



DEVELOPING THE INTERNET OF NATURE

ANTÓNIO CÂMARA YDREAMS AND CENSE

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Internet of Nature (IoN) uses sensors, satellite imagery, and algorithms to transform urban green spaces into data, enhancing our ecosystem management

Nadina Galle



DEVELOPING THE INTERNET OF NATURE: A broader vision

We face climate, biodiversity, and health crisis risks that we must address

Nature services are increasing translated into new opportunities. "Nature" is already the largest market in the World

The IoN leverages AI, AR/VR, IoT, Digital Twins and Robotics to unlock a new nexus between Humans, Machines and Nature

IoN will be B2B, and citizen oriented





HUMANS, MACHINES AND NATURE

Intrinsic services

Agriculture, Forestry, Health...

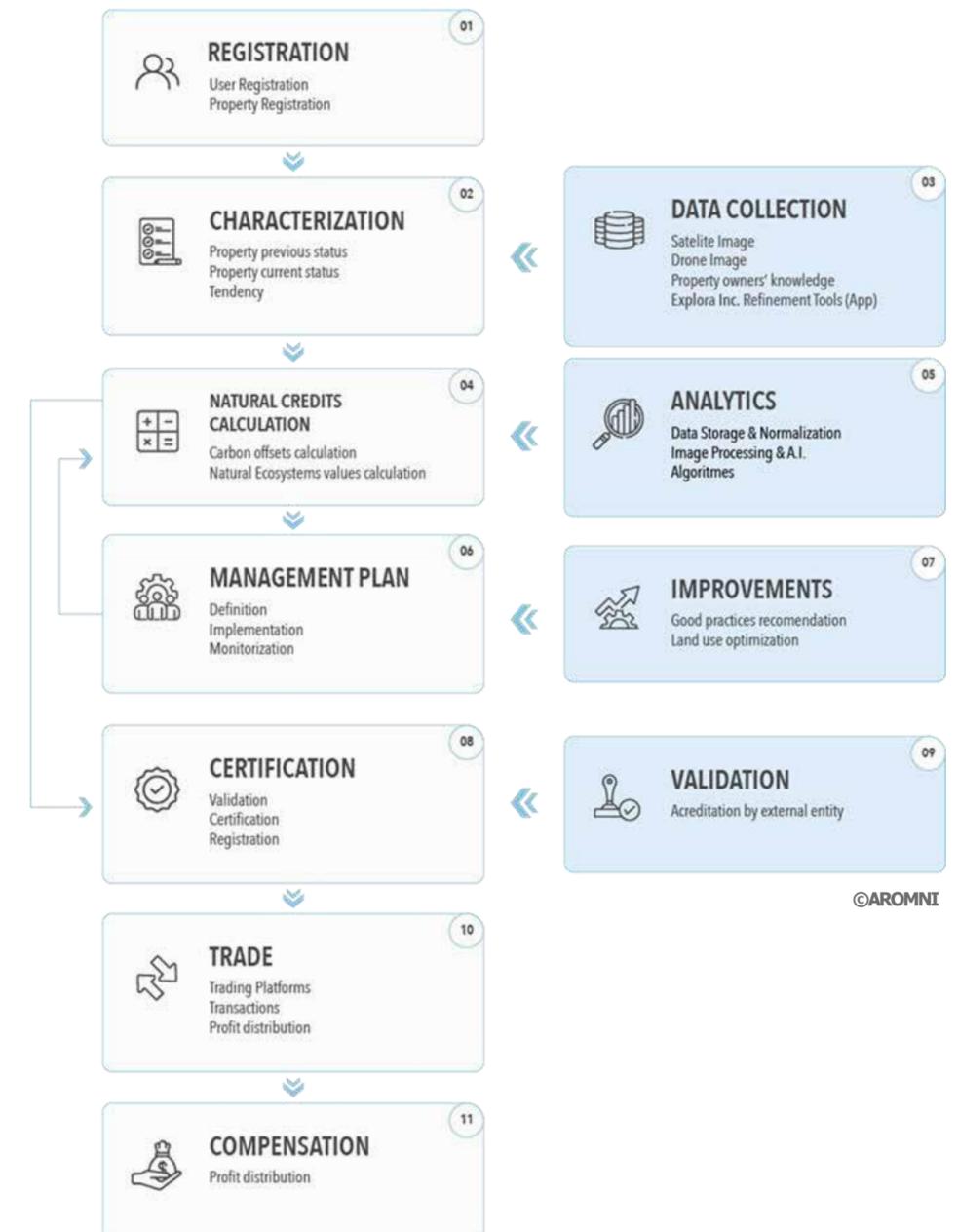
Offset services

Carbon and Bio-diversity Credits...

Derivative services

Tourism, Virtual Landscapes for the Gaming and Movie industry

Ecosystem Services: the Fundamentals



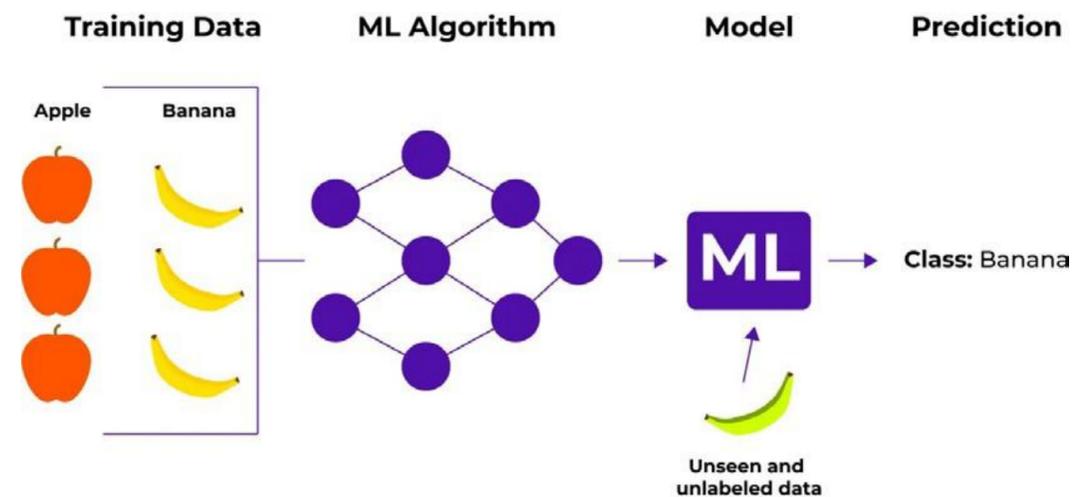
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HUMANS, MACHINES AND NATURE

AI fundamentals

Biological inspired neural networks are replacing traditional modeling and symbolic AI



An AI Engineer's Guide to Machine Learning and Generative AI

Generative AI

Large Language Models (LLMs) and *Large Multimodal Models (LMMs)* are the basis for a new *Agentic AI*





