and the outside world as well as with the Mission Support Center. The communication with the base station was managed and authorized by the MSC.

OUTSIDE WORLD TO...	...BASE STATION OMAN...	...VIA COMM PATHWAY...	...TO MISSION SUPPORT CENTER INNSBRUCK...	...TO OUTSIDE WORLD
	Private Mobile Radios ("PMR", Audio only) within the base station vicinity (<5 km)	PMR/IP Bridge via satellite (s/w: Mumble)	TCP/IP (software: Mumble). *This is mostly a "listening-in" channel to monitor field radio communication*	
Ham radio *(local/regional, field Ham radio only activated upon request by MSC or base station)*				
Telephone	Telephone *(if authorized by MSC)*	Satellite telephone? UMTS?	Telephone	
TCP/IP *(if OK by MSC)*	TCP/IP (for Audio, Video & telemetry). Software: Mumble (audio), webcam tools, suit telemetry s/w, direct file transfers etc	secure TCP/IP connection *(via satellite-based VPN tunnel)*	TCP/IP-based services	
			TCP/IP services *(E.g. Skype, file transfers, emails… - like our regular office internet-access)*	
	SPOT GPS positioning devices	SPOT S-Band satellite	SPOT positioning data (IP)	

- All individuals or organizations wishing to relay information to the field crew had to contact MSC first. Nominally, the single-point-of-contact was FCT/EARTHCOM during the simulation.
- It was NOT foreseen, that experiment teams interacted directly with the field crew.

7. Kepler Station Oman & field infrastructure

The Kepler station (named after the astronomer Johannes Kepler) was the logical representation of the future landing module on Mars, providing shelter and infrastructure for conducting the mission. The exact coordinates were not published for security reasons.

7.1. Base station layout

- **Electrical power** at the base station: 450 kW at 220-240V at 50Hz AC
- **Communication infrastructure:** a symmetric link at 20 Mbit/s down and uplink (dedicated). All modules had illumination, windows and power outlets.
- **Command module:** >25m² for operations (including 10 m² of sturdy tables), connected to additional 25m² for donning/doffing spacesuits.
- **Engineering/Science container**: 25m² for science and engineering operations (for 6 people)
- **Crew quarters** for 15 people (plus 10-15 people during the bridgehead phase)
- **Storage space container** 20m² of space for storing engineering equipment, samples etc
- **Mess:** 25m² kitchen & cantina space for 20 people and basic kitchen cutlery.
- **Hygiene module:** min. 2 showers, 2 toilets, 4 sinks and sufficient water provisions

Food and water were provided at the base station; all personnel in the field – regardless of specialization- was tasked also with housekeeping and technical work to ensure a safe and productive base station environment.

7.2. Medical provisions & Security

The field team had an experienced medical team with medical equipment on-site for immediate health care. At least two medical doctors or paramedics were on-site at all times, supported by the medical staff at the Mission Support Center.

The host country provided medical evacuation capability to the centers of care up to Trauma Level 1 hospitals. Their medevac response time was 90min for aerial evacuation, plus a basic military ambulance with a response time of less than 30min.

The base station was not accessible to the public. Within a perimeter of 5km kilometers, Omani security forces monitored and regulated access to the test site in coordination with the Mission Support Center and the Field Commander.

7.3. Mobility & Vehicles

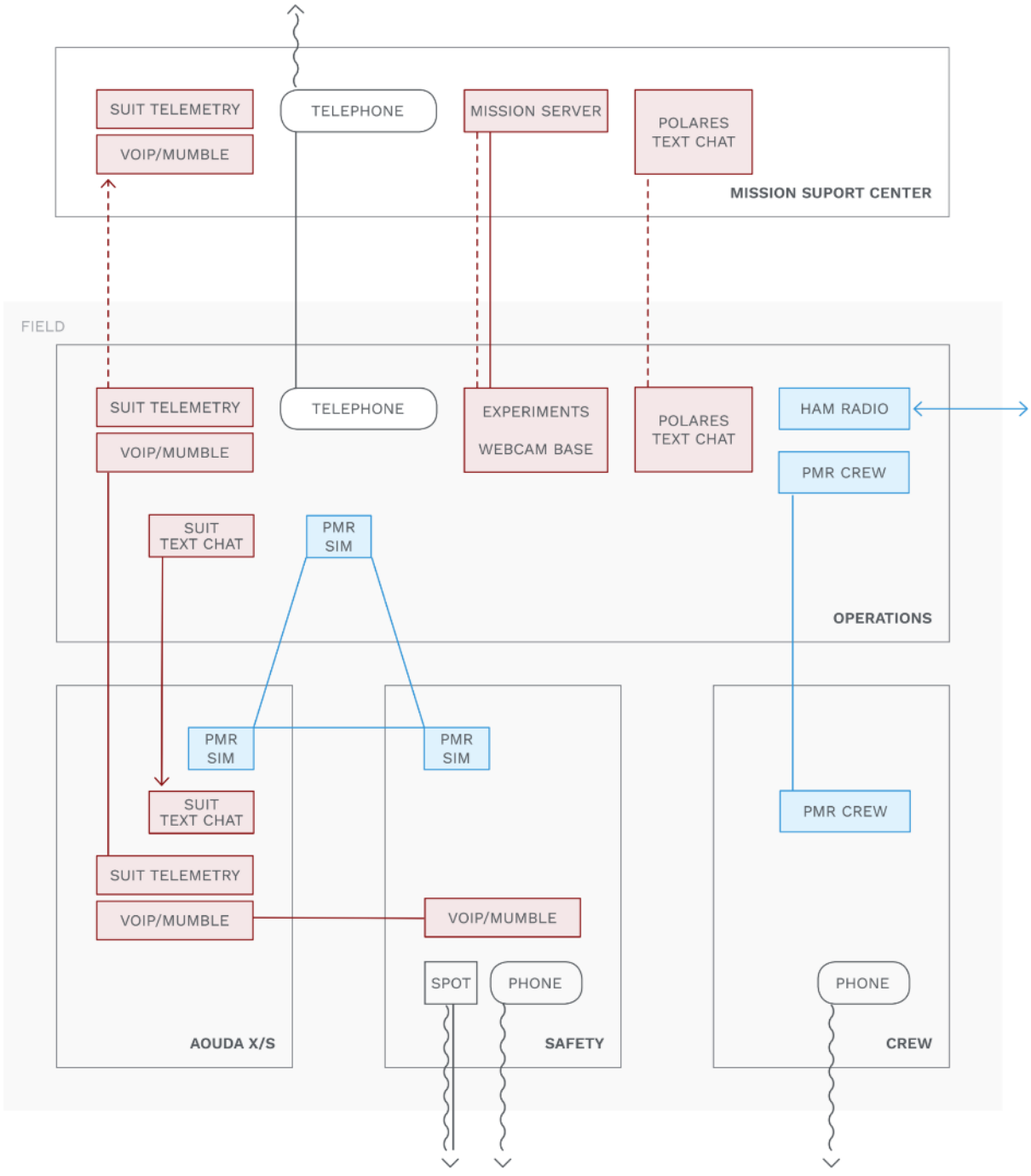
The mobility units were managed and maintained by the Quartermaster. Together with the Field Commander he/she authorized the usage of…

- 2 units of Ziesel electromobiles (see image below on the left), including material transportation basket (80kg max)
- 3 x Quad-Bikes (capable of carrying 2 persons each)
- 4 x 4x4 cars

Ziesel
(e.g. for SAFETY)

All-Terrain Vehicles (Quads)
(e.g. for analog astronauts)

7.4. Communication with/within the field



IP based protocols
digital & analog radio
~ public line
--- 10 min time delay

VoIP Voice over IP
SPOT Position contingency message

ÖW

8. Field Crew

The field crew (including the Analog Astronauts) was responsible for conducting science activities during the simulation („*in-sim*“), including all extravehicular activities (EVA). They observed safety procedures, maintain provisions inventories, kept track of and were trained to repair equipment to a certain extent and responded to media inquiries.

8.1. Field Commander (FC)

The Field Commander (FC) had the overall responsibility for all field operations. That included overall activity planning and scheduling tasks. This position was in direct contact with the Flight Director outside simulation, e.g. during contingency situations or for managing policy or administrative issues. The FC had the final authority on all decisions to be taken at in the field, especially in the case of contingency situations. The FC was responsible for maintaining contact with local authorities and media on-site.

AMADEE-18 FC: Gernot Groemer
AMADEE-18 Dpty-FCs: Joao Lousada and Sebastian Sams

8.2. Operations Station (OPS)

OPS (red jacket) coordinates –similar to the FD-A at the MSC- the operational activities as directed by the FC and EARTHCOM. This position was the counterpart of the MSC EARTHCOM, usually communicating in time-delay mode via text protocol. Off-Sim and during emergencies, OPS switched to real-time audio communication. This position represented the “extended eyes and ears” of the MSC, providing MSC with a continuous update on field activities. OPS communicated with the crew at the test site (including analog astronauts) and ensured a continuous flow of information from the EVA and experiments to “Earth”.

8.3. SCIOPS (“Field Science Officer”)

As an “extended arm”, the RSS had a RSS liaison function available in the field. This position, called “SCIOPS”, managed the scientific hardware in the field and procured the samples obtained. SCIOPS was aware of all scientific activities carried out at any given moment, including what has actually been accomplished, where the samples were obtained, what instruments were in which condition etc. SCIOPS assisted the SDO in maintaining the science data flow to the MSC.

8.4. Medical Officer (MEDO) & SAFETY

The On-Site Medical Officer (MEDO) was a medical doctor, or paramedic at the field test site for team and crew health related issues. From the medical perspective, SAFETY supported the medical officer, including support for all issues relating to crew health and medical data management, including real-time monitoring and real-time conferences. The SAFETY also provided support regarding medical or life science payloads, hazardous operations and medical policy making during the field campaign. The Medical officer was the expedition medical doctor. He / She is usually not tasked with the role as SAFETY (to be available to all expedition team members anytime) if both suits are operating at different locations. SAFETY “shadowed” the respective suit, hence there could be two SAFETY’s, one for each analog astronaut in case they work separately.

8.5. Quartermaster

The expedition’s quartermaster was the crewmember responsible for managing supplies and field resources, keeping track of consumables and maintaining equipment. This included also the management of all human-operated vehicles.

The mobility units were managed and maintained by the Quartermaster. Together with the Field Commander he/she authorized the usage of the human-operated vehicles.

AMADEE-18 QM: Claudia Kobald, Deputy: Aline Decadi

8.6. Analog astronauts

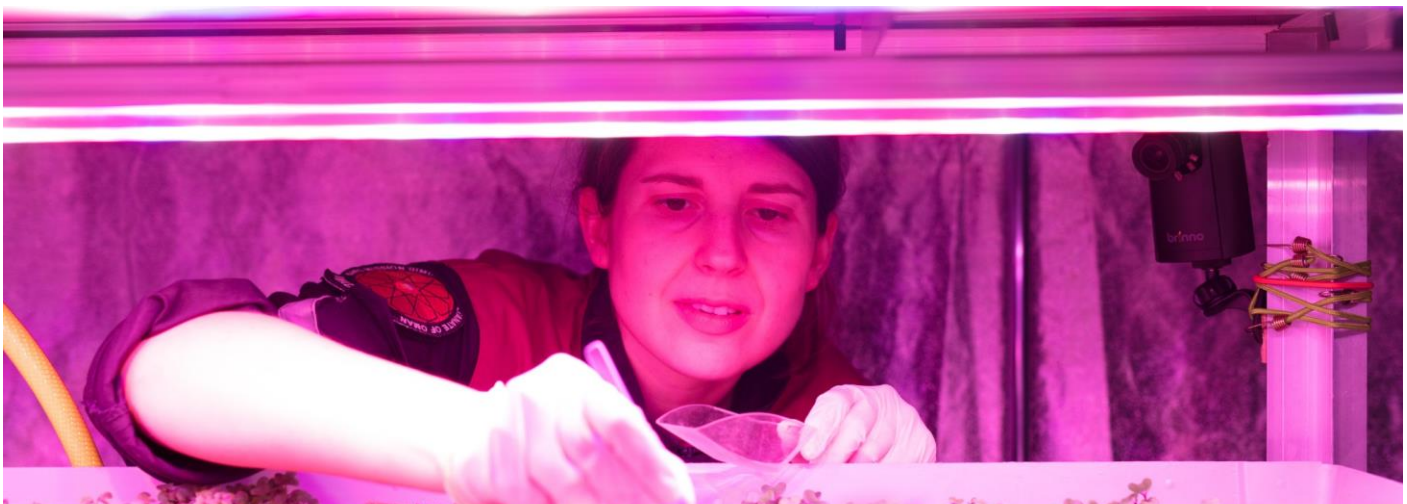
These carefully selected and trained individuals executed most of the science field activities. Their basic education was 5months, followed by the mission-specific training. Analog astronauts were also the public face of the mission, serving as STEAM-ambassadors in the media and education activities.
AA assigned for A-18 were: Kartik Kumar (NL), Stefan Dobrovolny (AT), Carmen Koehler (DE), Joao Lousada (PT), Inigo Munoz-Elorza (ES), Gernot Groemer (AT, back-up)

9. Experiment overviews

9.1. Peer-review selected experiments

The A-18 experiments were selected in a four-step process checking for credentials and expertise of the submission, scientific and engineering merit (methodology, technological readiness level), if they are in line with the OeWF programmatic considerations and experiment risk. The peer-reviewers assessing the sci/eng quality were external.

Acronym	PI	affiliation	short description
AVI-NAV	Univ.-Prof. Dr. Stephan Weiss *Stephan.Weiss@aau.at*	Institute of Smart System Techn., Alpen-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
FATIGUE	Dr. Stefan Dobrovolny. *Stefan.dobrovolny@oewf.org*	Medical Univ. of Vienna, Dep. of Anesthesia, Austria	Analysing physical and mental fatigue in Analog Astronauts during AMADEE-18.
Field Spectrometry	Eleonora Ammannito *eleonora.ammannito@asi.it*	Italian Space Agency (ASI/URS)	Acquisition of reflectance and radiance spectra in an environment analogous to Mars
Hortextreme	Dr. Sara Piccirillo *sara.piccirillo@est.asi.it*	Italian Space Agency (ASI/VUS)	Mobile and inflatable green house with hydroponics, to be used for the cultivation of microgreens.
Husky	Dr. Gerald Steinbauer *steinbauer@ist.tugraz.at*	Graz Univ. of Technology, Inst. of Software Techn.	An autonomous rover that supports astronauts and aids in area mapping
MIMIC	Dr. Martin Hagmüller *hagmueller@tugraz.at*	TU Graz, Signal Processing and Speech Communication Laboratory, Austria	A computerized analysis of verbal communication to study the mechanisms of psychological and physiological adaptation or maladaptation in extreme or stressful environments
MSTAT	Hilel Rubinstein, PhD *hillel.galim@gmail.com*	Ben Gurion Univ., Earth and Planetary Imaging Facility (EPIF), Israel	The situational awareness training aims to simulate two seperated groups of astronauts on Mars.



ScanMars	Maurizio Ercoli, PhD *maurizio.ercoli@unipg.it* Alessandro Frigeri *alessandro.frigeri@iaps.inaf.it*	Univ. of Perugia, Dipartment of Physics and Geology, Italy Istituto di Astrofisica e Planetologia Spaziali (IAPS), Italy	Subsurface Characterization of a Martian Analogue through 2D/3D Ground Penetrating Radar datasets
SIT-AS	Alexandra Hofmann *alexandra.hofmann@oewf.org*	University of Witten Herdecke, Germany	Examination of the situational awareness in and between co-working teams on Earth and simulated Mars
TEAM	Dr. Natalie J. Allen *nallen@uwo.ca*	Western Univ., 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)
V(R)ITAGO	Antonio Del Mastro *info@marsplanet.org*	Mars Planet, Italy	Virtual Reality tool for astronaut training and to aid the RSS team in analyzing geological features.

9.2. Junior explorers' experiments

In addition to the professional submissions, the OeWF selected four additional experiment managed by high school and technical school students from Europe and Oman. They also were exposed to the peer-review process and undergo the same logistics and planning pipeline like the others.

EOS	Martin Zwifl, JRP *martin.zwifl@gmail.com*	HTL Eisenstadt, Austria	Radio Navigation System for EVA's on GPS-less planets
TumbleWeed	Stefan Rietzinger, JRP *office@teamtumbleweed.eu*	Sir Karl Popper School, Vienna	A wind propelled compact rover to be used for efficient Mars exploration.
Water Explorer	Mohammed Al Hosni *Mohammed.Hosni@pdo.co.om* Maram Dawoodi *mramaldawdy@gmail.com*	Petroleum Development Oman Umm Al Khair Primary School, Oman	Water detection via a set of geophones, which measures the reflection of sound waves in the subsurface
A3DPT-2-Mars	Michael Müller, JRP *Michael.mueller@oewf.org*	TU Graz, Austria	3D printing operational workflow experiments for crewed Mars expeditions

9.3. Non peer-review selected experiments

In addition to the peer-review selected experiments, additional demonstrations and experiments were executed:

- **Embry-Riddle Aeronautical University**, Florida / Dr. Ryan Kobrick, Assistant Professor of Spaceflight Operations, KOBRICKR@erau.edu
    - **Evaluating Spacesuit mobility**
    - **Google Hangout** with time delay during AMADEE-18 when a Mars Desert Research Stations (Utah)-crew under the command of Ryan Kobrick is active.

- **OeWF-specific innovations:** AMADEE-18 was also a platform for field-commissioning several OeWF innovations such as improved workflows, spacesuit-related projects (e.g. advanced Head-Up Display,…), advanced base station IT and communication infrastructure.

9.4. Exploration Cascade

The focus of the scientific activities was to mimic the search for life on Mars. Hence, the peer-reviewed experiments were not only a research topic per-se, but served as a stepping-stone for "zooming" in. Starting with remote sensing techniques, down to surface levels and subsurface exploration, as well as focusing on the spectroscopy and microscopy level, this cascade simulated the interplay between the field crew on Mars and the Remote Science Support team at the Mission Support Center in Austria.

The original plan was as follows (*and was attempted to follow where possible: for details see the BSc thesis of Stefanie Garnitschnig, Univ. of Innsbruck, 2018*)

0) Preparatory phase

- Selection of the targets and landing site
- Optimization of the instrumentation and protocols according to the different proposals

1) AVI-NAV + MSTAT at Kepler station (Sequence decided by FP)

- Bird-view and long-ground view of the target site (imaging from different perspectives to be useful on geography, and geomorphology)
- Pressure, temperature, magnetic activity, Infrared measurement and cosmic radiation

2) HUSKY

- Optimization of the pathway and robotic support to the target site
- Stereo and 360º view of the target point as well as the astronaut procedure for sampling and decisions
- LIDAR measurement (to the sky or near surface)

3) Astronaut/EVA activities - sampling

- Imaging of the selected targets (following the sampling method on the first dress rehearsal)
- Full verbal description of the site (according to what astronauts see on target point)
- Sampling of selected rocks (surface) and possible near-subsurface (few centimeters),

4) Geological instrumentation (Scan-Mars and Field spectrometry) + Water explorer

- Radar measurement of the target point and local environment as well as sub-surface (to determine step 5 – second sampling steps) – search of water and determination of possible place for habitability

- Field spectroscopy of the target site in-situ (determination of the mineralogy and geochemistry of the site in-situ)
- Search of water by autonomous Rover for supplementing the Radar results

5) Second Astronaut/EVA activities – second sampling

- Imaging of the newly selected targets (following the sampling method on the first dress rehearsal) from Radar and Field spectrometry results in-situ
- Full verbal description of the target (according to what astronaut see) only for near-subsurface
- Sampling of selected rocks (surface) before digging and possible near-subsurface (few centimeters) after digging. Recommended method: Collect several samples (5 grams) every 2 cm up to 10-15 cm (drilling procedure as ExoMars - geological witness)

6) AVI-NAV + MSTAT *(Seqeucne decided by FP)*

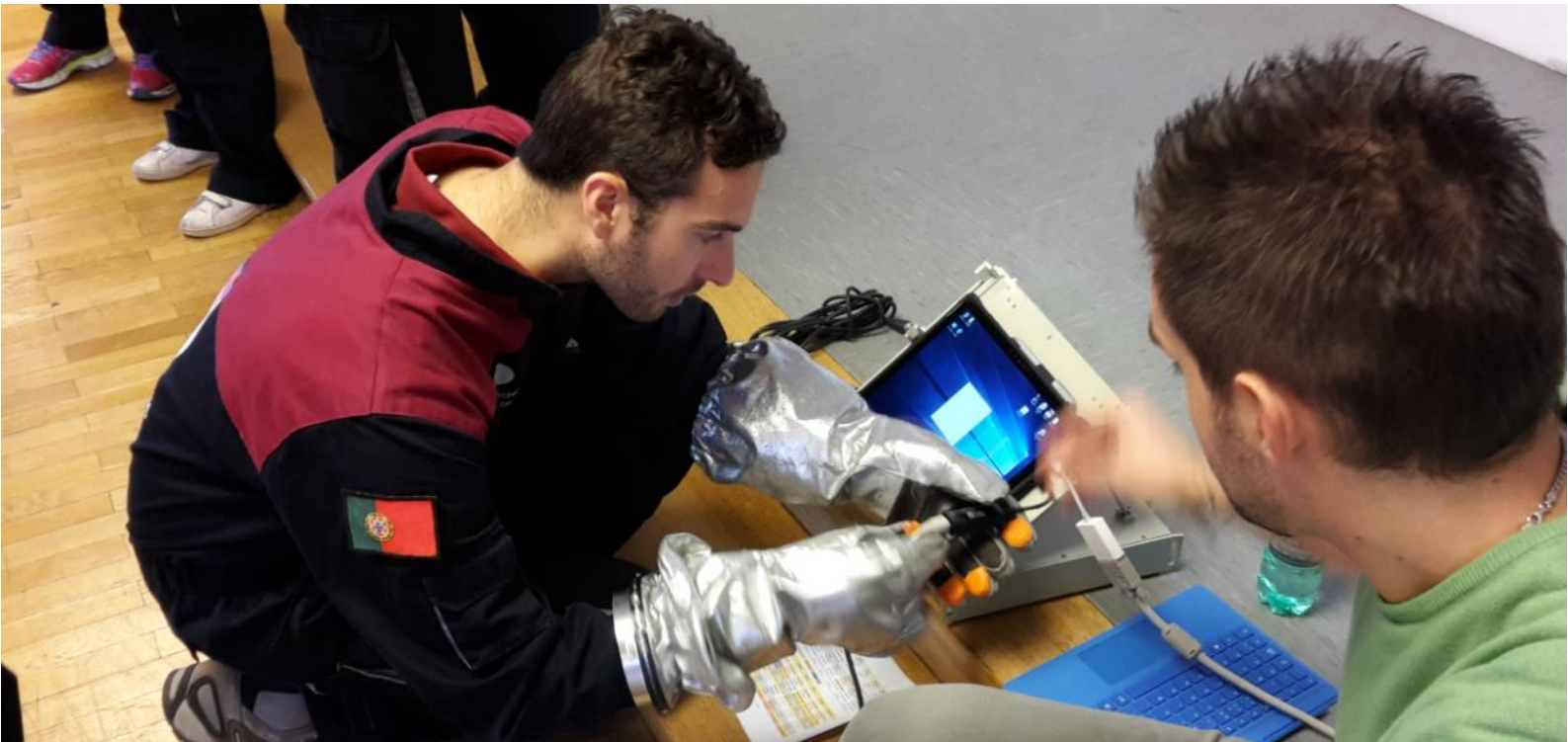
- Pressure, temperature, magnetic activity, Infrared measurement and cosmic radiation

7) Return Base-camp

- Full description of the most important and relevant samples (color, structure, physical alteration as well as morphology) in order to decide new targets or to return on the landing site.

GOALS were

- Assess the (astro)biological potential of several targets and search of biological past life (bio-alteration of geological materials) by: Astronaut sampling and Astronaut description (steps 3, 5 and 7).
- Characterize the geology of field site at all appropriate spatial scales by the steps 0, 1, 2, 4 and 6.
- Investigate the processes of relevance to past habitability by step 4
- Atmospheric evolution during the mission by steps 1 and 6.
- Characterize the broad spectrum of surface radiation and optimize working conditions and methods during the mission (by repeating or improving the synergy of the instrumentation).



10. Experiment descriptions

	10.1. MIMIC Monitoring of Mars Isolation Crew by Speech Processing and Psychological
Description	Voice communication as a marker of the psychological and physiological state of the mission members. 
PI	Martin HAGMÜLLER Graz Univ. of Technology hagmueler@tugraz.ac.at Balazs Laszlo MTA Research Centre for Natural Sciences, Institute of Cognitive Neuroscience and Psychology balazs.laszlo@ttk.mta.hu
Organization	Graz University of Technology
Summary	The aim of the experiment is to gain further understanding of the mechanisms of psychological and physiological adaptation or maladaptation in extreme or stressful environments, and to compare the results to those obtained by other studies of the Research Team (MDRS, Utah, USA; Concordia and Halley VI, Antarctica). Our future prospect is the development of a fully automated, multilingual content analysis tool, as well as a speech analysis method, that - in combination - could be used for monitoring crew mental health and psychodynamics in long-term space missions and in other Isolated, Confined, and Extreme (ICE) conditions.
Objectives & Hypothesis	We want to explore whether we can use human voice communication as an indicator of the psychological and physiological state, e.g. depression, excess workload, etc. If our hypothesis is true that this could be used as an early warning system for long term missions. As human communication is always happening is different channels, this comes at almost no additional cost or effort for the mission members.
Number of Runs/Samples	Every day to every other day Sample is a voice recording of human interactions (AA - OPS, meetings at MSC etc), each participant of any type of interaction should provide a daily baseline

	reading (a recording of a few lines of text provided, read in a normal voice tone) in pararllel with a diary entry reflecting their emotional state (feelings, worst, best things happened).
Experiment logistics	Mass: 200g Size: 1 x 1 x 1 m Power requirements: 5V Analog astronauts required: no Total number of people required: n/a
Special Requirements	Weather Storage Handling Risks
FP coordinator	Michael Czapski, michal.czapski@oewf.org +48 608647744 (please use whatsapp)

	10.2. TEAM Teamwork Effectiveness during the AMADEE-18 Mission	
Description	This survey study will examine key team-level variables (team cohesion, conflict, performance) and determine the "person" factors (including personality, and factors examined at the team level of analysis) that relate to the above team-level variables. Western UNIVERSITY · CANADA MISSION CONTROL SPACE SERVICES INC.	
PI	Natalie Allen University of Western Ontario nallen@uwo.ca	Melissa Battler Mission Control Space Services Melissa@missioncontrolspaceservices.ca
Organization	University of Western Ontario	
Summary	The goals of this project are to (a) examine the level and fluctuation, over time, of key team-level variables (team cohesion, conflict, performance) during the AMADEE-18 Mars Simulation, and (b) determine the "person" factors (including personality, and factors examined at the team level of analysis) that relate to the above team-level variables. Variables will be measured by means of surveys completed on an interval of approximately every 5-days during the simulation.	
Objectives & Hypothesis	Hypothesis 1: Team-level conscientiousness (operationalized as the mean conscientiousness of each team's members) will be positively related to overall team performance. Hypothesis 2: Team cohesion, assessed at each time-point, will be positively related to overall team performance, with stronger relations between cohesion assessed later, rather than earlier, in the mission.	

	Hypothesis 3: Team task conflict, assessed at each time-point, will be negatively related to overall team performance with stronger relations between task conflict assessed later, rather than earlier, in the mission. Hypothesis 4: Team relationship conflict, assessed at each time-point, will be negatively related to overall team performance, with stronger relations between conflict assessed later, rather than earlier, in the mission. Hypothesis 5: Team process conflict, assessed at each time-point, will be negatively related to overall team performance, with stronger relations between conflict assessed later, rather than earlier, in the mission.

Summary	Each team member completed a personality survey pre-mission. During the mission, each team member completed short questionnaire measures of team conflict and team cohesion every 5 days. A survey assessing peer ratings of teamwork behavior was completed at the end of the mission.
Preliminary assessment of data quality	Not yet conducted; see below.
Preliminary scientific output	N/A
First lessons learned	
Data fully received	Awaiting receipt of data by overseas mail.
Expected finishing of data analysis	Within 2-3 weeks of receiving data.
Expected journal submission	To be determined
Expected conferences	ASTRO 2018 Canadian Aeronautics & Space Institute Conference May 2018, Quebec City, Canada
Notes	Our team was very pleased with the workflow of the analog astronauts in the field and the assistance of the helpful AMADEE staff.

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10.3. A3DPT-2-Mars

</td></tr>
<tr><td>Description</td><td colspan="2">The experiment comprises a sequence of operational and technical processes to investigate how 3D-printing technology can aid geological field work on Mars as well as operations in general.
  </td></tr>
<tr><td>PI</td><td>Michael Müller
Graz University of Technology /
Austrian Space Forum
michael.mueller@oewf.org</td><td>Mauricio Coen
Texas A&M University
Mau.coen@gmail.com</td></tr>
<tr><td>Organization</td><td colspan="2">Graz University of Technology / Austrian Space Forum</td></tr>
<tr><td>Summary</td><td colspan="2">The A3DPT-Mars experiment tests the operational impact of having a 3D printer on a crewed Mars mission by inserting a 3D printer, and 3D printed parts into the workflow for a range of scenarios, including geological fieldwork and support of other experiments. By using a 3D printer to produce tools on demand, repairs to broken tools, and production of new parts for unplanned needs: the experiment will measure how the use of the technology benefits or hinders Martian operations.</td></tr>
<tr><td>Objectives & Hypothesis</td><td colspan="2">Assess subject and objective quality of using a 3D printer in the operational workflow for the scenarios of:
1) production of a tool on demand
2) production of a replacement part for a broken tool
3) production of single use tools on demand
4) Modification of a tool or production of a new part for an unplanned need.
Throughout these experiments the intended measures include: timing of operation execution (start, end and crew time taken), effectiveness of produced part, crew feedback on convenience and ease of use, and demand for 3D printing capabilities.

The goal is to test the experiments with both Earth-reliant and Earth independent operations to contrast between the two approaches.

There are three overarching hypotheses that will be tested:
1) That the use of 3D printing technology will assist the operations of the Mars crew to be more independent from Earth.
2) That the capability provided by the 3D printer will enable operations to be more adaptable.
3) That the use of 3D printing in a mission architecture can reduce the overall mass of the system.</td></tr>
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10.4. AVI-NAV

Autonomous Visual Navigation and Data Transfer for Airborne Vehicles on Mars – Proof of Concept

</td></tr>
<tr><td>Description</td><td colspan="2">AVI-NAV will verify if an unmanned aerial vehicle would be able to navigate autonomously purely on visual-inertial cues and with on-board processing over Mars-like surfaces
  </td></tr>
<tr><td>PI</td><td>Stephan Weiss
Alpen-Adria Universität Klagenfurt, Control of Networked Systems
stephan.weiss@aau.at</td><td>Eren Allak
Alpen-Adria Universität Klagenfurt, Control of Networked Systems
eren.allak@aau.at</td></tr>
<tr><td>Organization</td><td colspan="2">Alpen-Adria Universität Klagenfurt, Control of Networked Systems</td></tr>
<tr><td>Summary</td><td colspan="2">AVI-NAV consists of a framework including a small multi-copter aerial vehicle equipped with sensors (GPS, IMU, camera), processing unit, and an algorithmic framework that allows the aerial vehicle navigate autonomously to predefined GPS waypoints. The on-board camera will record imagery and synchronized IMU and GPS data for verification of visual-inertial odometry in a post-processing step. Data acquisitions over different terrain structure and in different lighting conditions will be compared against.</td></tr>
<tr><td>Objectives & Hypothesis</td><td colspan="2">The experiment will yield valuable insights to the desired surface structure and texture for surface relative navigation of unmanned aerial vehicles on Mars. These insights could directly feed into the ongoing Mars Helicopter Scout proposal by NASA JPL.

We assume that flights in early mornings or later aftrnoon will be beneficial because of the larger sun inclination and subsequent shadows that add contrast to the image. It is to be tested if the lower light conditions and the change of the shadows also have negative effects on the performance of the visual-inertial odometry.</td></tr>
<tr><td>Special Requirements</td><td colspan="2">Weather: wind should be less than 15km/h; direct sunlight needed, no clouds; Storage: needs to be protected from rain</td></tr>
</table>

	10.5. EOS EVA Orientation System
Description	Stand-alone navigation-system providing location data of moving objects or astronauts during field-based EVAs. 
PI	Martin Zwifl HTBLA-Eisenstadt Dep. Aeronautical Engineering martin.zwifl@gmail.com Angelo Ottenschläger HTBLA-Eisenstadt Dep. Aeronautical Engineering angelo.ottenschlaeger@gmail.com
Organization	HTBLA-Eisenstadt
Summary	EOS is a tool for evaluating and calibrating the accuracy of travel time measurement (electro-magnetic-waves) without high-tech micro-controllers. There will be a minimum of 3 stations fixed to the ground (for calibration of the relative values - output data). To make things or persons track-able they'll need a transceiver which will be a box very similar to the surface-fixed stations but without tripods.
Objectives & Hypothesis	By performing our experiment we can find out, what accuracy or stability measuring the "speed of light" with "common" micro controllers will be like. Furthermore we learn how to handle communication between micro controllers and how to reduce our deviation by calibrating the system. The scientific hypotheses is to measure the distance with the speed of radio waves. Therefore we measure the needed time from one transceiver to another. By calculating the distance and a location calibration of the stations we will be able to conclude this data to the position of the moving transceiver(s).
Number of Runs/Samples	Minimal required: 1 Optimal: 3 – 5 Would be great if the system gets tested in several areas to check the change of accuracy or stability. After the build-up someone should be tracked while several states of movement which will concern the antenna direction (e.g.: body vertically will be best).

Summary	After a short analysis of the data from the field-site regarding the six experiment runs of system EOS, we are now able to state that the navigation system worked successfully on the “martian” surface. We were able to define the position of the field astronauts with a surprisingly low deviation.

Preliminary assessment of data quality	Due to first setups without sight contact the system acquired less data than expected. By changing that, the system began to work well and saved enough data to reconstruct the hole experiment sequence. With this information we will be able to figure out the strengths and weaknesses of EOS for further development.
Preliminary scientific output	With these experiment-runs our team has been able to prove the functionality of a transportable, fully stand-alone navigation system. A more detailed analysis of the obtained data has revealed, that a mars-similar environment has a good influence concerning the wave propagation which is needed for EOS. Thanks to that the System reached unexpected small deviations.
First lessons learned	Because of a complex calibration process, it was a real challenge to provide a clean and understandable procedure to the field crew. Due to the difficult and rigid step-sequence of our experiment, we had to rewrite the procedure several times in order to ensure a better understanding of certain steps.
Data fully received	Yes, the collected data had been received.
Expected finishing of data analysis	25Apr2018
Expected journal submission	-
Expected conferences	-
Notes	Our team was very happy with the work of the field assistances, the analogue astronauts and the crew of MSC Innsbruck as they were always very supportive. Furthermore we are very happy about the results of the field testing. The only thing that is worth to mention, is that the feedback of the operating teams were a bit imprecise sometimes. In a nutshell it has been a real pleasure to work together with the Austrian Space Forum, its partners and all the other experiment teams to progress on the way for future mars exploration.

