MOONMARS ASTRONAUT & CAPCOM PROTOCOLS: ESTEC & LUNARES PMAS SIMULATIONS

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Introduction: ILEWG developed since 2008 a Mobile Laboratory Habitat (ExoHab) at ESTEC [1,2]. It was tested as a minimal MoonMars habitat during a short test simulation in July. The simulation was a foretaste of the PMAS mission on 31 July-14 August in LunAres base at Pila [3], with mission control in Torun, Poland. Subsequent LunAres simulation missions Lunex1 on 15-29 Aug 2017 & IcAres in October 2017 will use a mission control from ESTEC.

Protocols simulation: We created various protocols to follow during the ExoHab simulation.
1) We created a voice protocol which aimed to standardize and facilitate communication between the Mission Control and the ExoHab.
2) We created various habitat related protocols: setting up the Habitat communication center, linking the Habitat to sector, shifting the Habitat between work mode and rest mode.
4) We created EVA related protocols: doffing and donning, entering and exiting the Habitat.
5) We created health related protocols: medical check and working out.
6) We uploaded pre-existing protocols for experiments, in particular the handbook of the ExoGeoLander.
7) We wrote a script for the Analog Astronauts to follow during the script. It was thought to test all the possibilities of the habitat.

PMAS CapCom: We have been involved in the PMAS mission as Capsule Communicators (CapCom) in the Mission Controle in Torun, Poland.
Prior-to-the-mission training
As CapComs have a crucial role in the progress of the mission, we had to follow a training program starting 3 weeks before the launch of the mission. It cinsisted in:
1) Getting familiar with the different roles in the Mission Suport
2) Learning the protocols to be used when communicating with the Analog Astronauts
3) Getting familiat with the exeriments to be conducted during the mission.
4) Completing a self-study item.
5) Taking an exam to obtain the CapCom certification.
Role in the Mission Support
CapCom are in charge of communicating with the Habitat. All messages from the Mission Control or from the Principal Investigators (PI) are relayed by our team. We were in charge of communicating the protocols to the crew and make sure they were followed correctly. We were in constant contact with the crew and with the Mission Control and Principal Investigators in order to transmit any questions, answers and/or precisions. As we were the first team to obtain informations from the crew, we acted as a filter to relay the information to the proper team.
Concerning the messages from the Mission Control to the Habitat, we worked with the Flight Director (FD) to select and rephrase the messages.

Fig: ILEWG EuroMoonMars trainee Axel Blanc performing a video call from the Mission Control in Torun, Poland with the Analog Astronauts (at LunAres base) during the lunar simulation part of PMAS

Effective communication
We decided to use the *Hangout* chat for written communication with the Habitat. We created a CapCom and a Habitat account. The choice was motivated by the simple use of the software and by the possibility to start video calls. We had a video call with the Habitat every morning and every evening during the Moon simulation, that lasted about half an hour.
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