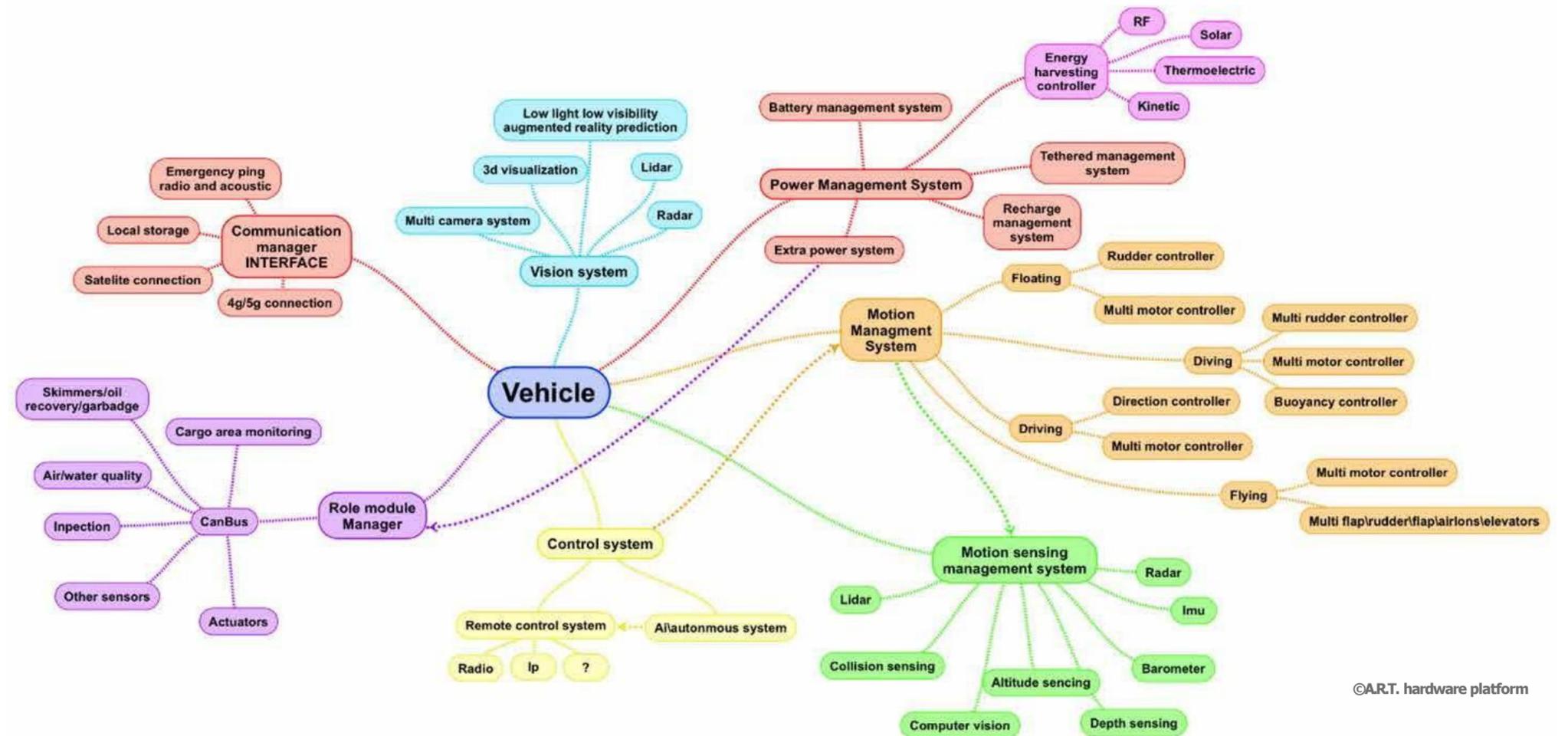
HUMANS, MACHINES AND NATURE

Robotics/IoT and Nature

Data Collection

Human Augmentation

Automation



©ART. hardware platform



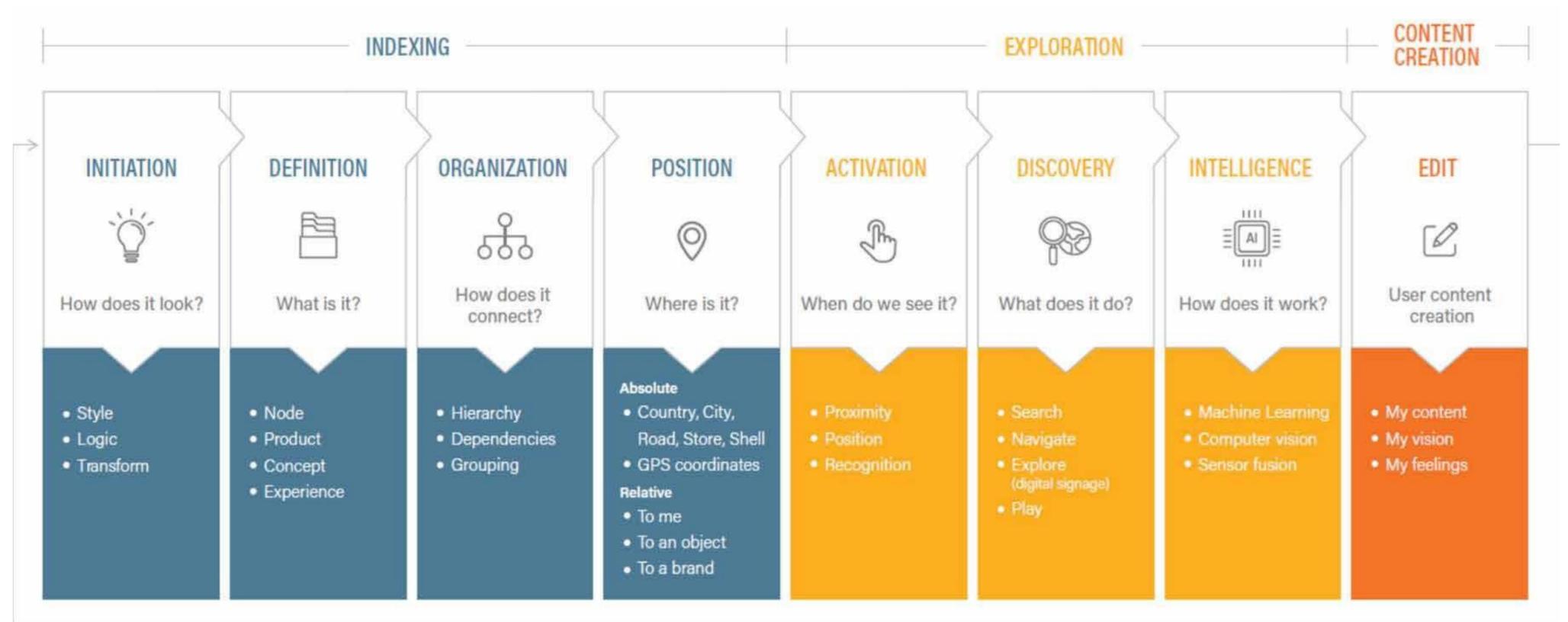
HUMANS, MACHINES AND NATURE

AR/VR and Nature

The Augmented World

The Digitally Twinned World

The Virtual World



©Aromni AR/VR smart tags system



INTERNET OF NATURE (ION): A Proposal for Disruption

AI Agents will be central

Examples:

AA (precision agriculture)

AB (biodiversity conservation)

AC (carbon credits validator)

ASE (energy self-sufficiency for the home)

Agents will access:

- Data infrastructure - Nature data obtained locally and remotely; legacy models
- Large Multimodal Models
- Agents will work in orchestration:
The EIA Example (AI generated)



INTERNET OF NATURE (ION): A Proposal for Disruption

Robots and IoT will be pervasive

Autonomous Survey Drones: Equipped with multispectral cameras, LiDAR, and environmental sensors for detailed ecosystem mapping

Reforestation Robots: Autonomous planters and seeders for large-scale restoration projects

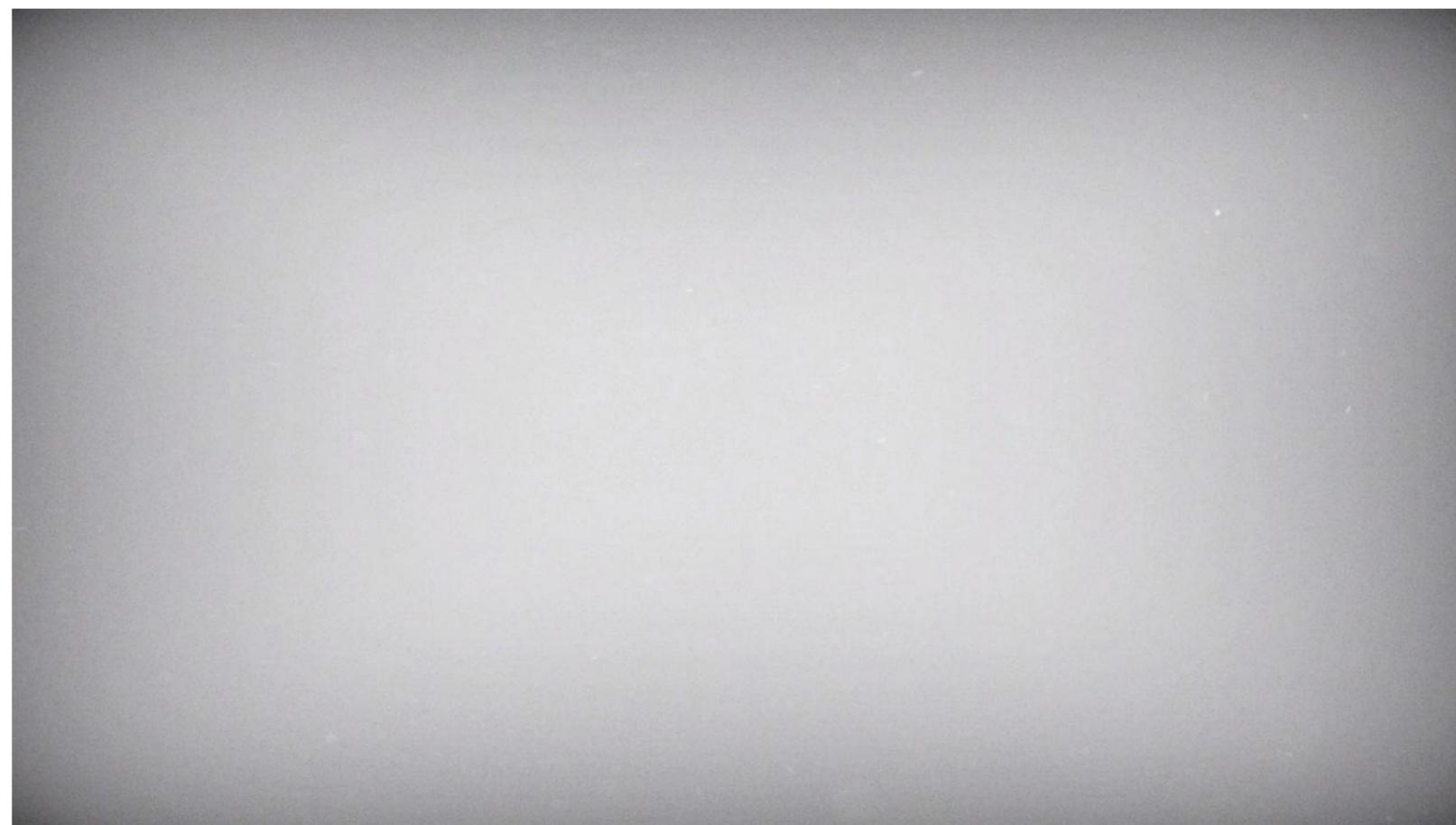
Invasive Species Hunters: AI-guided robots for targeted removal of invasive flora/fauna

Underwater ROVs: For coastal and marine ecosystem monitoring, including seagrass beds and marine protected areas

Sensor Network Coordinators: AI managing thousands of IoT sensors for real-time environmental data collection



