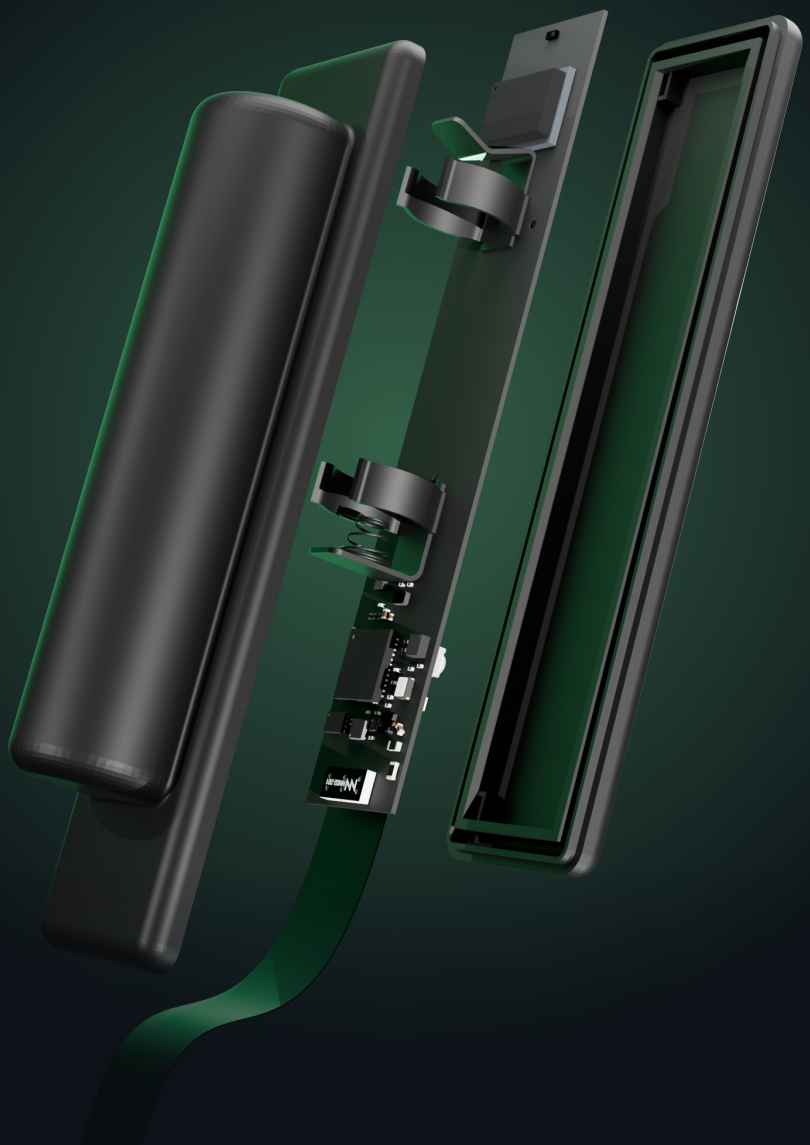
PROJECT PICOBALLOON

MicroStep-MIS
Calibration Partner

Maximize amount of atmospheric data, reduce cost.



96%	saving of filling gas cost
10 g	weight including battery
20x	more data over extended lifespan

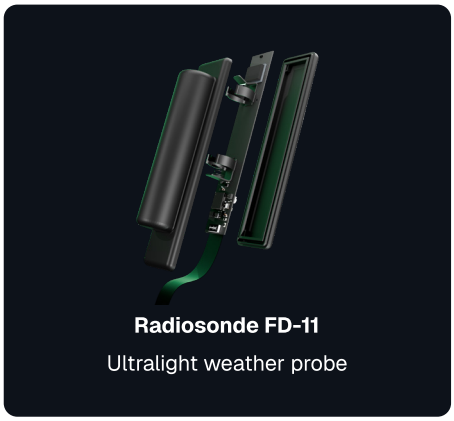
Our ultralight atmospheric observation system utilizes advanced hardware and materials engineering, cutting down lifting gas consumption by 96% while maintaining industry-standard accuracy and sampling rate.

Access affordable, high-quality environmental data scaled for governments, researchers, and businesses globally.

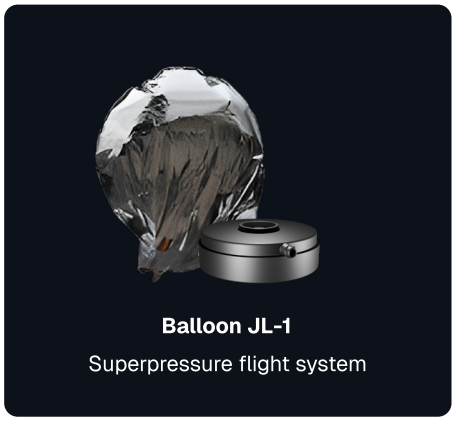
Picoballoon ecosystem

Our observation system is composed of an ultralight radiosonde and a long-duration superpressure balloon. We have successfully collected data from across continents in dozens of evaluation flights, validating our capabilities.