	10.6. Fatigue Fatigue in Analog Astronauts wearing a restrictive exoskeleton – A pilot study	
Description	Investigation and identification of factors predicting fatigue.	
PI	Dobrovolny Stefan	

	Medical University of Vienna st.dobro@gmail.com	
Organization	Medical University of Vienna	
Summary	Physical and mental stress as well as fatigue are considered to be critical factors for the success of long term missions under isolation. These factors may not only play a role in the design of daily flight plans, but may also influence long term planning decisions by the flight planning team over the course of a mission. Predictive value of certain factors has not yet been identified.	
Objectives & Hypothesis	The objective of Fatigue is to find predictors for fatigue in analog astronauts during a multi week exoplanetary exploration mission. Analog Astronauts' self assessment in combination with different parameters like Maximal Volitional Contraction, Heart Rate or ambient CO2 level can predict fatigue for upcoming mission days.	
Number of Runs/Samples	Minimal required: Dynamometry: 2 per suited AA per day Optimal: Dynamometry: 4 per suited AA per day Optimal for unsuited field crew: 2 per day	

	10.7. Hortextreme	
Description	Installation of an inflatable growth chamber to accomodate 2 square meter microgreens hydroponic cultivation. Evaluation of the plant growth performances in extreme environment.	
PI	Sara Piccirillo ASI - Italian Space Agency sara.piccirillo@est.asi.it	Eugenio Benvenuto, Luca Nardi ENEA - National Agency for New Technologies, Energy and Sustainable Economical Development eugenio.benvenuto@enea.it , luca.nardi@enea.it
Organization	ASI - Italian Space Agency	
Summary	Hortextreme deals with the installation of an inflatable structure in which a smaller grow room will be operated. A system of 2 square meter hydroponic cultivation will be developed with a selection of microgreens, identified on the basis of their agronomic characteristics (e.g short-growth cycle, need for low light intensity) and nutraceutical properties (anthocyanins and flavonoids content).	

Objectives & Hypothesis	The experiments aims to develop innovative cultivation system useful in our roadmap to Mars exploration and colonization, expanding the scientific knowledge on the Bioregenerative Systems management and performances. Furthermore, Hortextreme has important incidence on Earth applications, being a possible test-bed for cultivation systems in extreme environments and providing innovative solutions to issues related to all-round sustainability. Last but not least, it may allow to verify potential psychological benefits associated to growing plants in space for crew members during long- term missions. 1) May be a closed-loop and automated cultivation system, with controlled resources utilization, reduced amount of water and energy, achievable in extreme environment? 2) If yes, is the obtained vegetable production optimal in terms of: - plants physiological and morphological parameters; - plant-derived bioactive molecules content; -operators safety and acceptance (in case plants are used as a dietary supplement)

Summary	Due to the delay in the container delivery, a single experimental run was performed during the mission. For the experiment four species, that can be harvested at 15 days after germination with cotyledonary leaves fully developed (microgreens), were selected: red amaranth, red cabbage, red radish and red mustard. The presoaking and seeding procedures were performed by the experimenters present in the field. The low night temperatures (10-13°C) negatively affected the initial germination rate of Red Amaranth, whereas they had little effect on the other genotypes, in which the final number of germinated seeds was only slightly reduced. Moreover, the Grownode Control Unit did not work properly. During the mission, data were collected and recorded by the crew every 5 days: twenty seedlings for each species (80 samples) were randomly collected and selected for the following measures: fresh weight, hypocotyl length, cotyledon area; twelve fluorescence signals measured by the fluorimeter for chlorophyll(SFR_R and SFR_G), anthocyanin (ANTH) and flavonol (FLAV) indices. Crew were asked to add new activities in the timeline as providing photos of the samples, checking the status of the LED lamps; manual switching of the UV water sterilizer,checking of the humidity of the cultivation pads and the level of water in the tanks and daily opening and closing of the tent's windows for better air circulation
Preliminary assessment of data quality	Due to the low temperatures at night, 10-13°C instead of 16°C expected, the germination and growth of the seedlings were slightly delayed causing at day 5 the impossibility to perform a complete panel of measurements. All the measurements were performed efficiently and the real-time connection with the MSC in Innsbruck guaranteed to efficiently manage and solve all the issues and problems encountered.

	In the final phases of the experiment, mold growth was probably caused by the poor air circulation inside the growroom.
Preliminary scientific output	At this point, we were able to identify a good response for 2 species: an increase in the total weight and the mean hypocotyl length under the two different light regimens tested.
First lessons learned	• Importance of enough back-up solutions for the main Control unit • Analog astronauts' ability to support the experiment and to control all the requirements of the experiment • Analog astronauts' ability to perform the scientific measurements
Data fully received	Yes, data have been fully received and are ready for analysis
Expected finishing of data analysis	30Apr2018
Expected conferences	First Joint AgroSpace – MELiSSA Workshop, Rome, 16-18May2018

<table>
<tr><td></td><td colspan="2">10.8. HUSKY Autonomous Rover</td></tr>
<tr><td>Description</td><td colspan="2">Autonomous robot that supports astronauts in the exploration of planets (Mars) or moons. Tasks of the robot include the autonomous exploration, mapping, measuring habitat WLAN coverage and autonomous transport of material.
  </td></tr>
<tr><td>PI</td><td>Dr. Gerald Steinbauer
Graz University of Technology
Institute for Software Technology
Inffeldgasse 16b/II
A-8010 Graz
steinbauer@ist.tugraz.at</td><td>Willibald Stumptner
Austrian Space Forum
Neugasse 3/II/11
A-8045 Graz
Austria
willibald.stumptner@oewf.org</td></tr>
<tr><td>Organization</td><td colspan="2">Graz University of Technology
Institute for Software Technology</td></tr>
<tr><td>Summary</td><td colspan="2">The aim of the project is to develop an autonomous robot that supports astronauts in the exploration of planets (Mars) or moons. Tasks of the robot include the autonomous exploration and mapping of the environment around the habitat of the astronauts, the measurement of the radio/WLAN coverage around the habitat and an autonomous transport of material between the habitat and the current workplace of the astronauts.</td></tr>
<tr><td>Objectives & Hypothesis</td><td colspan="2">Within the experiment we want to show and prove that an autonomous robot is able to map an unstructured environment automatically, to enrich that map also with additional data like WLAN coverage, and to use this information to perform autonomous transportation and support tasks. In particular we are interested in the question if the navigation methods as well as the supervision methods are mature enough to allow the robot to perform its tasks with no intervention of humans (except receiving transport tasks). That means the robot needs to recognize problems during the mission and cope with them automatically. Therefore, the planned setting of the mission is optimal to work on these research questions. In principle the rover could also be used as a scientific instrument carrier e.g. spectrometers for remote detection of life, including the use as a power supply for the instruments supplied by other participating teams. It can also be used as a mobile transceiver station to temporarily extend the WLAN and/or radio coverage of the AMADEE base station.

In general we are interested in autonomous robots that perform their task with no or very limited support of humans. Moreover, we are interested in autonomous robots that can act in unstructured or semi-structured environments like open planetary landscapes or – in an earth environment - disaster sites. This is a novelty in ÖWF field expedition rover research – so far various remotely guided rovers (e.g. MAGMA, PULI, Dignity, Sisi, Phileas) have been utilized. The use of autonomous robots will reduce the demands on field-</td></tr>
</table>

	to-mission-support-centre data transfer bandwidth and required (analogue) astronaut time
Number of Runs/Samples	Runs Minimal required: 1 terrain mapping, 1 WLAN map, 1 WLAN data GIS import, 1 transport task Optimal: 1 terrain mapping, 2+ WLAN map, 2+ WLAN data GIS import, 3+ transport tasks WLAN mapping should be repeated whenever WLAN transceiver location significantly changes. Additional optional tasks when time is available e.g. teleoperations by field team, tests with 360 degree camera, interaction with other experiments (TBD)

Summary
During the preparation week the rover was set up and preliminary tested by the experimenter team. The originally designed hardware and software system worked mostly as expected. The terrain in and around the base camp was less structured and comprised much more loose and soft sand than expected. This lead to some difficulties in the autonomous navigation and exploration because the dead reckogning information was more than expected and the rover got stuck from time to time. Thus, quick fixes in the software were made in the first days.

Based on interaction with the field crew, improvements in the usability of the rover were implemented too. Besides these issues the sand caused fewer problems to the hardware than expected in particular in relation to the rotating laser scanner. During the preparation week a number of autonomous mapping runs in the base camp and its close proximity were performed. At the end of the preparation week also an interesting area a few kilometers away the camp were mapped successfully. During the isolation phase the rover was scheduled for several deployments with the crew. Here we encountered some problems in the software (mis-configurations) and hardware (losing sealing at the 3D unit) that were fixed giving some remote support by the experimenter team. Unfortunately, the rover system was less stable and the complexity of an autonomous system was high.

Thus, only a few runs performed by the field crew during isolation lead to successful exploration runs. Although, only a few successful autonomous mapping runs including collecting WLAN coverage has been performed the potential of an autonomous support robot was shown. Due to stability and time problems the originally planned far reach transport task had not been achieved.

preliminary assessment of data quality
The data collected from successful runs were as expected and allowed to produce a 3D map of the explored area. Moreover, the data and log information of unsuccessful runs are interesting too as they allow us do a post mission analysis on the problems that occurred and to improve the system. The nightly upload of the data to Innsbruck allowed us to immediately to check the results of the day and to update the procedures to improve the stability of the system.

preliminary scientific output
We were basically able to show that the intended complex 3D exploration system works for a challenging environment like the one of Amadee-18.

first lessons learned
due to the interaction with the real environment an autonomous robot system is much more complex in handling - in particular for non-robotics field crew members. Thus, the interaction between the crew members and the rover such as control, showing data and intentions, and error handling needs to be improved. Although, the rover hardware was only intended as a proof-of-concept a rover platform with improved locomotion capabilities is needed to manage the terrain. Further, sensors such as cameras need to be integrated to improve the situation awareness of the rover (e.g. loose sand and dynamic objects). Moreover, the logging and reporting of experiment runs needs to be improved, like systematic check lists and reports.

data fully received: yes apart from some basic log files that are on the rover.

expected finishing of data analysis: end of May 2018

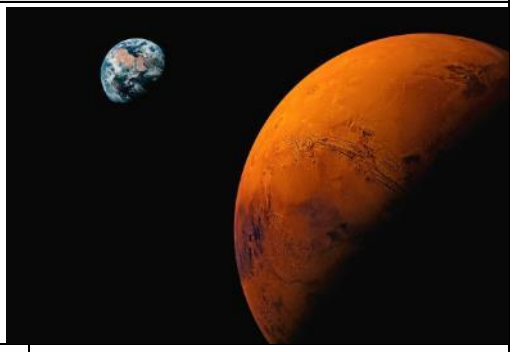
expected journal submission: due to a special call for the Journal of Field Robotics an article has been already submitted.

<table>
<tr><td></td><td colspan="2">10.9. MSTAT
 

Mars Simulation for Two Astronauts Teams</td></tr>
<tr><td>Description</td><td colspan="2">- Two astronauts teams situational awareness and communication experiment.
- Measuring cosmic ray flux in two points for two EVA missions duration.
  </td></tr>
<tr><td>PI</td><td>Hilel Rubinstein
Ben Gurion University
hillel.galim@gmail.com</td><td>Guy Ron
The Hebrew University
gron@racah.phys.huji.ac.il</td></tr>
<tr><td>Organization</td><td colspan="2">Ben Gurion University</td></tr>
<tr><td>Summary</td><td colspan="2">The Israeli analogue missions team I-MARS will perform their first human mission during February 2018 near Ramon crater in Israel. The MSTAT experiment includes: 1) Two - nodes simultaneous time dependent measurement of cosmic radiation measurements, 2) Communication setup tests between two astronaut teams - the Israeli team and the Austrian team - simulating two groups of astronauts on Mars, 3) Situational awareness training that includes communication between the two astronauts missions.</td></tr>
<tr><td>Objectives & Hypothesis</td><td colspan="2">1) MSTAT will allow testing and demonstration of the new analogue site in Israel, and establishing high level of know-how, which is important both for the</td></tr>
</table>

	succeeding educational missions, and maybe also for the AMADEE-20 proposed mission. 2) Establishment of communication architecture, setup and protocols will allow various new type of experiments in future analogue missions, and is important for future two astronaut teams Mars missions. 3) Cosmic radiation experiment 1) Cosmic radiation: the overall time dependence is expected to be identical between the two locations (caused by changes in the flux of solar radiation), with variations based on the relative direction to the sun from both locations, and from local ground shielding effects, and height above sea level (atmospheric depth). 2) Communication - If done properly, direct communication between two teams on Mars would facilitate better scientific output and better mitigation of contingency situations, but if not done properly could interfere with routine operations. Upon communication breakdown between an astronaut team and their Mars habitat, direct communication between two sites on Mars is expected to greatly contribute to higher situational awareness of the stranded team

Summary	Two measurements systems were deployed in parallel at AMADEE-18 and DMARS-01. Data from both systems was simultaneously uploaded to a shared databse.
Preliminary assessment of data quality	The AMADEE-18 system worked well as deployed inside the Oman habitat. The system deployed in the field at DMARS-01 showed marked variations in measured flux during the day and when deployed outside the habitat. Preliminary conclusions are that the system suffered from overheating (due to direct sunlight and/or heat conditions inside the habitat) to a degree that is more than expected based on component specs.
Preliminary scientific output	None yet.
First lessons learned	• Next gen systems will need to incorporate better light shielding as well as active cooling or temperature stabilization. • Next gen system will incorporate a pressure gauge to allow for calibration with respect to air pressure effects.
Data fully received	Yes, data have been fully received and are ready for analysis
Expected finishing of data analysis	June 2018
Expected journal submission	End June2018 to Rev. Sci. Inst.

	10.10. SITAS Situational Awareness in Simulated Mars Environments
Description	Psychological analysis of situational awareness between two teams (Earth and Mars). Use of qualitative research and measurement of physiological parameters. 
PI	Alexandra Hofmann University of Witten/Herdecke alexandra.hofmann@uni-wh.de
Organization	University of Witten/Herdecke
Summary	This study examines situational awareness in and between co-working teams during AMADEE18 mission. We follow a qualitative approach, using videotaped interviews in both teams during several measuring points. Further, physiological parameters, such as decoded facial expression from videos and heart rate, measured by a wearable watch, indicate possible synchronized levels of stress and changes in moods. Verbal content of videos will be correlated to facial expression and HR. Results will outline how situational awareness changes during one month of a mission and how teams communicate and interact. Additionally, our findings will help to improve coping strategies and monitoring and inspire a greater understanding of ongoing processes while working in extreme environments.
Objectives & Hypothesis	We can learn how conflicts are inspired by unawareness and a lack of listening between coworking teams. Results support trainings for teams in extreme environments, which can be improved according to the finding of this study. 1. Situational Awareness will decrease over time. 2. The decrease of S.A. will cause troubles in cooperations and tensions between team. 3. The intervention itself can help to improve this aspect already during the mission. 4. Physiological parameters (HR + Facial expressions) can prove the hypothesis mentioned above.

Summary	The experiment was deployed during 18 runs on Mars and we were able to acquire hopefully the same amount of data from Earth (which is still on it's way to Germany). Using the material of around 300 minutes of qualitative data, we expect to obtain a more detailed insight into situational awareness between teams.
Preliminary assessment of data quality	Most data is recorded in a proper way and about to be transformed into transcripts. Due to external noise, some data is harder to be processed, where we will try to improve the quality of sound by using some software.

Preliminary scientific output	At this point, we are not able to deliver any scientific output, as the other half of our data has not arrived yet. We have not received any of the questionnaires yet.
First lessons learned	• the experiment gained quite a lot attention in the german media, and was able to promote the ÖWF and it's psychological work in society • Data delivery from Mars is faster than from Earth ☺
Data fully received	Not yet
Expected finishing of data analysis	31may2018
Expected journal submission	End of May2018
Notes	Our team was content with the workflow of the field and MSC team; however, a slightly faster data transfer would have allowed more insights yet. Not every participant followed the time frame of our experiment, but we will still be able to gather qualitative data of the mission.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<tr><td></td><td colspan="2">10.11. Field spectrometry</td></tr>
<tr><td>Description</td><td colspan="2">Acquisition of reflectance and radiance spectra in an environment analogous to Mars
  </td></tr>
<tr><td>PI</td><td>Eleonora Ammannito
Agenzia Spaziale Italiana
eleonora.ammannito@asi.it</td><td>Simone De Angelis
Istituto Nazionale di Astrofisica
simone.deangelis@iaps.inaf.it</td></tr>
<tr><td>Organization</td><td colspan="2">Agenzia Spaziale Italiana</td></tr>
<tr><td>Summary</td><td colspan="2">VIS-NIR reflectance spectroscopy is the major technique used so far to identify mineralogical phases present on the surface of Mars. However, the interpretation of reflectance spectra is subject to a deep understanding of the contest in which the measurements have been acquired. The co-existence of different minerals (Brossard et al. 2016), the temperature (Singer & Roush 1985) and illumination (Mustard & Pieters, 1989) - just to cite few examples - can significantly alter the shape of absorption features of minerals leading to mistakes in the determination of the composition of the site under analysis.</td></tr>
<tr><td>Objectives & Hypothesis</td><td colspan="2">The scope of our proposal is to acquire spectra in a realistic Martian-like environment along with ancillary information like temperature and illumination conditions to check the reliability of mineralogical interpretation.

Reflectance spectra can be used to measure the mineralogical composition of a site but the interpretation of data might be affected by specific characteristic of the surrounding ambient.</td></tr>
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	10.12. Water explorer experiment
Description	Geophone Nodes are self-contained seismic data recorders that can measure seismic waves both passive and those generated by a source e.g Hammer and a plate. 
PI	Mohammed Al Hosni Petroleum Development Oman Mohammed.Hosni@pdo.co.om Maram Dawoodi Umm Al Khair Primary School mramaldawdy@gmail.com
Organization	Umm Al Khair Primary School
Summary	The self-contained light weight Geophone units can record subtle seismic waves passively and from an active source for more than 50 continuous days. Using these nodes allows a robust deployment of a seismic survey along with a simple hammer source or passive source can allow the detection of shallow aquifers by detecting changes in seismic impedance (velocity x density in the subsurface).
Objectives & Hypothesis	It is essential to know if there is water present in Mars shallow subsurface. This experiment will utilize a sensitive self-contained geophones to record both active and passive seismic signal to delineate shallow aquifers. The experiment will highlight the deployment of self-contained geophone units for subsurface investigation. Seismic waves that travel through any media exhibit both a reflection and transmission at boundaries of change of impedance [Velocity x Density]. These changes can be associated with medium changes such as fluids, rock types and rock texture. Using either active or passive source the seismic signal can be analyzed to provide an image of the subsurface which can be used to delineate possible shallow aquifers.
Number of Runs/Samples	1 to 2 runs The run (fold/multiplicity) involves using a hammer and a plate to hit the ground surface, this will depends on the effort can be done by the person. Optimally 10-30 runs. A second run might involve redeploying the geophones to different geometry on the ground.
Summary	The equipments were deployed to acquire at least one run of active source seismic records and a extended recording of passive seismic. The data retrieval from the self contained nodes is still ongoing. The initial harvesting of the data
Preliminary assessment of data quality	About 80% of the data have been harvested. Data quality assessment is too early at this stage as the data requires further processing. Data volume retrieved show successful data recording for majority of the nodes.
Preliminary scientific output	At this point, we are still in the data harvesting stage. About 80% of the nodes have been harvested successfully. About 20% showed either no data recorded or cannot be harvested. This is still under investigation. Time stamps on the records show that data for the active and passive experiments have been recorded successfully but not entirely for all 28 node utilized.

First lessons learned	• A better timing record (automatic) is required to get accurate timing for the active source. • An automatic source would provide better control on the signal sent into the ground and its timing.
Data fully received	Yes, Nodes received but data from the nodes in harvesting stage, expected completion date 25th March 2018.
Expected finishing of data analysis	15th May 2018
Expected journal submission	End of September 2018
Expected conferences	EAGE 24th European Meeting of Environmental and Engineering Geophysics, Porto, Portugal, 9 - 13 September 2018
Notes	The first breaks timing was not entirely captured in the experiment. This imposes an extra data analysis time and higher uncertainty in the timings for subsurface layers velocity analysis.

	10.13. Tumbleweed	
Description	The Tumbleweed is a wind-driven Mars rover that can be deployed to gather large-scale data of planetary surfaces.	
PI	Moritz Stephan Sir Karl Popper Schule moritz.stephan01@gmail.com	Julian Rothenbuchner Sir Karl Popper Schule julian.rothenbuchner@gmail.com
Organization	Sir Karl Popper School, Vienna	
Summary	We want to test if the Tumbleweed will perform all of its functions as intended. The goal is that it lands safely, constructs its outer structure autonomously and starts the mission, during which the thermometer, barometer, magnetometer, and infrared data are collected, along with images of pre-specified targets (e.g. areas between dunes with a certain level of flatness or anything abnormal) which will be automatically sorted through the image recognition algorithm. Additionally, we want to observe the effectiveness of the solar cells, especially with regard to accumulating dirt, and the data transmission rates.	

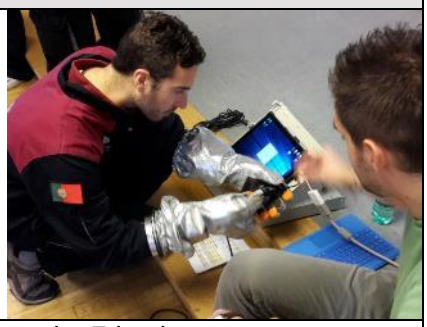
Objectives & Hypothesis	Through this experiment, we will be able to see if our principal structural design is fit for longer missions. Additionally, we can test the effectiveness of our data processing systems and solar panels. The systems will perform as intended. The Tumbleweed will expand to its full diameter of approximately 2 m, collect enough solar energy to supply the electronics, and send only data about important locations to the base camp.
Number of Runs/Samples	4 to 5 There must be at least 2, optimally 3, short range runs with one, then two, and at last three Tumbleweeds. Additionally, we need two long-range runs with all Tumbleweeds

Summary	A version of the second Tumbleweed prototype was tested during several runs. The parts tested included the solar charging system, the arresting system, and the atmospheric sensor suite.
Preliminary assessment of data quality	We received accounts from the members of the field crew responsible for the experiment, which was in most instances detailed enough
Preliminary scientific output	The results were mostly concerning engineering aspects of the rover that will be incorporated in future designs. We redesigned our connectors incorporating what we learned from this mission and changed the layout of the inner chassis to make it more structured and spacious.
First lessons learned	• Connectors printed from ABS are not viable and instead we will use our titanium versions in the future • We must make the wiring less dense and easier to understand since the field crew was not able to hook the sails up correctly. Tests with identical sails in Vienna showed that they work, though.
Data fully received	No, we are still waiting for the sensor data
Expected finishing of data analysis	~late may 2018
Expected journal submission	At some time in 2018 (European Journal of Physics)
Expected conferences	To be determined
Notes	The communication with the field worked well and was generally fast

	10.14. V(R)ITAGO Virtual Instrument Testing and Analysis of Geological Outcrop
Description	The proposal has the scope to provide to the AMADEE-18 team a VR tool to perform analysis and testing based on testing in the VR environment of instruments and inclusion of pictures of geological outcrop into the VR environment. 
PI	Antonio Del Mastro Mars Planet info@marsplanet.org Luca Venturini Mars Planet luca.venturini@marsplanet.org
Organization	Mars Planet
Summary	The use of VR/AR technology has in the last years found different potential applications in the space sector and it has been demonstrated a valid solution to carry out operations and training related to the astronauts activity. Such technology can contribute to: - Improve the operations to be carried out by astronauts. - Minimize the time required to a train for a task. - To improve knowledge retention. The proposed experiment is divided in VRIT (virtual testing of instruments) and VRAGO (Virtual analysis of geological outcrop).
Objectives & Hypothesis	The expected results for VRIT is to verify an acceptable level of likelihood between the procedures in VR environment and the real environment. The final results will be also suggestions for the improvement of the likelihood level in future version of the experiment. The expected results for VRAGO is to verify if real benefits will be produced for the RSS team and astronauts while the analogue mission will be executed. The final results will also include suggestions for the improvement of the developed technology in future version of the experiment. - The VR environment is developed for Oculus Headset. - The geological outcrops source images or similar information will be supplied by ÖWF and the VR environment in which include the instruments and the geological outcrops will be defined with the ÖWF. - The kind of instruments to be simulated will be defined with the ÖWF team.

Summary	Vritago experiment has been completed by developing the following application: 1) The Vritago Room: This application enables the visualization in VR of the site data and geological information as well as data of the AVI-NAV, FieldSpectometry, ScanMars experiments. 2) The base camp mission: The exploration of the base site mission. The application has been able to create a full external

	view of the base mission and exploration of it by a teleport system. 3) The Hortextreme application: A full model of the Greenhouse has been developed and a procedure to be used as training has been set up. 4) 3D printer application (under development): the application simulates some pieces of procedure of A3DPT-MARS experiment.
Preliminary assessment of data quality	The first supplied geological data where not worth to be included in the VR environment, this has lead to build the VRITAGO room with some maps of the geological site, which were available in the scientific community.
Preliminary scientific output	The Vritago room can be improved to create a complete mission monitoring room in VR and this could help to understand if this kind of technique can be applied in future analogue and not-analogue missions. Hortextreme and 3D-Printer application can be improved to better simulate mission operations and training procedures. The base camp mission could be used in a further evolution to simulate EVA, or other activities in base mission, with adding gesture recognition and sensors systems to the VR experience of the user.
First lessons learned	• The developed project has been useful to test our capability to create in VR realistic scenarios of the analogue missions and this can be applied also in other space missions. • The scientific value of the experiment will improve adding to it a more integrated and completed data management and analysis in VR as well as interaction of the users also by means of a multi-user activity in VR.
Data fully received	Yes, data received, further data management and analysis has been required to include the data in the Vritago Room. A tool has been developed to include in the VRITAGO room automatically scientific data uploaded on a web server.
Expected finishing of data analysis	In the Vritago room further information on the AVI-NAV experiment could be added if desired.
Expected journal submission	Under analysis in the next months.
Expected conferences	Mars to Earth Conference? (Milan, Italy 11th,12th May)
Notes	

	10.15. ScanMars Subsurface Mars Scanner	
Description	ScanMars is a ground penetrating radar which detects variations in dielectric properties of the ground.	
PI	Maurizio Ercoli University of Perugia, Italy maurizio.ercoli@unipg.it	Alessandro Frigeri National Institute for Astrophysics, Rome, Italy alessandro.frigeri@iaps.inaf.it
Organization	University of Perugia, Italy and National Institute for Astrophysics	
Summary	ScanMars instrument will image the subsurface of the study area by means of 2d transects of tens of meters. Depending on the available time for the experiment we can extend the observations to a 3D volume.	
Objectives & Hypothesis	The setting of the subsurface of the study area represents an important element in the reconstruction of the geologic evolution of the study area. Data will be georeferenced so it can be integrated with the observation of the other instruments.	

	What are the geologic structures in the study area? At what depth is the regolith/bedrock interface? Is there a water or ice table? At what depth?

Summary	The ScanMars experiment collected 24 radar profiles. About 1400 meters of profiles have been acquired by the analogue astronauts, for a total of 70000 radar echoes. 75% percent of the data are useful for scientific analysis. ScanMars data has been acquired in 4 different sites with different geological characteristics. We consider the experiment as successful as ScanMars data allows to pursue the main objective of studying water related subsurface geologic features.
Preliminary assessment of data quality	In the first phase of the experiment we had to face some technical problem related to hardware, radio frequency interference and tuning of the acquisition system. Despite those initial difficulties, the data quality of the main scientific campaign is to be considered good. Penetration depth up to 5 meters indicates very good system performance.
Preliminary scientific output	ScanMars data show dipping horizons, strong reflections, and sectors with different signal attenuation. The geometry and the signal strength of the data show features typical of dried Wadi riverbed environments.
First lessons learned	• The analogue astronauts have succesfully ScanMars data. The synergy between the science team and the field crew allowed to face problems and find solutions. • The equipment used in ScanMars would require some hardware developments and optimizations for making the use with spacesuit more efficient and functional during extreme climate operations. • Scientific planning/archiving have to be defined better before the mission starts (Keep this confidential – just for the AMADEE team)
Data fully received	Yes
Expected finishing of data analysis	13 Apr 2018
Expected journal submission	End of June – journal not selected yet
Expected conferences	European Planetary Space Conference, Berlin, 16-21 Sep 2018 IWAGPR international conference sand workshop. 2018. Lunar and Planetary Space Conference, Houston, March 2019 European Geoscience Union General Assembly, Vienna, 7-19 April 2019
Notes	Analog astronauts responded extremely well to the training phase, putting in practice all the instruction/suggestion from the science team. Field Crew was collaborative and all the problems have been faced and solved quickly.

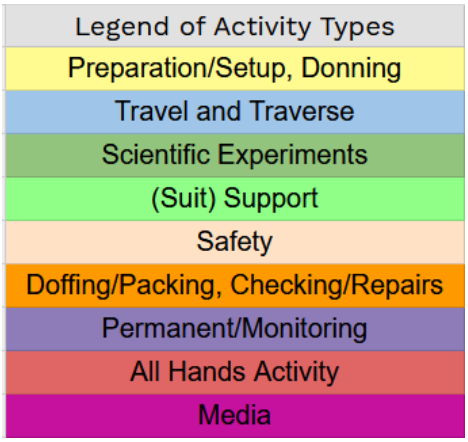
11. As-was Daily Activity Plan

This Daily Activity Plan (DAP) describes the planning for each day, based upon the OeWF internal Exploration Cascade methodology providing the best-possible instrument deployment strategy. Note however, that this plan might have had minor adjustments due to short-term operational needs, depending on scientific needs, environmental constraints (dust storms etc) and instrument & crew member availability. For a detailed sequence of the as-was activities, we refer to the RECORDS database in the Multi-Mission Science Data Archive of the Austrian Space Forum (mission.oewf.org/archive) .

The late start/early finishing times might be slightly misleading, as for the rest of the day, typical demobilization activities such as equipment servicing, bug fixing, repair & maintenance were not explicitly scheduled, but directed by the Field Commander.

Note: these Schedules give a rough description of the daily activities, for a detailed plan, as well as traverse planning data for both suited and unsuited activities, please refer to the OeWF Multi-Mission Science data Archive at mission.oewf.org/archive.

Color coding scheme for the activities:



31Jan2018 – 03Feb2018: First part of bridgehead-phase

- Utilized mainly or establishing the base, media activities and setting up the infrastructure.
- Due to the late delivery of the two shipping containers, the first EVA was shifted by one day into the mission