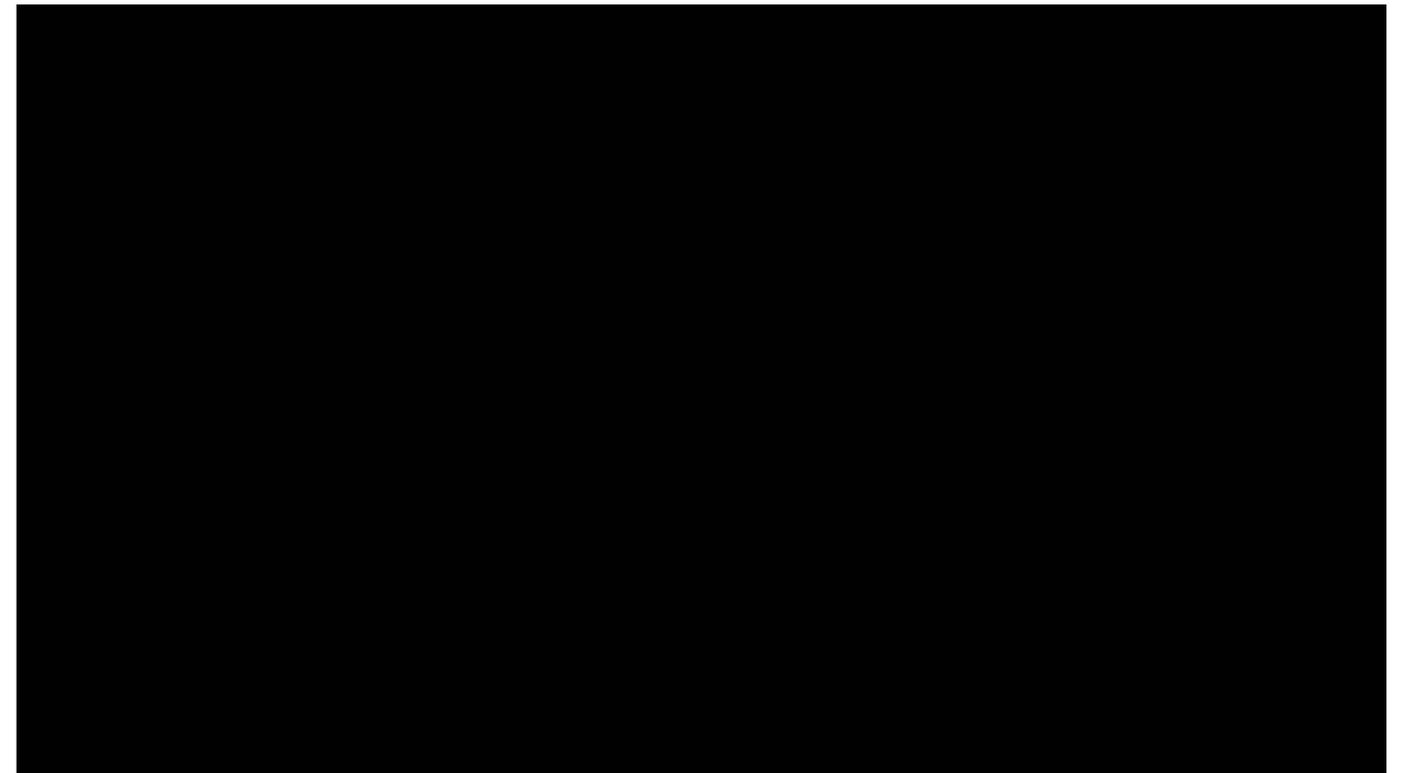
INTERNET OF NATURE (ION): A Proposal for Disruption





INTERNET OF NATURE (ION): A Proposal for Disruption

AI/AR/VR will create digital “Nature Worlds” and will be IoN interface





INTERNET OF NATURE (ION): A Proposal for Disruption

Early pilots IoN B2B

Orchards AR

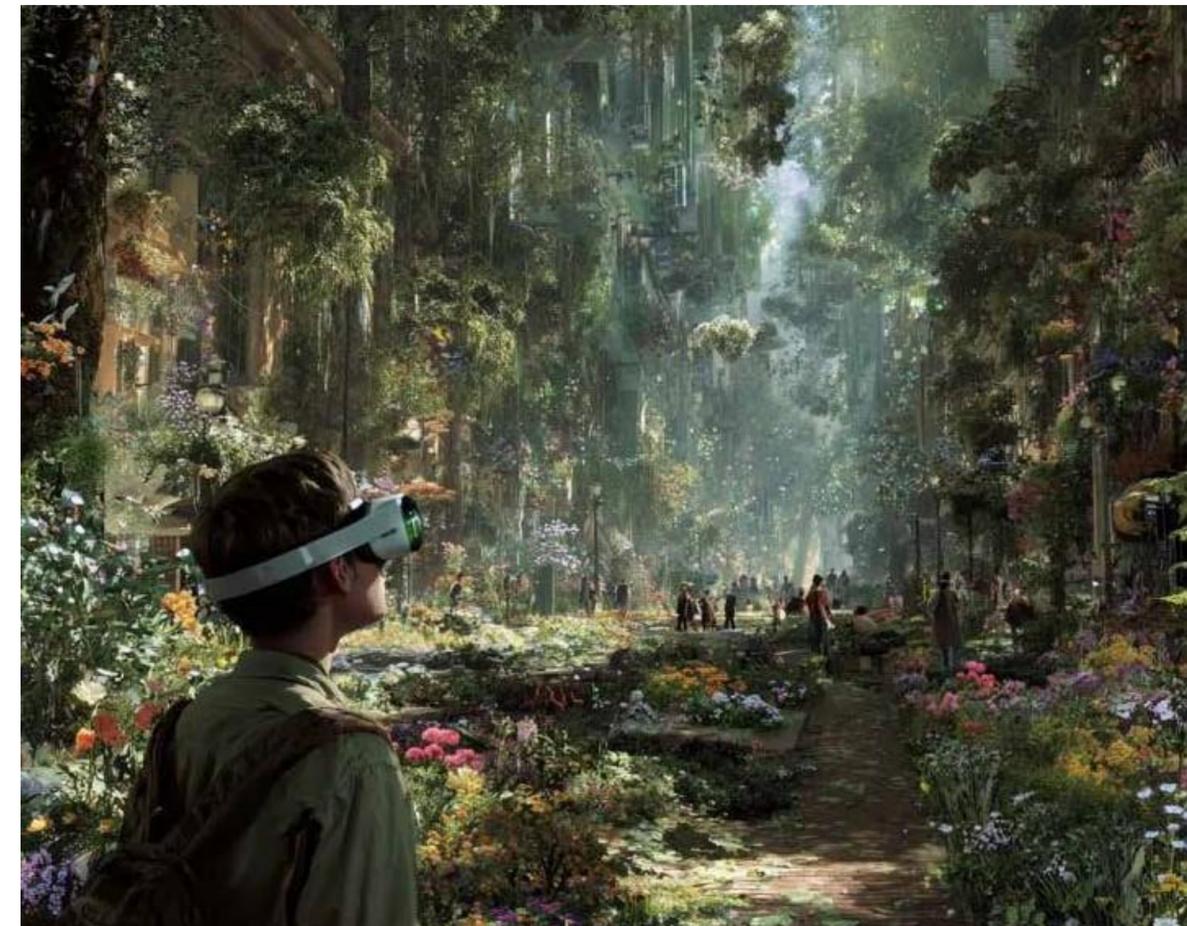
Forest 3D Mapping with Affordable Tech

AR based Landscape Architecture

GrainChain

Watermellon Magic Hammer

A desirable Agent list (AI generated)



