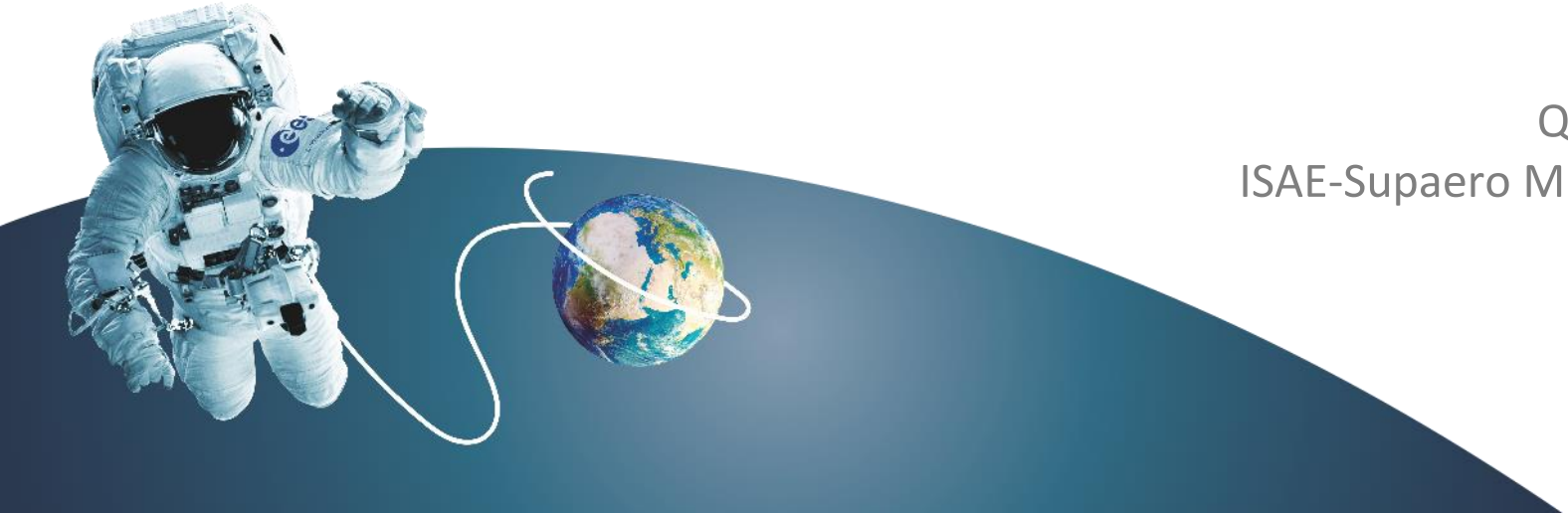
MELISSA
MICRO-ECOLOGICAL LIFE SUPPORT SYSTEM ALTERNATIVE

CREATING A CIRCULAR FUTURE

Analog mission to test life support system for future manned missions



Quentin ROYER
ISAE-Supaero MDRS Crew 275

Summary

I - Context : the MDRS Analog missions

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View of the Mars Desert Research Station (MDRS)

MDRS Crew 275

I - Context : the MDRS Analog missions

Experiments performed at MDRS :

- Human factors
- Tests of space equipments
- LOAC - MegaArès
- …

I - Context : the MDRS Analog missions

Greenhab of MDRS

IN COOPERATION WITH

European Space Agency

II - Past Supaero MDRS missions

II - Past Supaero MDRS missions

Growth of Bradyrhizobium japonicum cultivated on urina in symbiosis with soja

Crew 240

Goal of the experiment :

Test new ways of growing plants with the use of astronauts waste

Protocole :

Several plants with a different amount of fertilizer

II - Past Supaero MDRS missions
Water consumption monitoring

Goal of the experiment :

Understand the way water is consumed

Why is the MDRS mission useful ?