Sun,.04-Feb-2018	UTC	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00	14:00
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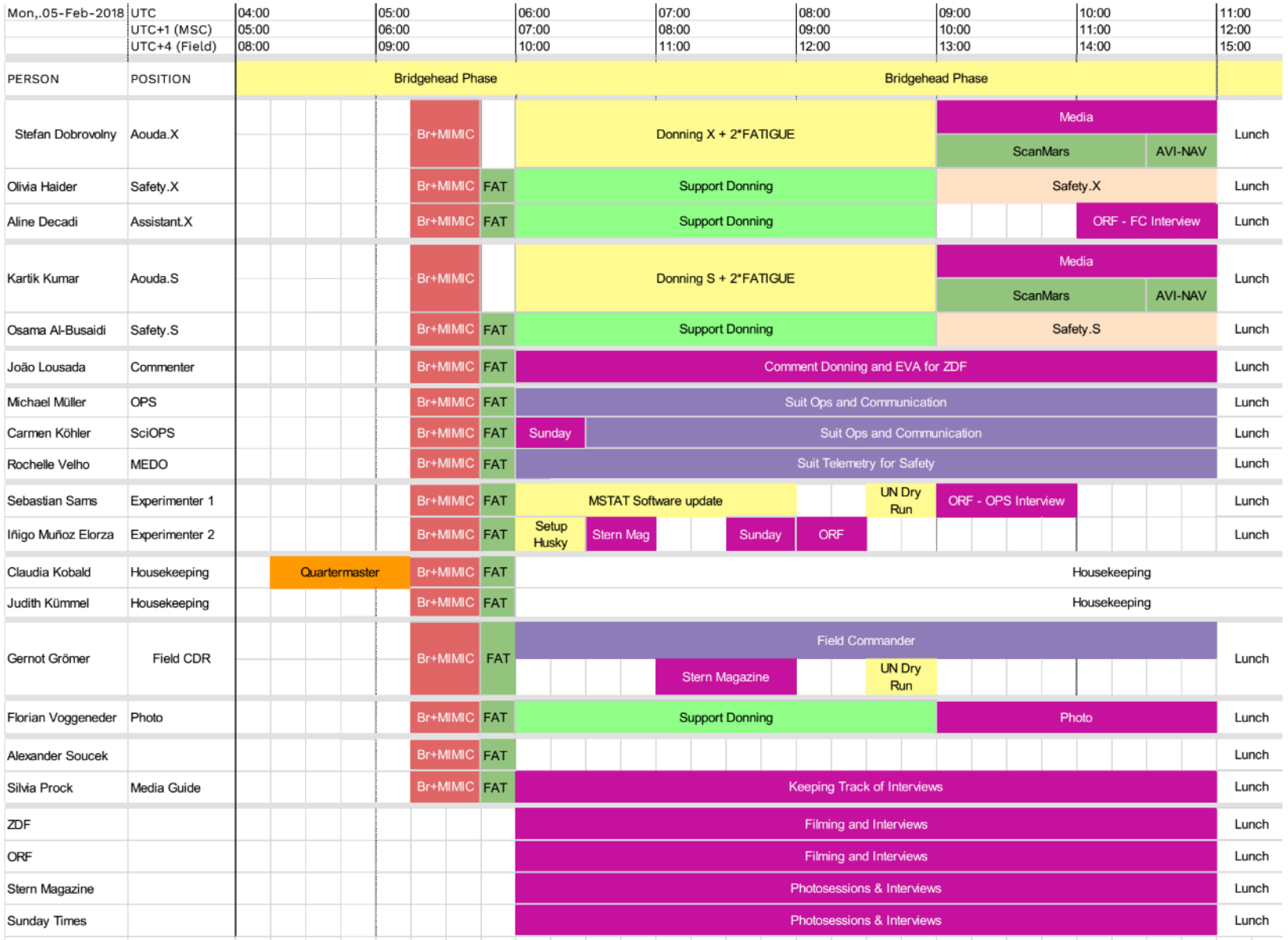
	UTC+4 (Field)	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00
PERSON	POSITION	Bridgehead Phase				Bridgehead Phase			Bridgehead Phase			
Iñigo Muñoz Elorza	Aouda.X		Br+MIMIC	Donning X + FATIGUE		Media / FieldSpec [0] / A3DPT GBE [0]		Lunch	Media / Scouting / AVI-NAV [0]		Doffing + FATIGUE	Br+MIMIC
Michael Müller	Safety.X	Setup FS	Br+MIMIC	Support Donning		Safety.X		Lunch	Safety.X		Support Doffing	Br+MIMIC
Carmen Köhler	Aouda.S		Br+MIMIC	Donning S + FATIGUE		Media / FieldSpec [0] / A3DPT GBE [0]		Lunch	Media / Scouting / AVI-NAV [0]		Doffing + FATIGUE	Br+MIMIC
Kartik Kumar	Safety.S		Br+MIMIC	Support Donning		Safety.S		Lunch	Safety.S		Support Doffing	Br+MIMIC
Sebastian Sams	OPS		Br+MIMIC	Support Donning	Suit Ops and Communication			Lunch	Suit Ops and Communication			Br+MIMIC
Claudia Kobald	SciOPS		Br+MIMIC	Quartermaster	Suit Ops and Communication			Lunch	Suit Ops and Communication			Br+MIMIC
Rochelle Velho	MEDO		Br+MIMIC	Support Donning	Suit Telemetry for Safety			Lunch	Suit Telemetry for Safety			Br+MIMIC
João Lousada	VIP support		Br+MIMIC	Support Donning	VIP support	WEE introduction	VIP Support	Lunch	VIP Support		Support Doffing	Br+MIMIC
Aline Decadi	VIP support		Br+MIMIC		VIP support			Lunch	VIP Support		Support Doffing	Br+MIMIC
Stefan Dobrovolny	VIP support		Br+MIMIC		VIP support	WEE introduction	VIP support	Lunch	VIP Support		Support Doffing	Br+MIMIC
Alexander Soucek	VIP support		Br+MIMIC		VIP support			Lunch	VIP Support			Br+MIMIC
Osama Al-Busaidi	VIP support		Br+MIMIC		VIP support			Lunch	VIP Support			Br+MIMIC
Olivia Haider	Housekeeping		Br+MIMIC		Housekeeping							Br+MIMIC
Silvia Prock	Housekeeping		Br+MIMIC		Housekeeping							Br+MIMIC
Gernot Grömer	Field CDR		Br+MIMIC		Field Commander / Welcoming VIPs			Lunch	Field Commander			Br+MIMIC
Judith Kümmel	CDR Assistant		Br+MIMIC		CDR Assisting			Lunch	CDR Assisting			Br+MIMIC
Florian Voggeneder	Photo		Br+MIMIC		Photo							Br+MIMIC
all unsuited			Br+MIMIC	FATIGUE								Br+MIMIC
WEE PI						WEE introduction						
VIPs												
ZDF					Filming and Interviews							
ORF					Filming and Interviews							
Stern Magazine					Filming and Interviews							
Sunday Times					Filming and Interviews							
Vanessa					Filming and Interviews							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PERSON
POSITION
Bridgehead Phase
Bridgehead Phase
Stefan Dobrovolny
Aouda.X
Br+MIMIC
Donning X + 2*FATIGUE
Media
ScanMars
AVI-NAV
Lunch
Olivia Haider
Safety.X
Br+MIMIC
FAT
Support Donning
Safety.X
Lunch
Aline Decadi
Assistant.X
Br+MIMIC
FAT
Support Donning
ORF - FC Interview
Lunch
Kartik Kumar
Aouda.S
Br+MIMIC
Donning S + 2*FATIGUE
Media
ScanMars
AVI-NAV
Lunch
Osama Al-Busaidi
Safety.S
Br+MIMIC
FAT
Support Donning
Safety.S
Lunch
João Lousada
Commenter
Br+MIMIC
FAT
Comment Donning and EVA for ZDF
Lunch
Michael Müller
OPS
Br+MIMIC
FAT
Suit Ops and Communication
Lunch
Carmen Köhler
SciOPS
Br+MIMIC
FAT
Sunday
Suit Ops and Communication
Lunch
Rochelle Velho
MEDO
Br+MIMIC
FAT
Suit Telemetry for Safety
Lunch
Sebastian Sams
Experimenter 1
Br+MIMIC
FAT
MSTAT Software update
UN Dry Run
ORF - OPS Interview
Lunch
Iñigo Muñoz Elorza
Experimenter 2
Br+MIMIC
FAT
Setup Husky
Stern Mag
Sunday
ORF
Lunch
Claudia Kobald
Housekeeping
Quartermaster
Br+MIMIC
FAT
Housekeeping
Judith Kümmel
Housekeeping
Br+MIMIC
FAT
Housekeeping
Gernot Grömer
Field CDR
Br+MIMIC
FAT
Field Commander
Stern Magazine
UN Dry Run
Lunch
Florian Voggeneder
Photo
Br+MIMIC
FAT
Support Donning
Photo
Lunch
Alexander Soucek
Br+MIMIC
FAT
Lunch
Silvia Prock
Media Guide
Br+MIMIC
FAT
Keeping Track of Interviews
Lunch
ZDF
Filming and Interviews
Lunch
ORF
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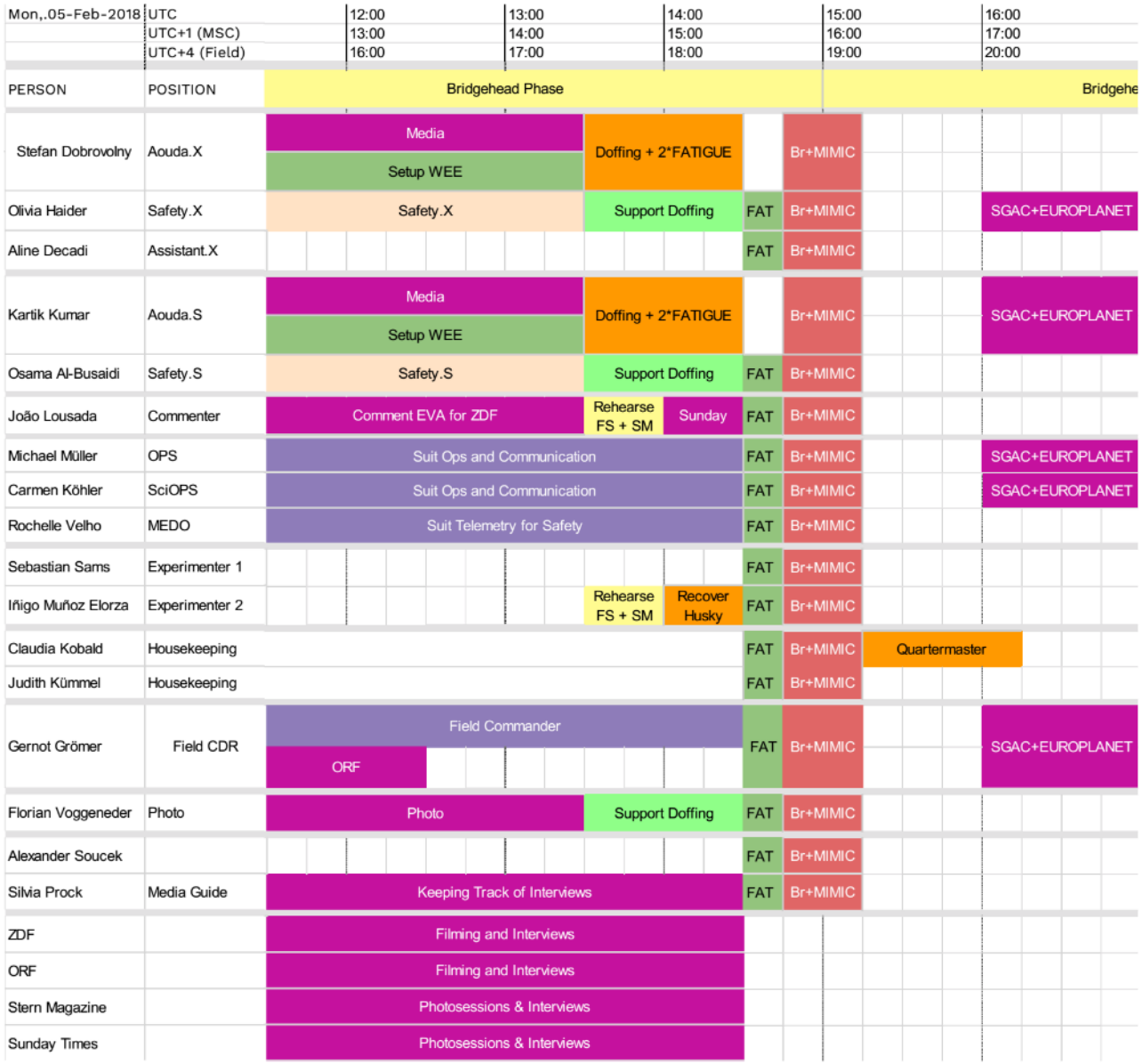
Lunch
Stern Magazine
Photosessions & Interviews
Lunch
Sunday Times
Photosessions & Interviews
Lunch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PERSON
POSITION
Bridgehead Phase
Bridgehe
Stefan Dobrovolny
Aouda.X
Media
Setup WEE
Doffing + 2*FATIGUE
Br+MIMIC
Olivia Haider
Safety.X
Safety.X
Support Doffing
FAT
Br+MIMIC
SGAC+EUROPLANET
Aline Decadi
Assistant.X
FAT
Br+MIMIC
Kartik Kumar
Aouda.S
Media
Setup WEE
Doffing + 2*FATIGUE
Br+MIMIC
SGAC+EUROPLANET
Osama Al-Busaidi
Safety.S
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Support Doffing
FAT
Br+MIMIC
João Lousada
Commenter
Comment EVA for ZDF
Rehearse FS + SM
Sunday
FAT
Br+MIMIC
Michael Müller
OPS
Suit Ops and Communication
FAT
Br+MIMIC
SGAC+EUROPLANET
Carmen Köhler
SciOPS
Suit Ops and Communication
FAT
Br+MIMIC
SGAC+EUROPLANET
Rochelle Velho
MEDO
Suit Telemetry for Safety
FAT
Br+MIMIC
Sebastian Sams
Experimenter 1
FAT
Br+MIMIC
Iñigo Muñoz Elorza
Experimenter 2
Rehearse FS + SM
Recover Husky
FAT
Br+MIMIC
Claudia Kobald
Housekeeping
FAT
Br+MIMIC
Quartermaster
Judith Kümmel
Housekeeping
FAT
Br+MIMIC
Gernot Grömer
Field CDR
Field Commander
ORF
FAT
Br+MIMIC
SGAC+EUROPLANET
Florian Voggeneder
Photo
Photo
Support Doffing
FAT
Br+MIMIC
Alexander Soucek
FAT
Br+MIMIC
Silvia Prock
Media Guide
Keeping Track of Interviews
FAT
Br+MIMIC
ZDF
Filming and Interviews
ORF
Filming and Interviews
Stern Magazine
Photosessions & Interviews
Sunday Times
Photosessions & Interviews

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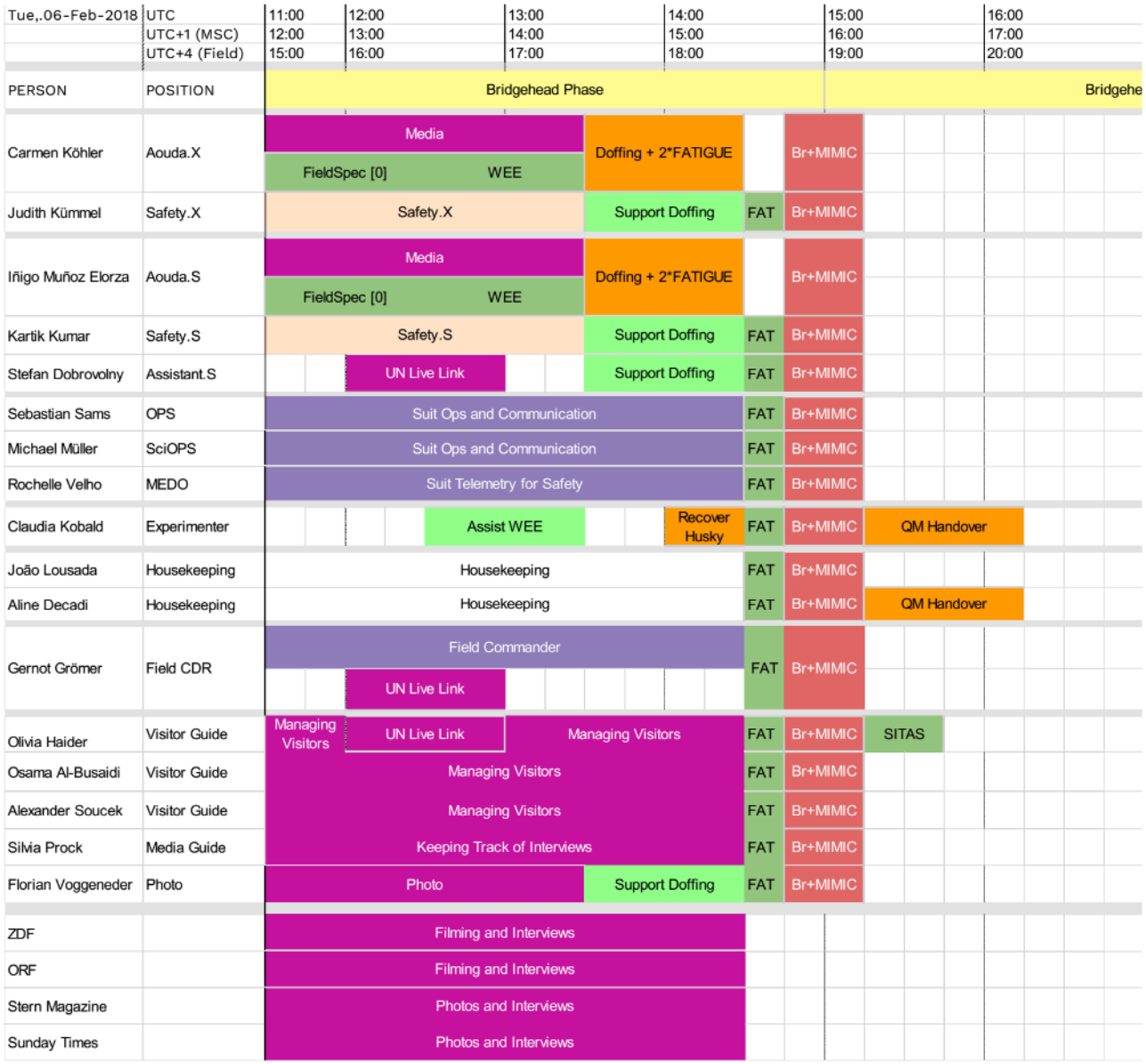
PERSON	POSITION	Bridgehead Phase					Bridgehead Phase		
Carmen Köhler	Aouda.X		Br+MIMIC		Donning X + 2*FATIGUE			Media / ScanMars [0]	Lunch
Judith Kümmel	Safety.X		Br+MIMIC	FAT	Support Donning			Safety.X	Lunch
Iñigo Muñoz Elorza	Aouda.S		Br+MIMIC		Donning S + 2*FATIGUE			Media / ScanMars [0]	Lunch
Kartik Kumar	Safety.S		Br+MIMIC	FAT	Support Donning			Safety.S	Lunch
Stefan Dobrovolny	Assistant.S		Br+MIMIC	FAT	Support Donning				Lunch
Sebastian Sams	OPS		Br+MIMIC	FAT	Suit Ops and Communication				Lunch
Michael Müller	SciOPS		Br+MIMIC	FAT	Suit Ops and Communication				Lunch
Rochelle Velho	MEDO		Br+MIMIC	FAT	Suit Telemetry for Safety				Lunch
Claudia Kobald	Experimenter	Quartermaster	Br+MIMIC	FAT	Setup MSTAT	Setup H			Lunch
João Lousada	Housekeeping		Br+MIMIC	FAT				Housekeeping	
Aline Decadi	Housekeeping		Br+MIMIC	FAT				Housekeeping	
Gernot Grömer	Field CDR		Br+MIMIC	FAT	Field Commander				Lunch
Olivia Haider	Visitor Guide	SIT	Br+MIMIC	FAT	Managing Visitors				Lunch
Osama Al-Busaidi	Visitor Guide		Br+MIMIC	FAT	Managing Visitors				Lunch
Alexander Soucek	Visitor Guide		Br+MIMIC	FAT	Managing Visitors				Lunch
Silvia Prock	Media Guide		Br+MIMIC	FAT	Keeping Track of Interviews				Lunch
Florian Voggeneder	Photo		Br+MIMIC	FAT	Support Donning			Photo	Lunch
ZDF					Filming and Interviews				
ORF					Filming and Interviews				
Stern Magazine					Photos and Interviews				
Sunday Times					Photos and Interviews				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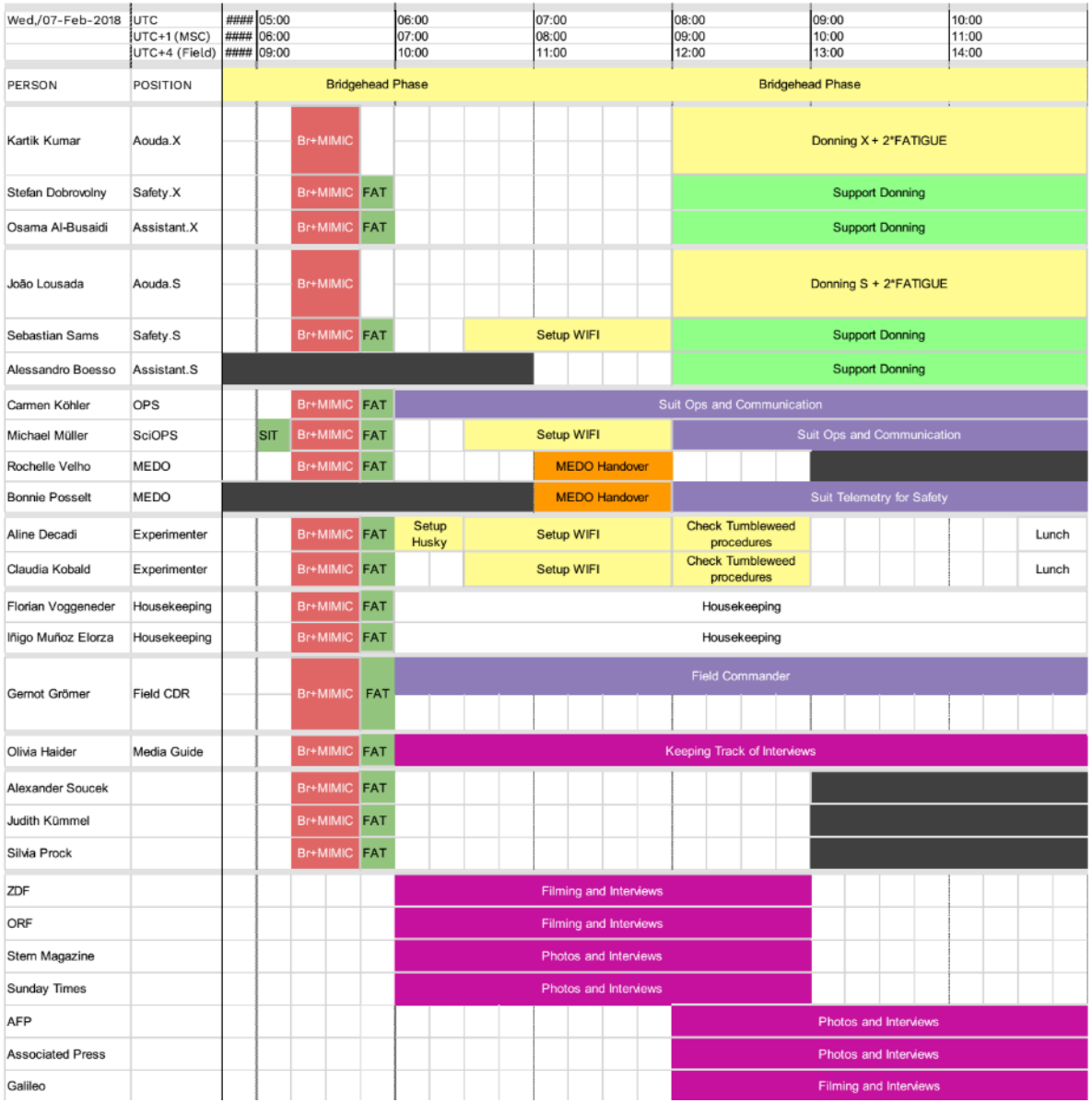
PERSON
POSITION
Bridgehead Phase
Bridgehe
Carmen Köhler
Aouda.X
Media
FieldSpec [0]
WEE
Doffing + 2*FATIGUE
Br+MIMIC
Judith Kümmel
Safety.X
Safety.X
Support Doffing
FAT
Br+MIMIC
Iñigo Muñoz Elorza
Aouda.S
Media
FieldSpec [0]
WEE
Doffing + 2*FATIGUE
Br+MIMIC
Kartik Kumar
Safety.S
Safety.S
Support Doffing
FAT
Br+MIMIC
Stefan Dobrovolny
Assistant.S
UN Live Link
Support Doffing
FAT
Br+MIMIC
Sebastian Sams
OPS
Suit Ops and Communication
FAT
Br+MIMIC
Michael Müller
SciOPS
Suit Ops and Communication
FAT
Br+MIMIC
Rochelle Velho
MEDO
Suit Telemetry for Safety
FAT
Br+MIMIC
Claudia Kobald
Experimenter
Assist WEE
Recover Husky
FAT
Br+MIMIC
QM Handover
João Lousada
Housekeeping
Housekeeping
FAT
Br+MIMIC
Aline Decadi
Housekeeping
Housekeeping
FAT
Br+MIMIC
QM Handover
Gernot Grömer
Field CDR
Field Commander
UN Live Link
FAT
Br+MIMIC
Olivia Haider
Visitor Guide
Managing Visitors
UN Live Link
Managing Visitors
FAT
Br+MIMIC
SITAS
Osama Al-Busaidi
Visitor Guide
Managing Visitors
FAT
Br+MIMIC
Alexander Soucek
Visitor Guide
Managing Visitors
FAT
Br+MIMIC
Silvia Prock
Media Guide
Keeping Track of Interviews
FAT
Br+MIMIC
Florian Voggeneder
Photo
Photo
Support Doffing
FAT
Br+MIMIC
ZDF
Filming and Interviews
ORF
Filming and Interviews
Stern Magazine
Photos and Interviews
Sunday Times
Photos and Interviews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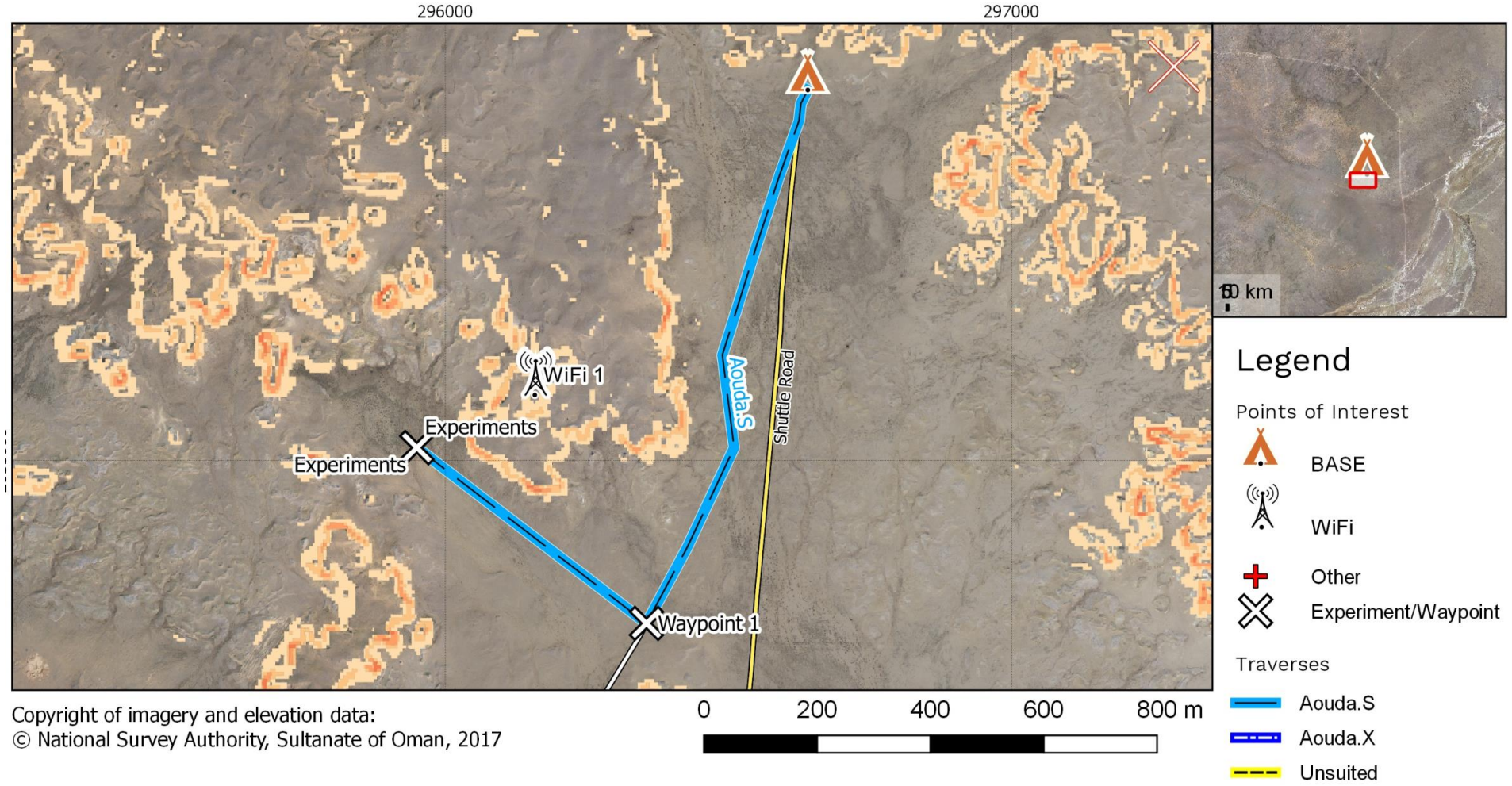
PERSON
POSITION
Bridgehead Phase
Kartik Kumar
Aouda.X
Donning X + 2*FATIGUE
Stefan Dobrovolny
Safety.X
Support Donning
Osama Al-Busaidi
Assistant.X
João Lousada
Aouda.S
Donning S + 2*FATIGUE
Sebastian Sams
Safety.S
Setup WIFI
Alessandro Boesso
Assistant.S
Carmen Köhler
OPS
Suit Ops and Communication
Michael Müller
SciOPS
SIT
Rochelle Velho
MEDO
MEDO Handover
Bonnie Posselt
Suit Telemetry for Safety
Aline Decadi
Experimenter
Setup Husky
Check Tumbleweed procedures
Lunch
Claudia Kobald
Florian Voggeneder
Housekeeping
Iñigo Muñoz Elorza
Gernot Grömer
Field CDR
Field Commander
Olivia Haider
Media Guide
Keeping Track of Interviews
Alexander Soucek
Judith Kümmel
Silvia Prock
ZDF
Filming and Interviews
ORF
Stern Magazine
Photos and Interviews
Sunday Times
AFP
Associated Press
Galileo
Br+MIMIC
FAT

Wed,/07-Feb-2018	UTC UTC+1 (MSC) UTC+4 (Field)	11:00 12:00 15:00	12:00 13:00 16:00	13:00 14:00 17:00	14:00 15:00 18:00	15:00 16:00 19:00
PERSON	POSITION	Bridgehead Phase				
Kartik Kumar	Aouda.X	Lunch	Media AVI-NAV / Scan Mars	Doffing + 2*FATIGUE	FAT / TE AM	Br+MIMIC
Stefan Dobrovolny	Safety.X	Lunch	Safety.X	Support Doffing	FAT / TE AM	Br+MIMIC
Osama Al-Busaidi	Assistant.X	Lunch		Support Doffing	FAT / TE AM	Br+MIMIC
João Lousada	Aouda.S	Lunch	Media AVI-NAV / Scan Mars	Doffing + 2*FATIGUE	FAT / TE AM	Br+MIMIC
Sebastian Sams	Safety.S	Lunch	Safety.S	Support Doffing	FAT / TE AM	Br+MIMIC
Alessandro Boesso	Assistant.S	Lunch		Support Doffing	FAT / TE AM	Br+MIMIC
Carmen Köhler	OPS	Lunch	Suit Ops and Communication		FAT / TE AM	Br+MIMIC
Michael Müller	SciOPS	Lunch	Suit Ops and Communication		FAT / TE AM	Br+MIMIC / SITAS
Rochelle Velho	MEDO					
Bonnie Posselt	MEDO	Lunch	Suit Telemetry for Safety		FAT / TE AM	Br+MIMIC
Aline Decadi	Experimenter	Quartermaster [food inventory]		Turn off WIFI	FAT / TE AM	Br+MIMIC
Claudia Kobald	Experimenter	Quartermaster [food inventory]		Turn off WIFI	FAT / TE AM	Br+MIMIC
Florian Voggeneder	Housekeeping	Lunch	Housekeeping		FAT / TE AM	Br+MIMIC
Iñigo Muñoz Elorza	Housekeeping	Lunch	Housekeeping		FAT / TE AM	Br+MIMIC
Gernot Grömer	Field CDR	Lunch	Field Commander		FAT / TE AM / TE AM	Br+MIMIC
Olivia Haider	Media Guide	Lunch	Keeping Track of Interviews	Recover Husky	FAT / TE AM	Br+MIMIC
Alexander Soucek						
Judith Kümmel						
Silvia Prock						
ZDF						
ORF						
Stern Magazine						
Sunday Times						
AFP		Lunch	Photos and Interviews			
Associated Press		Lunch	Photos and Interviews			
Galileo		Lunch	Filming and Interviews			

For Date: 2018-02-07 Version: 1 Author: N. Sejkora Developed on: 2018-02-06



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PERSON	POSITION	Landing Day			Landing Day			
Stefan Dobrovolny	Aouda.X			Br+MIMIC		Donning X + 2*FATIGUE		Media / AVI-NAV / Landing / Geosampling
Iñigo Muñoz Elorza	Safety.X			Br+MIMIC	FAT	Support Donning		Safety.X
Osama Al-Busaidi	Assistant.X			Br+MIMIC	FAT	Support Donning		AVI-NAV assistance
Carmen Köhler	Aouda.S			Br+MIMIC		Donning S + 2*FATIGUE		Media / AVI-NAV / Landing / Geosampling
Florian Voggeneder	Safety.S			Br+MIMIC	FAT	Support Donning		Safety.S
Aline Decadi	Assistant.S		Quartermaster	Br+MIMIC	FAT	Support Donning		Setup Hortextreme
Sebastian Sams	OPS			Br+MIMIC	FAT	Suit Ops and Communication		
Alessandro Boesso	SciOPS			Br+MIMIC	FAT	Suit Ops and Communication		
Bonnie Posselt	MEDO			Br+MIMIC	FAT	Suit Telemetry for Safety		
João Lousada	Experimenter1			Br+MIMIC	FAT	Setup WiFi / Setup HUSKY	Setup Hortextreme	
Claudia Kobald	Experimenter2			Br+MIMIC	FAT	Setup WiFi	Setup Hortextreme	
Kartik Kumar	Housekeeping		SITAS	Br+MIMIC	FAT	Housekeeping		
Michael Müller	Housekeeping			Br+MIMIC	FAT	Housekeeping		
Gernot Grömer	Field CDR			Br+MIMIC	FAT	Field Commander		Landing
Olivia Haider	Media guide			Br+MIMIC	FAT	Keeping track of interviews		Landing
AFP							Photos and Interviews	
Associated Press							Photos and Interviews	
Galileo							Filming and Interviews	

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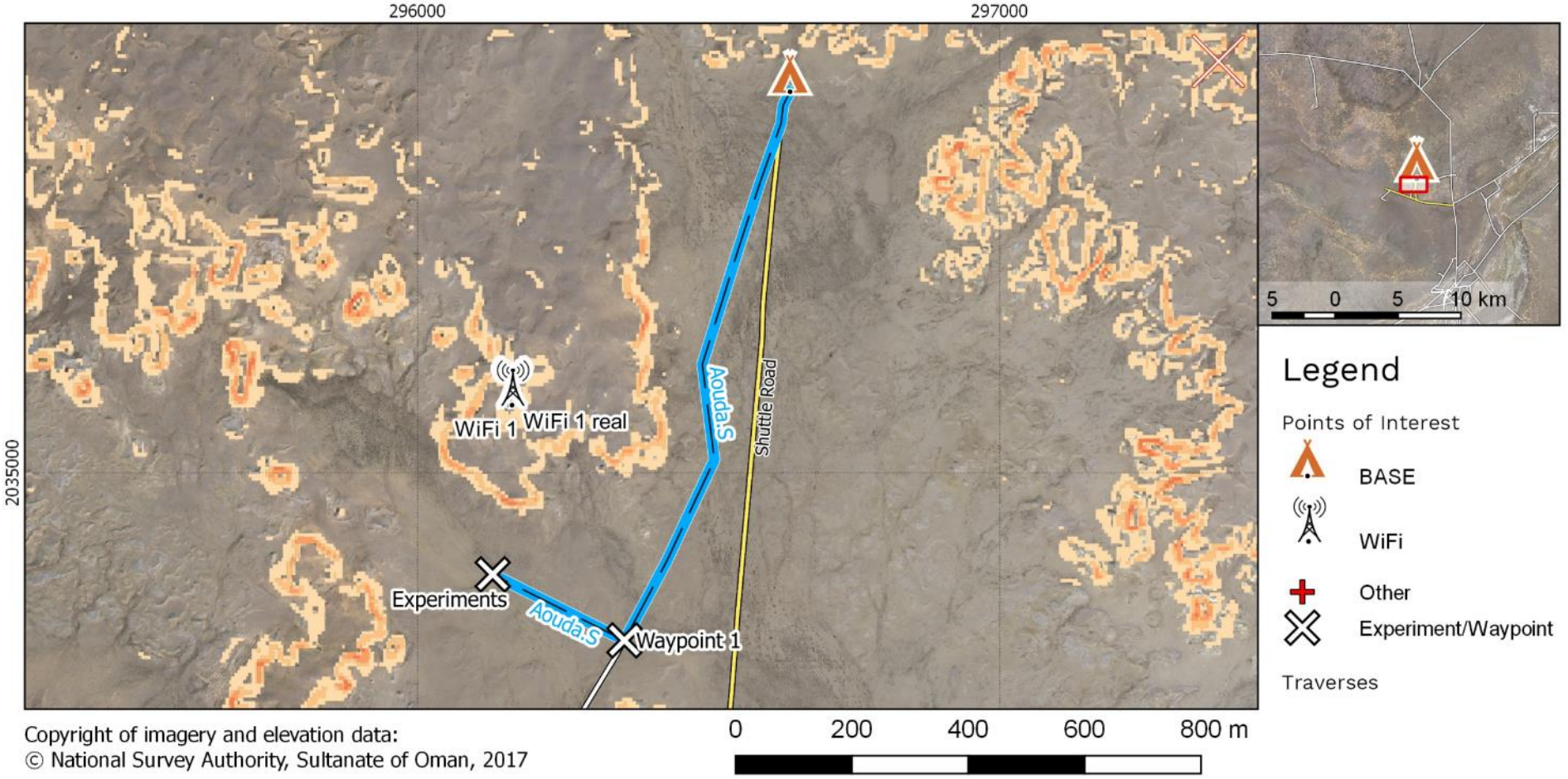
	UTC+4 (Field)	15:00	16:00	17:00	18:00	19:00	20:00
PERSON	POSITION	Landing Day				Landing Day	
Stefan Dobrovolny	Aouda.X	Lunch	Media / Field Spec / ScanMars		Doffing + 2*FATIGUE	FAT	Br+MIMIC
Iñigo Muñoz Elorza	Safety.X	Lunch	Safety.X		Support Doffing	FAT	Br+MIMIC
Osama Al-Busaidi	Assistant.X	Lunch			Support Doffing	FAT	Br+MIMIC
Carmen Köhler	Aouda.S	Lunch	Media / Field Spec / ScanMars		Doffing + 2*FATIGUE	FAT	Br+MIMIC
Florian Voggeneder	Safety.S	Lunch	Safety.S		Support Doffing	FAT	Br+MIMIC
Aline Decadi	Assistant.S	Lunch	Setup Hortextreme		Support Doffing	FAT	Br+MIMIC / Quartermaster
Sebastian Sams	OPS	Lunch	Suit Ops and Communication			FAT	Br+MIMIC
Alessandro Boesso	SciOPS	Lunch	Suit Ops and Communication			FAT	Br+MIMIC
Bonnie Posselt	MEDO	Lunch	Suit Telemetry for Safety			FAT	Br+MIMIC
João Lousada	Experimenter1	Lunch	Setup Hortextreme	Turn off WiFi	Recover HUSKY	FAT	Br+MIMIC
Claudia Kobald	Experimenter2	Lunch	Setup Hortextreme	Turn off WiFi	Clean solar panels	FAT	Br+MIMIC
Kartik Kumar	Housekeeping	Lunch	Housekeeping			FAT	Br+MIMIC / SITAS
Michael Müller	Housekeeping	Lunch	Housekeeping			FAT	Br+MIMIC
Gernot Grömer	Field CDR	Lunch	Field Commander			FAT	Br+MIMIC
Olivia Haider	Media guide	Lunch	Keeping track of interviews			FAT	Br+MIMIC
AFP		Lunch	Photos and Interviews				
Associated Press		Lunch	Photos and Interviews				
Galileo		Lunch	Filming and Interviews				

