



# The MELiSSA Project in the ESA\_Lab@ Initiative: A platform to promote European STEM talents

Maria-Gabriella Sarah, Partnerships, Development and  
Strategy office, European Space Agency

MELiSSA Conference 2022  
09 November, Toulouse, Espace Vanel



# Background : Why ESA\_Labs?

- Launched after Council Ministerial Meeting 2016 following Resolution 1 “Towards Space 4.0 for a United Space in Europe”, adopted on 1 December 2016
  - to achieve the objective “ Develop, preserve and disseminate knowledge, competence and skills for capacity building and sustainable growth, inspiring and promoting creativity”
- No exchange of funds principle in **Memorandum of Collaboration (MoC)** / in-kind support by ESA
- Collaboration scheme: ESA\_Lab@ with university with a **Point of Contact (PoC)** in ESA and in the partner university





# Current status of ESA\_Labs

- **> 30 ESA\_Labs in 11 Member States since 2018**, constant interest and ongoing negotiations for new ESA\_Labs.
- **Main locations:** UK, France, Poland, and Italy followed by Germany.
- **Wide range of ESA\_Lab@ topics** : exploration, space medicine, space economy, quantum computing, artificial intelligence etc.
- **Way forward:** deepen the network by identifying research topics to be conducted by at least two ESA\_Lab@ , foster cross fertilization





Basic and Applied  
Research

Technology  
Development

Projects, Missions  
and Programmes

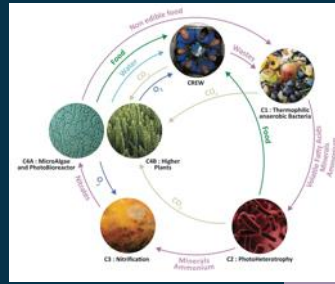
Commercialisation

## Supporting Ideas from inception to market



- Signed on 19 February 2020 (just before start of COVID pandemic!),
- Kicked off with round table on Climate Change
- On-going collaboration activities with MELiSSA
  - Lectures and classroom workshops
  - Supervision of short and long-term research projects remotely from ESTEC
- MELiSSA Conference Scientific Committee





## Activities synthesis

### THEME:

Specification Process of a simulation platform for the MELiSSA project

### Results:

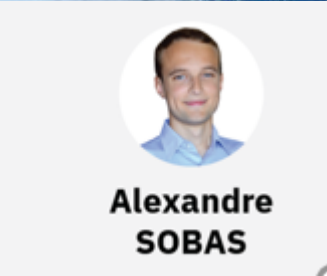
- Synthesis of existing LSS/digital tools for circularity with their limits/challenges
- Mapping of the MELiSSA organization
- State of the art of 3 methodologies to specify simulation requirements for Performance assessment



Franck Marle



François Cluzel



Alexandre SOBAS

Circular Economy



# Activities synthesis



CentraleSupélec



Franck Marle



François Cluzel

## Circular Economy

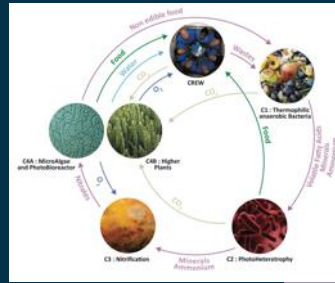
# 1. Challenge Circular System Design Methodology

ESA/EIC Call for contribution

On-going

Challenges for Circular Economy & Sustainable Living in Space and on Earth

Contribution to a white paper on how circular challenges can be met and what building blocks for technology, policy, legal and financial aspects are needed



# 2. Mars Transit Habitat Ground Demonstrator Facility

ESA Request for Information - Mars

Future European Elements of Mars Exploration

Under review

Contribution to the circularity performance simulation of the operation & maintenance of a regenerative life support system, in its design phase,