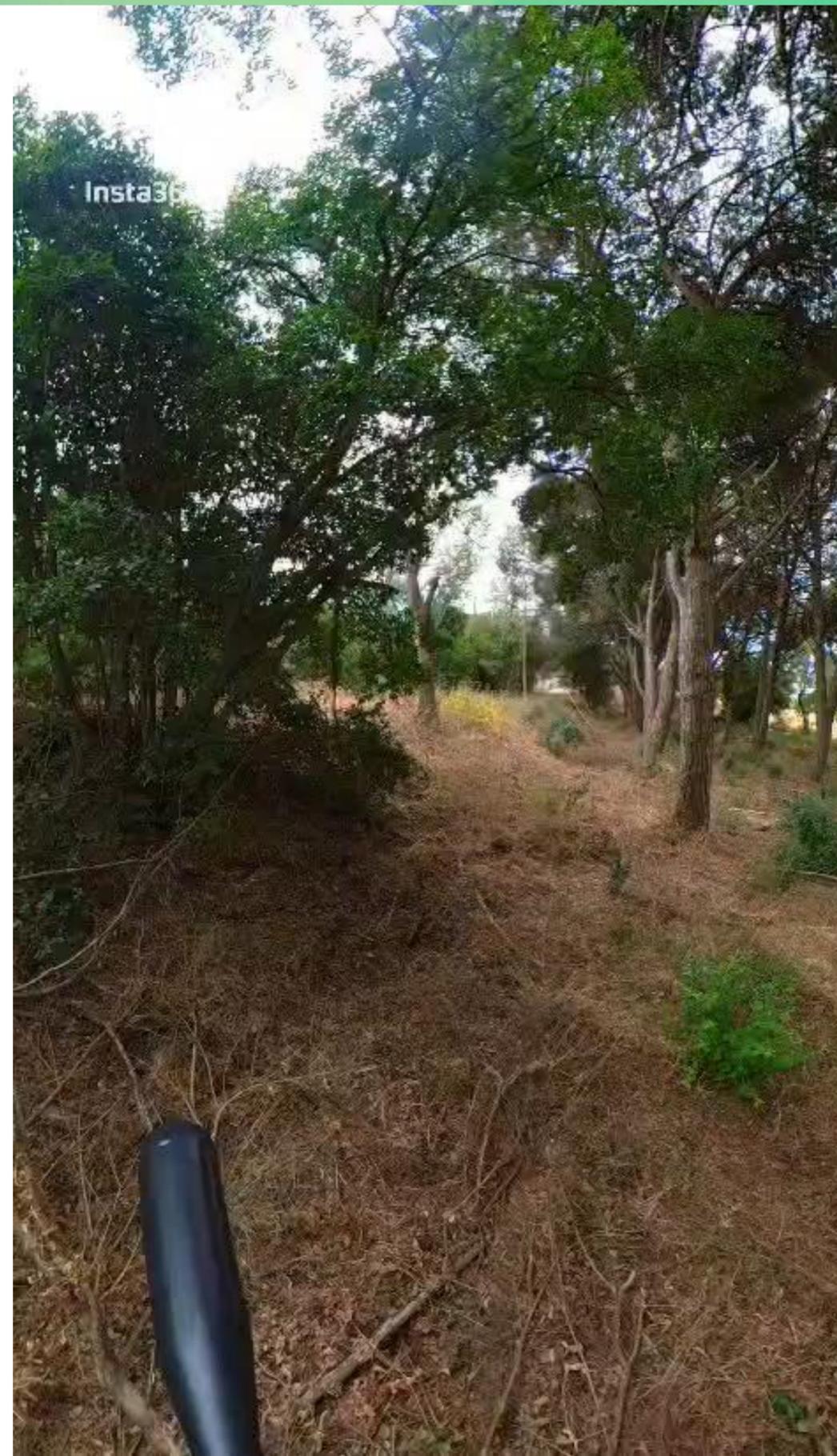
INSTA360

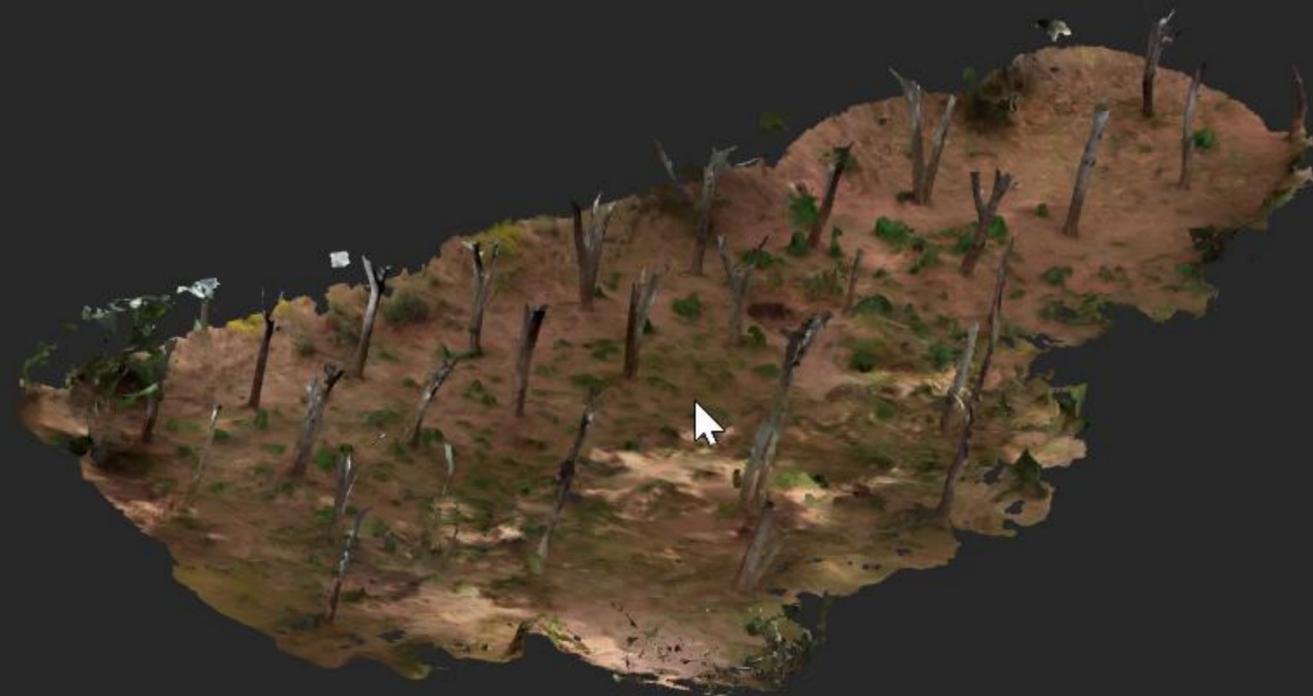


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CUPIXVISTA



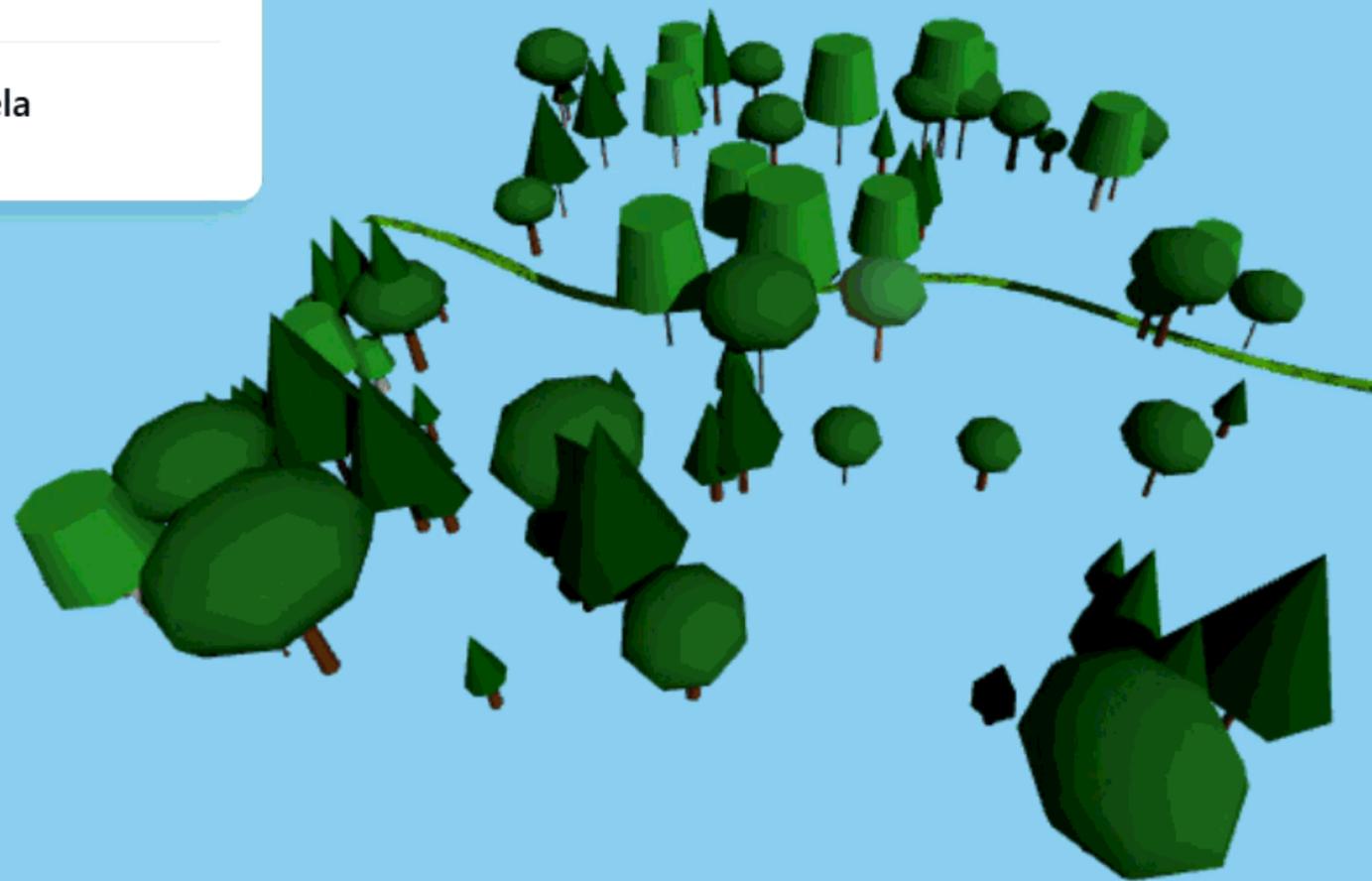


3D4ESTS - Interactive platform

Controles:

- Arrastar: Rotacionar câmera
- Scroll: Zoom in/out
- Clique: Selecionar árvore

Modo Parcela



Análise Florestal

Informações da Árvore

ID: wcdth8zm8

Espécie: Oak

Altura: 11.4 m

DAP (1.30m): 73.2 cm

Estatísticas Gerais

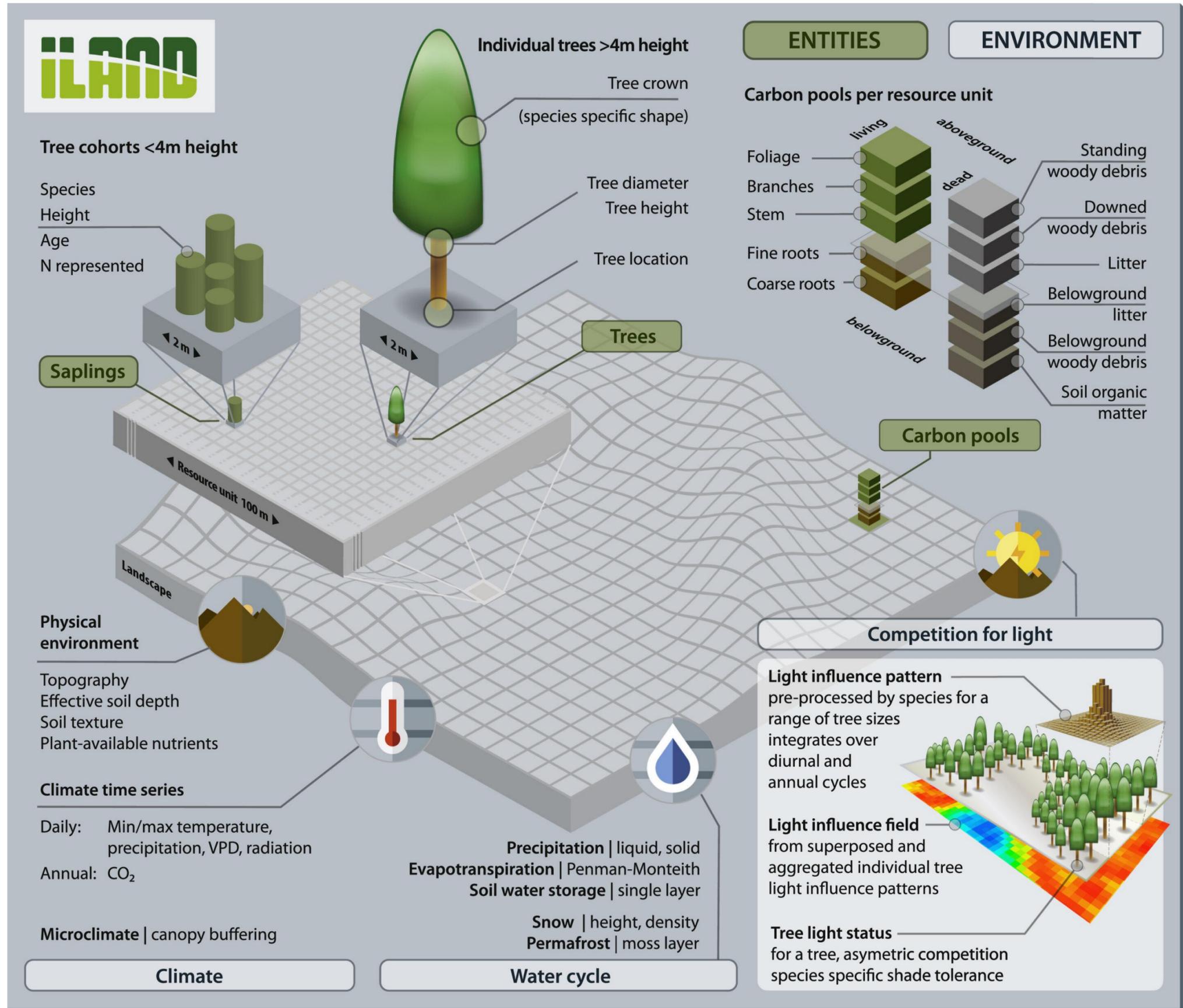
Total de árvores: 80

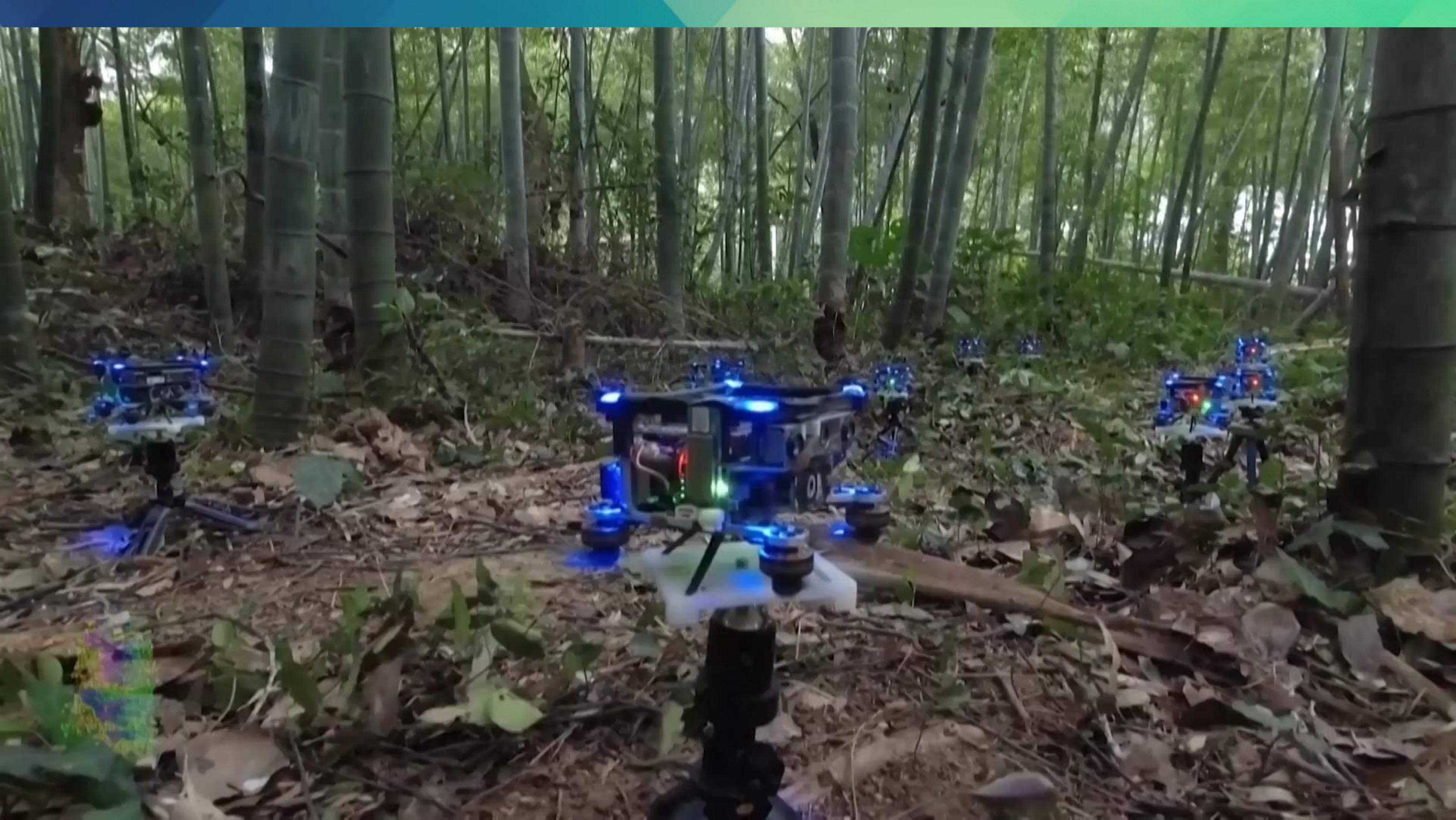
Espécies: Pine, Oak, Birch, Eucalyptus

Área total: ~1,2 ha

Application

Forest Digital Twinning





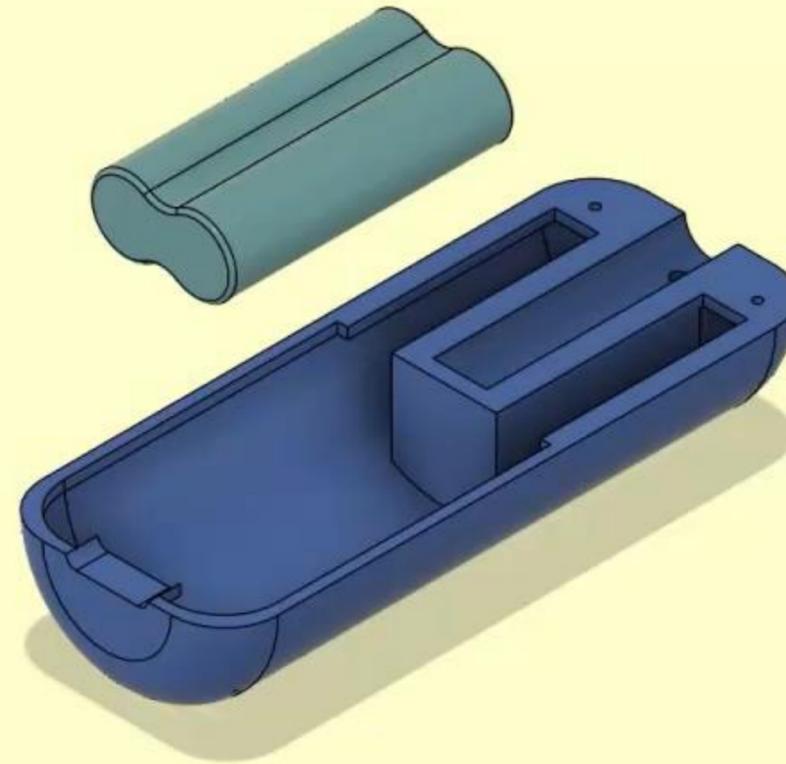
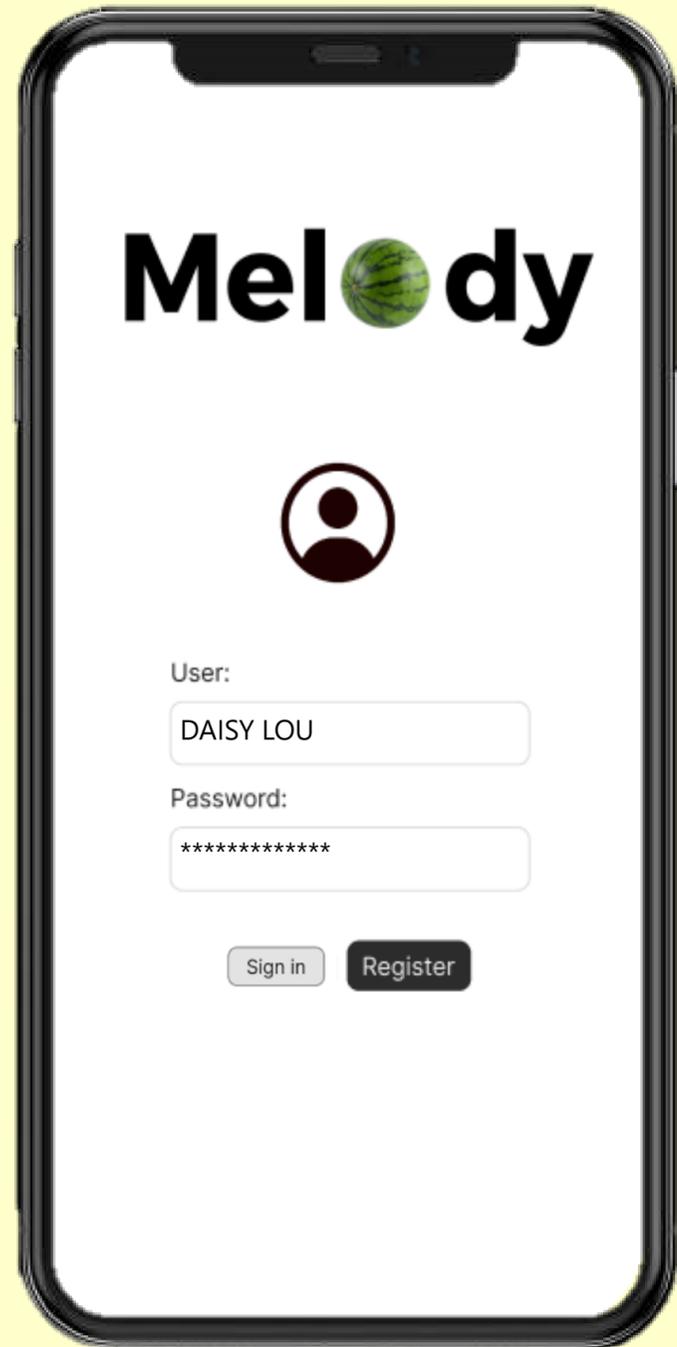
THE POWER OF THE SOUND