For Date: 2018-02-08 Version: 1 Author: N. Sejkora Developed on: 2018-02-07



Fri,/09-Feb-2018	UTC	04:00	05:00	06:00	07:00	08:00
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	UTC+4 (Field)	08:00	09:00	10:00	11:00	12:00
PERSON	POSITION	Bridgehead Phase				Bridgehe
Kartik Kumar	Aouda.X	Breakfast, Br+MIMIC		Donning X + 2*FATIGUE		
Florian Voggeneder	Safety.X	Breakfast, Br+MIMIC		FAT, Support Donning		
Osama Al-Busaidi	Assistant.X	Breakfast, Br+MIMIC		FAT, Support Donning		
Iñigo Muñoz Elorza	Aouda.S	Breakfast, Br+MIMIC		Donning S + 2*FATIGUE		
Stefan Dobrovolny	Safety.S	Breakfast, Br+MIMIC		FAT, Support Donning		
Aline Decadi	Assistant.S	Breakfast, Br+MIMIC	QUARTER MASTER	FAT, Support Donning		
Michael Müller	OPS	Breakfast, Br+MIMIC	SIT AS	FAT, Suit Ops and Communication		
Carmen Köhler	SciOPS	Breakfast, Br+MIMIC		FAT, Suit Ops and Communication		
Bonnie Posselt	MEDO	Breakfast, Br+MIMIC		FAT, Suit Telemetry for Safety		
Claudia Kobald	Experimenter 1	Breakfast, Br+MIMIC		FAT, turn on WIFI, Setup Hortextreme, Lunch		
João Lousada	Experimenter 2	Breakfast, Br+MIMIC		FAT, turn on WIFI, Setup Hortextreme, Lunch		
Alessandro Boesso	Housekeeping	Breakfast, Br+MIMIC		FAT, Housekeeping, Lunch		
Sebastian Sams	Housekeeping	Breakfast, Br+MIMIC		FAT, Housekeeping, Lunch		
Gernot Grömer	Field CDR	Breakfast, Br+MIMIC		FAT, Field Commander, Lunch		
Olivia Haider	Media Guide	Breakfast, Br+MIMIC	setup Husky	FAT, Keeping Track of Interviews, Lunch		
AFP		Breakfast		Photos and Interviews, Lunch		
Associated Press		Breakfast		Photos and Interviews, Lunch		
Galileo		Breakfast		Filming and Interviews, Lunch		

Fri,/09-Feb-2018	UTC	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00
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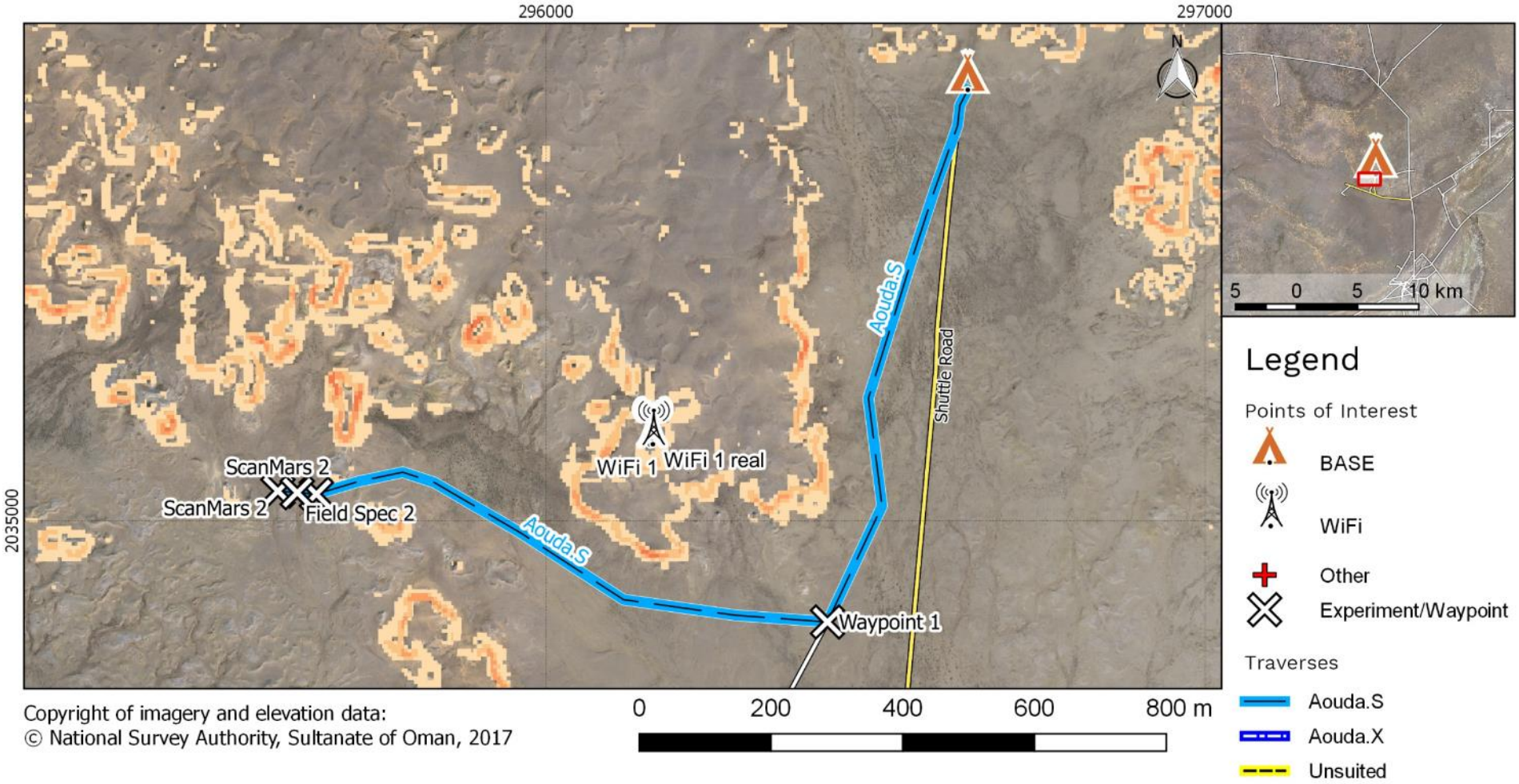
	UTC+4 (Field)	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00
PERSON	POSITION	ad Phase		Bridgehead Phase					
Kartik Kumar	Aouda.X	Media				Doffing + 2*FATIGUE		Br+MIMIC	Dinner
		WEE	ScanMars		FieldSpec				
Florian Voggeneder	Safety.X	Safety.X				Support Doffing		FAT Br+MIMIC	Dinner
Osama Al-Busaidi	Assistant.X	Lunch				Support Doffing		FAT Br+MIMIC	Dinner
Iñigo Muñoz Elorza	Aouda.S	Media				Doffing + 2*FATIGUE		Br+MIMIC	Dinner
		WEE	ScanMars		FieldSpec				
Stefan Dobrovolny	Safety.S	Safety.S				Support Doffing		FAT Br+MIMIC	Dinner
Aline Decadi	Assistant.S	Lunch	Setup Hortextreme			Support Doffing		FAT Br+MIMIC	Dinner QUARTER MASTER
Michael Müller	OPS	Lunch	Suit Ops and Communication				SITAS	FAT Br+MIMIC	Dinner
Carmen Köhler	SciOPS	Lunch	Suit Ops and Communication					FAT Br+MIMIC	Dinner
Bonnie Posselt	MEDO	Lunch	Suit Telemetry for Safety					FAT Br+MIMIC	Dinner
Claudia Kobald	Experimenter 1	Setup Hortextreme					turn off WIFI	FAT Br+MIMIC	Dinner
João Lousada	Experimenter 2	Setup Hortextreme					turn off WIFI	FAT Br+MIMIC	Dinner POOL PARTY
Alessandro Boesso	Housekeeping	Housekeeping						FAT Br+MIMIC	Dinner
Sebastian Sams	Housekeeping	Housekeeping						FAT Br+MIMIC	Dinner POOL PARTY
Gernot Grömer	Field CDR	Field Commander						FAT Br+MIMIC	Dinner POOL PARTY
Olivia Haider	Media Guide	Assist WEE	Keeping Track of Interviews				Recover Husky	FAT Br+MIMIC	Dinner
AFP		Photos and Interviews							Dinner
Associated Press		Photos and Interviews							Dinner
Galileo		Filming and Interviews							Dinner

For Date: 2018-02-09 Version: 1 Author: N. Sejkora Developed on: 2018-02-08



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PERSON	POSITION	Bridgehead Phase			Bridgehead Phase	
Kartik Kumar		Breakfast	Briefing	Procedures study	Time for Mission Relevant Stuff	
Carmen Köhler		Breakfast	Briefing	SIT AS / Procedures study	A3DPT	Time for Mission Relevant Stuff
João Lousada		Breakfast	Briefing	Procedures study	Time for Mission Relevant Stuff	Interview 1 / Interview 2
Iñigo Muñoz Elorza		Breakfast	Briefing	setup Husky / Procedures study	Time for Mission Relevant Stuff	recover Husky
Sebastian Sams		Breakfast	Briefing	Procedures study	Time for Mission Relevant Stuff	
Alessandro Boesso		Breakfast	Briefing	check HX / Procedures study	Time for Mission Relevant Stuff	
Olivia Haider		Breakfast	Briefing	Procedures study	Time for Mission Relevant Stuff	
Osama Al-Busaidi		Breakfast	Briefing	Procedures study	Time for Mission Relevant Stuff	
Claudia Kobald		Breakfast	Briefing	Procedures study	Time for Mission Relevant Stuff	
Aline Decadi		Breakfast	Briefing	QUARTERMASTER / Procedures study	Time for Mission Relevant Stuff	
Michael Müller	OPS	Breakfast	Briefing	Suit Ops and Communication		
Bonnie Posselt	Housekeeping	Breakfast	Briefing	Housekeeping		
Stefan Dobrovolny	Housekeeping	Breakfast	Briefing	Housekeeping		
Gernot Grömer	Field CDR	Breakfast	Briefing	Field Commander		
Florian Voggeneder	Photographer	Breakfast	Briefing	Photo		

Sat,.10-Feb-2018	UTC	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00
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	UTC+4 (Field)	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00
PERSON	POSITION	BLACK AFTERNOON							
Kartik Kumar		Lunch						MI MIC	Br+MIMIC
Carmen Köhler		Lunch						MI MIC	Br+MIMIC
João Lousada		Lunch						MI MIC	Br+MIMIC
Iñigo Muñoz Elorza		Lunch						MI MIC	Br+MIMIC
Sebastian Sams		Lunch						MI MIC	Br+MIMIC
Alessandro Boesso		Lunch						MI MIC	Br+MIMIC
Olivia Haider		Lunch						MI MIC	Br+MIMIC
Osama Al-Busaidi		Lunch						MI MIC	Br+MIMIC
Claudia Kobald		Lunch						MI MIC	Br+MIMIC
Aline Decadi		Lunch						MI MIC	Br+MIMIC
Michael Müller	OPS	Lunch						MI MIC	Br+MIMIC
Bonnie Posselt	Housekeeping	Lunch						MI MIC	Br+MIMIC
Stefan Dobrovolny	Housekeeping	Lunch						MI MIC	Br+MIMIC
Gernot Grömer	Field CDR	Lunch	Field Commander					MI MIC	Br+MIMIC
Florian Voggeneder	Photographer	Lunch						MI MIC	Br+MIMIC

Dinner		
Dinner	SITAS	
Dinner		
Dinner		
Dinner		
Dinner		
Dinner		
Dinner		
Dinner		
Dinner	QUARTERMASTER	
Dinner		
Dinner		
Dinner		
Dinner		

FREE TIME

Sun,/11-Feb-2018	UTC	04:00		05:00				06:00				07:00				08:00			
	UTC+1 (MSC)	05:00		06:00				07:00				08:00				09:00			
	UTC+4 (Field)	08:00		09:00				10:00				11:00				12:00			
PERSON	POSITION																		
João Lousada	Aouda.X	Breakfast	Br+MIMIC					Donning X + 2*FATIGUE											
Kartik Kumar	Safety.X	Breakfast	Br+MIMIC				FAT	Support Donning											
Claudia Kobald	Assistant.X	Breakfast	Br+MIMIC				FAT	Support Donning											
Stefan Dobrovolny	Aouda.S	Breakfast	Br+MIMIC					Donning S + 2*FATIGUE											
Alessandro Boesso	Safety.S	Breakfast	Br+MIMIC			SIT AS	FAT	Support Donning											
Iñigo Muñoz Elorza	Assistant.S	Breakfast	Br+MIMIC				FAT	Support Donning											
Michael Müller	OPS	Breakfast	Br+MIMIC				FAT	Suit Ops and Communication											
Olivia Haider	SciOPS	Breakfast	Br+MIMIC				FAT	Suit Ops and Communication											
Bonnie Posselt	MEDO	Breakfast	Br+MIMIC				FAT	Suit Telemetry for Safety											
Aline Decadi	Experimenter 1	Breakfast	Br+MIMIC	QUARTER MASTER			FAT	turn on WIFI	chec k HX	A3DPT						Lunch			
Osama Al-Busaidi	Experimenter 2	Breakfast	Br+MIMIC				FAT	turn on WIFI	setup Husky							Lunch			
Gernot Grömer	Housekeeping	Breakfast	Br+MIMIC				FAT	Housekeeping								Lunch			
Carmen Köhler	Housekeeping	Breakfast	Br+MIMIC				FAT	Housekeeping								Lunch			
Sebastian Sams	Field CDR	Breakfast	Br+MIMIC				FAT	Field Commander								Lunch			
Florian Voggeneder	Photo	Breakfast	Br+MIMIC				FAT	Photos								Lunch			

Sun,/11-Feb-2018	UTC	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00
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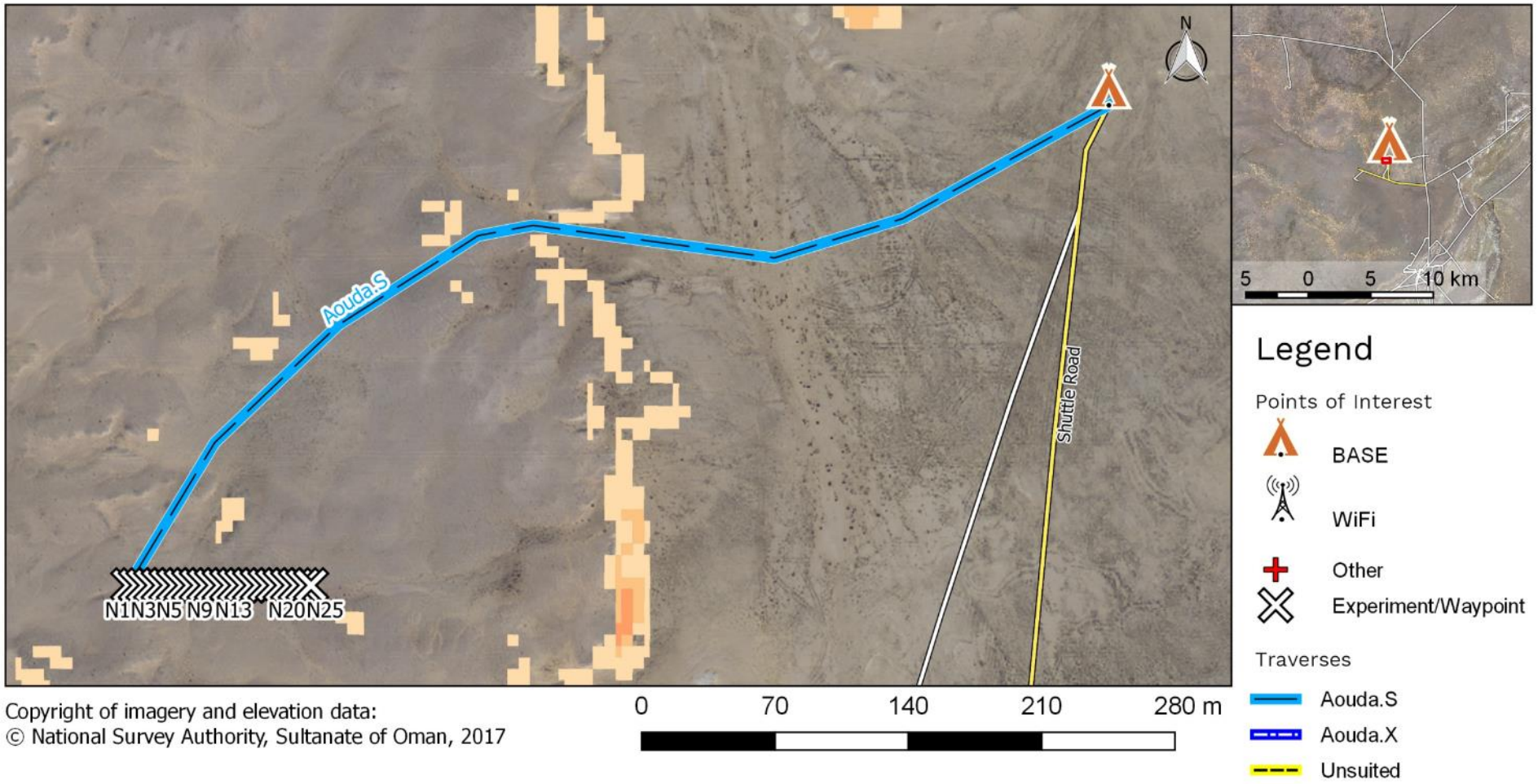
	UTC+4 (Field)	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00
PERSON	POSITION								
João Lousada	Aouda.X	setup WEE			Geo + Husky	Doffing + 2*FATIGUE		Br+MIMIC	Dinner	POOL PARTY
Kartik Kumar	Safety.X	Safety.X				Support Doffing		FAT Br+MIMIC	Dinner	
Claudia Kobald	Assistant.X	Lunch		setup EOS - steps A1 and A2		Support Doffing		FAT Br+MIMIC	Dinner	
Stefan Dobrovolny	Aouda.S	setup WEE			Geo + Husky	Doffing + 2*FATIGUE		Br+MIMIC	Dinner	
Alessandro Boesso	Safety.S	Safety.S				Support Doffing	SITAS	FAT Br+MIMIC	Dinner	
Iñigo Muñoz Elorza	Assistant.S	Lunch	setup Tumbleweed			Support Doffing		FAT Br+MIMIC	Dinner	
Michael Müller	OPS	Lunch	Suit Ops and Communication					FAT Br+MIMIC	Dinner	
Olivia Haider	SciOPS	Lunch	Suit Ops and Communication					FAT Br+MIMIC	Dinner	
Bonnie Posselt	MEDO	Lunch	Suit Telemetry for Safety					FAT Br+MIMIC	Dinner	
Aline Decadi	Experimenter 1		setup Tumbleweed				turn off WIFI	FAT Br+MIMIC	Dinner	QUARTER MASTER
Osama Al-Busaidi	Experimenter 2		setup Tumbleweed			Recover Husky	turn off WIFI	FAT Br+MIMIC	Dinner	
Gernot Grömer	Housekeeping	Housekeeping						FAT Br+MIMIC	Dinner	POOL PARTY
Carmen Köhler	Housekeeping	Housekeeping						FAT Br+MIMIC	Dinner	
Sebastian Sams	Field CDR	Field Commander						FAT Br+MIMIC	Dinner	POOL PARTY
Florian Voggeneder	Photo	Photos		setup EOS - steps A1 and A2		Photos		FAT Br+MIMIC	Dinner	

For Date: 2018-02-11 Version: 2 Author: N. Sejkora Developed on: 2018-02-08



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PERSON	POSITION																								
Kartik Kumar	Aouda.X	Breakfast		Br+MIMIC												EB		Donning S + 2*FATIGUE							
Aline Decadi	Safety.X	Breakfast		Br+MIMIC		QUARTER MASTER										FAT		Support Donning							
Osama Al-Busaidi	Assistant.X	Breakfast		Br+MIMIC						Husky						FAT		Support Donning				Lunch			
João Lousada	Aouda.S	Breakfast		Br+MIMIC												EB		Donning S + 2*FATIGUE							
Michael Müller	Safety.S	Breakfast		Br+MIMIC		Suit Maintenance										FAT		Support Donning							
Stefan Dobrovolny	Assistant.S	Breakfast		Br+MIMIC						Husky						FAT		Support Donning				Lunch			
Olivia Haider	OPS	Breakfast		Br+MIMIC		SITAS										FAT		Suit Ops and Communication							
Carmen Köhler	SciOPS	Breakfast		Br+MIMIC		Suit Maintenance										FAT		Suit Ops and Communication							
Bonnie Posselt	MEDO	Breakfast		Br+MIMIC		Suit Maintenance										FAT		Suit Ops and Communication							
Alessandro Boesso	Experimenter 1	Breakfast		Br+MIMIC		check HX				FieldSpec				turn on WIFI		FAT		Hortextreme				Lunch			
Sebastian Sams	Experimenter 2	Breakfast		Br+MIMIC						FieldSpec				turn on WIFI		FAT		Hortextreme				Lunch			
Iñigo Muñoz Elorza	Housekeeping	Breakfast		Br+MIMIC		Housekeeping										FAT		Hortextreme				Support Donning			
Claudia Kobald	Housekeeping	Breakfast		Br+MIMIC		Housekeeping										FAT		Housekeeping							
Gernot Grömer	Field CDR	Breakfast		Br+MIMIC												FAT		Field Commander							
Florian Voggeneder	Photographer	Breakfast		Br+MIMIC		Suit Maintenance										FAT		Photos				Support Donning			

Tue,/13-Feb-2018	UTC	11:00				12:00				13:00				14:00				15:00				16:00				17:00			
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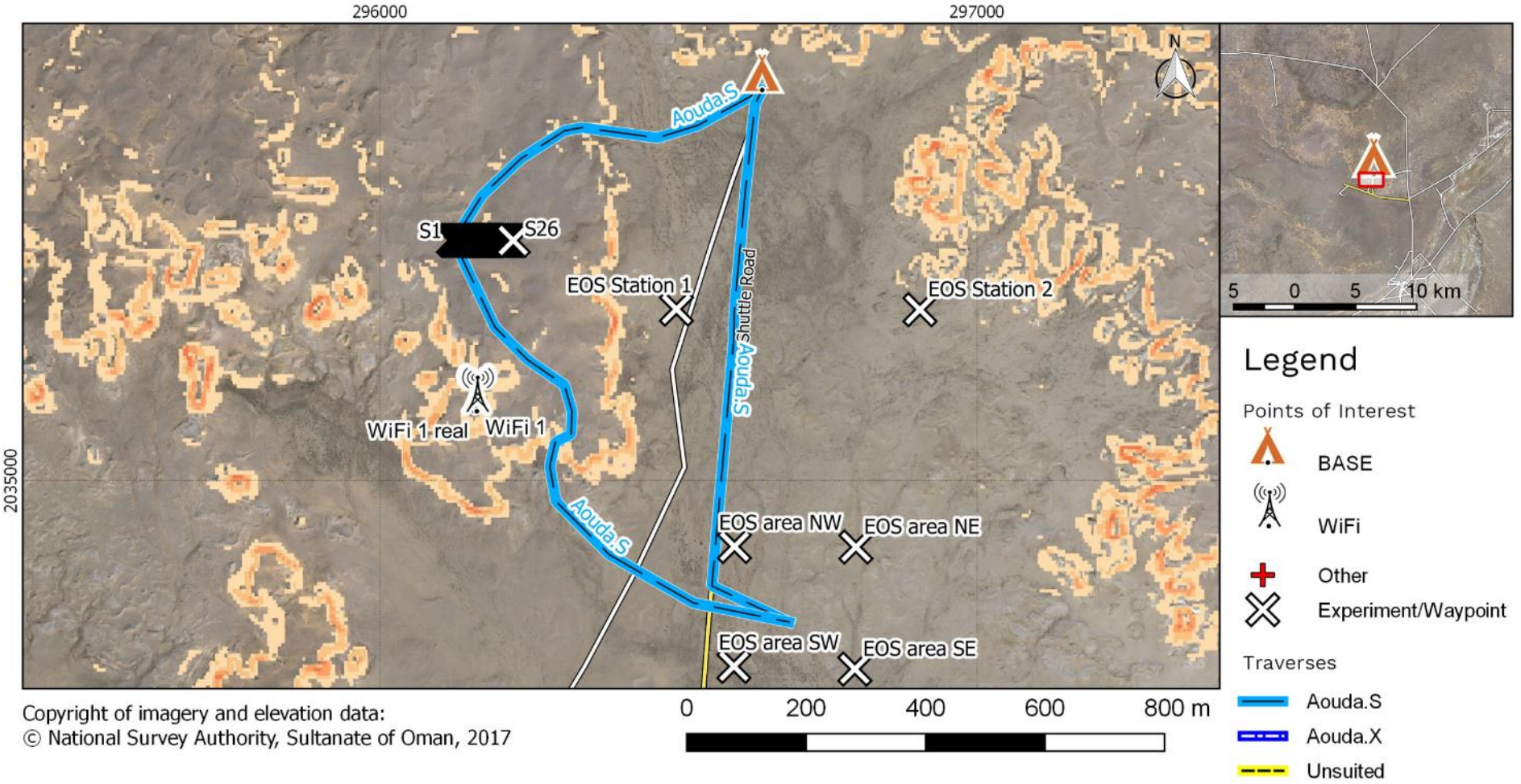
	UTC+4 (Field)	15:00				16:00				17:00				18:00				19:00				20:00				21:00			
PERSON	POSITION																												
Kartik Kumar	Aouda.X	ScanMars						FieldSpec				Geo sampling		Doffing + 2*FATIGUE								Br+MIMIC		Dinner					
Aline Decadi	Safety.X	Safety.X												Support Doffing							FAT	Br+MIMIC		Dinner		QM Handover			
Osama Al-Busaidi	Assistant.X	WIFI Setup						AVI-NAV						Support Doffing							FAT	Br+MIMIC		Dinner					
João Lousada	Aouda.S	ScanMars						FieldSpec				Geo sampling		Doffing + 2*FATIGUE								Br+MIMIC		Dinner		POOL PARTY			
Michael Müller	Safety.S	Safety.S												Support Doffing							FAT	Br+MIMIC		Dinner					
Stefan Dobrovolny	Assistant.S	WIFI Setup												Support Doffing							FAT	Br+MIMIC		Dinner					
Olivia Haider	OPS	Lunch		Suit Ops and Communication															SITAS		FAT	Br+MIMIC		Dinner					
Carmen Köhler	SciOPS	Lunch		Suit Ops and Communication																	FAT	Br+MIMIC		Dinner					
Bonnie Posselt	MEDO	Lunch		Suit Ops and Communication																	FAT	Br+MIMIC		Dinner					
Alessandro Boesso	Experimenter 1	WIFI Setup						MSTAT COMM setup [Session 1 (&2)]								turn off WIFI		chec k HX			FAT	Br+MIMIC		Dinner					
Sebastian Sams	Experimenter 2	WIFI Setup						MSTAT COMM setup [Session 1 (&2)]								turn off WIFI					FAT	Br+MIMIC		Dinner		POOL PARTY			
Iñigo Muñoz Elorza	Housekeeping	Lunch		Housekeeping																	FAT	Br+MIMIC		Dinner					
Claudia Kobald	Housekeeping	Lunch		Housekeeping																	FAT	Br+MIMIC		Dinner		QM Handover			
Gernot Grömer	Field CDR	Lunch		Field Commander																	FAT	Br+MIMIC		Dinner		POOL PARTY			
Florian Voggeneder	Photographer	Lunch		Photos																	FAT	Br+MIMIC		Dinner					

For Date: 2018-02-12 Version: 4 Author: N. Sejkora Developed on: 2018-02-11



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	UTC+4 (Field)	09:00		10:00		11:00		12:00		13:00		14:00	
PERSON	POSITION												
Kartik Kumar	Aouda.X	Breakfast	Br+MIMIC						EB	Donning S + 2*FATIGUE			
Aline Decadi	Safety.X	Breakfast	Br+MIMIC	QUARTER MASTER					FAT	Support Donning			
Osama Al-Busaidi	Assistant.X	Breakfast	Br+MIMIC			Husky			FAT	Support Donning		Lunch	
João Lousada	Aouda.S	Breakfast	Br+MIMIC						EB	Donning S + 2*FATIGUE			
Michael Müller	Safety.S	Breakfast	Br+MIMIC	Suit Maintenance					FAT	Support Donning			
Stefan Dobrovolny	Assistant.S	Breakfast	Br+MIMIC			Husky			FAT	Support Donning		Lunch	
Olivia Haider	OPS	Breakfast	Br+MIMIC	SITAS					FAT	Suit Ops and Communication			
Carmen Köhler	SciOPS	Breakfast	Br+MIMIC	Suit Maintenance					FAT	Suit Ops and Communication			
Bonnie Posselt	MEDO	Breakfast	Br+MIMIC	Suit Maintenance					FAT	Suit Ops and Communication			
Alessandro Boesso	Experimenter 1	Breakfast	Br+MIMIC	check HX		FieldSpec		turn on WIFI	FAT	Hortextreme		Lunch	
Sebastian Sams	Experimenter 2	Breakfast	Br+MIMIC			FieldSpec		turn on WIFI	FAT	Hortextreme		Lunch	
Iñigo Muñoz Elorza	Housekeeping	Breakfast	Br+MIMIC	Housekeeping					FAT	Hortextreme		Support Donning	
Claudia Kobald	Housekeeping	Breakfast	Br+MIMIC	Housekeeping					FAT	Housekeeping			
Gernot Grömer	Field CDR	Breakfast	Br+MIMIC						FAT	Field Commander			
Florian Voggeneder	Photographer	Breakfast	Br+MIMIC	Suit Maintenance					FAT	Photos		Support Donning	

Tue,/13-Feb-2018	UTC	11:00	12:00	13:00	14:00	15:00	16:00	17:00
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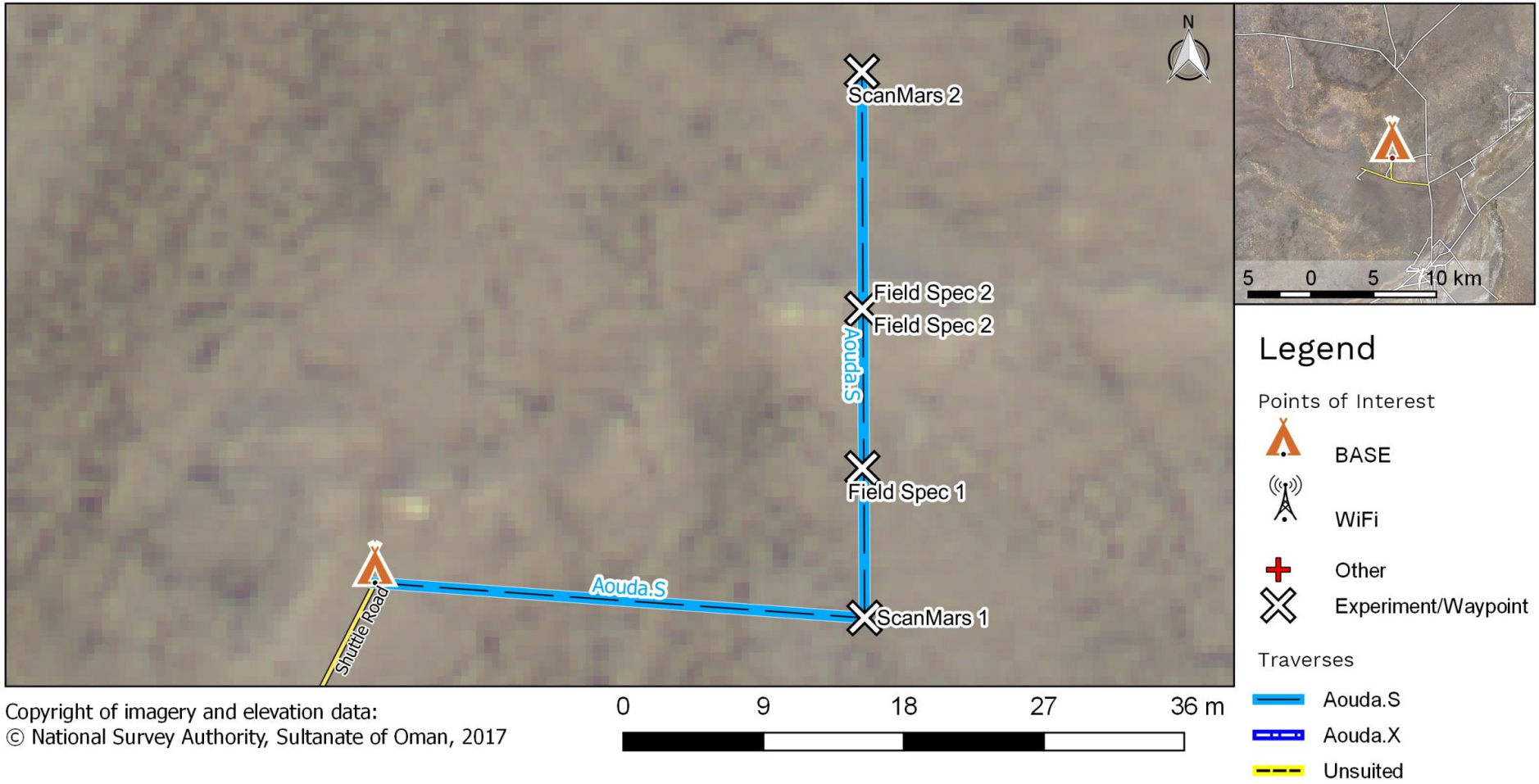
	UTC+4 (Field)	15:00	16:00	17:00	18:00	19:00	20:00	21:00
PERSON	POSITION							
Kartik Kumar	Aouda.X	ScanMars	FieldSpec	Geo sampling	Doffing + 2*FATIGUE		Br+MIMIC	Dinner
Aline Decadi	Safety.X	Safety.X			Support Doffing	FAT	Br+MIMIC	Dinner	QM Handover
Osama Al-Busaidi	Assistant.X	WIFI Setup	AVI-NAV		Support Doffing	FAT	Br+MIMIC	Dinner
João Lousada	Aouda.S	ScanMars	FieldSpec	Geo sampling	Doffing + 2*FATIGUE		Br+MIMIC	Dinner	POOL PARTY
Michael Müller	Safety.S	Safety.S			Support Doffing	FAT	Br+MIMIC	Dinner
Stefan Dobrovolny	Assistant.S	WIFI Setup			Support Doffing	FAT	Br+MIMIC	Dinner
Olivia Haider	OPS	Lunch	Suit Ops and Communication			SITAS	FAT	Br+MIMIC	Dinner
Carmen Köhler	SciOPS	Lunch	Suit Ops and Communication			FAT	Br+MIMIC	Dinner
Bonnie Posselt	MEDO	Lunch	Suit Ops and Communication			FAT	Br+MIMIC	Dinner
Alessandro Boesso	Experimenter 1	WIFI Setup	MSTAT COMM setup [Session 1 (&2)]	turn off WIFI	chec k HX	FAT	Br+MIMIC	Dinner
Sebastian Sams	Experimenter 2	WIFI Setup	MSTAT COMM setup [Session 1 (&2)]	turn off WIFI		FAT	Br+MIMIC	Dinner	POOL PARTY
Iñigo Muñoz Elorza	Housekeeping	Lunch	Housekeeping			FAT	Br+MIMIC	Dinner
Claudia Kobald	Housekeeping	Lunch	Housekeeping			FAT	Br+MIMIC	Dinner	QM Handover
Gernot Grömer	Field CDR	Lunch	Field Commander			FAT	Br+MIMIC	Dinner	POOL PARTY
Florian Voggeneder	Photographer	Lunch	Photos			FAT	Br+MIMIC	Dinner

