

Commander Report
Mars Log 03.27.2015
Susan Jewell MD

Hello Earthlings,

Nearing the end of this Mars mission and I can honestly say it has been the best experience I have had so far. If I had to choose three words to describe Crew151, Innovative Emerging Space Leaders, they will have to be: imaginative, illuminating and definitely innovative!

For a team of four crew members, reduced to three last week, running the MDRS station with organized efficiency, harmony and creative fun was surprisingly easy and smooth. The past two weeks we have managed to successfully achieve all our objectives and goals. Here is an overview of the projects completed:

- **TELESURGERY TRAINING STUDY INTEGRATING INNOVATIVE TECHNOLOGIES, EEG DEVICES AND 3D PRINTED SURGICAL TOOLS.** This is an ongoing study with previous, current and up-coming crews at MDRS. We successfully completed the testing during this mission using the surgery training videos, the Optinvent glasses/ Google VR goggles, the EEG head devices, and 3D printed surgical tools during several testing sessions.

-**YOGA AND MINDFULNESS MEDITATION AS COUNTERMEASURES FOR MAINTAINING HEALTH AND WELLBEING FOR ASTRONAUTS.** This is an on-going quantitative study with previous, current and future crews at MDRS. We completed the testing and integration of the VR goggles, incorporating EEG head devices during the yoga and meditation sessions.

- **MEDICAL EVA, MEVA**

We successfully integrated the drone/UAV equipped with onboard camera into several Search and Rescue procedures for terrain scouting and localization of the injury site to rescue and save "Igor" the dummy astronaut. Additionally, we tested the "cliff rescue" procedure and used the backboard stretcher attached to the ATVS for recovery and evacuation of the injured "Igor" astronaut back to the Hab. The crew successfully performed basic medical triage during the simulations.

- **LOCARD (Localization and Radio Relay Drone)**

LOCARD is a three-year-long project studying the feasibility (both operational and technical) of a quadricopter UAV in Mars extreme conditions. This first year the study focused on the operational feasibility and aimed to produce proof of concept for two different uses of a quadricopter UAV on Mars: Localization and Communication relay. The UAV was raised in the sky and the live video transmission and the ability of LOCARD to rotate 360° stationary allowed the astronaut to find the HAB that could not be seen from a human height because of the relief. The localization ability of the UAV was also tested during a medical EVA where the rescue team managed to find an injured astronaut (mannequin) that had fallen from a cliff. We tested the LOCARD as communication relay. The experience was successful and with the repeater the wifi range was increased of 60%. The range could have been increased even more if the battery of the UAV could provide more power to the wifi antenna without hurting the flight abilities of the UAV.

- **CLIFF RECONNAISSANCE VEHICLE/THINGZ MODULE**

During the first EVA, the crewmembers tested the direct video transmission as well as the Thingz module. They also got used to the operations needed to let the CRV down the cliff and monitor the video at the same time. One EVA was needed to scout the locations proposed by Planète Mars and try and find an efficient and rapid way to tie the vehicle at the back of an ATV. Finally, the crew successfully conducted the experiment on a particularly interesting cliff with strata on the north side of Candor Chasma Canyon, 30 minutes from the Hab. Every piece of equipment worked well and the only difficulty was to retrieve the CRV and bring it back at the top of the cliff. The crewmembers also thought about modernizations and improvements that could be brought to this fascinating, battle proven Cliff Reconnaissance Vehicle.

- **EYEWEAR USER INTERFACE FOR MARSNAUTS**

The experiment consisted in testing the added value of virtual reality glasses in the context of space exploration and extravehicular activities. The AR Glasses, by a French company called Optinvent, supports the Android platform so we combined existing apps to provide the Marsnauts with the features needed during an EVA and IVA(inside the Hab):

- Display of Engineering Check Procedures

- audio/video recording have been tested.
- Chrono/Time left before end of EVA (simulated O2 reserve status)
- A wifi camera connected to the glasses was test
- Use of the glasses during telesurgery training simulation

- Astronomy Observation

Several observations were conducted during the mission and it was an opportunity to learn how to use the MUSK telescope, enjoy the night sky and ponder on the vast blackness of the Universe. The study of the feasibility of a low cost "Atmosphere Opacity Monitoring System" using the equipment of the Observatory for next year was successful.

- CREATIVE SPACE ARTISTIC PROJECT: "Les Temps Phantômes"

Each night, the crew watched a surprise video prepared by a French Artist. LUDWIG, on the different Universe. The next day we incorporated into our daily schedule an artistic creation (eg, video, photo montage) on this topic. The Universes given were "slowness", "blue", "archipelago", "phantoms", "garden", "speed" and "atmosphere". The crew team enjoyed the creative activities which increased crew bonding and cohesion. It also helped to reduce stress and anxiety. The project will be featured in several art galleries and presented at conferences in Europe next year.

