

MARSCENTER

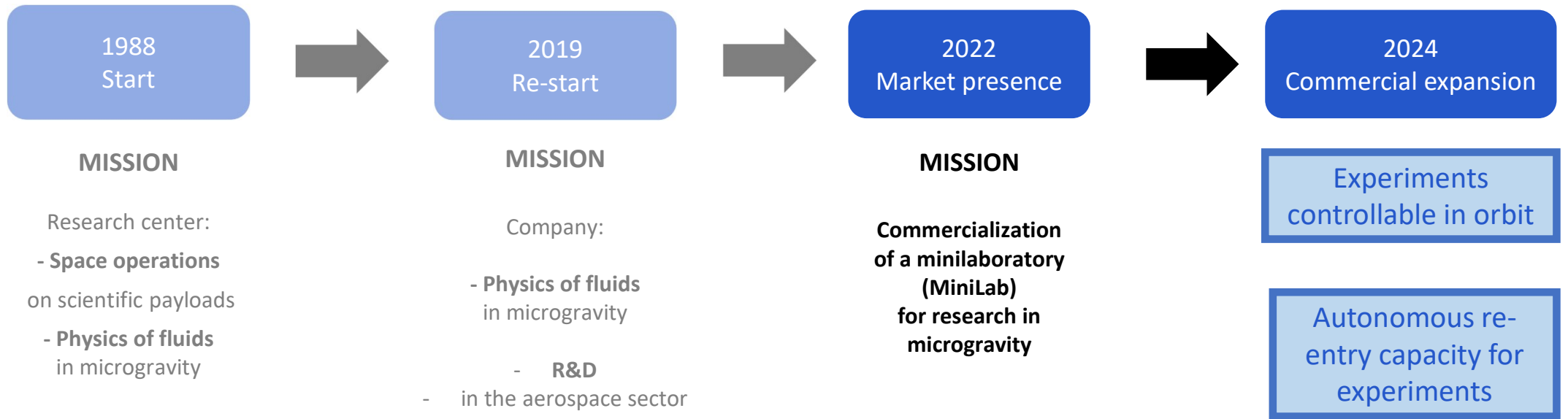
A HISTORY OF TECHNOLOGICAL SUCCESS

EUROAVIA

Naples, 22 December 2022



History and objectives



Initial team



Prof. Luigi Napolitano



Prof. Rodolfo Monti

Team today



Giuseppe Morsillo

**Engineers
and biologists**

Opportunities

GROWTH TREND

The demand of **experiments in microgravity is in strong growth**, due to the interest in studying cellular degradation and effects on fluids and materials

ENTRY BARRIERS

Today experiments in microgravity (except for some of those of very short duration) are carried-out through **devices sent on-board ISS** (this being handled by very few players)

NEW NEEDS

Current **devices do not allow to satisfy new needs**, such as:

- **monitoring** of ongoing experiments and
- **their riconfigurability in orbit** (which would allow to test more configurations in a same flight)

Our product **today**: MiniLab

MiniLab is a small size **laboratory**, devoted to perform experiments in microgravity. It allows to study how gravity and the extreme space environment may impact on physics and life sciences. **It is not reconfigurable in orbit, and data from the experiments are available only after re-entry on earth (the latter not autonomous).**



Easy and fast configuration



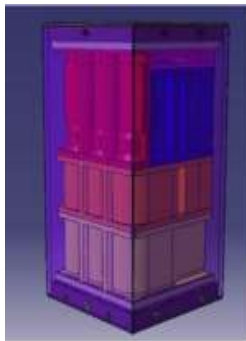
3D printed



Cheap

Product evolution: MiniLab 2.0 and Irenesat Orbital

MiniLab 2.0 will allow to **reconfigure experiments in orbit** and also **to run them in full autonomy if combined to Irenesat Orbital re-entry technology**, so without necessarily docking on space stations



MiniLab 2.0



IRENESAT- ORBITAL
Flight Model

- **Modular architecture**
- **More cells** to perform more experiments at the same time
- **Quasi-real time monitoring** of main parameters of ongoing experiments and potential modification during flight of such parameters
- **Double thermal control** allowing to regulate more widely the temperature of experiments
- **Irenesat Orbital technology** will allow the **autonomous re-entry** (proven with last 23 November MIFE demo flight) of MiniLab, with **overall execution time from conception - for an experiment - reduced from 2-3 years to some 6 months**

The market (1/2)

- ✓ **ISS** will remain operational until **2030**.
- ✓ **Axiom** – by means of its own resources – has already started the production of modules of its own future space station.
- ✓ NASA is funding the preliminary design activities from groups of **private companies** to develop commercial space stations:
 - Blue Origin (Orbital Reef)
 - Voyager Space/Nanoracks (Starlab)
 - Northrop Grumman/Dynetics.
- ✓ In this **context of enlargement of the number of future orbiting stations**, the **market of scientific experiments in microgravity will enjoy a growing trend**



ISS



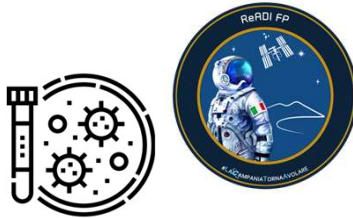
STARLAB



ORBITAL REEF

The market (2/2)

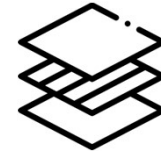
MiniLabs offer the unique opportunity to study the effects of microgravity on physics and life sciences, and **understand their impact on various phenomena, at the benefit of society**



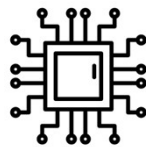
Life Science and
biotechnologies



Pharmaceutics



Material Science



Electronics



Agriculture

Business model

CURRENT

- 1 MINILAB DESIGN
- 2 FOCUS ON SPACE VEHICLE FEATURES



IN TWO YEARS

- 1 LAB AS-A-SERVICE
- In-orbit laboratory capability «offered as-a-service» to **institutional and/or commercial customers** enabling and **providing status monitoring, in-orbit control** and **leverage on re-entry schedule** (the latter by selection of autonomous re-entry option)

Development roadmap

2022

- **Able to produce MiniLabs for third parties** (pharmaceutical companies, biotechnology companies, universities and research centers, space agencies, etc.) allowing to run experiments in microgravity.
- **On-going contracts for 4 MiniLabs**

2023

- Flight of **3 Minilabs**
- Contractualization of **new orders** for the production of some **10 MiniLabs**.
- Start of the **development of Minilab 2.0** and its related **control center**

2024

- **Qualification in flight of Minilab 2.0 with demonstration of service from its control center**
- Contractualization of **new orders** for the production of some **10 MiniLabs 2.0**.
- **Start of the operational re-entry service by means of the mini-satellite IRENESAT-ORBITAL** (Space Mail mode from ISS)