Crews stay for 2 to 4 weeks

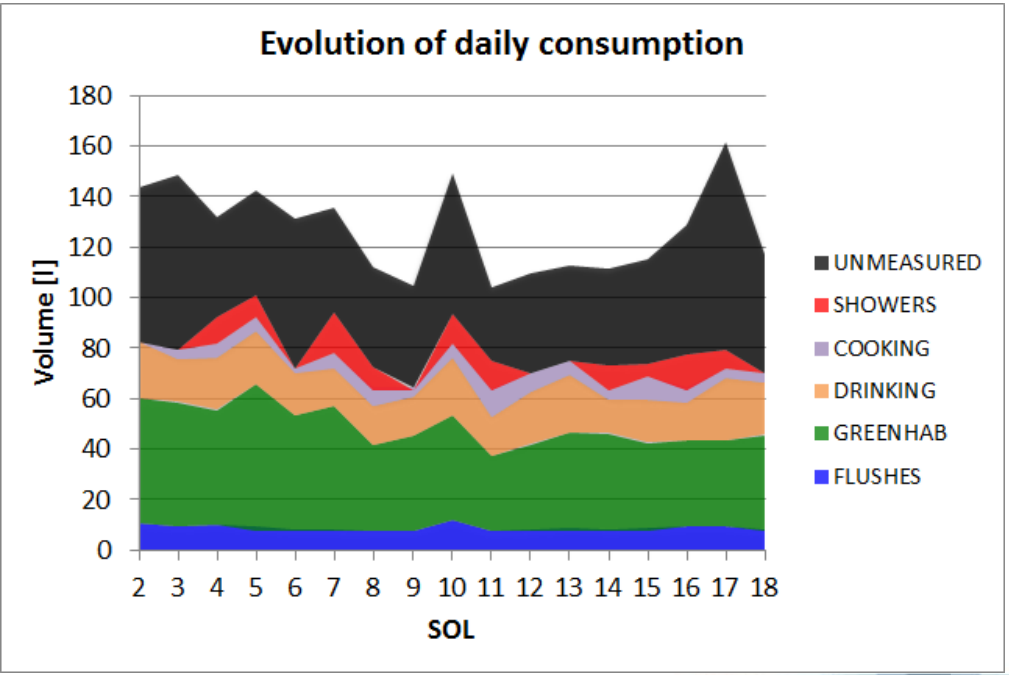
Crew 189

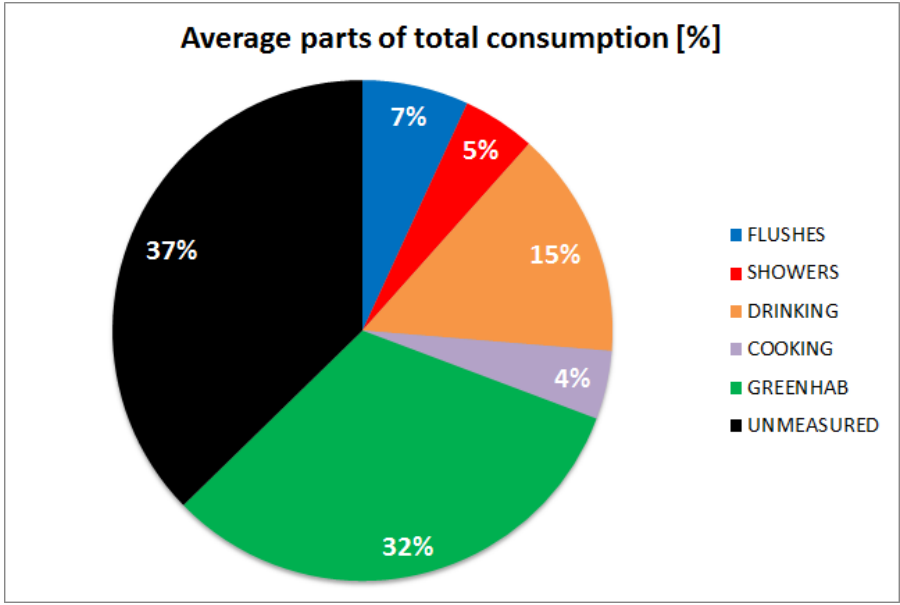
- Drinking
- Cooking
- Showers
- Flushes
- GreenHab

Crew 206

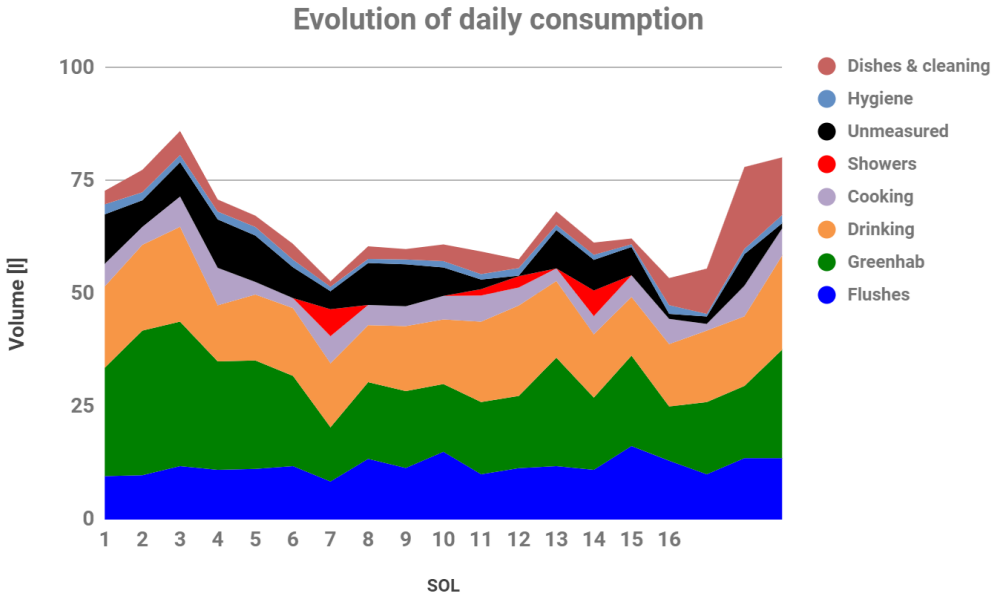
- Drinking
- Cooking
- Showers
- Flushes
- GreenHab
- Hand and oral hygiene (new)
- Dishes and household cleaning (new)