There is skilled labor that, through experience, can assess the internal ripeness.



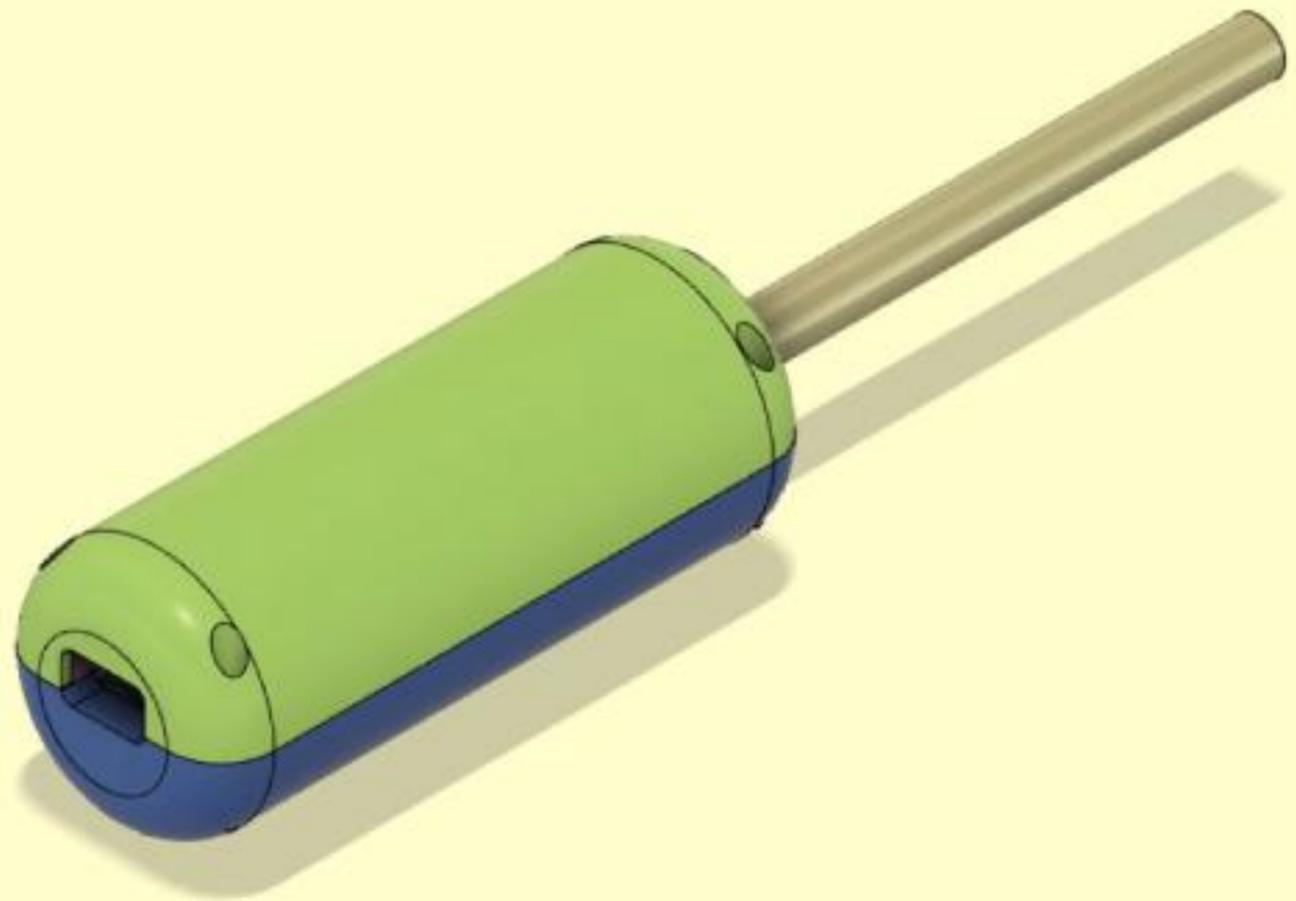
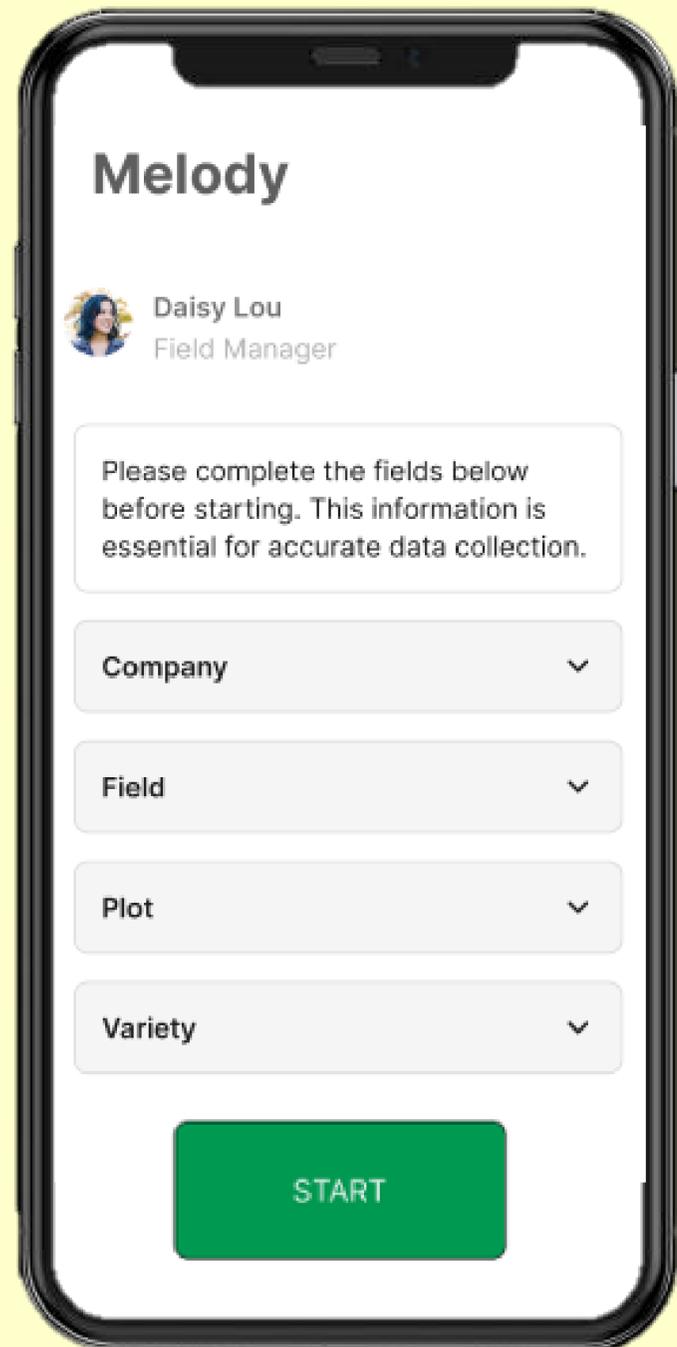
MELODY: APP AND DEVICE

A smart solution to measure internal watermelon ripeness. Portable, fast, and intuitive.



