AMADEE-20
GEOS Experiments

Austrian Space Forum (OeWF)

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The AMADEE-20 Mars Simulation

• WHERE?
  ✓ Ramon Crater, Negev Desert, Israel

• WHEN?
  ✓ 15 October - 15 November 2020

• AIMS
  ✓ Studying equipment behavior, e.g. robotic tools, instrument deployment
  ✓ Testing life-detection or geoscientific techniques
  ✓ Evolving “Know-how” on crewed planetary missions
GEOS (Geology Experiments)

- Is an internal experiment of OeWF
- Has been coordinated by the geoscientist group from RSS* team of OeWF together with RSS team lead
- Aims
  - to perform “REAL” field geology within the simulated Mars mission
  - to identify geochemical conditions
  - to enlighten the geological history of the area
  - to discover “HOW to TRANSFER” the analog mission skill set to the planetary missions
  - to find traces of life

Divided into 4 sub-experiments:

- Geo-mapping
- Geo-sampling
- Geo-compare
- Geo-micrometeorite

*RSS: Remote Science Support
Be aware of GEOs

- We maintain an **artificial blinding** of the geoscience team: Limited information about the test site!

- Analog astronauts (AAs) are **not geoscientists**
  - They had approx. 3 days theoretical geo-training and 2 days field geo-training containing:
  - They will have 3 more hours procedure-training before the mission during the Dress Rehearsals

*Sometimes it can be a little bit complicated...!*
Try to find a meaning for this rock piece!

The KEY is in our hand!

HMMMMM ......??!
Geo-mapping

Rock-color-map

Legend
Map boundaries 5 x 5 km
Base Station
tectonics Main road
Trail Path Bike trail
ROI (Region of Interest)
rock color map
1 yellow
2 beige to dark grey
3 black
3a bright blue
4 bright beige
5 brown grey shaded
6 red
7 white
8 white beige
9 dark red
10 grey

Map source: Google Maps, 2020

Pre-mission Post mission

created by Markus Eder (RSS-GEOS)

Image Credit: OeWF
Geo-mapping

Pre-mission phase
✓ Worked on satellite images
✓ Defined 10 different formations (1-10) ca. 5 km around the base station
✓ Defined 4 ROI (Region of Interest) (A-D)

Mission phase
✓ The map will be improved by AAs’ field work as well as with the support of drone-rover experiments
✓ Major geological structures will be identified

Post-Mission phase
✓ Geomap with at least 4 profile sections per ROI will be finalized
✓ The 3D model will be produced
✓ The map produced by AAs and a geologist will be compared
✓ Lessons learned
Geo-sampling

AIMS

✓ The samples speak for the formations
✓ To get better geological understanding and the geological history of the area
✓ Improve the AAs** usage of field work equipment (e.g. hammer, sampling bags, magnet, loupe…) and define the pros and cons of the astronaut suit
✓ Compare

Pre-mission phase
✓ All equipment are provided
✓ AAs were trained in geo-sampling methods and procedures

Mission phase
✓ Each POI* is a sampling location which will be handed to AAs by PIs after drone and rover missions during bridge head phase
✓ Representative samples will be collected according to procedures
✓ required pre-lab will be performed at the base

Post-mission phase
✓ Suitable samples will be picked by PIs and will be sent to respective laboratories for petrographic and geochemical investigations

*Point of Interest
**Analogue Astronauts

Image Credits: OeWF
Micrometeorite

Pre-mission phase
✓ All equipment are provided
✓ AAs are trained on methods and procedures

Mission phase
✓ Each POI* is a sampling location which will be handed to AAs by PIs after drone and rover missions during bridge head phase,
✓ Representative samples will be collected according to procedures
✓ One group of samples will be taken (swiped) from: the roof and the walls of the base, drone, rover and other chosen suitable experiment tools.
✓ The other group of sand samples will be collected from chosen sedimentary accumulation areas
✓ required pre-lab methods will be performed at the base (e.g. magnetic separation, size fraction separation)

Post-mission phase
✓ Eliminated particles picked by the PI and will be sent to respective laboratories for petrographic and geochemical investigations

AIMS
✓ Try to find traces of other planetary bodies
✓ Improve the AAs** sampling skills of sand and dust

Geo-Compare aims

✓ To compare spatial information acquisition strategies between people with different level of expertise by using thematical/geological maps and the natural environment

✓ Mobile eye tracker

✓ To obtain how to develop training skills as well as training programs to both analog and space astronauts
GEOS
Team