

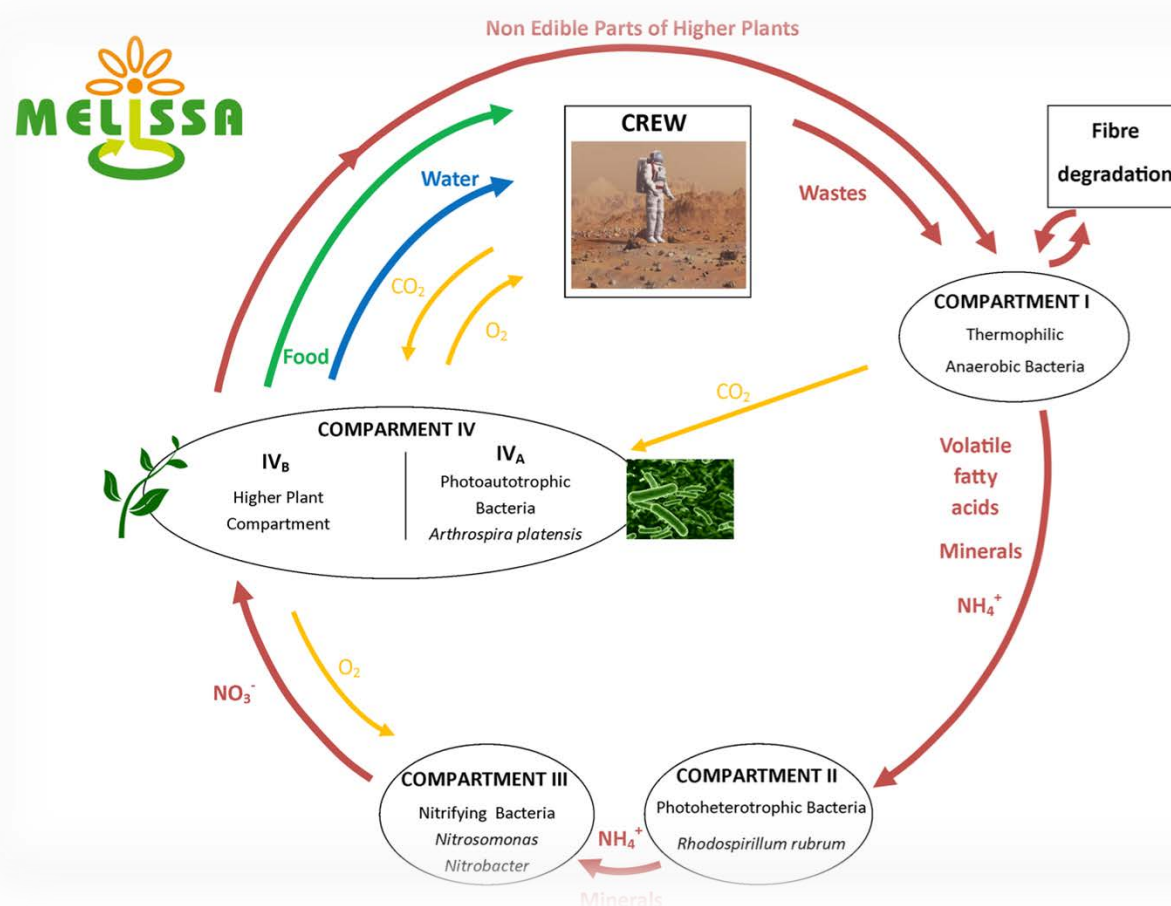
Fluids and Space Engineering Seminar

Date: Wednesday, November 27, 2019 at 13:00

Location: ZARM, Room 1730

Closed cycles to Mars mission

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Metabolic consumables` masses (e.g. oxygen, water, food) to sustain crew alive during transit and surface phases to Mars are not today far above the capacity of any exiting launcher. Initiated in March 1989, the European project of regenerative life support follows a very progressive approach. It is correct to state that the key challenge of MELiSSA is: how to select, to assemble and to demonstrate processes and technologies to reach the highest degree of cycle closure within the ALISSE criteria set: Mass, Energy, Efficiency, Safety, Reliability and Crew Time. The project is structured in a very progressive approach. Phase 1, Basic R&D: the processes and technologies are characterized at stoichiometry`s level, energy and safety, then static and dynamics models are elaborated. Phase 2 called Preliminary Flight experiments: the critical space issues are identified (e.g. reduced gravity, multi-phases processes, radiations,..) and propose for flight experiment. Phase 3: the selected processes and technologies are integrated and demonstrated over a long period and with a living consumer. The core of this activity is performed at the MELiSSA Pilot plant in Spain. In parallel to these 3 phases there is as well Phase 4, Technology transfer, where 5 spin-off companies already have been created to transfer space technology to Earth. Phase 5, which has taken a reasonable amplitude over the last years: Education and Communication is led by the MELiSSA foundation and support Students and STEM activity (e.g. AstroPlants).