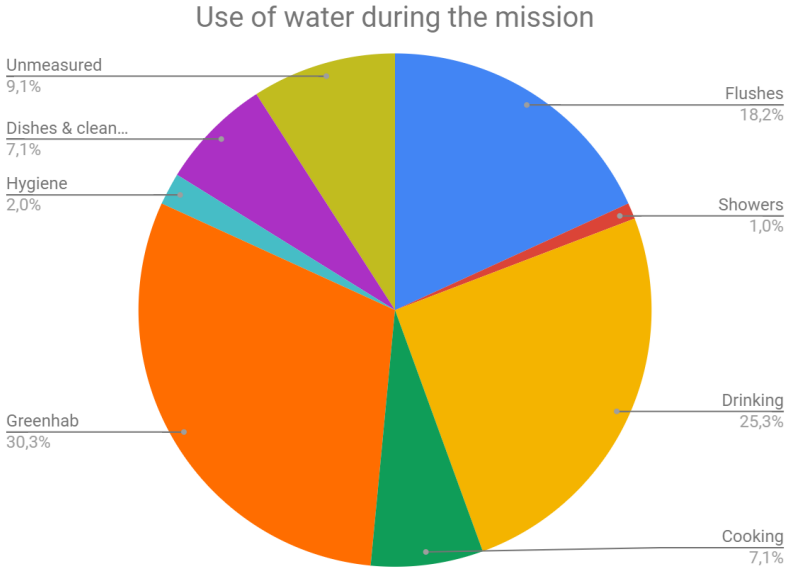
II - Past Supaero MDRS missions
Water consumption monitoring
Crew 189 (18 days)





II - Past Supaero MDRS missions
Water consumption monitoring
Crew 206 (19 days)





II - Past Supaero MDRS missions
AQUAPAD

Crew 206 / Crew 263

Goal of the experiment :

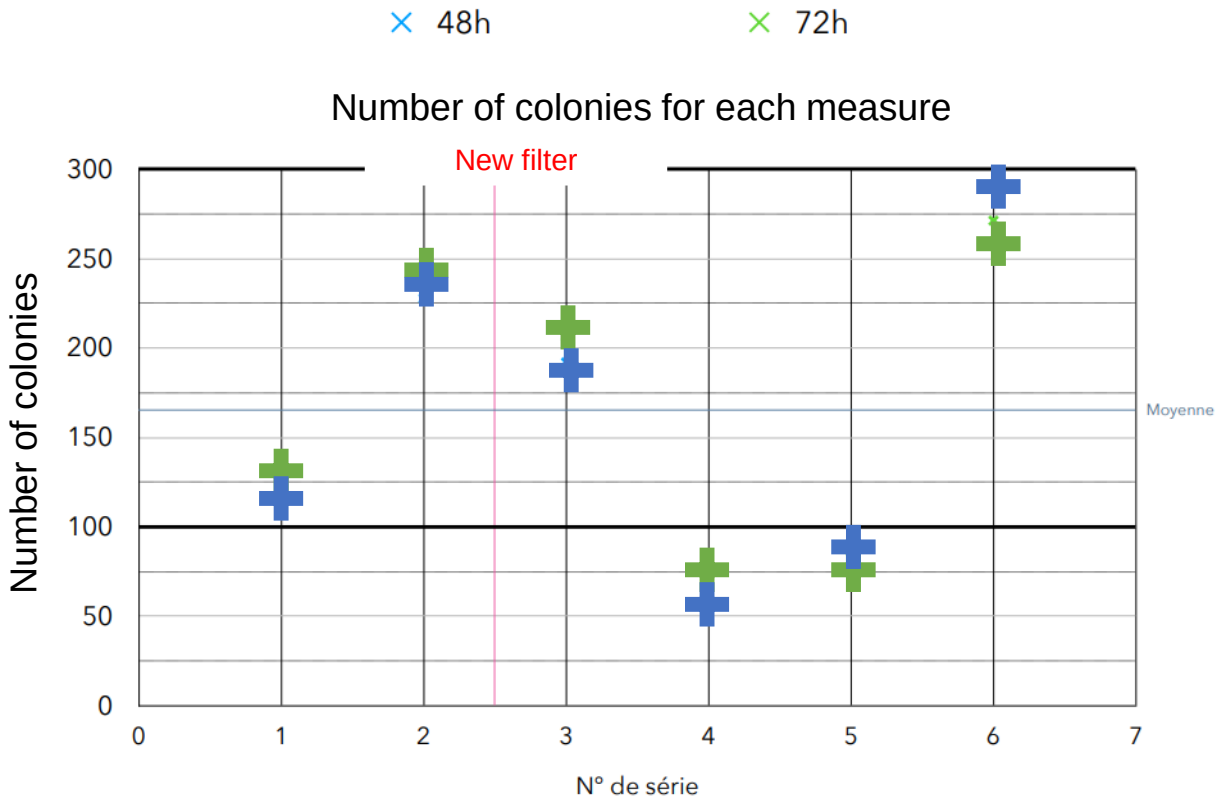
Characterize the drinkability of water in a remote environnement