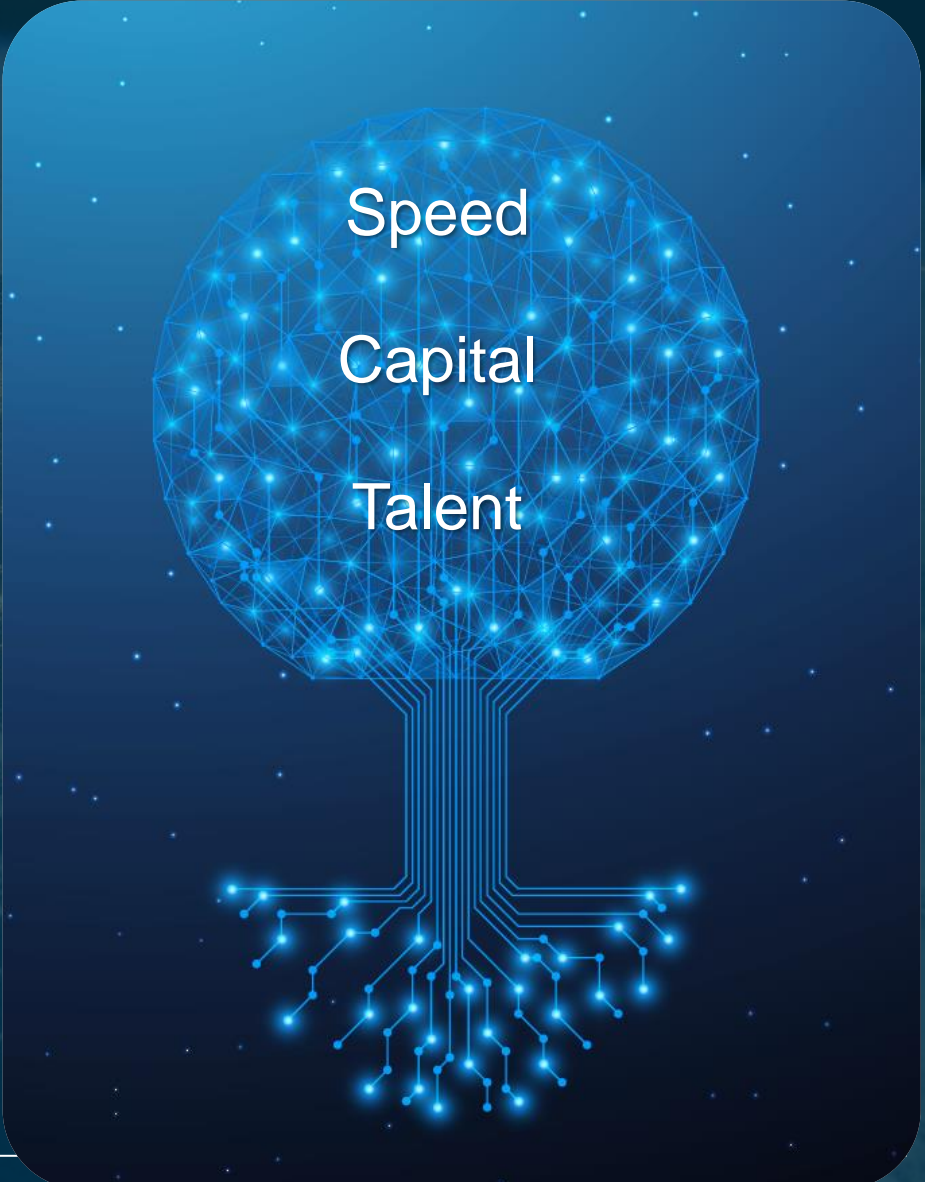
- at Director General level in May 2022
- K.O. meeting at IAC 2022 (Paris) in September 2022
- On-going collaboration activities with MELiSSA
  - Lectures and classroom workshops for 2<sup>nd</sup> year students
  - Supervision of 3<sup>rd</sup> year long-term research projects remotely from ESTEC
  - Interns & YGT at ESA/ESTEC
- MELiSSA Conference Scientific Committee





# ADDED VALUE OF ESA\_LAB@

- ❑ ESA\_Lab@ activities facilitating technology development → dealing with **innovative topics** could mature into emerging commercial products using e.g. ESA BICs
- ❑ Explore Cross-fertilisation with the future  $\phi$ -labNET
- ❑ ESA\_Lab@ contributing to increase interest in space topics for the engineers/scientists of the future and foster renewal of space workforce
- ❑ ESA\_Lab@ activities supports ESA's research activities in major research areas (e.g. AI, quantum technologies, mission operations, space safety and exploration) and profits the University students ↔ “win-win”





**THANK YOU!**

**MAKE SPACE FOR EUROPE !  
PLUS D'ESPACE POUR L'EUROPE!**

**#SpaceAmbition**

[www.esa.int](http://www.esa.int)