- project__Orpheus
- // the PC moment
- // for bio-labs

1. Problem → Solution

Modern biotech is 21st century science + 20th century tools:

- slow
- error-prone
- L expensive

5%

Bio-innovation is a fraction of its TRUE potential.

1. Problem → Solution

Time is ripe for a paradigm shift:

[from] rooms filled with expensive equipment (≈MAINFRAMES)

[to] compact, affordable, programmable, modular desktop
devices that run entire lab workflows like software (≈PCs)

2. Technology

```
Extendable base station plus swappable cartridges:
    BASE (reusable)
      ├─ compute: microcontroller; all routing via software

    actuation: electrowetting grid moving droplets

        sensing: embedded on the stream
    CARTRIDGE (disposable)
    SOFTWARE
```

2. Technology

```
Extendable base station plus swappable cartridges:
    BASE (reusable)
    CARTRIDGE (disposable)
        wet path layer: defines sterile droplet area
      ports/blisters: loading samples and reagents
     Loptional inserts: magnet capture zone etc.
    SOFTWARE
```

2. Technology

```
Extendable base station plus swappable cartridges:
    BASE (reusable)
    CARTRIDGE (disposable)
    SOFTWARE
        parser: protocol JSON → actuator commands
        LLM layer: natural language → protocol JSON
        telemetry incl. sensor data, timestamps, etc.
```

3. Markets

Beachhead: research labs that cannot afford robots

- university/institute cores
- biotech startups

- @ 15,000-40,000 academic labs and early biotechs
- @ 5,000-15,000 EUR/year average revenue per client

≈ 100-300 MEUR/year global beachhead (SAM)

3. Markets

Broader: global life sciences tools sector

- from mid-biotech and clinical labs, to big pharma
- setting new standard for modular automation

- @ 10-20 BEUR/year life sciences tools and consumables
- @ 20-40% addressable share for modular automation

≈ 2-8 BEUR/year global potential (TAM)

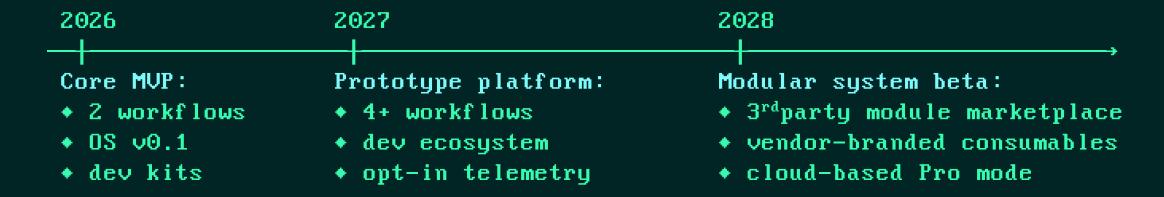
4. Business model

- ▶ Consumables: recurring, high-margin (razor blade model) ├─ (semi)disposable cartridges └─ compatible reagent kits (vendor co-branded)

5. IP strategy

```
Patents: protect core innovations
   system-level integration (MF + manifold + sensing)
   method claims (e.g. automated SPRI)
Trade secrets: keep know-how private
   cartridge fabrication/coating
   ML models trained on fleet telemetry
Open-source: catalyze community-led growth
   OS protocol language
   software library (e.g. visualization, simulation)
   hardware interface / API specs
   basic dev boards and demo cartridges
```

6. Roadmap



2029 →
Standardization, wide adoption

• 10-12 validated workflows

• OS as global open standard

• first enterprise pilots

<u>7. Core team</u>

We are creating a collective of builders; nerds; misfits; Supported by Biocatalyst Foundation's ecosystem networks.

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Andrii Shekhirev
Biocatalyst Foundation cofounder, 10+ years building
startups. Set up a chemistry
lab in his room as a kid.

(° ± ~)

Eduards Teodors Mincis
Senior Lab Assistant @ LU
Institute of Biotechnology.
3 yrs in iGEM. Bred plasticeating larvae as a kid.

project_Orpheus

creating a global and open-source hardware + software standard that enables fleet learning on a scale never imagined before in biology.

95%

Think of the value to be unlocked with a global network of PC-like biolabs!