For Date: 2018-02-13 Version: 1 Author: N. Sejkora Developed on: 2018-02-11



Wed,/14-Feb-2018	UTC	04:00	05:00	06:00	07:00
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PERSON	POSITION	BLACK DAY			
Aline Decadi		Breakfast			
Claudia Kobald		Breakfast	QUARTER MASTER		
Osama Al-Busaidi		Breakfast			
Stefan Dobrovolny		Breakfast			
Carmen Köhler		Breakfast			
Kartik Kumar		Breakfast			
Olivia Haider		Breakfast			
Michael Müller		Breakfast			
Iñigo Muñoz Elorza		Breakfast			
Bonnie Posselt		Breakfast			
Alessandro Boesso		Breakfast	check HX		
Sebastian Sams	OPS	Breakfast	Suit Ops and Communication		
João Lousada	Housekeeping	Breakfast	Housekeeping		
Florian Voggeneder	Housekeeping	Breakfast	Housekeeping		
Gernot Grömer	Field CDR	Breakfast	Field Commander		

FREE TIME

Wed,/14-Feb-2018	UTC	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00
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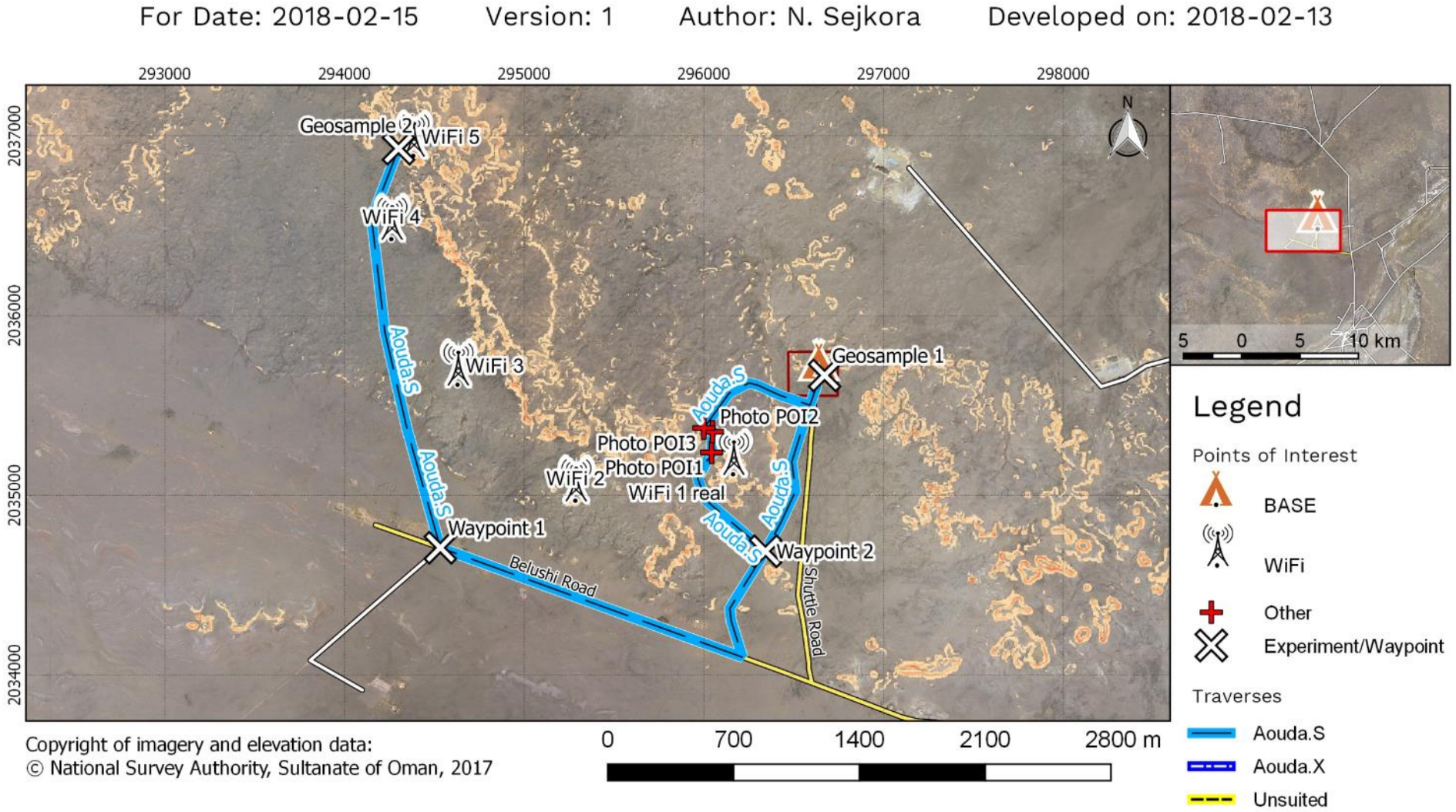
	UTC+4 (Field)	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00
PERSON	POSITION	BLACK DAY				BLACK DAY					
Aline Decadi		Lunch								Dinner	
Claudia Kobald		Lunch								Dinner	QUARTER MASTER
Osama Al-Busaidi		Lunch								Dinner	
Stefan Dobrovolny		Lunch								Dinner	
Carmen Köhler		Lunch								Dinner	
Kartik Kumar		Lunch								Dinner	
Olivia Haider		Lunch								Dinner	
Michael Müller		Lunch								Dinner	
Iñigo Muñoz Elorza		Lunch								Dinner	
Bonnie Posselt		Lunch								Dinner	
Alessandro Boesso		Lunch							check HX	Dinner	
Sebastian Sams	OPS	Lunch	Suit Ops and Communication							Dinner	
João Lousada	Housekeeping	Lunch	Housekeeping							Dinner	
Florian Voggeneder	Housekeeping	Lunch	Housekeeping							Dinner	
Gernot Grömer	Field CDR	Lunch	Field Commander							Dinner	

Thu,/15-Feb-2018	UTC	04:00	05:00	06:00	07:00	08:00
	UTC+1 (MSC)	05:00	06:00	07:00	08:00	09:00
	UTC+4 (Field)	08:00	09:00	10:00	11:00	12:00
PERSON	POSITION					
Gernot Grömer	Aouda.X		Breakfast	Br+MIMIC		Suit Maintenance
Olivia Haider	Safety.X		Breakfast	Br+MIMIC	FAT	Wifi Setup
Aline Decadi	Assistant.X		Breakfast	Br+MIMIC	FAT	*Husky*
Stefan Dobrovolny	Aouda.S		Breakfast	Br+MIMIC		Suit Maintenance
Alessandro Boesso	Safety.S		Breakfast	Br+MIMIC	FAT	check HX / Wifi Setup
Carmen Köhler	Assistant.S		Breakfast	Br+MIMIC	FAT	*Husky*
Michael Müller	OPS		Breakfast	Br+MIMIC	FAT	Suit Ops and Communication
Claudia Kobald	SciOPS	QUARTER MASTER	Breakfast	Br+MIMIC	FAT	Wifi Setup
Bonnie Posselt	MEDO		Breakfast	Br+MIMIC	FAT	Suit Maintenance
Osama Al-Busaidi	Experimenter 1		Breakfast	Br+MIMIC	FAT	WEE hammering / turn on WIFI
Iñigo Muñoz Elorza	Experimenter 2		Breakfast	Br+MIMIC	FAT	WEE hammering / turn on WIFI
Kartik Kumar	Housekeeping		Breakfast	Br+MIMIC	FAT	SIT AS / Housekeeping
Sebastian Sams	Housekeeping		Breakfast	Br+MIMIC	FAT	Wifi Setup
João Lousada	Field CDR		Breakfast	Br+MIMIC	FAT	Field Commander
Florian Voggeneder	Photographer		Breakfast	Br+MIMIC	FAT	Drone Maintenance

Thu,/15-Feb-2018	UTC	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00
	UTC+1 (MSC)	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00
	UTC+4 (Field)	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00

PERSON	POSITION																					
Gernot Grömer	Aouda.X	Lunch	Donning X + 2*FATIGUE						Geosampling	Travel time	*A3DPT GBE/ Geosampling*	Travel	Photos	Doffing + 2*FATIGUE					MIMIC	Br+MIMIC	Dinner	POOL PARTY
Olivia Haider	Safety.X	Lunch	Support Donning						Safety.X				Photos	Support Doffing		FAT			MIMIC	Br+MIMIC	Dinner	
Aline Decadi	Assistant.X	Lunch	Support Donning											Support Doffing		FAT			MIMIC	Br+MIMIC	Dinner	
Stefan Dobrovolny	Aouda.S	Lunch	Donning X + 2*FATIGUE						Geosampling	Travel time	*A3DPT GBE/ Geosampling*	Travel	Photos	Doffing + 2*FATIGUE					MIMIC	Br+MIMIC	Dinner	
Alessandro Boesso	Safety.S	Lunch	Support Donning						Safety.S				Photos	Support Doffing		FAT			MIMIC	Br+MIMIC	Dinner	
Carmen Köhler	Assistant.S	Lunch	Support Donning											Support Doffing		FAT			MIMIC	Br+MIMIC	Dinner	
Michael Müller	OPS	Lunch	Suit Ops and Communication													FAT			MIMIC	Br+MIMIC	Dinner	
Claudia Kobald	SciOPS	Lunch	Suit Ops and Communication													FAT			MIMIC	Br+MIMIC	Dinner	QUARTER MASTER
Bonnie Posselt	MEDO	Lunch	Suit Telemetry for Safety													FAT			MIMIC	Br+MIMIC	Dinner	
Osama Al-Busaidi	Experimenter 1	Lunch												turn off WIFI		FAT			MIMIC	Br+MIMIC	Dinner	
Iñigo Muñoz Elorza	Experimenter 2	Lunch												turn off WIFI	check HX	FAT			MIMIC	Br+MIMIC	Dinner	
Kartik Kumar	Housekeeping	Lunch	Housekeeping													FAT			MIMIC	Br+MIMIC	Dinner	SITAS
Sebastian Sams	Housekeeping	Lunch	Housekeeping													FAT			MIMIC	Br+MIMIC	Dinner	POOL PARTY
João Lousada	Field CDR	Lunch	Field Commander													FAT			MIMIC	Br+MIMIC	Dinner	POOL PARTY
Florian Voggeneder	Photographer	Lunch	Photos						AVI-NAV <20km/h	Photos		*AVI-NAV <20km/h*	Photos			FAT			MIMIC	Br+MIMIC	Dinner	


For Date: 2018-02-15
Version: 1
Author: N. Sejkora
Developed on: 2018-02-13
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WiFi 5
WiFi 4
WiFi 3
Geosample 1
Photo POI2
Photo POI3
Photo POI1
WiFi 2
WiFi 1 real
Waypoint 1
Waypoint 2
Aouda.S
Belushi Road
Shuttle Road
N
5 0 5 10 km
Legend
Points of Interest
BASE
WiFi
Other
Experiment/Waypoint
Traverses
Aouda.S
Aouda.X
Unsuited
0 700 1400 2100 2800 m
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	UTC+4 (Field)	08:00	09:00	10:00	11:00	12:00
PERSON	POSITION					
Iñigo Muñoz Elorza	Aouda.X		Breakfast Br+MIMIC			
Bonnie Posselt	Safety.X		Breakfast Br+MIMIC	FAT	Suit Maintenance	
Carmen Köhler	Assistant.X	SIT AS	Breakfast Br+MIMIC	FAT	TT	Husky TT
Kartik Kumar	Aouda.S		Breakfast Br+MIMIC			
Aline Decadi	Safety.S		Breakfast Br+MIMIC	FAT		
Olivia Haider	Assistant.S		Breakfast Br+MIMIC	FAT	TT	Husky TT
Sebastian Sams	OPS		Breakfast Br+MIMIC	FAT	Suit Ops and Communication Suit Maintenance	
Claudia Kobald	SciOPS	QUARTER MASTER	Breakfast Br+MIMIC	FAT	check HX	
Stefan Dobrovolny	MEDO		Breakfast Br+MIMIC	FAT		
Alessandro Boesso	Experimenter 1		Breakfast Br+MIMIC	FAT	TT	FieldSpec turn on WIFI
Osama Al-Busaidi	Experimenter 2		Breakfast Br+MIMIC	FAT	TT	FieldSpec turn on WIFI
Michael Müller	Housekeeping		Breakfast Br+MIMIC	FAT	Housekeeping	
Gernot Grömer	Housekeeping		Breakfast Br+MIMIC	FAT	Housekeeping	
João Lousada	Field CDR		Breakfast Br+MIMIC	FAT	Field Commander	
Florian Voggeneder	Photographer		Breakfast Br+MIMIC	FAT	Photos	

Fri,/16-Feb-2018	UTC	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00		
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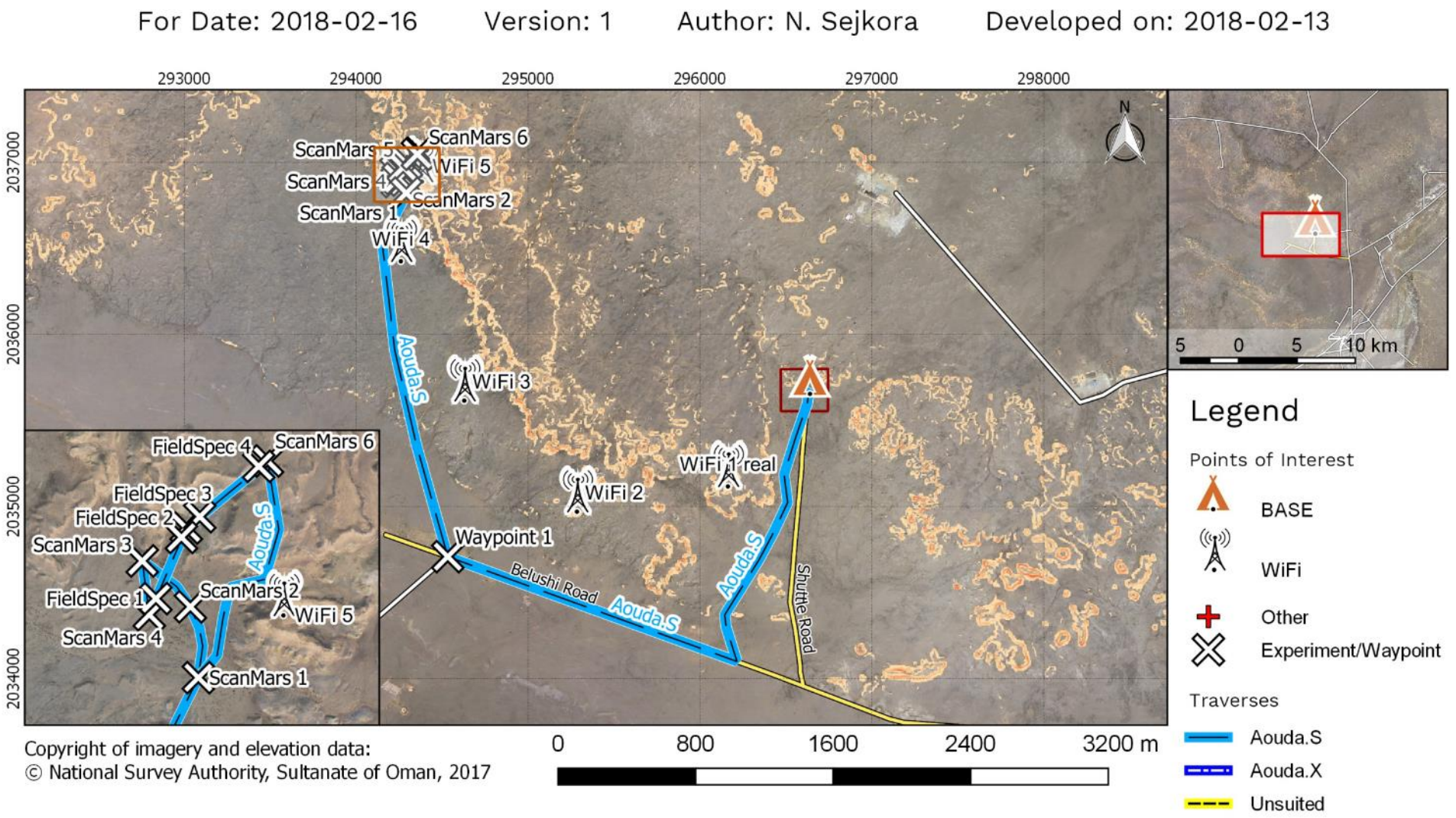
	UTC+4 (Field)	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00		
PERSON	POSITION											
Iñigo Muñoz Elorza	Aouda.X	Lunch	Donning S + 2*FATIGUE		TT	Scan Mars	FieldSpec	TT	Doffing + 2*FATIGUE		Br+MIMIC	Dinner
Bonnie Posselt	Safety.X	Lunch	Support Donning		Safety.X				Support Doffing	FAT	Br+MIMIC	Dinner
Carmen Köhler	Assistant.X	Lunch	Support Donning						Support Doffing	SITAS FAT	Br+MIMIC	Dinner
Kartik Kumar	Aouda.S	Lunch	Donning S + 2*FATIGUE		TT	Scan Mars	FieldSpec	TT	Doffing + 2*FATIGUE		Br+MIMIC	Dinner
Aline Decadi	Safety.S	Lunch	Support Donning		Safety.S				Support Doffing	FAT	Br+MIMIC	Dinner
Olivia Haider	Assistant.S	Lunch	Support Donning		Tumbleweed setup				Support Doffing	FAT	Br+MIMIC	Dinner
Sebastian Sams	OPS	Lunch	Suit Ops and Communication		Suit Ops and Communication					FAT	Br+MIMIC	Dinner POOL PARTY
			MSTAT Session 2		MSTAT Session 2							
Claudia Kobald	SciOPS	Lunch	Suit Ops and Communication		Suit Ops and Communication			check HX		FAT	Br+MIMIC	Dinner QUARTER MASTER
Stefan Dobrovolny	MEDO	Lunch	Suit Telemetry for Safety		Suit Telemetry for Safety					FAT	Br+MIMIC	Dinner
Alessandro Boesso	Experimenter 1	Lunch	Generator swap and refuel		Tumbleweed setup			turn off WIFI		FAT	Br+MIMIC	Dinner
Osama Al-Busaidi	Experimenter 2	Lunch	Generator swap and refuel		Tumbleweed setup			turn off WIFI		FAT	Br+MIMIC	Dinner
Michael Müller	Housekeeping	Lunch	Housekeeping		Housekeeping					FAT	Br+MIMIC	Dinner
Gernot Grömer	Housekeeping	Lunch	Housekeeping		Housekeeping					FAT	Br+MIMIC	Dinner POOL PARTY
João Lousada	Field CDR	Lunch	Field Commander		Field Commander					FAT	Br+MIMIC	Dinner POOL PARTY
Florian Voggeneder	Photographer	Lunch	Photos		TT	AVI-NAV	Photos	TT	Photos	FAT	Br+MIMIC	Dinner


For Date: 2018-02-16
Version: 1
Author: N. Sejkora
Developed on: 2018-02-13
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Waypoint 1
Belushi Road
Aouda.S
Aouda.S
Shuttle Road
FieldSpec 4
ScanMars 6
FieldSpec 3
FieldSpec 2
ScanMars 3
Aouda.S
FieldSpec 1
ScanMars 2
WiFi 5
ScanMars 4
ScanMars 1
5 0 5 10 km
Legend
Points of Interest
BASE
WiFi
Other
Experiment/Waypoint
Traverses
Aouda.S
Aouda.X
Unsuited
Copyright of imagery and elevation data:
© National Survey Authority, Sultanate of Oman, 2017
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Sat,/17-Feb-2018	UTC	04:00	05:00	06:00	07:00	08:00
	UTC+1 (MSC)	05:00	06:00	07:00	08:00	09:00
	UTC+4 (Field)	08:00	09:00	10:00	11:00	12:00
PERSON	POSITION					
João Lousada	Aouda.X		Breakfast, Br+MIMIC	ERAU Preparation	ERAU unsuited	
Kartik Kumar	Safety.X		Breakfast, Br+MIMIC	FAT	Suit Maintenance	
Claudia Kobald	Assistant.X	QUARTER MASTER	Breakfast, Br+MIMIC	FAT	check HX	Setup EOS
Carmen Köhler	Aouda.S		Breakfast, Br+MIMIC	ERAU Preparation	ERAU unsuited	
Osama Al-Busaidi	Safety.S		Breakfast, Br+MIMIC	FAT	Suit Maintenance	
Iñigo Muñoz Elorza	Assistant.S		Breakfast, Br+MIMIC	FAT		
Michael Müller	OPS		Breakfast, Br+MIMIC	FAT	Suit Ops and Communication	
Sebastian Sams	SciOPS		Breakfast, Br+MIMIC	FAT	Suit Ops and Communication	MSTAT-COMM Session 5
Bonnie Posselt	MEDO		Breakfast, Br+MIMIC	FAT	Suit Maintenance	
Olivia Haider	Experimenter 1		Breakfast, Br+MIMIC	FAT	turn on WIFI	Husky
Aline Decadi	Experimenter 2		Breakfast, Br+MIMIC	FAT	turn on WIFI	Husky
Alessandro Boesso	Housekeeping		Breakfast, Br+MIMIC	FAT	SIT AS	Housekeeping
Stefan Dobrovolny	Housekeeping		Breakfast, Br+MIMIC	FAT	Housekeeping	
Gernot Grömer	Field CDR		Breakfast, Br+MIMIC	FAT	Field Commander	
Florian Voggeneder	Photographer		Breakfast, Br+MIMIC	FAT	Photos	Setup EOS

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2*FATIGUE</td><td></td><td></td><td>TE
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IC</td><td colspan="2">Br+MIMIC</td><td colspan="2">Dinner</td><td colspan="4">POOL PARTY</td></tr>
<tr><td>Kartik Kumar</td><td>Safety.X</td><td colspan="2">Lunch</td><td colspan="10">Support Donning</td><td colspan="8">Safety.X</td><td colspan="3">Doffing</td><td></td><td></td><td>TE
AM</td><td>FAT</td><td>MIM
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<tr><td>Claudia Kobald</td><td>Assistant.X</td><td colspan="2">Lunch</td><td colspan="10">Support Donning</td><td colspan="2">ERAU</td><td colspan="6"></td><td colspan="3">Doffing</td><td></td><td></td><td></td><td>FAT</td><td>MIM
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<tr><td>Carmen Köhler</td><td>Aouda.S</td><td colspan="2">Lunch</td><td colspan="10">Donning X + 2*FATIGUE</td><td colspan="2">ERAU</td><td colspan="2">Tumble
weed</td><td colspan="4">EOS</td><td colspan="3">Doffing +
2*FATIGUE</td><td></td><td></td><td>TE
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<tr><td>Osama Al-Busaidi</td><td>Safety.S</td><td colspan="2">Lunch</td><td colspan="10">Support Donning</td><td colspan="8">Safety.S</td><td colspan="3">Doffing</td><td></td><td></td><td></td><td>FAT</td><td>MIM
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<tr><td>Iñigo Muñoz Elorza</td><td>Assistant.S</td><td colspan="2">Lunch</td><td colspan="10">Support Donning</td><td colspan="8"></td><td colspan="3">Doffing</td><td colspan="2">EVA Prep</td><td>TE
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IC</td><td colspan="2">Br+MIMIC</td><td colspan="2">Dinner</td><td colspan="4"></td></tr>
<tr><td>Michael Müller</td><td>OPS</td><td colspan="2">Lunch</td><td colspan="23">Suit Ops and Communication</td><td></td><td>FAT</td><td>MIM
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<tr><td rowspan="2">Sebastian Sams</td><td rowspan="2">SciOPS</td><td colspan="2">Lunch</td><td colspan="23">Suit Ops and Communication</td><td></td><td rowspan="2">FAT</td><td rowspan="2">MIM
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<tr><td colspan="4">MSTAT-COMM Session 5</td><td colspan="8">MSTAT-COMM Session 6</td><td colspan="14"></td></tr>
<tr><td>Bonnie Posselt</td><td>MEDO</td><td colspan="2">Lunch</td><td colspan="23">Suit Telemetry for Safety</td><td></td><td>FAT</td><td>MIM
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<tr><td>Olivia Haider</td><td>Experimenter 1</td><td colspan="2">Lunch</td><td colspan="10"></td><td colspan="6">Tumbleweed</td><td colspan="2">Tumblewee
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<tr><td>Aline Decadi</td><td>Experimenter 2</td><td colspan="2">Lunch</td><td colspan="10"></td><td colspan="6">Tumbleweed</td><td colspan="2">Tumblewee
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WIFI</td><td colspan="4"></td><td>FAT</td><td>MIM
IC</td><td colspan="2">Br+MIMIC</td><td colspan="2">Dinner</td><td colspan="4"></td></tr>
<tr><td>Alessandro Boesso</td><td>Housekeeping</td><td colspan="2">Lunch</td><td colspan="24">Housekeeping</td><td>FAT</td><td>MIM
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<tr><td>Gernot Grömer</td><td>Field CDR</td><td colspan="2">Lunch</td><td colspan="23">Field Commander</td><td></td><td>FAT</td><td>MIM
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<tr><td>Florian Voggeneder</td><td>Photographer</td><td colspan="2">Lunch</td><td colspan="10">Photos</td><td colspan="13">Photos</td><td></td><td>FAT</td><td>MIM
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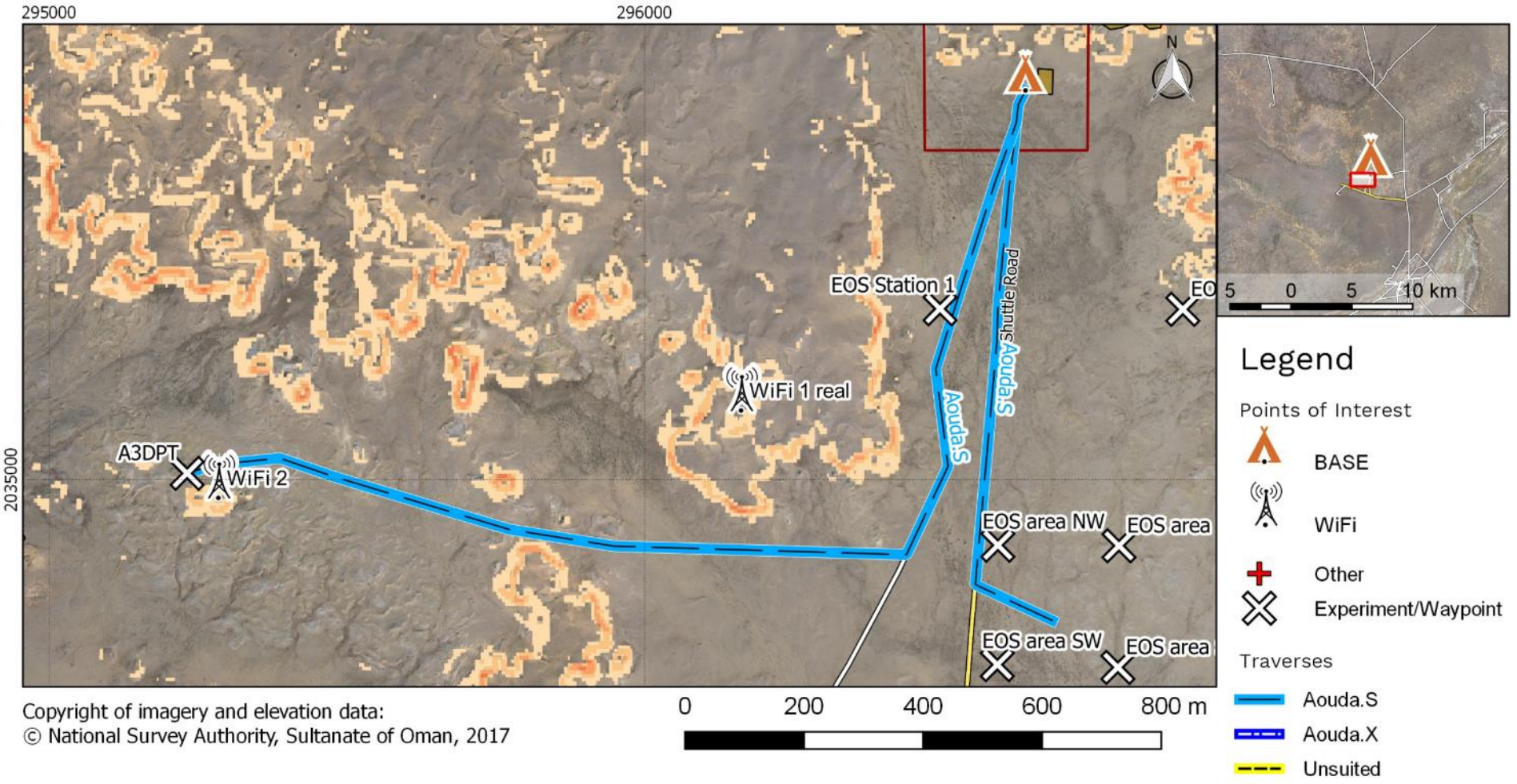
For Date: 2018-02-17 Version: 2 Author: N. Sejkora Developed on: 2018-02-16



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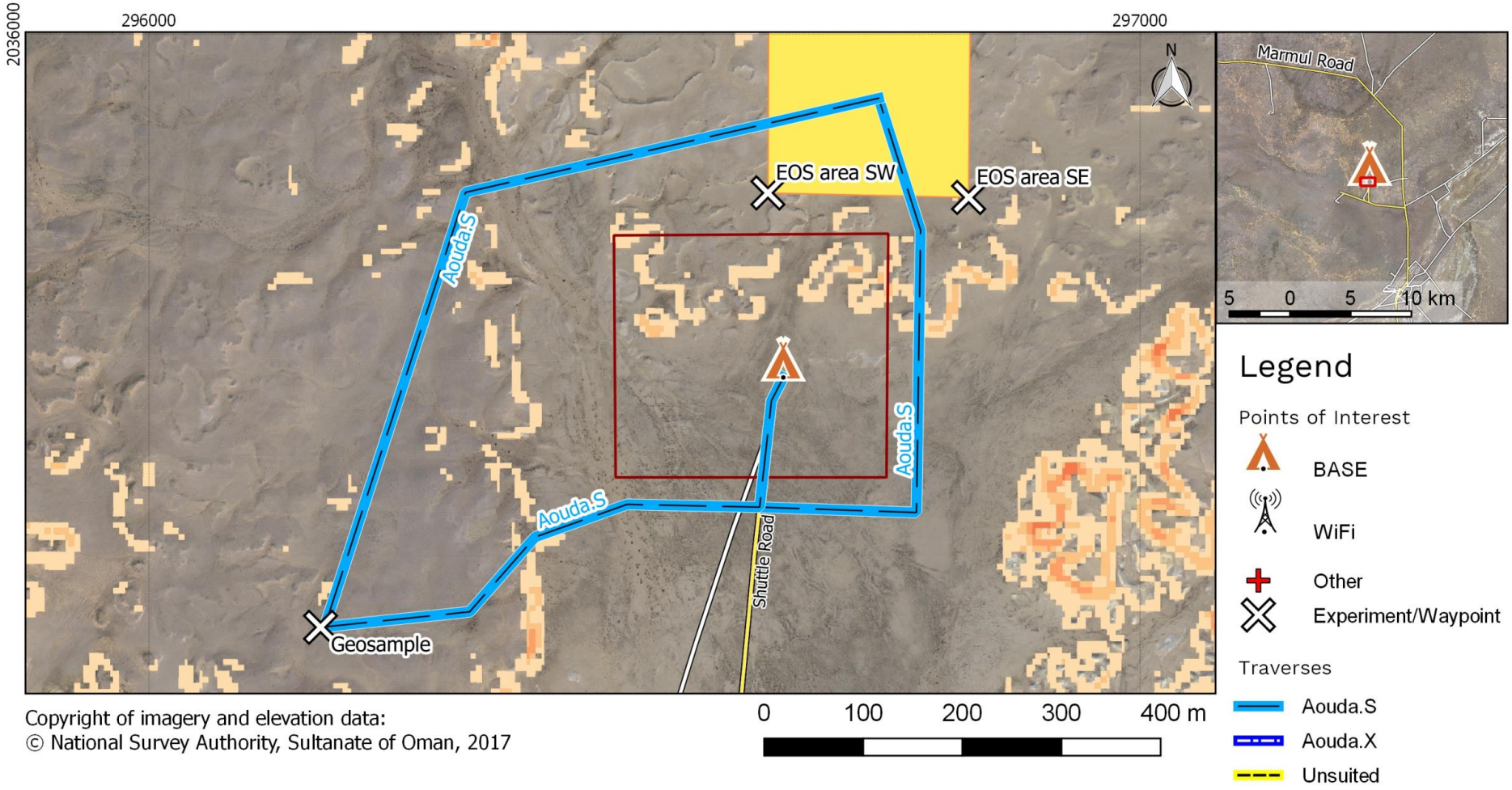
PERSON	POSITION					
Iñigo Muñoz Elorza	Aouda.X		Breakfast, Br+MIMIC			
Kartik Kumar	Safety.X		Breakfast, Br+MIMIC	FAT		
João Lousada	Assistant.X		Breakfast, Br+MIMIC	FAT	Suit Maintenance	
Stefan Dobrovolny	Aouda.S		Breakfast, Br+MIMIC			
Aline Decadi	Safety.S	QUARTER MASTER	Breakfast, Br+MIMIC	FAT		
Michael Müller	Assistant.S		Breakfast, Br+MIMIC	FAT	SIT AS, Suit Maintenance	
Sebastian Sams	OPS		Breakfast, Br+MIMIC	FAT	Suit Ops and Communication	MSTAT Session 7
Olivia Haider	SciOPS		Breakfast, Br+MIMIC	FAT	Kids 2 Mars, Suit Maintenance	
Bonnie Posselt	MEDO		Breakfast, Br+MIMIC	FAT	Suit Maintenance	
Alessandro Boesso	Experimenter 1		Breakfast, Br+MIMIC	FAT	turn on WIFI	check HX
Claudia Kobald	Experimenter 2	QUARTER MASTER	Breakfast, Br+MIMIC	FAT	turn on WIFI	Setup EOS
Carmen Köhler	Housekeeping		Breakfast, Br+MIMIC	FAT	Housekeeping	
Osama Al-Busaidi	Housekeeping		Breakfast, Br+MIMIC	FAT	Housekeeping	
Gernot Grömer	Field CDR		Breakfast, Br+MIMIC	FAT	Kids 2 Mars, Field Commander	
Florian Voggeneder	Photographer		Breakfast, Br+MIMIC	FAT	Photos, Setup EOS	