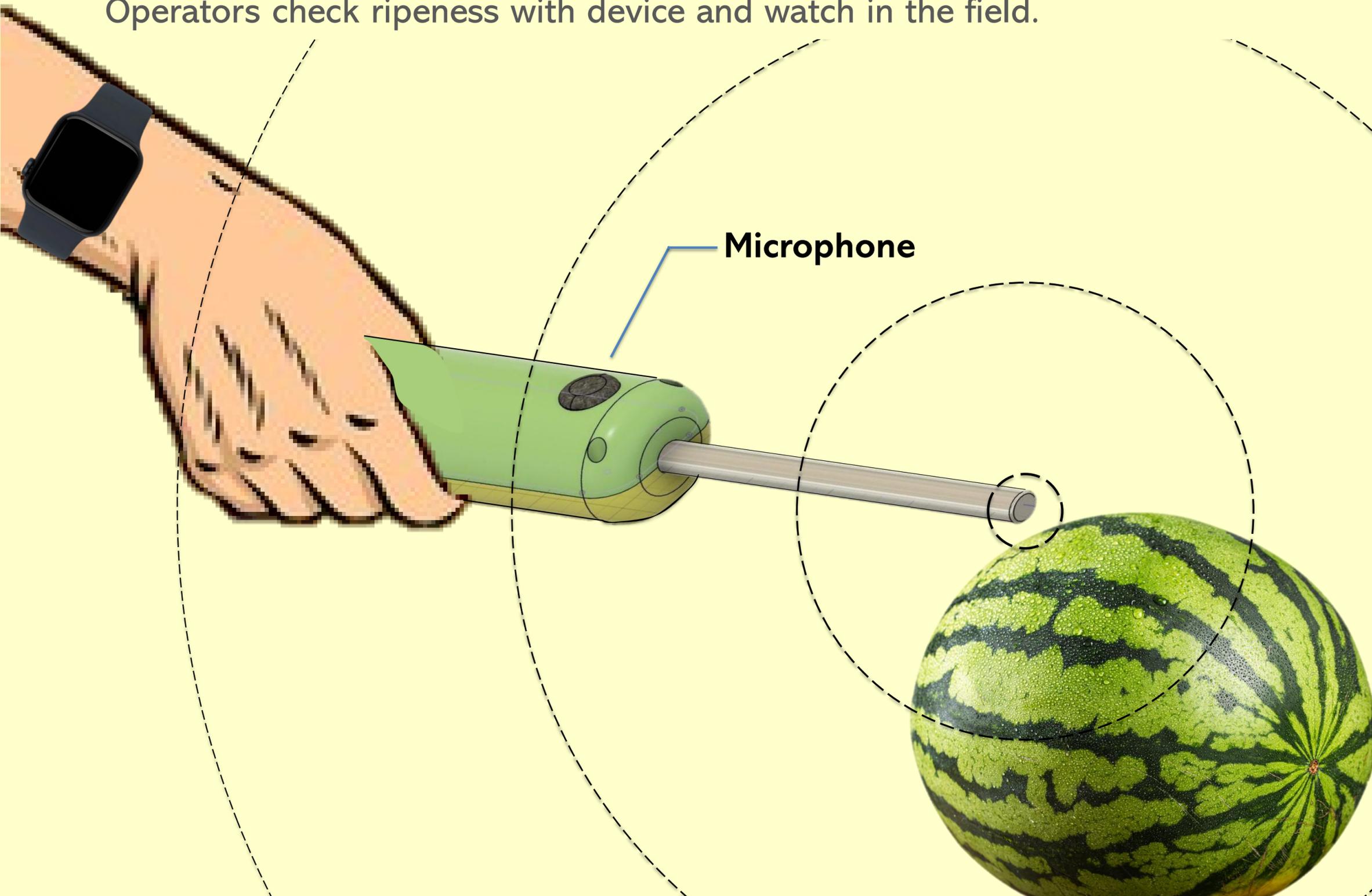
MELODY: APP AND DEVICE

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MELODY: APP AND DEVICE

Operators check ripeness with device and watch in the field.



MELODY: APP AND DEVICE

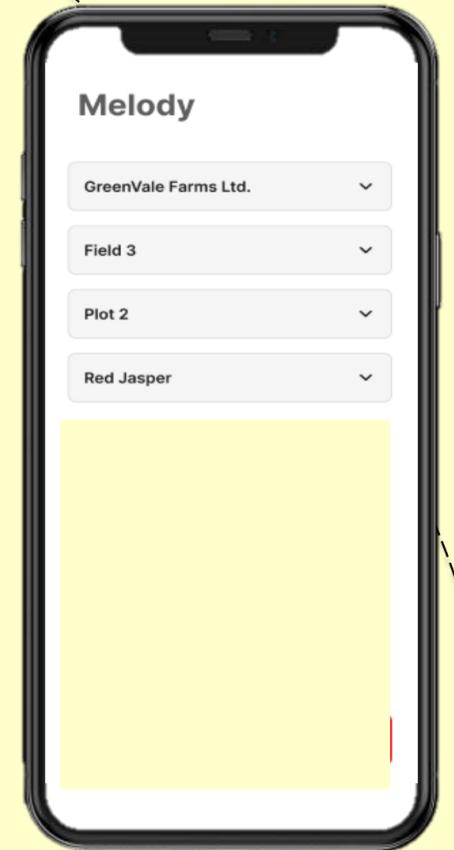
Operators check ripeness with device and watch in the field.

OK → Sweet Spot

Pre OK → Lack of Ripeness

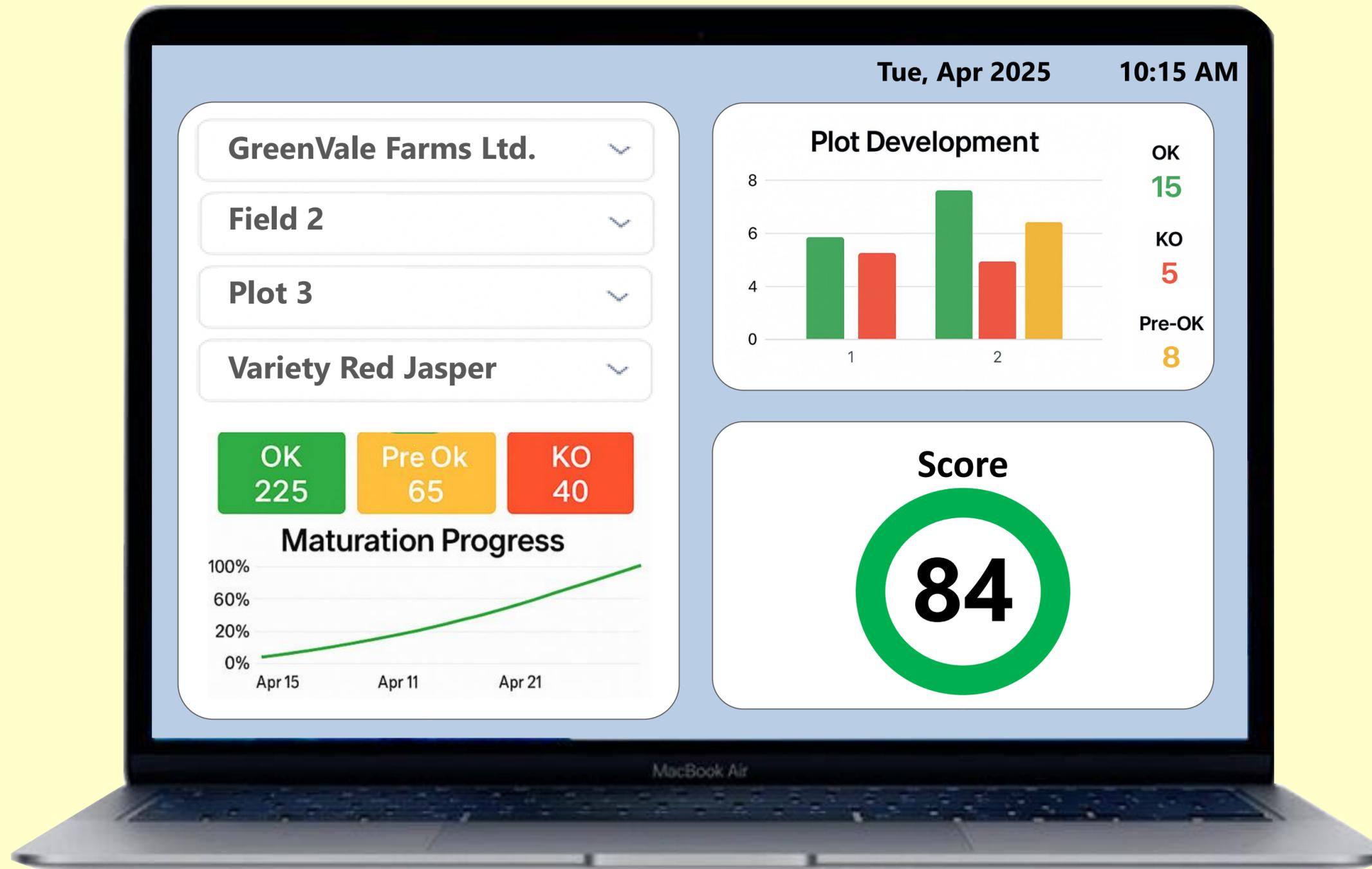
KO → Overripeness

Microphone



MELODY: APP AND DEVICE

Field data is also accessible to top management.