Why is the MDRS mission useful ?

Analog astronauts can test equipments developed for space

Protocole :

II - Past Supaero MDRS missions AQUAPAD



III - Projects for MDRS Crew 275

III - Projects for MDRS Crew 275
Aquaponics

- Aquaculture linked to agriculture
- Use of aqua bio balls to increase biological filtration

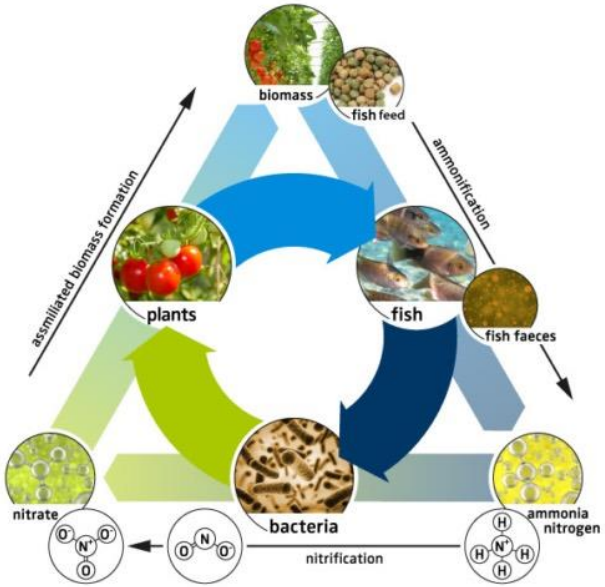
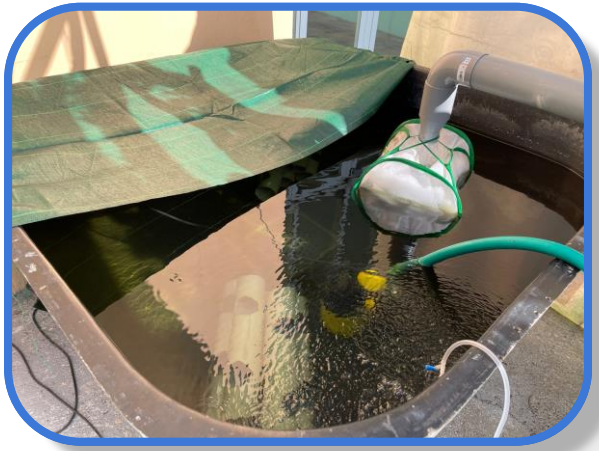


Figure 1. Symbiotic aquaponic cycle.



VILLE DE NICE PARC PHOENIX

III - Projects for MDRS Crew 275
Aquaponics

- No need of soil for the plants
- Water sampling and measuring roots

VILLE DE NICE PARC PHOENIX

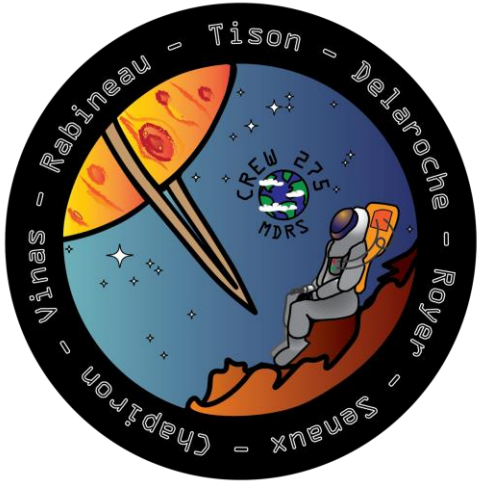
III - Projects for MDRS Crew 275
Spirulina growth

- Spirulina culture for its protein value
- Transparent tubes to increase the volume and adapted to photosynthesis

Call for experiments !

→ Crew 275 - February 2023

→ 4 weeks



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vito

MELISSA

MICRO-ECOLOGICAL
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ALTERNATIVE

THANK YOU.

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