Sun,/18-Feb-2018	UTC UTC+1 (MSC) UTC+4 (Field)	09:00 10:00 13:00	10:00 11:00 14:00	11:00 12:00 15:00	12:00 13:00 16:00	13:00 14:00 17:00	14:00 15:00 18:00	15:00 16:00 19:00	16:00 17:00 20:00	17:00 18:00 21:00
PERSON	POSITION									
Iñigo Muñoz Elorza	Aouda.X	Lunch	Donning S + 2*FATIGUE		EOS	Geosampling	Doffing + 2*FATIGUE	EVA report	Br+MIMIC	Dinner
Kartik Kumar	Safety.X	Lunch	Support Donning		Safety.X		Support Doffing	FAT	Br+MIMIC	Dinner
João Lousada	Assistant.X	Lunch	Support Donning				Support Doffing	FAT	Br+MIMIC	Dinner	POOL PARTY
Stefan Dobrovolny	Aouda.S	Lunch	Donning S + 2*FATIGUE		EOS	Geosampling	Doffing + 2*FATIGUE	EVA report	Br+MIMIC	Dinner
Aline Decadi	Safety.S	Lunch	Support Donning		Safety.S		Support Doffing	FAT	Br+MIMIC	Dinner	QUARTER MASTER
Michael Müller	Assistant.S	Lunch	Support Donning				Support Doffing	SITAS	FAT	Br+MIMIC	Dinner
Sebastian Sams	OPS	Lunch	Suit Ops and Communication					FAT	Br+MIMIC	Dinner	POOL PARTY
Olivia Haider	SciOPS	Lunch	Suit Ops and Communication					FAT	Br+MIMIC	Dinner
Bonnie Posselt	MEDO	Lunch	Suit Ops and Communication					FAT	Br+MIMIC	Dinner
Alessandro Boesso	Experimenter 1	Lunch	Hortextreme			recollect EOS	turn off WIFI	FAT	Br+MIMIC	Dinner
Claudia Kobald	Experimenter 2	Lunch	Hortextreme			recollect EOS	turn off WIFI	check HX	FAT	Br+MIMIC	Dinner	QUARTER MASTER
Carmen Köhler	Housekeeping	Lunch	Housekeeping					FAT	Br+MIMIC	Dinner
Osama Al-Busaidi	Housekeeping	Lunch	Housekeeping					FAT	Br+MIMIC	Dinner
Gernot Grömer	Field CDR	Lunch	Field Commander					FAT	Br+MIMIC	Dinner	POOL PARTY
Florian Voggeneder	Photographer	Lunch	Photos			AVI-NAV	Photos	FAT	Br+MIMIC	Dinner

For Date: 2018-02-18 Version: 1 Author: N. Sejkora Developed on: 2018-02-17



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	UTC+4 (Field)	08:00				09:00				10:00				11:00				12:00			
PERSON	POSITION																				
Olivia Haider	Experimenter 1				SIT AS	Breakfast				Br+MIMIC				FAT				Suit Maintenance			
Osama Al-Busaidi	Experimenter 2					Breakfast				Br+MIMIC				FAT				WEE recollect			
Iñigo Muñoz Elorza	Experimenter 3					Breakfast				Br+MIMIC				FAT				WEE recollect			
Kartik Kumar	Experimenter 4					Breakfast				Br+MIMIC				FAT				Maintenance			
Carmen Köhler	Experimenter 5					Breakfast				Br+MIMIC				FAT				Suit Maintenance			
Stefan Dobrovolny	Experimenter 6					Breakfast				Br+MIMIC				FAT				setup WIFI			
Alessandro Boesso	Experimenter 7			check HX		Breakfast				Br+MIMIC				FAT				setup WIFI			
Sebastian Sams	Experimenter 8					Breakfast				Br+MIMIC				FAT				Suit Maintenance			
Aline Decadi	Experimenter 9	QUARTER MASTER				Breakfast				Br+MIMIC				FAT				setup WIFI			
Michael Müller	Experimenter 10					Breakfast				Br+MIMIC				FAT				setup WIFI			
Claudia Kobald	OPS	QUARTER MASTER				Breakfast				Br+MIMIC				FAT				Suit Ops and Communication			
João Lousada	Housekeeping					Breakfast				Br+MIMIC				FAT				Housekeeping			
Bonnie Posselt	Housekeeping					Breakfast				Br+MIMIC				FAT				Housekeeping			
Gernot Grömer	Field CDR					Breakfast				Br+MIMIC				FAT				Field Commander			
Florian Voggeneder	Photographer					Breakfast				Br+MIMIC				FAT				Suit Maintenance			

Mon,/19-Feb-2018	UTC	09:00		10:00	11:00	12:00	13:00	14:00		15:00			16:00		17:00	
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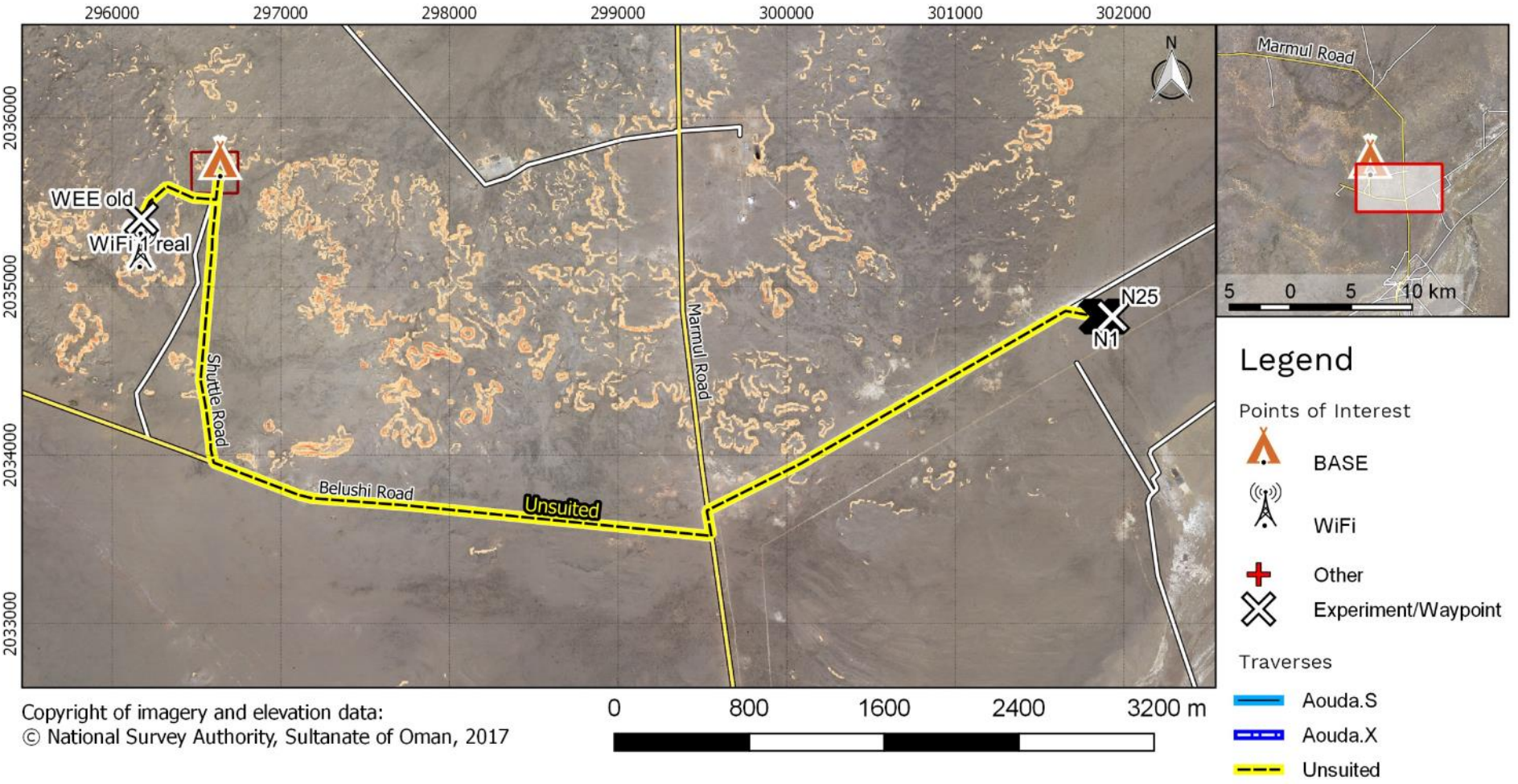
PERSON	POSITION															
Olivia Haider	Experimenter 1	Lunch	Suit Maintenance								MIMIC	FAT	Br+MIMIC	Dinner	SITAS	
Osama Al-Busaidi	Experimenter 2	Lunch	Maintenance			WEE Hammering					MIMIC	FAT	Br+MIMIC	Dinner		
Iñigo Muñoz Elorza	Experimenter 3	Lunch	Maintenance			WEE Hammering					MIMIC	FAT	Br+MIMIC	Dinner		
Kartik Kumar	Experimenter 4	Lunch	Maintenance								MIMIC	FAT	Br+MIMIC	Dinner		
Carmen Köhler	Experimenter 5	Lunch	Suit Maintenance						EVA prep		MIMIC	FAT	Br+MIMIC	Dinner		
Stefan Dobrovolny	Experimenter 6	Lunch	setup WEE			setup WIFI			EVA prep		MIMIC	FAT	Br+MIMIC	Dinner		
Alessandro Boesso	Experimenter 7	Lunch	setup WEE			setup WIFI				check HX	MIMIC	FAT	Br+MIMIC	Dinner		
Sebastian Sams	Experimenter 8	Lunch	Suit Maintenance			setup WIFI		Suit Maintenance			MIMIC	FAT	Br+MIMIC	Dinner	POOL PARTY	
Aline Decadi	Experimenter 9	Lunch	setup WEE			setup WIFI					MIMIC	FAT	Br+MIMIC	Dinner	QUARTER MASTER	
Michael Müller	Experimenter 10	Lunch	Suit Maintenance								MIMIC	FAT	Br+MIMIC	Dinner		
Claudia Kobald	OPS	Lunch	Suit Ops and Communication								MIMIC	FAT	Br+MIMIC	Dinner	QUARTER MASTER	
João Lousada	Housekeeping	Lunch	Housekeeping								MIMIC	FAT	Br+MIMIC	Dinner	POOL PARTY	
Bonnie Posselt	Housekeeping	Lunch	Housekeeping								MIMIC	FAT	Br+MIMIC	Dinner		
Gernot Grömer	Field CDR	Lunch	Field Commander								MIMIC	FAT	Br+MIMIC	Dinner	POOL PARTY	
Florian Voggeneder	Photographer	Lunch	Suit Maintenance								MIMIC	FAT	Br+MIMIC	Dinner		

For Date: 2018-02-19 Version: 1 Author: N. Sejkora Developed on: 2018-02-18



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	UTC+4 (Field)	8:00				9:00				10:00				11:00				12:00				13:00	
PERSON	POSITION																						
Stefan Dobrovolny	Aouda.X					Breakfast		Br+MIMIC														Lunch	
Alessandro Boesso	Safety.X					Breakfast		Br+MIMIC		FAT	FieldSpec					setup WIFI						Lunch	
Osama Al-Busaidi	Assistant.X					Breakfast		Br+MIMIC		FAT	FieldSpec					setup WIFI						Lunch	
Carmen Köhler	Aouda.S					Breakfast		Br+MIMIC														Lunch	
João Lousada	Safety.S					Breakfast		Br+MIMIC		FAT		turn on WIFI		setup WIFI								Lunch	
Claudia Kobald	Assistant.S	QUARTER MASTER				Breakfast		Br+MIMIC		FAT	Suit Maintenance											Lunch	
Sebastian Sams	OPS					Breakfast		Br+MIMIC		FAT	Suit Ops and Communication											Lunch	
Michael Müller	SciOPS					Breakfast		Br+MIMIC		FAT	Suit Maintenance											Lunch	
Bonnie Posselt	MEDO					Breakfast		Br+MIMIC		FAT	Suit Maintenance											Lunch	
Aline Decadi	Experimenter 1	QUARTER MASTER				Breakfast		Br+MIMIC		FAT		turn on WIFI		setup WIFI								Lunch	
Kartik Kumar	Experimenter 2				SIT AS	Breakfast		Br+MIMIC		FAT	check HX			setup WIFI								Lunch	
Iñigo Muñoz Elorza	Housekeeping					Breakfast		Br+MIMIC		FAT	Housekeeping											Lunch	
Olivia Haider	Housekeeping					Breakfast		Br+MIMIC		FAT	Housekeeping											Lunch	
Gernot Grömer	Field CDR					Breakfast		Br+MIMIC		FAT	Field Commander											Lunch	
Florian Voggeneder	Photographer					Breakfast		Br+MIMIC		FAT	Photos											Lunch	
abbreviations		Br + MIMIC… Briefing + MIMIC																					
		FAT… FATIGUE																					
		check HX … check Hortextreme																					

Tue,/20-Feb-2018	UTC	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00
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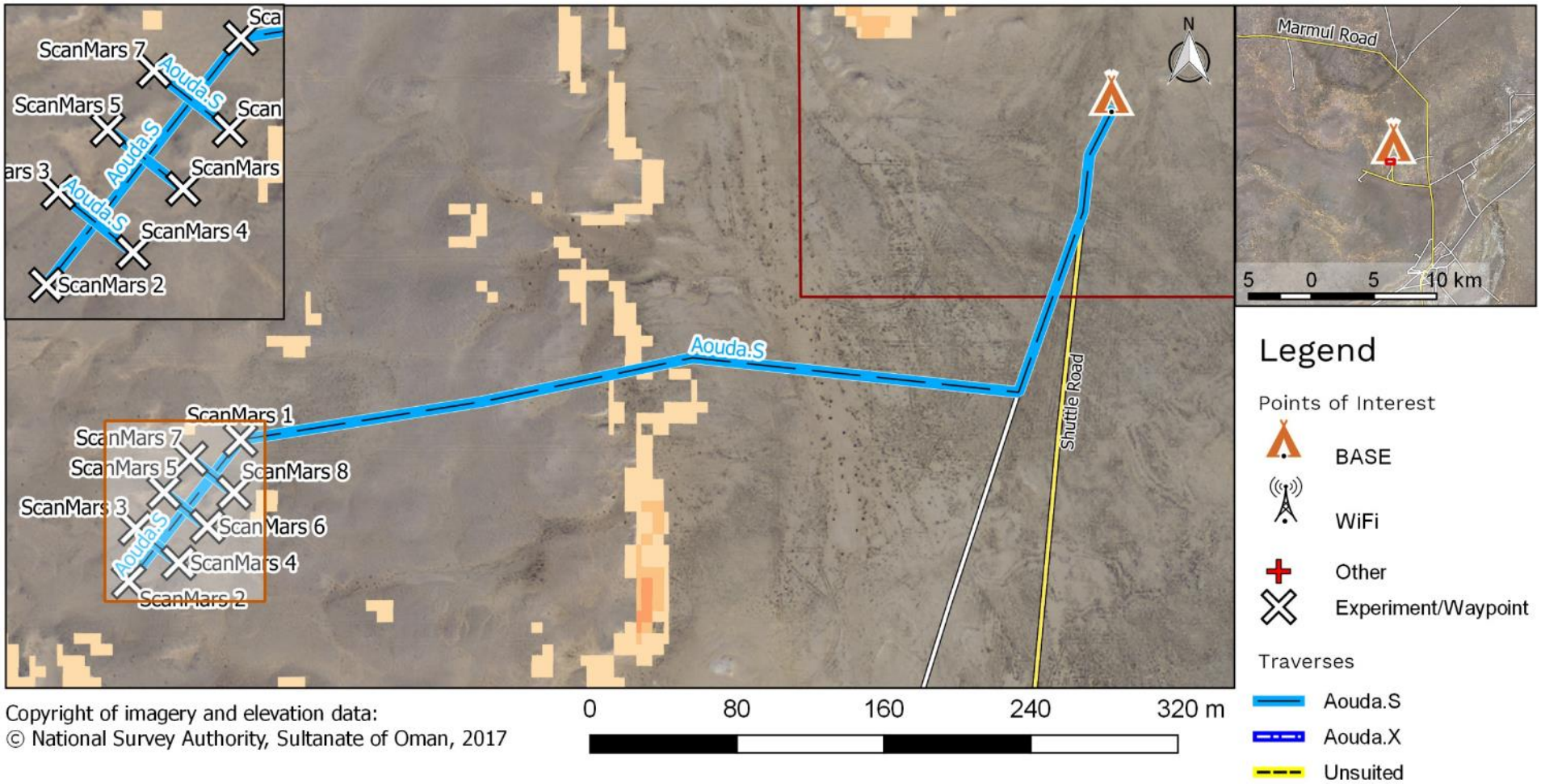
	UTC+4 (Field)	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00
PERSON	POSITION								
Stefan Dobrovolny	Aouda.X	Donning S + 2*FATIGUE		ScanMars	FieldSpec	Doffing + 2*FATIGUE	EVA report	Br+MIMIC	Dinner
Alessandro Boesso	Safety.X	Support Donning		Safety.X		Support Doffing	FAT	Br+MIMIC	Dinner
Osama Al-Busaidi	Assistant.X	Support Donning	Setup AVI-NAV	AVI-NAV		Support Doffing	FAT	Br+MIMIC	Dinner
Carmen Köhler	Aouda.S	Donning S + 2*FATIGUE		ScanMars	FieldSpec	Doffing + 2*FATIGUE	EVA report	Br+MIMIC	Dinner
João Lousada	Safety.S	Support Donning		Safety.S		Support Doffing	EVA prep	FAT Br+MIMIC	Dinner POOL PARTY
Claudia Kobald	Assistant.S	Support Donning				Support Doffing	FAT	Br+MIMIC	Dinner QUARTER MASTER
Sebastian Sams	OPS	Suit Ops and Communication					FAT	Br+MIMIC	Dinner POOL PARTY
Michael Müller	SciOPS	Suit Ops and Communication					FAT	Br+MIMIC	Dinner
Bonnie Posselt	MEDO	Suit Ops and Communication					FAT	Br+MIMIC	Dinner
Aline Decadi	Experimenter 1		Support Donning			turn off WIFI	check HX	FAT Br+MIMIC	Dinner QUARTER MASTER
Kartik Kumar	Experimenter 2					turn off WIFI	SITAS	FAT Br+MIMIC	Dinner
Iñigo Muñoz Elorza	Housekeeping	Housekeeping						FAT Br+MIMIC	Dinner
Olivia Haider	Housekeeping	Housekeeping						FAT Br+MIMIC	Dinner
Gernot Grömer	Field CDR	Field Commander					EVA prep	FAT Br+MIMIC	Dinner POOL PARTY
Florian Voggeneder	Photographer	Photos	Setup AVI-NAV	AVI-NAV	Photos			FAT Br+MIMIC	Dinner

For Date: 2018-02-20 Version: 1 Author: N. Sejkora Developed on: 2018-02-18



21. February was a Black Day

Thu,/22-Feb-2018	UTC	04:00	05:00	06:00	07:00	08:00
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	UTC+4 (Field)	08:00	09:00	10:00	11:00	12:00
PERSON	POSITION					
Gernot Grömer	Aouda.X		Breakfast	Br+MIMIC		Lunch
Bonnie Posselt	Safety.X		Breakfast	Br+MIMIC	FAT	Suit Maintenance	Lunch
Osama Al-Busaidi	Assistant.X		Breakfast	Br+MIMIC	FAT		Lunch
João Lousada	Aouda.S		Breakfast	Br+MIMIC		Suit Maintenance	Lunch
Kartik Kumar	Safety.S		Breakfast	Br+MIMIC	FAT		Lunch
Aline Decadi	Assistant.S	QUARTER MASTER	Breakfast	Br+MIMIC	FAT		Lunch
Michael Müller	OPS		Breakfast	Br+MIMIC	FAT	Suit Ops and Communication	Lunch
Claudia Kobald	SciOPS	QUARTER MASTER	Breakfast	Br+MIMIC	FAT	check HX	Suit Maintenance	Lunch
Stefan Dobrovolny	MEDO		Breakfast	Br+MIMIC	FAT		Lunch
Iñigo Muñoz Elorza	Experimenter 1		Breakfast	Br+MIMIC	FAT	turn on WIFI	Husky maintenance	Lunch
Carmen Köhler	Experimenter 2	SIT AS	Breakfast	Br+MIMIC	FAT	turn on WIFI	Husky maintenance	Lunch
Alessandro Boesso	Housekeeping		Breakfast	Br+MIMIC	FAT	Housekeeping	Lunch
Olivia Haider	Housekeeping		Breakfast	Br+MIMIC	FAT	Housekeeping	Lunch
Sebastian Sams	Field CDR		Breakfast	Br+MIMIC	FAT	Field Commander	Lunch
Florian Voggeneder	Photographer		Breakfast	Br+MIMIC	FAT	Photos	Lunch

abbreviations	
	Br + MIMIC… Briefing + MIMIC
	FAT… FATIGUE
	check HX … check Hortextreme

Thu,/22-Feb-2018	UTC	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00
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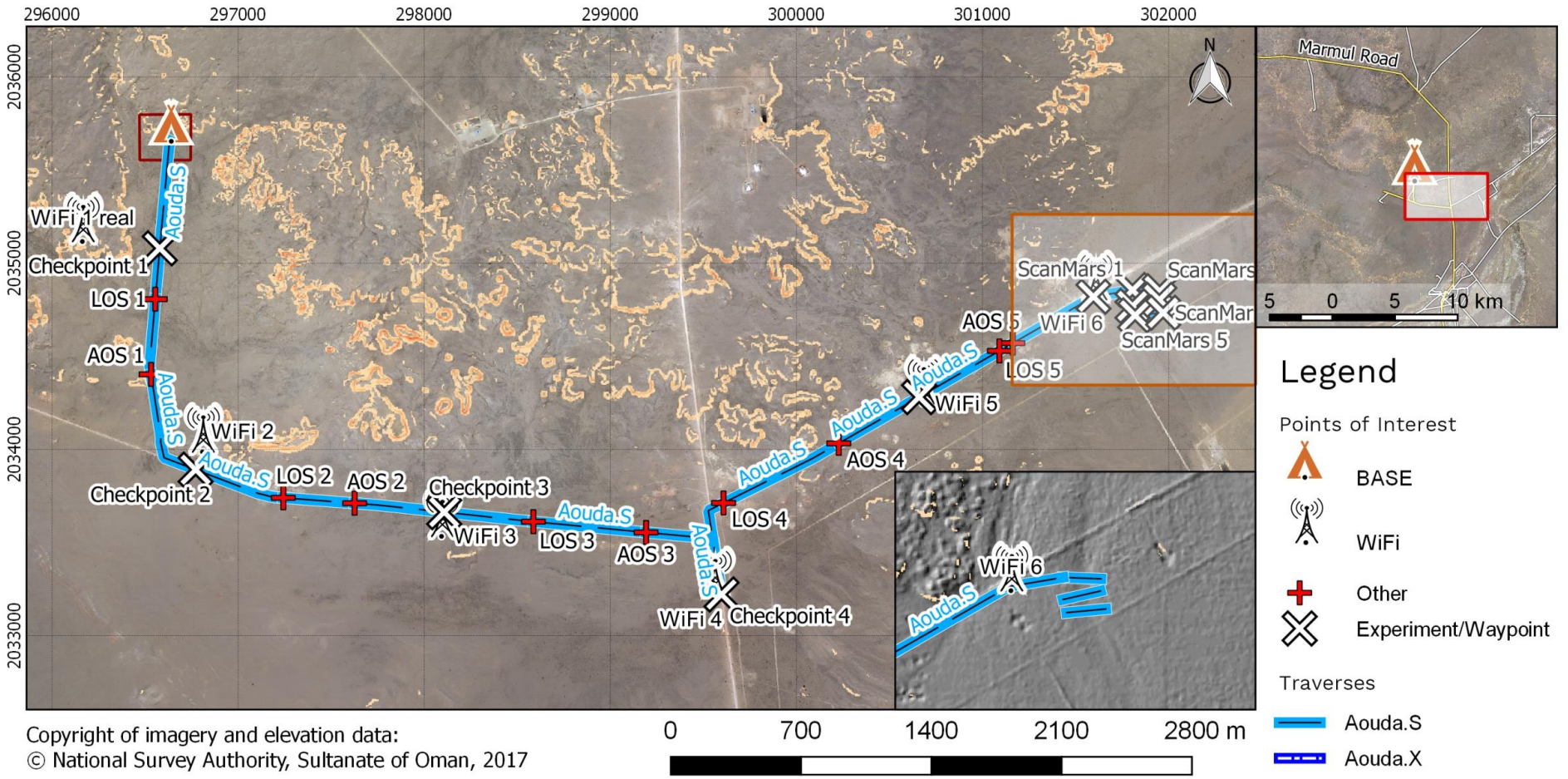
	UTC+4 (Field)	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00
PERSON	POSITION									
Gernot Grömer	Aouda.X	Donning S + 2*FATIGUE			TT	ScanMars	TT	Doffing + 2*FATIGUE	EVA report	MI MIC Br+MIMIC Dinner POOL PARTY
Bonnie Posselt	Safety.X	Support Donning			Safety.X			Doffing	FAT	MI MIC Br+MIMIC Dinner
Osama Al-Busaidi	Assistant.X	Support Donning		Setup AVI-NAV	TT	AVI-NAV	TT	Doffing	FAT	MI MIC Br+MIMIC Dinner
João Lousada	Aouda.S	Donning S + 2*FATIGUE			TT	ScanMars	TT	Doffing + 2*FATIGUE	EVA report	TE AM MI MIC Br+MIMIC Dinner POOL PARTY
Kartik Kumar	Safety.S	Support Donning			Safety.X			Doffing	FAT	MI MIC Br+MIMIC Dinner
Aline Decadi	Assistant.S	Support Donning						Doffing	FAT	MI MIC Br+MIMIC Dinner QUARTER MASTER
Michael Müller	OPS	Suit Ops and Communication							FAT	MI MIC Br+MIMIC Dinner
Claudia Kobald	SciOPS	Suit Ops and Communication							check HX FAT	MI MIC Br+MIMIC Dinner QUARTER MASTER
Stefan Dobrovolny	MEDO	Suit Ops and Communication							FAT	TE AM MI MIC Br+MIMIC Dinner
Iñigo Muñoz Elorza	Experimenter 1			Support Donning	Tumbleweed			turn off WIFI	FAT	TE AM MI MIC Br+MIMIC Dinner EVA prep
Carmen Köhler	Experimenter 2				Tumbleweed			turn off WIFI	FAT	TE AM MI MIC Br+MIMIC Dinner SITAS
Alessandro Boesso	Housekeeping	Housekeeping							FAT	MI MIC Br+MIMIC Dinner
Olivia Haider	Housekeeping	Housekeeping							FAT	TE AM MI MIC Br+MIMIC Dinner EVA prep
Sebastian Sams	Field CDR	Field Commander							FAT	MI MIC Br+MIMIC Dinner POOL PARTY
Florian Voggeneder	Photographer	Photos		Setup AVI-NAV	TT	Photos	AVI-NAV	Photos	TT	Photos FAT MI MIC Br+MIMIC Dinner

For Date: 2018-02-22 Version: 2 Author: N. Sejkora Developed on: 2018-02-19



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	UTC+4 (Field)	08:00				09:00				10:00				11:00				12:00			
PERSON	POSITION																				
Kartik Kumar	Aouda.X					Breakfast		Br+MIMIC												Lunch	
Bonnie Posselt	Safety.X					Breakfast		Br+MIMIC		FAT										Lunch	
Osama Al-Busaidi	Assistant.X				SIT AS	Breakfast		Br+MIMIC		FAT	turn on WIFI				Field Spec					Lunch	
Iñigo Muñoz Elorza	Aouda.S					Breakfast		Br+MIMIC												Lunch	
Aline Decadi	Safety.S	QUARTER MASTER				Breakfast		Br+MIMIC		FAT	turn on WIFI				Field Spec					Lunch	
Carmen Köhler	Assistant.S					Breakfast		Br+MIMIC		FAT	Suit Maintenance									Lunch	
Michael Müller	OPS					Breakfast		Br+MIMIC		FAT	Suit Ops and Communication									Lunch	
Olivia Haider	SciOPS					Breakfast		Br+MIMIC		FAT	Suit Maintenance									Lunch	
Stefan Dobrovolny	MEDO					Breakfast		Br+MIMIC		FAT										Lunch	
Claudia Kobald	Experimenter 1	QUARTER MASTER				Breakfast		Br+MIMIC		FAT	Hortextreme									Lunch	
Alessandro Boesso	Experimenter 2			check HX		Breakfast		Br+MIMIC		FAT	Hortextreme									Lunch	
Gernot Grömer	Housekeeping					Breakfast		Br+MIMIC		FAT	Housekeeping									Lunch	
Sebastian Sams	Housekeeping					Breakfast		Br+MIMIC		FAT	Housekeeping									Lunch	
João Lousada	Field CDR					Breakfast		Br+MIMIC		FAT	Field Commander									Lunch	
Florian Voggeneder	Photographer					Breakfast		Br+MIMIC		FAT	Photos									Lunch	

Fri,/23-Feb-2018	UTC	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00
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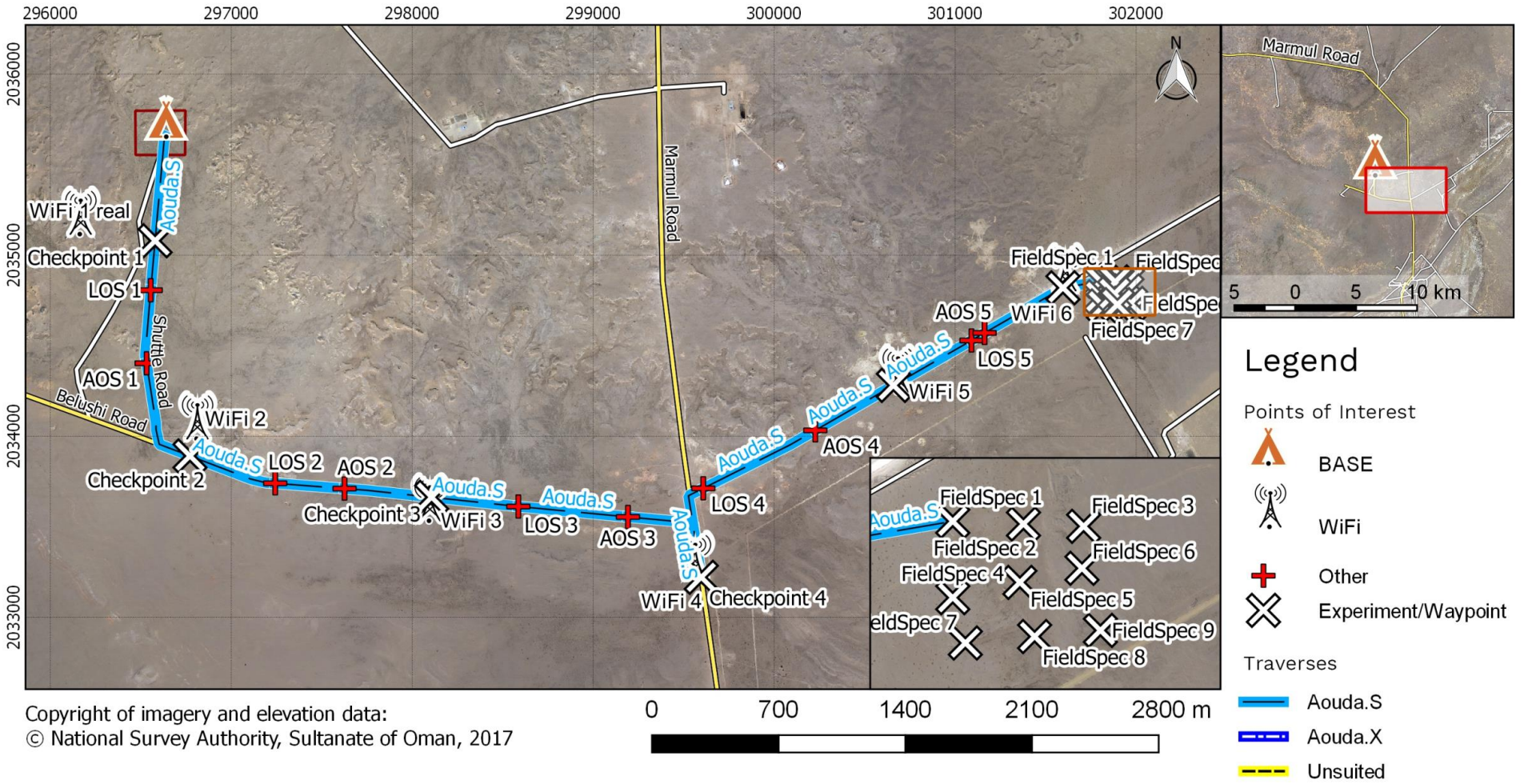
	UTC+4 (Field)	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00
PERSON	POSITION										
Kartik Kumar	Aouda.X	Donning X + 2*FATIGUE			TT	Geo sampling	Field Spec	TT	Doffing + 2*FATIGUE	Photos	
Bonnie Posselt	Safety.X	Support Donning			Safety.X				Doffing		
Osama Al-Busaidi	Assistant.X	Support Donning			TT	Husky		TT	Doffing		
Iñigo Muñoz Elorza	Aouda.S	Donning S + 2*FATIGUE			TT	Geo sampling	Field Spec	TT	Doffing + 2*FATIGUE	Photos	
Aline Decadi	Safety.S	Support Donning			Safety.X				Doffing		
Carmen Köhler	Assistant.S	Support Donning			TT	Husky		TT	Doffing	Photos	
Michael Müller	OPS	Suit Ops and Communication									
Olivia Haider	SciOPS	Suit Ops and Communication									
Stefan Dobrovolny	MEDO	Suit Telemetry for Safety							Photos		
Claudia Kobald	Experimenter 1	Hortextreme							turn off WIFI		
Alessandro Boesso	Experimenter 2	Hortextreme							turn off WIFI		check HX
Gernot Grömer	Housekeeping	Housekeeping							Photos		
Sebastian Sams	Housekeeping	Housekeeping									
João Lousada	Field CDR	Field Commander							Photos		
Florian Voggeneder	Photographer	Photos									

FAT	Br+MIMIC	Dinner	EVA report
FAT	Br+MIMIC	Dinner	
FAT	Br+MIMIC	Dinner	SITAS
	Br+MIMIC	Dinner	EVA report
FAT	Br+MIMIC	Dinner	QUARTER MASTER
FAT	Br+MIMIC	Dinner	
FAT	Br+MIMIC	Dinner	
FAT	Br+MIMIC	Dinner	
FAT	Br+MIMIC	Dinner	QUARTER MASTER
FAT	Br+MIMIC	Dinner	
FAT	Br+MIMIC	Dinner	EVA prep
FAT	Br+MIMIC	Dinner	
	Br+MIMIC	Dinner	EVA prep
FAT	Br+MIMIC	Dinner	