- ROTATING COMMANDERSHIP CONCEPT, RCC: Leadership during Isolation and confinement in Extreme Environments. A White Paper

Crew 151 conducted a new approach to leadership. This rotating commandership is a great opportunity to look at other crew member style of leadership. It was a very successful experience for the team.. We worked about 1h every day on the paper. The first draft is written and we will plan to publish the final paper in a peer-reviewed journal,

A detailed Final Mission Report will be post on the Mars Society and MDRS website.

So new the crew is preparing to launch from Mars at midnight tonight and will hopefully land safely back on terraforma Earth tomorrow morning. This is our last night on beautiful Mars. We are looking out the Hab's porthole and gazing at the myriad of brilliant shining "jewels"....the magnificence of it all!!!

Until the next time...and thank you for following our Martian journey.

This is just a temporary "goodnight"

Ad Astra.

Susan

Commander Crew 151

Innovative Emerging Space Leaders

EVA Report

EVA#10

Crew members: Mehdi Scoubeau (EVA leader) and Mohammad Iranmanesh (EVA buddy)

Location: Around the Hab (12s-519965E-4250992.5N)

Time: departure at 10:00 a.m.

Duration: 1 hour

Purposes:

- Project EMUI (Eyewear User Interface for Marsnauts):

Test of the 360 degrees situational awareness (displaying on the glasses what a camera tied up to the glove sees)

- Project LOCARD (Localization and Relay Drone)
Last flight stability test

Extra time: Hab and landscape videos for a French documentary

10:05 a.m.: EVA leaves Airlock
10:10 a.m.: Engineer Check Complete
10:11 a.m.: EVA departs
10:30 a.m.: Check-in
10:50 a.m.: Check-in
11:00 a.m.: Check-in
11:06 a.m.: Recompression Complete

Summary: The weather was very hot so we did not stay out long but we manage to test the 360 degrees situational awareness using a camera tied to a glove and displaying the live video on the AR glasses. It worked well and could be very useful. We also took some landscape videos for a French documentary.

Final Engineering Report

Date: March 28, 2015

Crew Engineer Name: Mehdi Scoubeau

Diesel – 72%

Propane – 54%

Gasoline – 12 gallons in tank

Water (trailer) – distance from top: 5cm (the trailer has been brought back) - Crew 152 has been told that from now on they have to give the distance from the bottom

Water (static) – distance from top: 55 cm

Trailer to Static Pump used - no

Water (loft) – 34 gallons

Static to Loft Pump used – yes

Water Meter (Gallons:95186.4)

Atv Oil Checked: all full

Atv Tires Status: all ok

Atv Notes And Comments: Over the two weeks, we had ATV2, 3 and 4 stalling when the engine was not warm.

Summary of Engineering activities:

- On main generator
- Internet connection via WiFi
- HALpr on

Questions and Concerns to Mission Support:

As crew 150 has already told Capcom, there is a water leak in front of the Hab. We know that it is not clean water but I just wanted to let you know that it is still leaking.

Thank you for your support and help during two weeks,

Mehdi Scoubeau

Journalist Report

MDRS Crew 151

Mohammad Iranmanesh

03/27/15

As Victor Hugo once said: "Melancholy Is the Pleasure of Being Sad". That's probably what crew 151 feels today. We are sad to leave this Mars Analog Mission, to leave OUR Mars.

You could think that our sadness comes from the fact that contrary to previous days the afternoon was spent cleaning the HAB instead of preparing the next EVA, but no, the reason was much deeper than that.

We can't believe that it has already been two weeks that we are in simulation and that soon we will have to leave this place. The city noises and its polluted sky will have a hard time making us forget Mars.

But we know that this is the good kind of sadness that we feel, the happy kind. We had an amazing experience and we managed to do so much more than we expected. Against all odds, our small crew of 4 (that later became even smaller), did a great job accomplishing the daily tasks at the hab and reaching the scientific goals set for this mission.

These results are probably due to the fact that we managed to adapt ourselves on the fly to new situations and calmly worked as a team towards finding a solution for each problem we encountered.

For me, these two weeks reinforced my belief concerning the importance of Humans in space exploration and the advantages of Astronauts over robots in the race to Mars. I highly doubt that robots would have made a crew as awesome as crew 151!

Dear Mars, It's a happy kind of sadness when I think of you! Hope to land on you soon.