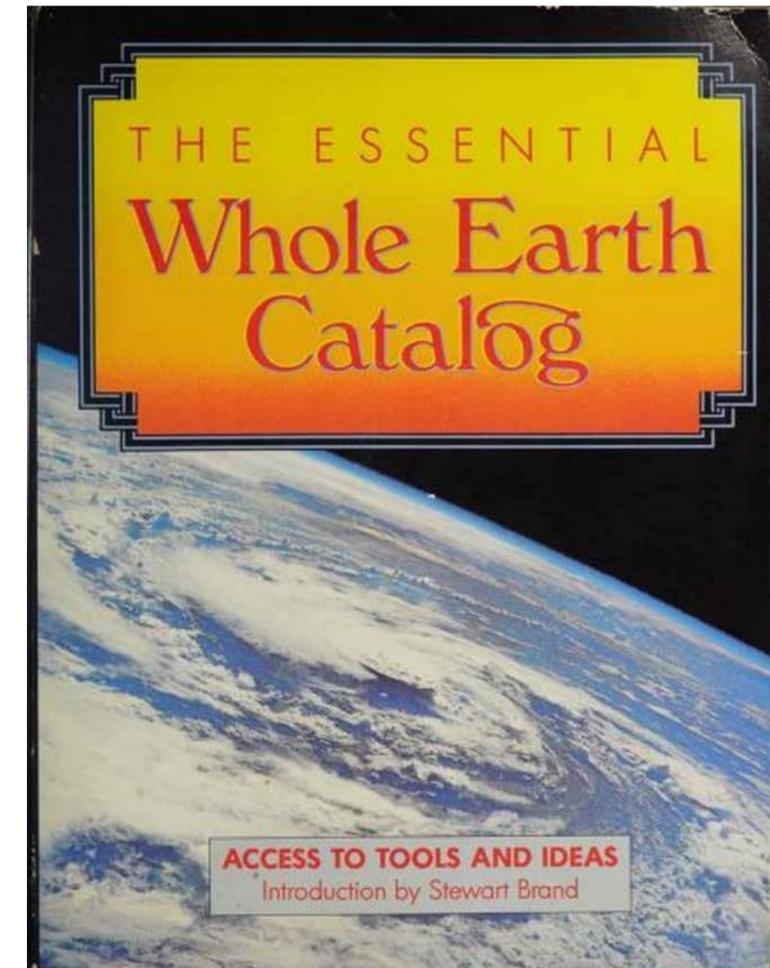
INTERNET OF NATURE (ION): A Proposal for Disruption

IoN B2C: The Citizens oriented project

A minimalist Whole Earth/Craigslist inspired Web project

Resources and tools created and to be used by everyone

“A too early sample site” (AI generated)



“Stay Hungry, Stay Foolish”
Steve Jobs



INTERNET OF NATURE (ION): A Proposal for Disruption

Early Pilots B2C

Kruka

Wise Lamp

DIY Irrigation System Design

Plume

Guideline

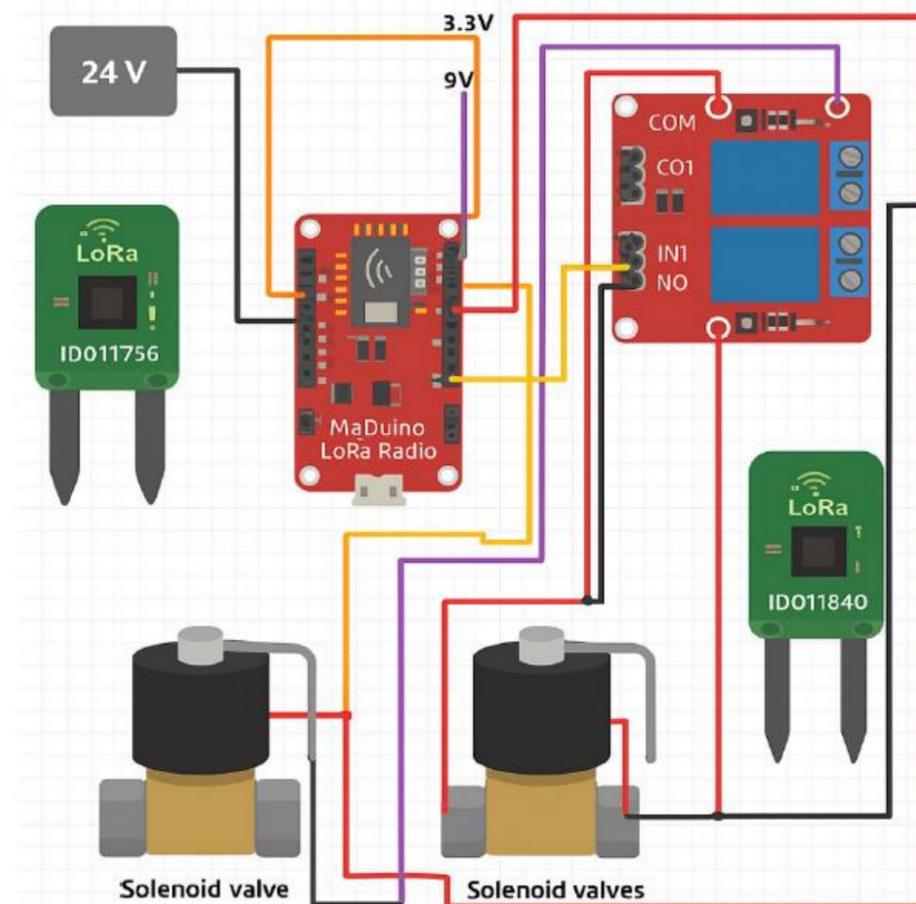
Safest Space





Irrigation System Design

- **Type:** Drip irrigation (localized watering)
- **Main Components:**
- 2 Solenoid valves (12V NC)
- 2 Relay (control solenoid valves)
- 2 Moisture sensors (LoRa)
- Maduino LoRa receiver (gateway)
- Solar panel + battery for autonomy





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INTERNET OF NATURE (ION): A Proposal for Disruption

A moonshot IoN initiative

“Walled gardens”, a “communal park” and “skunkworks”

A global “launch Explora 1.0” event in September 2026

A mid-term in the end of June 2026

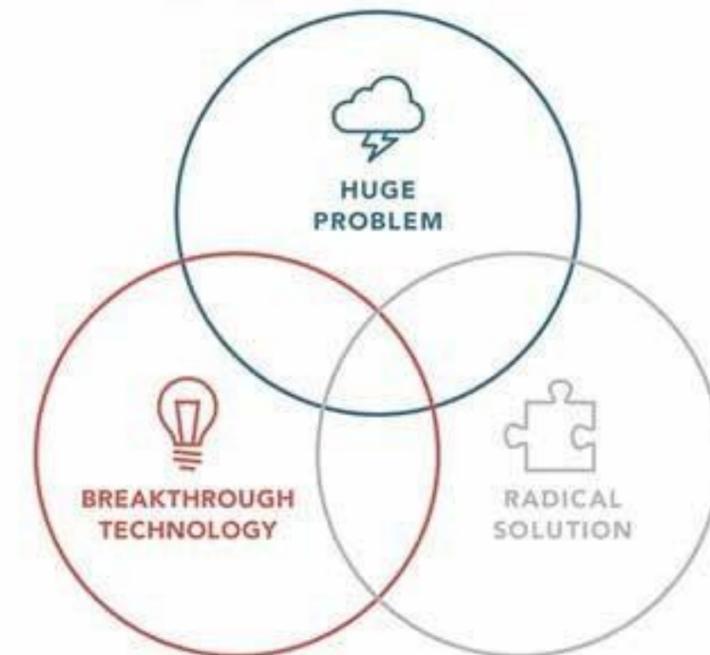
Portugal Natural Capital Consortium

Sovereign Models

IoN Publishing Model

A new ecological economy

MOONSHOT BLUEPRINT



Source: X, solveforx.com/about



INTERNET OF NATURE (ION): A Proposal for Disruption

IoN will be disruptive for both institutions and citizens

Made possible through a disruptive education model.

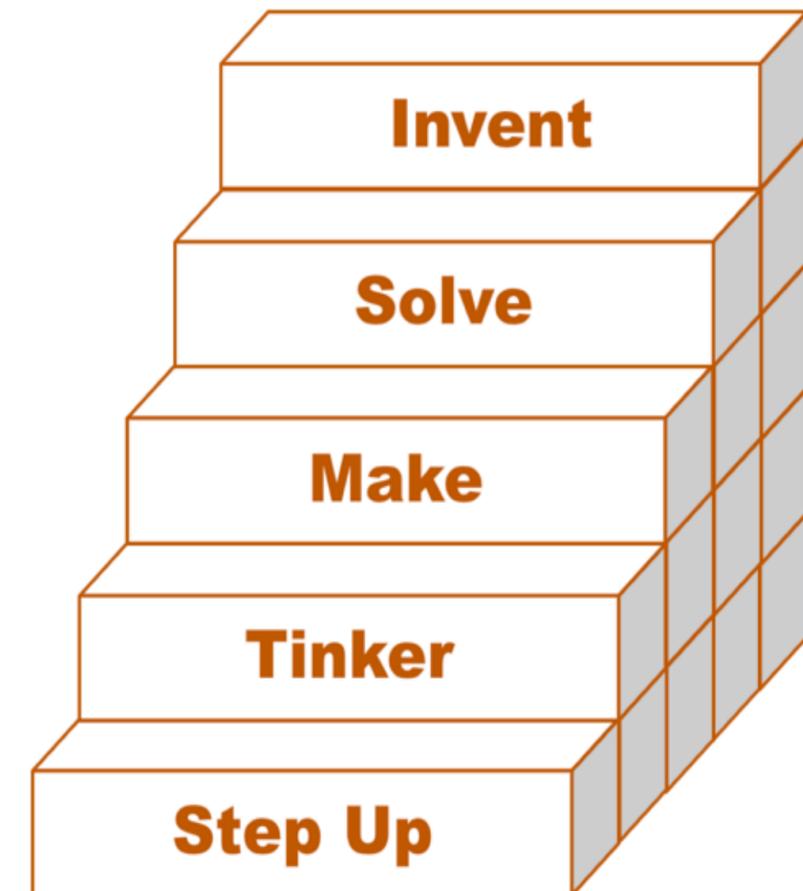
Integrated multimodal Agentic AI.

Embedded carbon/biodiversity markets.

AR/VR front ends for well-being.

Next-gen wellness and sensing devices.

Portugal Natural Capital Corporation as a scalable funding model
(for Portugal)





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Sunday News

The YDreams Collection