For Date: 2018-02-23 Version: 1 Author: N. Sejkora Developed on: 2018-02-19



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PERSON	POSITION					
Gernot Grömer	Aouda.X		Breakfast	Br+MIMIC		Lunch
Bonnie Posselt	Safety.X		Breakfast	Br+MIMIC	FAT	Lunch
Iñigo Muñoz Elorza	Assistant.X		Breakfast	Br+MIMIC	FAT	Husky / Lunch
João Lousada	Aouda.S		Breakfast	Br+MIMIC		Lunch
Aline Decadi	Safety.S	QUARTER MASTER	Breakfast	Br+MIMIC	FAT	Suit Maintenance / Lunch
Kartik Kumar	Assistant.S		Breakfast	Br+MIMIC	FAT	Suit Maintenance / Lunch
Michael Müller	OPS	SIT AS	Breakfast	Br+MIMIC	FAT	Suit Ops and Communication / Lunch
Olivia Haider	SciOPS		Breakfast	Br+MIMIC	FAT	Lunch
Stefan Dobrovolny	MEDO		Breakfast	Br+MIMIC	FAT	Lunch
Claudia Kobald	Experimenter 1	QUARTER MASTER	Breakfast	Br+MIMIC	FAT	turn on WIFI / Husky / Lunch
Alessandro Boesso	Experimenter 2		Breakfast	Br+MIMIC	FAT	turn on WIFI / Lunch
Carmen Köhler	Housekeeping		Breakfast	Br+MIMIC	FAT	Housekeeping / Lunch
Osama Al-Busaidi	Housekeeping		Breakfast	Br+MIMIC	FAT	Housekeeping / Lunch
Sebastian Sams	Field CDR		Breakfast	Br+MIMIC	FAT	Field Commander / Lunch
Florian Voggeneder	Photographer		Breakfast	Br+MIMIC	FAT	Photos / Lunch

Sat,/24-Feb-2018	UTC	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00
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	UTC+4 (Field)	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00
PERSON	POSITION									
Gernot Grömer	Aouda.X	Donning X + 2*FATIGUE			TT	A3DPT	FieldSpec	TT	Doffing + 2*FAT	EVA report
Bonnie Posselt	Safety.X	Support Donning			Safety.X				Doffing	
Iñigo Muñoz Elorza	Assistant.X	Support Donning			Pack Hortextreme				Doffing	EVA prep
João Lousada	Aouda.S	Donning S + 2*FATIGUE			TT	A3DPT	FieldSpec	TT	Doffing + 2*FAT	EVA report
Aline Decadi	Safety.S	Support Donning			Safety.X				Doffing	
Kartik Kumar	Assistant.S	Support Donning			Pack Hortextreme				Doffing	EVA prep
Michael Müller	OPS	Suit Ops and Communication								
Olivia Haider	SciOPS	Suit Ops and Communication								
Stefan Dobrovolny	MEDO	Suit Telemetry for Safety								
Claudia Kobald	Experimenter 1	Tumbleweed			Pack Hortextreme				turn off WIFI	
Alessandro Boesso	Experimenter 2	Tumbleweed			Pack Hortextreme				turn off WIFI	
Carmen Köhler	Housekeeping	Housekeeping								
Osama Al-Busaidi	Housekeeping	Housekeeping								
Sebastian Sams	Field CDR	Field Commander								
Florian Voggeneder	Photographer	Photos								

15:00	16:00	17:00	18:00	19:00	20:00	21:00
	MI MIC	Br+MIMIC	Dinner	POOL PARTY		
FAT	MI MIC	Br+MIMIC	Dinner			
FAT	MI MIC	Br+MIMIC	Dinner			
	MI MIC	Br+MIMIC	Dinner	POOL PARTY		
FAT	MI MIC	Br+MIMIC	Dinner	QUARTER MASTER		
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FAT	MI MIC	Br+MIMIC	Dinner	SITAS		
FAT	MI MIC	Br+MIMIC	Dinner			
FAT	MI MIC	Br+MIMIC	Dinner			
FAT	MI MIC	Br+MIMIC	Dinner	QUARTER MASTER		
FAT	MI MIC	Br+MIMIC	Dinner			
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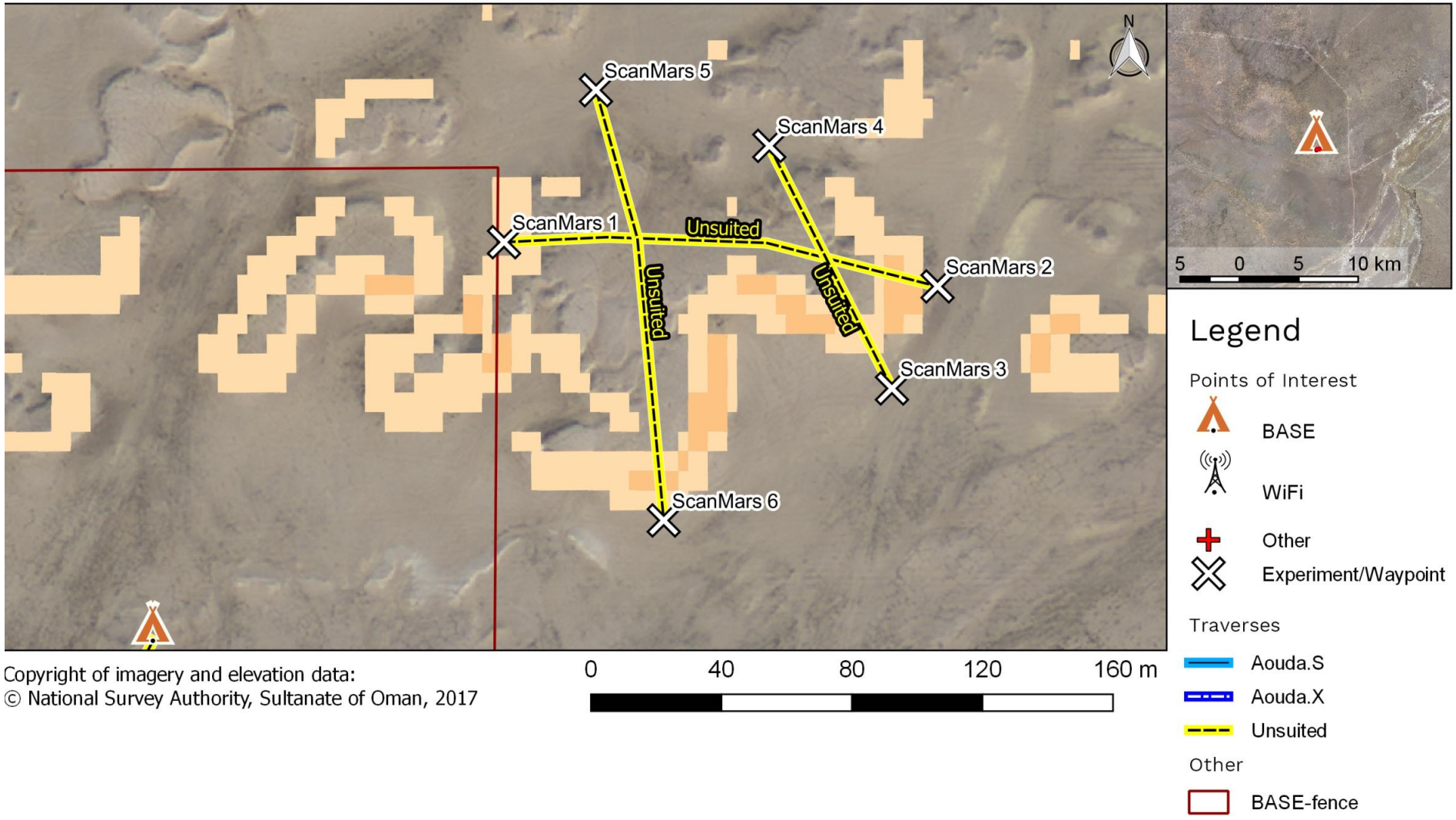
FAT	MI MIC	Br+MIMIC	Dinner	POOL PARTY		
FAT	MI MIC	Br+MIMIC	Dinner			

For Date: 2018-02-24 Version: 2 Author: N. Sejkora Developed on: 2018-02-24



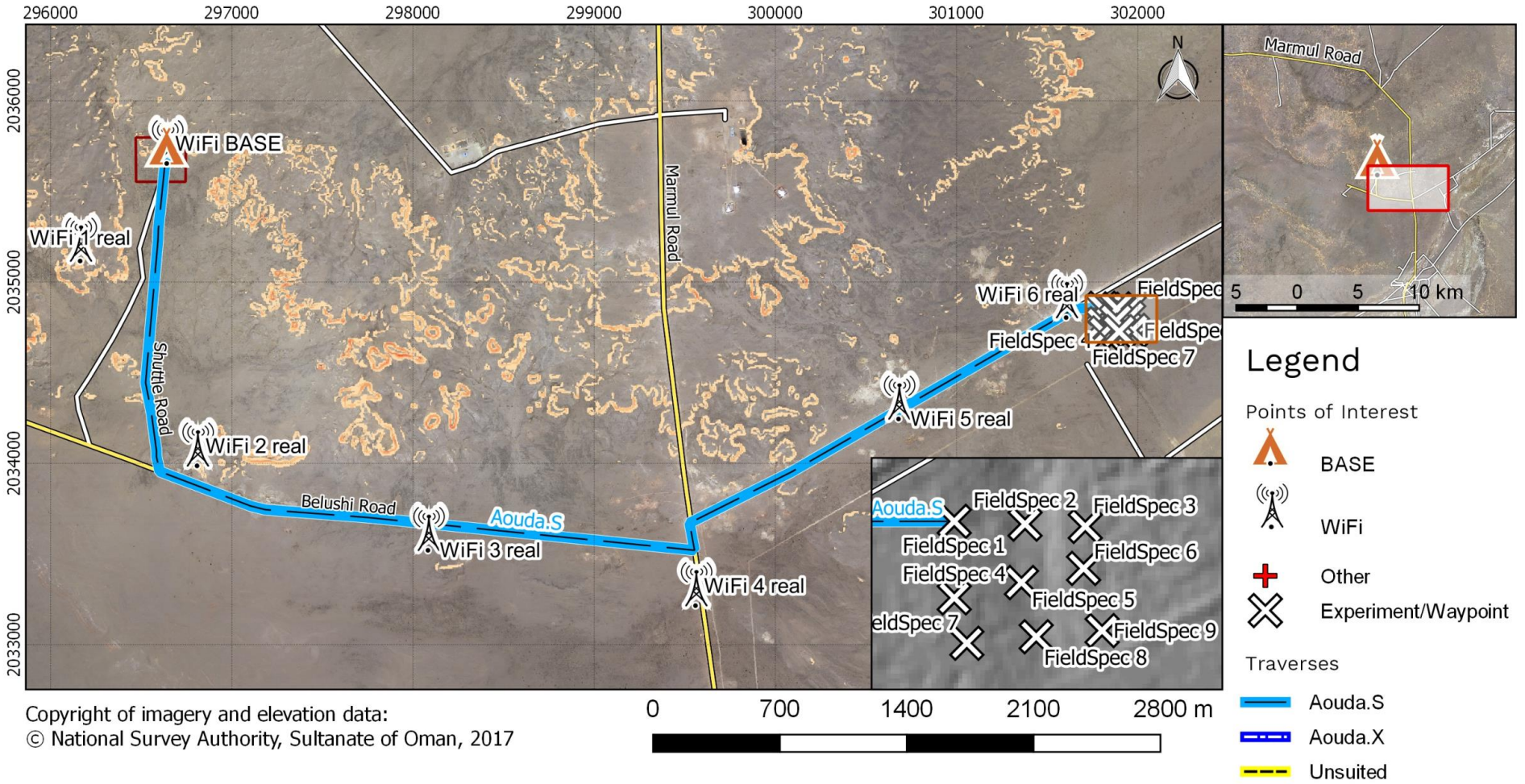
Sun,/25-Feb-2018	UTC	05:00		06:00		07:00	08:00
	UTC+1 (MSC)	06:00		07:00		08:00	09:00
	UTC+4 (Field)	09:00		10:00		11:00	12:00
PERSON	POSITION						
Kartik Kumar	Experimenter 1	Breakfast	Briefing	SIT AS	pack Hortextreme		
Carmen Köhler	Experimenter 2	Breakfast	Briefing			sample repacking and documentation	A3DPT
Gernot Grömer	Experimenter 3	Breakfast	Briefing	Video editing			
Iñigo Muñoz Elorza	Experimenter 4	Breakfast	Briefing	Husky maintenance		Husky	ScanMars
Sebastian Sams	Experimenter 5	Breakfast	Briefing	Husky maintenance		sample repacking and documentation	
Alessandro Boesso	Experimenter 6	Breakfast	Briefing	pack Hortextreme			
Olivia Haider	Experimenter 7	Breakfast	Briefing	Video editing			
Osama Al-Busaidi	Experimenter 8	Breakfast	Briefing	Husky maintenance		Husky	ScanMars
Claudia Kobald	Experimenter 9	Breakfast	Briefing	QUARTERMASTER	pack Hortextreme		
Aline Decadi	Experimenter 10	Breakfast	Briefing	QUARTERMASTER	pack Hortextreme		
Michael Müller	OPS	Breakfast	Briefing	Suit Ops and Communication			
Bonnie Posselt	Housekeeping	Breakfast	Briefing	Housekeeping			
Stefan Dobrovolny	Housekeeping	Breakfast	Briefing	Housekeeping			
João Lousada	Field CDR	Breakfast	Briefing	Field Commander			
Florian Voggeneder	Photographer	Breakfast	Briefing	Photo			

Sun, 25-Feb-2018	UTC	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00					
	UTC+1 (MSC)	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00					
	UTC+4 (Field)	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00					
PERSON	POSITION	BLACK AFTERNOON												
Kartik Kumar	Experimenter 1	Lunch	FREE TIME							Dinner	SITAS			
Carmen Köhler	Experimenter 2	Lunch								Dinner				
Gernot Grömer	Experimenter 3	Lunch								Dinner				
Iñigo Muñoz Elorza	Experimenter 4	Lunch								Dinner				
Sebastian Sams	Experimenter 5	Lunch								Dinner				
Alessandro Boesso	Experimenter 6	Lunch								Dinner				
Olivia Haider	Experimenter 7	Lunch								Dinner				
Osama Al-Busaidi	Experimenter 8	Lunch								Dinner				
Claudia Kobald	Experimenter 9	Lunch								Dinner	QUARTERMASTER			
Aline Decadi	Experimenter 10	Lunch								Dinner	QUARTERMASTER			
Michael Müller	OPS	Lunch								Dinner				
Bonnie Posselt	Housekeeping	Lunch								Dinner				
Stefan Dobrovolny	Housekeeping	Lunch								Dinner				
João Lousada	Field CDR	Lunch								Dinner				
Florian Voggeneder	Photographer	Lunch								Dinner				

Mon,/26-Feb-2018	UTC	04:00				05:00				06:00				07:00				08:00			
	UTC+1 (MSC)	05:00				06:00				07:00				08:00				09:00			
	UTC+4 (Field)	08:00				09:00				10:00				11:00				12:00			
PERSON	POSITION																				
João Lousada	Aouda.X					Breakfast	Br+MIMIC														Lunch
Bonnie Posselt	Safety.X					Breakfast	Br+MIMIC	FAT		Pack Hortextreme							Husky				Lunch
Aline Decadi	Assistant.X	QUARTER MASTER				Breakfast	Br+MIMIC	FAT		Pack Hortextreme											Lunch
Kartik Kumar	Aouda.S					Breakfast	Br+MIMIC														Lunch
Claudia Kobald	Safety.S	QUARTER MASTER				Breakfast	Br+MIMIC	FAT		Pack Hortextreme											Lunch
Carmen Köhler	Assistant.S / Aouda.S					Breakfast	Br+MIMIC	FAT		Pack Hortextreme											Lunch
Sebastian Sams	OPS					Breakfast	Br+MIMIC	FAT		Suit Ops and Communication											Lunch
Olivia Haider	SciOPS				SIT AS	Breakfast	Br+MIMIC	FAT		Pack Hortextreme							FieldSpec				Lunch
Stefan Dobrovolny	MEDO					Breakfast	Br+MIMIC	FAT		Pack Hortextreme											Lunch
Iñigo Muñoz Elorza	Experimenter 1					Breakfast	Br+MIMIC	FAT		turn on WIFI							Husky				Lunch
Osama Al-Busaidi	Experimenter 2					Breakfast	Br+MIMIC	FAT		turn on WIFI							FieldSpec				Lunch
Michael Müller	Housekeeping					Breakfast	Br+MIMIC	FAT		Housekeeping											Lunch
Alessandro Boesso	Housekeeping					Breakfast	Br+MIMIC	FAT		Housekeeping											Lunch
Gernot Grömer	Field CDR					Breakfast	Br+MIMIC	FAT		Field Commander											Lunch
Florian Voggeneder	Photographer					Breakfast	Br+MIMIC	FAT		Photos											Lunch

Mon,/26-Feb-2018	UTC	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00
	UTC+1 (MSC)	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00				
	UTC+4 (Field)	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00				
PERSON	POSITION													
João Lousada	Aouda.X	Donning X + 2*FATIGUE			Media	TT	Geo sampling	FieldSpec	TT	Doffing + 2*FATIGUE	MI MIC	EVA report	Dinner	Br+MIMIC	POOL PARTY
Bonnie Posselt	Safety.X	Support Donning				Safety.X				Doffing	FAT MI MIC	Donning	Dinner	Doffing Br+MIMIC	
Aline Decadi	Assistant.X	Support Donning				Pack Hortextreme				Doffing	FAT MI MIC	QUARTER MASTER	Dinner	Br+MIMIC	
Kartik Kumar	Aouda.S	Donning S + 2*FATIGUE			Media	TT	Geo sampling	FieldSpec	TT	Doffing + 2*FATIGUE	MI MIC	EVA report	Dinner	Br+MIMIC	
Claudia Kobald	Safety.S	Support Donning				Safety.S				Doffing	FAT MI MIC	QUARTER MASTER	Dinner	Br+MIMIC	
Carmen Köhler	Assistant.S / Aouda.S	Support Donning				Pack Hortextreme				Doffing	FAT MI MIC	Donning S	Media	Doffing Br+MIMIC	Dinner
Sebastian Sams	OPS	Suit Ops and Communication									FAT MI MIC	Suit Ops and Communication		Br+MIMIC	Dinner POOL PARTY
Olivia Haider	SciOPS	Suit Ops and Communication									FAT MI MIC	Donning	SITAS	Dinner Doffing Br+MIMIC	
Stefan Dobrovolny	MEDO	Suit Telemetry for Safety									FAT MI MIC	Suit Telemetry for Safety		Br+MIMIC	Dinner
Iñigo Muñoz Elorza	Experimenter 1	Tumbleweed				recollect WEE			turn off WIFI		FAT MI MIC	Assistant		Br+MIMIC	Dinner
Osama Al-Busaidi	Experimenter 2	Tumbleweed				recollect WEE			turn off WIFI		FAT MI MIC	Assistant		Br+MIMIC	Dinner
Michael Müller	Housekeeping	Housekeeping									FAT MI MIC	Donning	Dinner	Doffing Br+MIMIC	
Alessandro Boesso	Housekeeping	Housekeeping									FAT MI MIC	Dinner		Br+MIMIC	
Gernot Grömer	Field CDR	Field Commander									FAT MI MIC	Field Commander		Br+MIMIC	Dinner POOL PARTY
Florian Voggeneder	Photographer	Photos									FAT MI MIC	Photos		Br+MIMIC	Dinner

For Date: 2018-02-26 Version: 1 Author: N. Sejkora Developed on: 2018-02-25



27Feb-01Mar2018

- Base station demobilization & Transfer field crew back to Muscat
- FieldCDR G.Groemer stayed until 05Mar2018.

12. Education activities

12.1. Junior Researchers Program

Four student teams from Europe and Oman were selected for the AMADEE-18 expedition.

The JRP teams …

- Defined research questions and implement the experiment
- Trained the field crew and interact with the Mission Support Center of the Austrian Space Forum
- Observe (and tele-operate if necessary) the experiment during its implementation
- Analyze and interpret the data and publish them in a final experiment report and present the findings at the AMADEE-18 science workshop in mid-2018.
- For travel or shipping expenses for the student teams (e.g. for shipping costs to/from Innsbruck or travel costs for team members for training the field crew in Innsbruck, up to 500 €/team can be covered by the Austrian Space Forum.

12.2. Kids2Mars program

In cooperation with innovaspace.org (Prf. Thais Russomanos), students between 6-18 years old asked video questions to the field crew. The field crew (or MSC team members) answered those inquiries from more than 30 nations and the best ones were distributed via the innovaspace website.

Liaison:

Prof. Thais Russomano MD PhD
School of Basic and Medical Biosciences
Faculty of Life Sciences & Medicine
King's College London, UK
www.thaisrussomano.com , trussomano@hotmail.com

12.3. AMADEE-18 expedition outlets

In selected science centers, live data or near-real time data streams offered the general public the opportunity to virtually participate in the mission.

These were the participating science centers

- Ars Electronica Center Linz, Austria
- Audioversum Science Center, Innsbruck, Austria
- Planetarium Vienna, Austria
- Petroleum Development of Oman (PDO) Exhibition Center, Muscat

The first week of the mission was dedicated to Media and Outreach activities as well as the preparation of the experiments. In the course of this bridgehead phase, as well as during the mission itself, carefully selected Science Centers broadcasted the vision of Mars exploration, in addition to the scientific insights and experience from the test site in Oman.

The Austrian Space Forum provided the following input and data products:

- **Questions to Mars**: visitors submitted their questions to the Field Crew in Oman via the Mission Support Center (e.g. via e-mail); the question of the day were selected, presented and answered by experts

- Regularly updated footage: **(360°-) videos** from the test site were provided by the field crew for the Expedition Outlets, also blog articles with highlights of the day. This included transmissions from Omani desert sunsets at the test site.

- **Picture of the day**: An exciting picture shot at the test site in Oman each day was used by the Expedition Outlets.

- **Live-links** to the Mission Support Center (and eventually to the Field Crew during the bridgehead phase): live-links connect the visitors to the Mission Support Center and the field crew to get a live-time feeling of Mars

- **(Social) media co-operations**: In cooperation with the (social) media team of the Austrian Space Forum, the expedition outlets were promoted as “Mars affine”. This included operating the T-Mobile Austria Instagram Account between 19-21Feb2018.

- **Provision of experts**: the Austrian Space Forum also provides experts for lectures and/or workshops (e.g. with school classes)

12.4. Audioversum Science Center Program

February 2018 was the dedicated Mars Month in the Audioversum Science Center in Innsbruck. Scales and sand probes were installed to let the visitors experience the impact of the reduced gravity as well as the surface material on Mars. Features like 360° video footage and weekly updated photos from the Mars simulation in Oman further provide insights into how we prepare for the journey to Mars, together with social media efforts to engage the public with questions to the field crew or the Mission Support Center.

On 6Feb, we held two lectures for ca 100 primary school pupils, where we explained the environment on Mars, what it takes to get there and what experiments the astronauts were going to execute once they set foot on the Red Planet. In the course of that we introduced the experiments we conduct during AMADEE-18. The pupils also experienced the Dignity rover of the Austrian Space Forum, demonstrating the robotic exploration of Mars.

12.5. Planetarium Vienna lecture series

At the Planetarium Vienna, a series of lectures was held including video greetings from the field.

- **Lecture 1:** 19Feb2018/19:00-20:30 CET, MSC/Benedikt Stingl “AMADEE-18 – Der Mars ist zum Greifen nah!“
- **Lecture 2:** 20Feb2018/09:00-10:00 CET for high school students: MSC/Benedikt Stingl “Flaschenpost vom Mars”
- **Lecture 2:** 23Feb2018/19:00-20:30 CET, Norbert Frischauf “AMADEE18 – Der Mars ist zum Greifen nah!”.

In addition, advertisement on the AMADEE-18 mission was be printed in the official VHS brochure distributed across Vienna.

12.6. Ars Electronica Center Linz program

On 31Jan2018, there was a sneak-preview on a "Österreich Heute" movie on Austrian space activities, including a reference to AMADEE-18 as well as the contribution of the FH Gesundheit (Univ. of Applied Science for Health, Linz).

10Feb2018: TEDx Linz

- Flight Director Laura Zanardini gave a presentation including a time-delayed link to the field crew.

15Feb2018/18:00+: lecture series 3 x 45min each

- Herbert Raab (Linz Astronomical Society on astronomical aspects of Mars
- Barbara von Rechbar (Staffordshire Univ. For Business) on „Design Fiction. Space & Storytelling"
- Sophie Gruber (ÖWF) on the AMADEE-18 mission

12.7. Oman official Kepler station site visits

Besides the media teams on-site, three visiting groups were scheduled for 04 + 05 + 06Feb2018 at the Base station. These were a) a group of ca 70 Omani students and selected reprsentatives of the Omani Astronomical Society, b) a group of PDO representatives and c) a group of dignitaries and official representatives. Each of them visited for 2-3 hours.

1. Registration at the Security Checkpoint
2. Welcome reception by the field crew
3. Introduction to AMADEE-18 in the dome by Dr. Groemer (15 min)
4. Base station tour (10 min), Donning and Helmet closure (15 min) – The guests can witness the final donning steps of the Aouda Spacesuit simulator.
5. Division into three groups (each station 25 min):
    a. Live-link to MSC and communication with the Analog Astronaut in the field via the Operations station – A live-link to the Mission Support Center in Austria will provide insights into the “Earth operations” of the AMADEE-18 Mars simulation. Furthermore, there will be the opportunity to talk to the Analog Astronaut during an extra vehicular activity.
    b. Experiment presentations in the Science Engineering room: Hortextreme (vertical farming), AVI-NAV (autonomous quadcopter), Husky rover and the Water Explorer experiment
    c. Ziesel rides and Q&A sessions - The VIPs can try out the Ziesel, an electronic all-terrain vehicle, and will have exclusive time to ask questions to an Analog Astronaut or Flight Director.
6. Group photo (10 min)
7. Traditional Austrian Snack and farewell (30 min)

13. Industrial Partners

13.1. OeWF Partners (Europe and US)

The following entities were official partners of AMADEE-18 on the OeWF side

SUPPORTED BY

Major partners

- T-Mobile (Austria): Communication partner on the MSC side, direct support
- Lancom (Germany): Communication partner for industrial-grade W-LAN in the field
- Mattro (Austria): Electromobility vehicles (provision of 2 “Ziesel” vehicles)
- DB Schenker (Austria): Shipping logistics and field containers
- Fortis-Uhren AG: direct support and donating AMADEE-18 branded watches
- European Space Agency, direct support for the Junior Researchers Program
- Land Tirol Kultur, direct support for the Junior Researchers Program

Development partners

- Manas Tech (Argentinia/USA): Software implementation of the geolocation for Aouda
- Skriware (Poland): High-end 3d Printers

Junior Partners

- Fair Rescue (Austria): Medical equipment & clothing
- Bindfix (Austria): Logistics material
- Traum und Wahnsinn (Austria): Film making company (Mission trailer)
- Medienfee.at (Austria): Professional voice recordings for video productions
- 360°Fly (USA): 4k 360° camera systems
- Tespak: Solar energy harvesting hardware
- ThorGroup GmbH (Germany/Switzerland): Media partner (Space Watch Middle East)
- TORGGLER & HOFINGER Patentanwälte, majore donation of MSC IT hardware

13.2. Omani Partners

The following industrial and institutional/governmental organisations were partners of the Omani National Steering ctte:

The Kepler Station infrastructure was provided in most parts by the Petroleum Development of Oman (PDO), including substantial logistics and security support of the Oman Ministry of Defense, in particular the Navy and the Air Force.

The tests site was closed off to the public within a perimeter of 5km from the Kepler Station.

The Austrian Space Forum would like to say both a formal and heartfelt thank you to the Oman National Steering Comittee and its industrial partners for enabling this mission and being a reliable and competent partner.

In addition, the Austrian Space Forum felt that both the industrial partners and the governmental organizations shared a similar culture of safety and professionalism.

14. Media Activities

The Austrian Space Forum's media team, consisting of experts to address traditional media as well as social media (Facebook, Twitter, Instagram, Youtube, Flickr) supported by its visuals team created a high visibility of the mission on an international level.

About 100 national, more than 300 international reports, over 20 million people reached on twitter, countless posts on Facebook, Instagram... 5 international TV Documentaries will follow on... that was our media performance during the last few weeks.

Press Kit

To provide media with easily accessible information a press kit containing information about AMADEE-18, Mars-simulations in general plus an overview and straightforward description of the specific experiments were compiled, then published in English, Arabic (short version) and German. Participating institutions distributed the press kit or used it as a blueprint to create media information in their own language. The bases for experiment descriptions were the PIs' abstracts, who also approved the contents prior to the release.

Press Releases and Media Day on Landing Day
On Landing Day, media representatives witnessed the isolation phase start at the Mission Support Center in Innsbruck/Austria, follow live communication with the test site and meet space experts during the press conference.

Available media ressources

- AMADEE-18 Press Kit
- Key visuals (both imagery, audio files as well as high-definition videos)
- Testimonials and interview opportunities upon request via the media team
- Upon request: AMADEE-18 mission badges (ca € 4,00/piece)

Milestones of the media campaign:

- **Until 30Jun2017:** Regular reminder of AO on Social Media
- **19Jul2017:** Press Release incl. Social Media coverage; announcing selected institutions/experiments and participating nations
- **08-10Sep2017:** Press conference at the Dress Rehearsal 1, Unveiling of Mission Badge - Social Media Coverage
- **30Oct2017:** Signing of Memorandum of Understanding between OeWF and Oman – Press Release in Oman; Mission-Trailer Release – Social Media
- **Nov2017 – End of Jan2018:** Social media coverage of preparations incl. DR 2 + 3
- **Bridgehead week:** Professional film crews filming on test site in Oman; Social Media coverage
- **08Feb2018: Landing Day:** Media Day and Press Conference at Mission Support Center in Innsbruck; Press Release, Intensive phase of Social Media Coverage starts
- **27Feb2018:** Mission ends: Press Release & Social Media Coverage
- **Ca. 04Mar2018:** Field Crew returns from Oman: Social Media Coverage
- **May 2018:** AMADEE-18 Science Conference: Press Release and Social Media Coverage

14.1. AMADEE-18 KEY MESSAGES

- AMADEE-18 moves us closer to understanding the scope of the biggest adventure of our generation: Exploring Mars!
- AMADEE-18 brings challenges for both technology and humans. We are paving the way for future human Mars missions.
- AMADEE-18 is the Austrian Space Forum's 12th Mars analog mission. We benefit from the insight and experience gained from our previous Mars Simulations.
  During AMADEE-18 the Austrian Space Forum will apply its world-class expertise in conducting high-fidelity Mars analog research.
- The highly trained AMADEE-18 field crew, analog astronauts and Mission Support Center will make their expertise and findings available to international partners.
- AMADEE-18 is an international and interdisciplinary analog mission involving more than 20 nations.
- AMADEE-18 is complemented by innovative education and outreach activities to inform and inspire the next generation of researchers and the general public for future human missions to Mars.
- The Austrian Space Forum is the only organization in Europe – and one of only four worldwide – to develop spacesuit technology for human Mars missions.
- The Sultanate of Oman is a valuable and highly supportive partner of the AMADEE-18 mission. The desert of Dhofar provides the perfect test area for emulating a mission to the extreme living conditions found on Mars.

14.2. Social Media

The AMADEE-18 Social Media strategy was complementary to the OeWF Social Media with focus on Mars analog research:

Our social media strategy aimed to **reach** more people, to **raise awareness** about the OeWF and its expertise in Mars analog simulations to **increase brand reputation**. We **generated enthusiasm** towards the idea of **paving the way for the first human Mars mission**, while **informing and making people understand** that Mars analog research is the best way to prepare for a real Mars mission. At the same time, it conveyed **the professionalism & expertise** of the team and present its scientific and technological **achievements**.

To fulfill our mission statement and goals we developed a compelling and easy to communicate story:

More science. Greater fidelity. Closer to Mars.

All AMADEE-18 social media activities focused to tell this story.

AMADEE-18 Hashtags: #AMADEE18, #simulateMars
Main OeWF social media channels: Facebook: spaceforum | Twitter: @oewf | YouTube: oewf | Instagram: oewf_org | Flickr: oewf | Website: oewf.org

Highlights of our Social Media campaign:

- Feature on analog astronauts (short videos), Timeframe: Jan 2018 – Feb 2018
- Feature on science experiments (incl. short videos from PI's). Timeframe: Feb 2018
- Picture of the Day, Timeframe: Feb 2018
- Livestream "Last night on Earth" from field on 07 Feb 2018
- Livestream from Mission Support Center on 15 Feb 2018
- Live-Tweeting during AMADEE-18 mission, Timeframe: Feb2018

14.3. Numbers/Stats

Homepage: A total of nine articles were published during mission (counting only one language). These consisted of two press releases (landing day and end of mission), 4 news update ("Preparation week: From Oman to Innsbruck", "First days of Isolation phase", "Landing Day" and "Busy days on Mas (and Earth)",), 1 update on expedition outlets lectures and two picture of the day articles (one for the preparation phase and one for the isolation phase; these were updated every day). If you would count every picture of the day as individual article this would have been additional 28 articles. This is comparable to the AMADEE-15 mission, were in 2015 a total of seven articles were published. But the AMADEE-15 mission was shorter (14 days). This can be explained, that our social media strategy focusses on using the social media channels itself as content producer not the oewf.org homepage and that we had less MediaCom's during AMADEE-18 (only one person on duty per day).

According to Google Analytics (*Timeframe: 01Feb – 10Mar2018, comparison timeframe 25Dec2017 – 31Jan2018)* we still have an impact in increasing website traffic during a Mars simulation. We could increase Visitors +75.05%, New visitors +78.33% and Pageviews +99.27%. Compared to the same timeframe in 2017 (01Feb-10Mar2017) we even have a +370.03% visitors, +385.18% and +364.51% pageviews.

- The most popular days were as usual the Landing Day on 8Feb2018, followed by 12Mar2018. Most traffic on 8Feb2018 came via 1. Google/organic (37.83% of all traffic), 2. Direct (+20.54% of all traffic), 3. Science.orf.at /referral (+17.45% of all traffic)
- Country wise our **Top 5 visitors** came from 1. Austria (29.60%), 2. Germany (11.61%), 3. Oman (11.37%), 4. Italy (7.30%) and 5. United States (6.62%). During the mission we had a significant increase in non-Austrian visitors. The Top 5 in the comparison timeframe are: 1. Austria (64.82%), 2. Germany (7.87%), 3. United States (4.35%), 4. Italy (2.80%), 5. United Kingdom (2.72%)
- The top accessed pages (excluding English and German start page) was the AMADEE-18 portfolio page (http://oewf.org/en/portfolio/amadee-18/) in English & German followed by the AMADEE-18 live page (http://oewf.org/en/amadee18-live/), the analog astronaut page (http://oewf.org/en/about-the-oewf/oewf-analog-astronauts/) and the picture of the day page (http://oewf.org/en/2018/02/amadee-18-picture-of-the-day/). The acquisition from social media channels increased also during the mission +49.13% via Facebook, +389.58% via

Twitter and +255.56% in Instagram (but still on a very low level. This is due to Instagram policy that you can't click on links in posts.). Acquisition via organic search (44.8%) & direct access (31.7% -> this channel increased during mission the most +138.31% to the comparison timeframe) is still more relevant than via social media (10.6%). Organic and direct access can be directly related to our outreach & media activities and increase in brand reputation. According to the Google search console we increased the google search impressions with following keywords "öwf", "Österreichisches Weltraum forum", "oewf", "Österreichisches weltraumforum" by +64% (same comparison timeframe as for google analytics used)

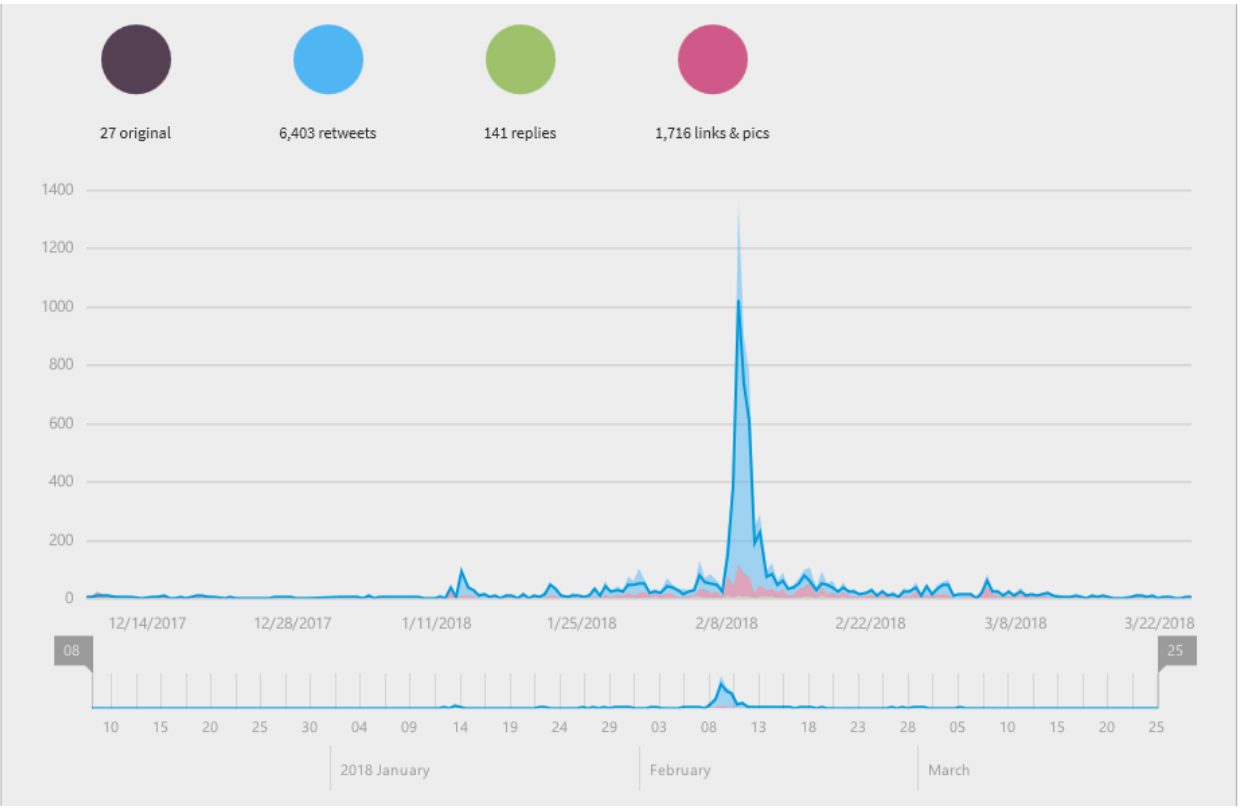
Twitter:
To track the performance of our hashtags #simulateMars and #AMADEE18 we used Tweetbinder as provider (http://twtb.in/BHRzNcm1ZL6). The Twitter performance of the AMADEE-18 mission was extraordinary and by far the best outreach we've ever had on Twitter.
Timeframe: 8Dec2017 3:42:44 PM until 25Mar2018 3:08:29 PM

- **8,195 tweets**
- **44,775,172 Potential impacts** (the potential numbers of times somebody could have seen the hashtag)
- **20,624,855 Potential reach** (the number of unique users(people) that could have seen the hashtag)

In comparison to **World Space Week 2013** and Hashtag #wsw2013 had between 14Sep – 14Oct2013 had **6,622** tweets with **19,825,473** impressions (equal to potential impacts) and **4,907,994** reach (equal to potential reach). Or AMADEE-15 (timeframe 01Aug – 14Aug): **942** Tweets were delivered to **2,450,288** timelines (equal to potential impacts) and had **1,173,935** reach (equal to potential reach)

The day with most activity was Friday 9Feb2018 with over 1,000 retweets. This can be related that after the press releases on 8Feb2018 the #simulateMars picked up pace and in Arabic countries Friday is a holiday (like Sunday) and many people were interested in that topic. There was an Arabic hashtag created which got trending topic in Oman on 9Feb2018 which pushed also the #simulateMars hashtag.

The extremely high reach is related that press agency like AFP and AP and the Arabic media published a lot of content on social media as well as the account @Arabic_NASA was promoting the AMADEE-18 mission on its channel (see most popular graphics)



Tweetbinder Timeline overview

Hashtags wise our primary hashtag #simulateMars was most of the time used: 8,107 out of 8,195 tweets, the secondary hashtag #AMADEE18 was used in 3,947 out of 8,195 tweets)

Top 10 languages

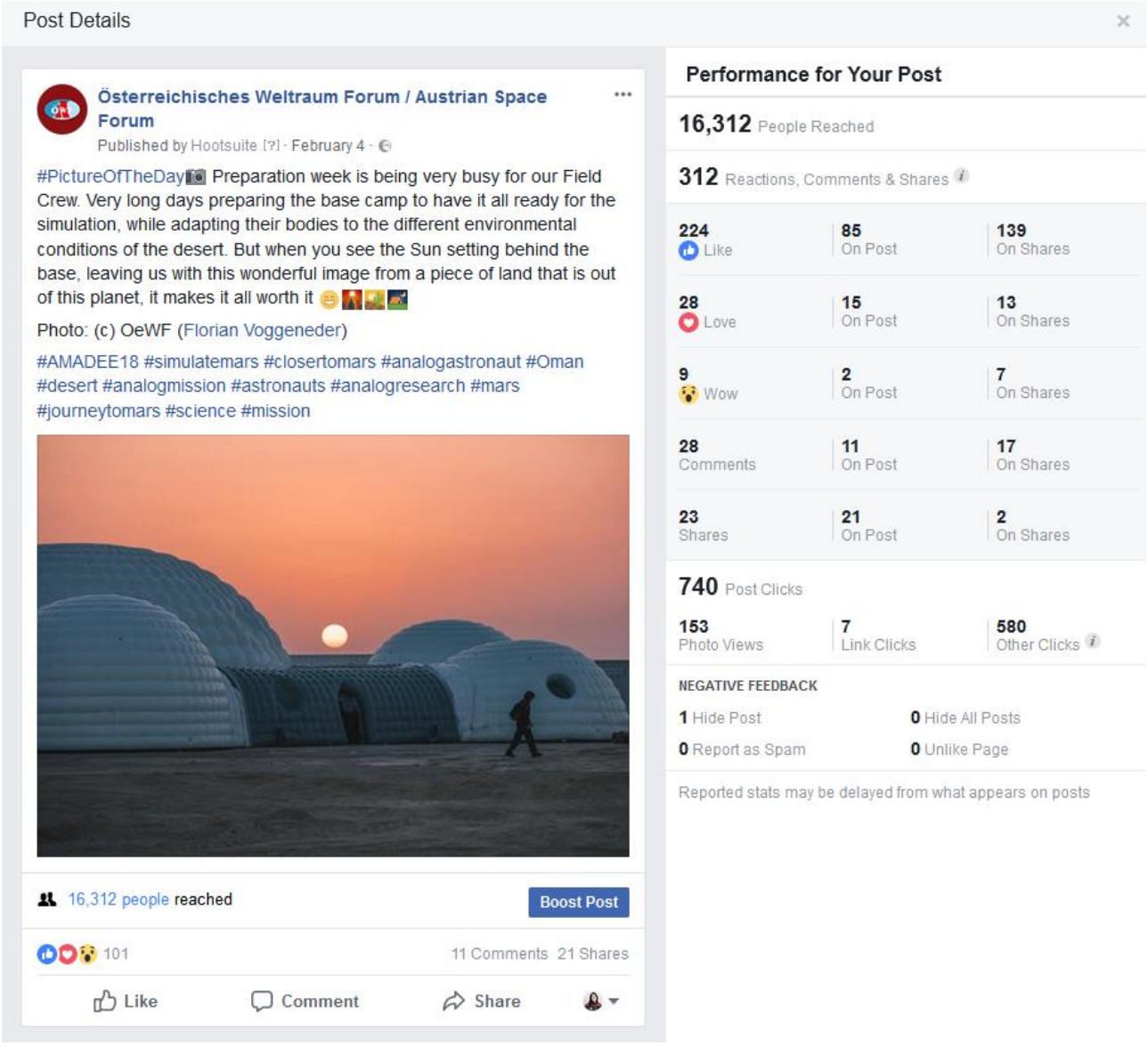
Language	Tweets
Arabic	4,050
English	3,355
Undetermined	348
German	188
Italian	115
Spanish	58
French	34
Portuguese	20
Hebrew	17
Japanese	3

Facebook and Instagram performance:
This cannot be directly compared to Twitter as they only include posts by the Austrian Space Forum and focus on the mission timeline. Timeframe 01Feb – 09Mar2018

	Facebook	**Instagram (without stories)**
Posts	71	133
Engagement (Likes / Comments / Shares)	5.1K 4.4k / 296 / 413	6K 5.9K / 115
Post Reach	127,214	Not available
Post impressions	204,254	Not available

Engagement does work better on Instagram. In total the Instagram pots got more likes and had a better engagement rate than on Facebook. This is remarkable as our Instagram account has only around 500 followers.

Best performing post on Facebook:



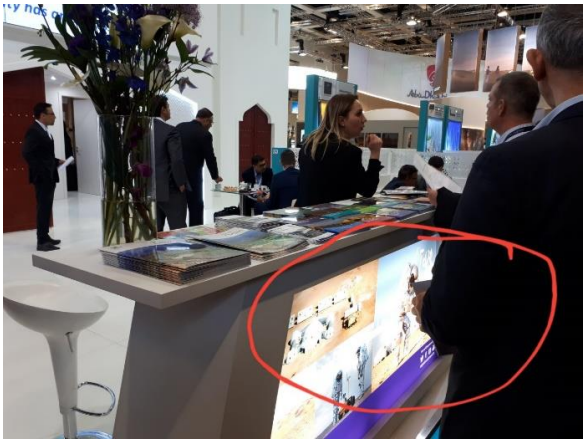
Media Team
Lead: Monika Fischer monika.fischer@oewf.org +43 699 1213 4610
(Deputy: reinhard.tlustos@oewf.org +43 699 8130 4844)

Team Lead OeWF Visuals: Sarah Feilmayer

Social Media team lead: Olivia Haider
olivia.haider@oewf.org

14.4. Complementary Outreach and Media activities

During the ITB (International Tourism Board) conference in Berlin, one of the largest tourism conferences in the world, Oman was voted as “Destination of the year 2018”. Their booth also included a presentation of the AMADEE-18-mission.



14.5. National Media review (Best of)

16. Februar 2018

- **Futurezone.at, So sieht es im Kontrollraum einer Mars-Mission aus,** online

futurezone

SCIENCE 16.02.2018

So sieht es im Kontrollraum einer Mars-Mission aus

©ÖWF/ Katja Zanella-Kux

Das Österreichische Weltraumforum simuliert eine bemannte Marsmission im Oman. Wir haben das Mission Support Center in Innsbruck besucht.

Im Februar 2018 wird die Wüste des Oman für ein internationales Forschungsprojekt unter österreichischer Führung zum Mars. Im Projekt AMADEE-18 des ÖWF wird eine bemannte Marsmission zum roten Planeten simuliert. Analog zu echten Raumfahrern bewegt sich ein Team von so genannten Analog-Astronauten in Raumanzügen durch die Wüste, um Experimente von internationalen Universitäten und Raumfahrtunternehmen durchzuführen und das Zusammenleben einer kleinen Raumfahrerkolonie zu testen. Unterstützt wird das Team im Oman von Innsbruck aus. Dort befindet sich das Mission Support Center von AMADEE-18. Wir waren zu Besuch.

Am 8. Februar fand der "Landing Day" des Projektes statt. An diesem Tag begann die Simulation der

09. Februar 2018

- **Der Standard, Österreichische Marsforscher testen in Omans Wüste,** online

derStandard.de 19 Postings

PROBELAUF

Österreichische Marsforscher testen in Omans Wüste

Die Marssimulation Amadee-18 des Österreichischen Weltraumforums findet heuer in Oman statt

9. Februar 2018, 09:00 19 Postings

Maskat/Innsbruck – "Sand, Sand, Sand", beschreibt Gernot Grömer seinen Ausblick durch die Fenster der Kontrollstation. "Nur auf einer Seite erhebt sich eine 'inflatable structure', ein aufblasbares Zelt in der Größe von 50 mal 50 Metern." Es ist die Basisstation, in der in Kürze Wissenschafter mit Marsforschern im Außeneinsatz, mit Roboterautos und anderen Instrumenten draußen im Wüstensand kommunizieren werden.

Die Szene, die der Direktor des Österreichischen Weltraum-Forums (ÖWF) beschreibt, liegt tief in der Wüste von Dhofar im Sultanat Oman. Mit dem "Landing Day" beginnt am 8. Februar offiziell die zwölfte Marssimulation des ÖWF, Amadee-18. Sie wird die unwirtliche Umgebung hier am südlichen Ende der arabischen Halbinsel in die unwirtliche Umgebung unseres Nachbarplaneten verwandeln, um wissenschaftliche Experimente, neuartige Raumfahrttechnologien sowie Prozesse einer bemannten interplanetaren Mission zu erproben. Und natürlich geht es darum, Begeisterung für die Erforschung des Mars, "eines der größten Abenteuer unserer

Analogastronauten bei der Arbeit: Wie zuvor schon bei einer Simulation in Marokko schlagen die Wissenschafter heuer ihre aufblasbaren Zelte in der Wüste des Sultanats Oman auf. In der unwirtlichen Umgebung, die den Bedingungen auf dem Mars ähnlich sein soll, werden Experimente, Technologien und Prozesse erprobt.

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- **Tiroler Tageszeitung, Jetzt im Oman, später am Mars: Mission des ÖWF hat begonnen,** online

ÜBERBLICK TIROL POLITIK WIRTSCHAFT PANORAMA SPORT LEBENSART TT CLUB IMMO JOBS MOTOR MEINS.AT SERVICE

Letztes Update am Fr, 09.02.2018 06:54 TT / Tiroler Tageszeitung Onlineausgabe

RAUMFAHRT

Jetzt im Oman, später am Mars: Mission des ÖWF hat begonnen

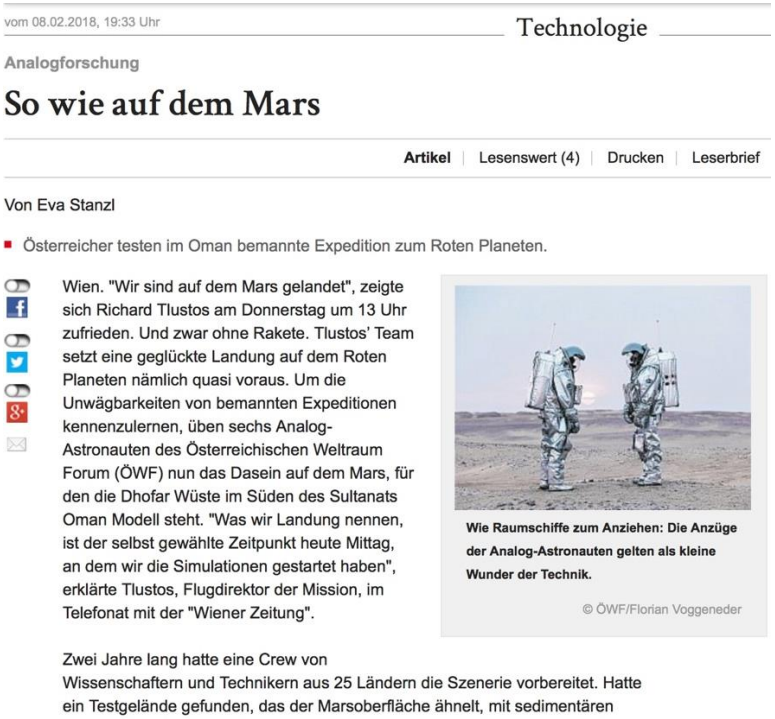
„Macht uns stolz während eures Aufenthalts am Mars" – Mit dem für Weltraumabenteuer üblichen Pathos startete gestern die Simulation des Österreichischen Weltraum Forums in einer Wüste im Oman.

ARTIKEL DISKUSSION

Analog-Astronauten Kartik Kumar und Stefan Dobrovolny. © APA/ÖWF/FLORIAN VOGGENEDER

08. Februar 2018

- **Wiener Zeitung, So wie auf dem Mars,** online



vom 08.02.2018, 19:33 Uhr

Technologie

Analogforschung

So wie auf dem Mars

Artikel | Lesenswert (4) | Drucken | Leserbrief

Von Eva Stanzl

Österreicher testen im Oman bemannte Expedition zum Roten Planeten.

Wien. "Wir sind auf dem Mars gelandet", zeigte sich Richard Tlustos am Donnerstag um 13 Uhr zufrieden. Und zwar ohne Rakete. Tlustos' Team setzt eine geglückte Landung auf dem Roten Planeten nämlich quasi voraus. Um die Unwägbarkeiten von bemannten Expeditionen kennenzulernen, üben sechs Analog-Astronauten des Österreichischen Weltraum Forum (ÖWF) nun das Dasein auf dem Mars, für den die Dhofar Wüste im Süden des Sultanats Oman Modell steht. "Was wir Landung nennen, ist der selbst gewählte Zeitpunkt heute Mittag, an dem wir die Simulationen gestartet haben", erklärte Tlustos, Flugdirektor der Mission, im Telefonat mit der "Wiener Zeitung".

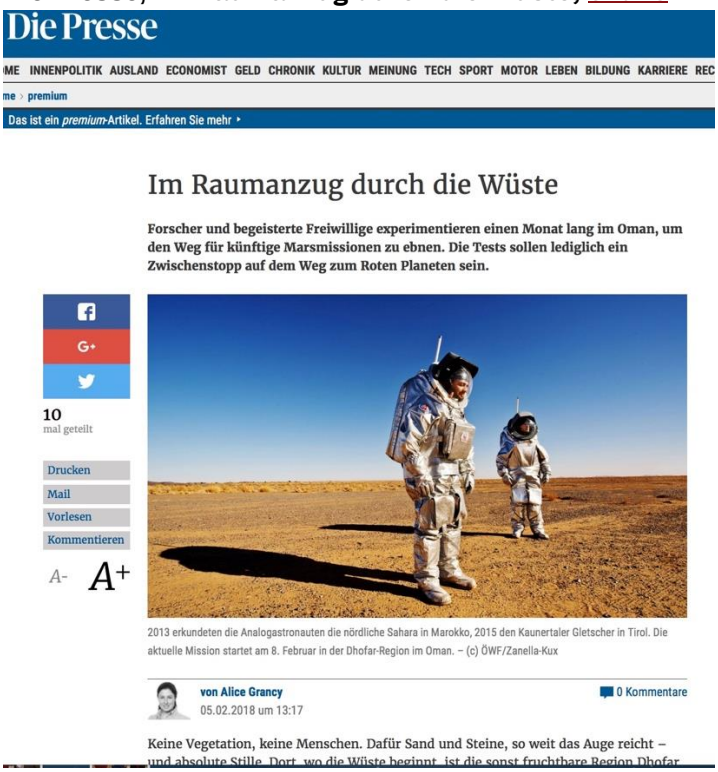
Wie Raumschiffe zum Anziehen: Die Anzüge der Analog-Astronauten gelten als kleine Wunder der Technik.

© ÖWF/Florian Voggeneder

Zwei Jahre lang hatte eine Crew von Wissenschaftern und Technikern aus 25 Ländern die Szenerie vorbereitet. Hatte ein Testgelände gefunden, das der Marsoberfläche ähnelt, mit sedimentären

05. Februar 2018

- **Die Presse, Im Raumanzug durch die Wüste,** online + Print



Die Presse

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Im Raumanzug durch die Wüste

Forscher und begeisterte Freiwillige experimentieren einen Monat lang im Oman, um den Weg für künftige Marsmissionen zu ebnen. Die Tests sollen lediglich ein Zwischenstopp auf dem Weg zum Roten Planeten sein.

10
mal geteilt

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2013 erkundeten die Analogastronauten die nördliche Sahara in Marokko, 2015 den Kaunertaler Gletscher in Tirol. Die aktuelle Mission startet am 8. Februar in der Dhofar-Region im Oman. – (c) ÖWF/Zanella-Kux

von Alice Grancy
05.02.2018 um 13:17

0 Kommentare

Keine Vegetation, keine Menschen. Dafür Sand und Steine, so weit das Auge reicht – und absolute Stille. Dort, wo die Wüste beginnt, ist die sonst fruchtbare Region Dhofar

14.6. AMADEE-18 TV – national (best of)

09. Februar 2018

- **ZIB 24, Innsbruck kontrolliert Mars-Simulation, TV Beitrag 00.00 Uhr**
- **ZIB 24, Weltraumexperte Frischauf über die Mars-Simulation, TV Beitrag 00.00 Uhr**

ZIB 24 Fr, 09.02.2018 00.00 Uhr 20:55 Min. Noch 6 Tage verfügbar

HD ORF eins

ORF.AT

NORBERT FRISCHAUF
ÖSTERREICHISCHES WELTRAUM FORUM

08:36 | 20:55

Weltraumexperte Frischauf über die Mars-Simulation | 04:53 Min.
In rund 20 Jahren könnten Menschen auf dem Mars landen. Norbert Frischauf vom Österreichischen Weltraumforum erläutert den Zweck der Simulation einer Mars-Mission in der Wüste des Oman.

> abspielen > Beitrag versenden / teilen

Meldungen | 02:03 Min.

Reportage vom Opernball | 02:48 Min.

Omar Souleyman in Wien | 02:20 Min.

- **ORF Guten Morgen Österreich, Österreich beteiligt an Mars-Mission, TV Beitrag 7.35 Uhr**

08. Februar 2018

- **ORF, Tirol heute, Mars-Mission: Kontrollzentrum in Innsbruck, TV Beitrag 19.00 Uhr**

- **ZIB 1 (ÖGS), Innsbruck kontrolliert Mars-Simulation, TV Beitrag 19.30 Uhr**
- **ZIB 1, Innsbruck kontrolliert Mars-Simulation, TV Beitrag 19.30 Uhr**
- **ZIB Flash, Innsbruck kontrolliert Mars-Simulation, TV Beitrag 22.25 Uhr**
- **ZIB 20, Österreichisches Weltraum Forum simuliert Marsaufenthalt, TV Beitrag 20.00 Uhr**

07. Februar 2018

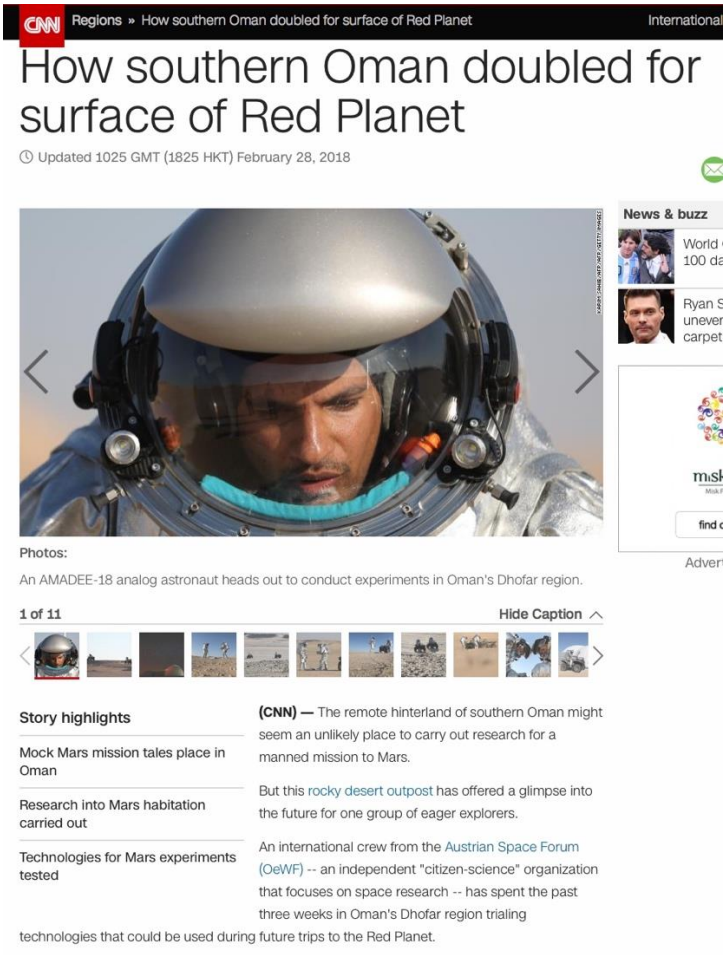
- **Puls4.com, Nach Tesla-Auto: Wann fliegen wir zum Mars?, TV Beitrag,** online
- ORF, Guten Morgen Österreich, **Mission zum Mars – Was kann das bringen?,** Beiträge um 6.35 Uhr, 7.35 Uhr, 8.35 Uhr und 17.30 Uhu

- ORF Oberösterreich heute, **Marsmission mit österreichischer Beteiligung**, TV Beitrag 19.00 Uhr

14.7. Media international (best of)

February 28th, 2018

- Edition.cnn.com, **How southern Oman doubled for surface of Red Planet**, online

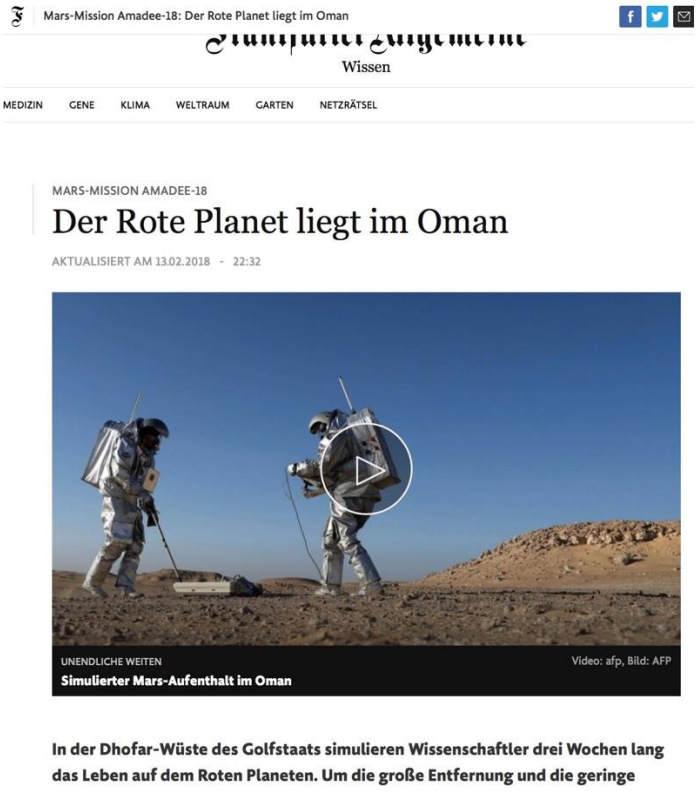


February 15th, 2018

- Issuu.com (Times of Oman), **MARS MISSION IN OMAN**, Print cover + page 8-11, online

February 13th, 2018

- Frankfurter Allgemeine**, Der Rote Planet liegt im Oman,** online


Mars-Mission Amadee-18: Der Rote Planet liegt im Oman

Wissen

MEDIZIN GENE KLIMA WELTRAUM GARTEN NETZRÄTSEL

MARS-MISSION AMADEE-18

Der Rote Planet liegt im Oman

AKTUALISIERT AM 13.02.2018 - 22:32

UNENDLICHE WEITEN Video: afp, Bild: AFP

Simulierter Mars-Aufenthalt im Oman

In der Dhofar-Wüste des Golfstaats simulieren Wissenschaftler drei Wochen lang das Leben auf dem Roten Planeten. Um die große Entfernung und die geringe

February 11th, 2018

- The Jordan Times, **In Oman desert, European venture sets sights on Mars,** online


THE JORDAN TIMES

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Home » Region » In Oman desert, European venture sets sights on Mars

In Oman desert, European venture sets sights on Mars

By AFP - Feb 11,2018 - Last updated at Feb 11,2018

DHOFAR, Oman — Would-be astronauts in aluminium-coated suits venture out in rovers from a sprawling camp in Oman's barren desert: a simulation by a European venture aiming to one day help humans survive on Mars.

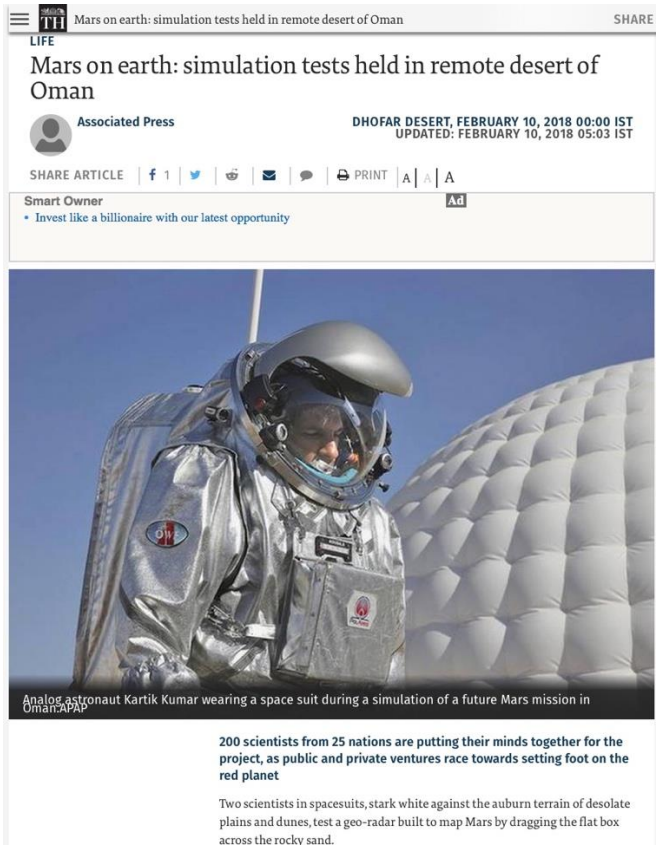
Behind a barbed wire fence protected by soldiers from the Gulf sultanate, researchers in prefab facilities work away on experiments that include trying to grow vegetables in inhospitable terrain chosen for its resemblance to the red planet.

Run by the Austrian Space Forum, a mainly volunteer collective, with the backing of the Omani government, the AMADEE-18 Mars Analog Mission has brought together researchers, inventors, space professionals and

Members of the AMADEE-18 Mars simulation mission wear spacesuits while conducting scientific experiments during an analog field simulation in Oman's Dhofar Desert, on Wednesday, in a collaboration between the Austrian Space Forum and the Oman National Steering Comittee preparing for future human Mars missions (AFP photo)

February 10th, 2018

- The Hindu, **Mars on earth: simulation tests held in remote desert of Oman**, online



Mars on earth: simulation tests held in remote desert of Oman SHARE

LIFE

Mars on earth: simulation tests held in remote desert of Oman

Associated Press

DHOFAR DESERT, FEBRUARY 10, 2018 00:00 IST
UPDATED: FEBRUARY 10, 2018 05:03 IST

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Analog astronaut Kartik Kumar wearing a space suit during a simulation of a future Mars mission in Oman. AFAP

200 scientists from 25 nations are putting their minds together for the project, as public and private ventures race towards setting foot on the red planet

Two scientists in spacesuits, stark white against the auburn terrain of desolate plains and dunes, test a geo-radar built to map Mars by dragging the flat box across the rocky sand.

February 9th, 2018

- Ziv.ru, **В пустыню Омана прибыли будущие колонизаторы Марса**, online

ZIV
ВАШ ЭЛЕКТРОННЫЙ ЖУРНАЛ

Главная | Общество | Политика | Экономика | Наука | Технологии | Здоровье | Культура

В пустыню Омана прибыли будущие колонизаторы Марса

Главная > Наука > 09 февраля 2018 16:03 Комментариев: 0

SEE, UNDERSTAND, AND

На юго-востоке султаната Оман был возведен испытательный полигон для проведения наземного моделирования жизни на Марсе. Такая информация

- ZDF.de, **Feldversuch für bemannte Mission - Mars-Test in Omans Wüste,** online

heute

Feldversuch für bemannte Mission

Mars-Test in Omans Wüste

09.02.2018 09:09 Uhr

Das Rennen zum Mars ist in vollem Gange. Wissenschaftler testen in marsähnlicher Umgebung - in einer Wüste im Oman. Ein Besuch beim "Mars-Zar" und anderen Pionieren.

February 8th, 2018

- Chicago Tribune, **Mars on Earth: Scientists in spacesuits conduct simulation tests in Oman desert**, online

Chicago Tribune

SEARCH

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Mars on Earth: Scientists in spacesuits conduct simulation tests in Oman desert

Two scientists test space suits and a geo-radar for use in a future Mars mission in the Dhofar desert of southern Oman. The desolate desert in southern Oman resembles Mars so much that more than 200 scientists from 25 nations are using it for the next four weeks to field-test technology for a manned mission to Mars. (Sam McNeil / AP)

By Samuel McNeil
Associated Press

FEBRUARY 8, 2018, 3:50 PM | DHOFAR DESERT, OMAN

Two scientists in spacesuits, stark white against the auburn terrain of desolate plains and dunes, test a geo-radar built to map Mars by dragging the flat box across the rocky sand.

- Washington Post, **Mars on Earth: Simulation tests in remote desert of Oman,** online

- Washington Post, Gallery: **A look at Mars on Earth,** online

- Watson.ch, **Nicht nur Elon Musk will auf den Mars, auch die Österreicher trainieren bereits dafür**, online

14.8. Best of AMADEE-18 in TV

March 1st, 2018

- CGTN, **Exploration of Mars: Testing carried out in desert, preparing for life on Mars**, online

February 26th, 2018

- Pro 7, Galileo, **Die simulierte Mars-Mission: So könnte die Zukunft aussehen!** TV Beitrag

February 22nd, 2018

- Rtlnieuws.nl, **Oefenen voor Mars in de woestijn: 'Dit pak aandoen kost al twee uur'**, TV Beitrag und online

February 9th, 2018

- DW Türkce, Umman'ın çöllerinde Mars şehri kuruldu, online

February 5th, 2018

- Oman, ubc, TV, **ظفار بمحافظة مرمول صحراء في المريخ كوكب على العيش لمحاكاة العالمية التجارب بدء**, online + online

The AMADEE-18 mission was organized by the Austrian Space Forum in partnership with institutions from 25 nations.

The AMADEE-18 mission patch was designed by Sarah Feilmayr, OeWF Media Team/Visuals. It symbolizes a typical Arabic ornamental pattern. The nodal points of the black lines stand for the multidisciplinarity of the experiments, whilst the orange hues are a symbol of a desert sunset. Under the motto "**Two worlds. One sun**.", the AMADEE-18 mission patch also stands for the sun as a common feature explorers will see on both Earth and Mars.

The official motto of the AMADEE-18 mission is:
"More Science. Greater Fidelity. Closer to Mars."

#SIMULATEMARS

About the Austrian Space Forum

AUSTRIAN SPACE FORUM

The Austrian Space Forum (Österreichisches Weltraum Forum, OeWF) is a national network for aerospace engineers, scientists and people with a passion for space.

The citizen-science organization is involved in cutting-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.

www.oewf.org

amadee18.oewf.org