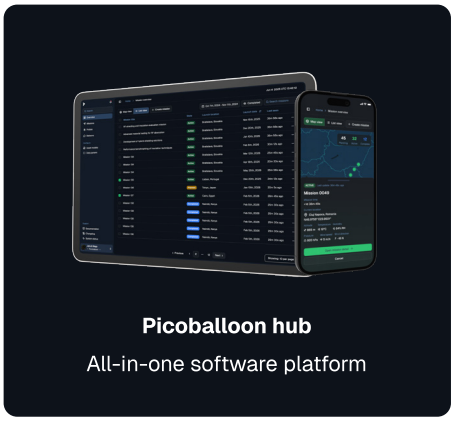
Our complete cloud-based software, featuring mission tracking, inventory management, forecasts, and operational insights, transforms complex high-altitude operations into a seamless and collaborative experience.



Radiosonde FD-11
Ultralight weather probe



Balloon JL-1
Superpressure flight system



Picoballoon hub
All-in-one software platform

Advantages of our system

Cost-effective
Saving up to 96% on lifting gas expenditure thanks to our ultralight radiosonde design.

Extended lifetime
Our radiosonde can collect over 20x more measurements over its extended operating time.

Instant integration
Enabling organizations to collect weather data without investments into ground stations.

Effortless launch
Our system is specifically designed to be launched in harsh conditions with minimal prior training.

Remote area observation
Horizontal flight covering hard-to-reach areas not accessible by traditional sensing platforms.

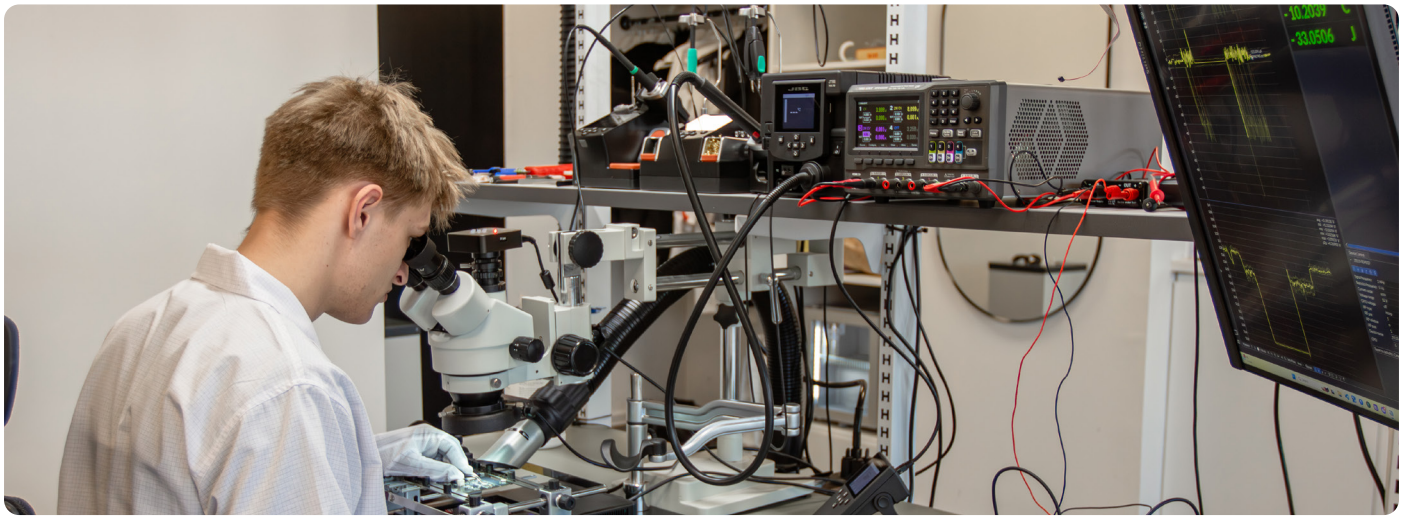
Low altitude platform
Our system can float as low as 1 km creating a unique opportunity to track weather in the boundary layer.

About the team

We are a deep-tech startup rethinking the way atmospheric data is collected. Our dedicated team has extensive experience in open innovation, hardware and software engineering, combining the fresh perspectives of our 20-year-old founders with the invaluable experience of senior engineers with 25+ years in the field. Our team members are strategically based all across Europe, from Slovakia and Czechia to the Netherlands, enabling global reach and diverse insights.

Picoballoon team presenting at Red Bull Basement

Launch preparations



Lab at Noove HQ

Tell us about your needs!

Do you have a specific challenge or idea in mind? Schedule a call and share your specific use case.

Adam Bednář
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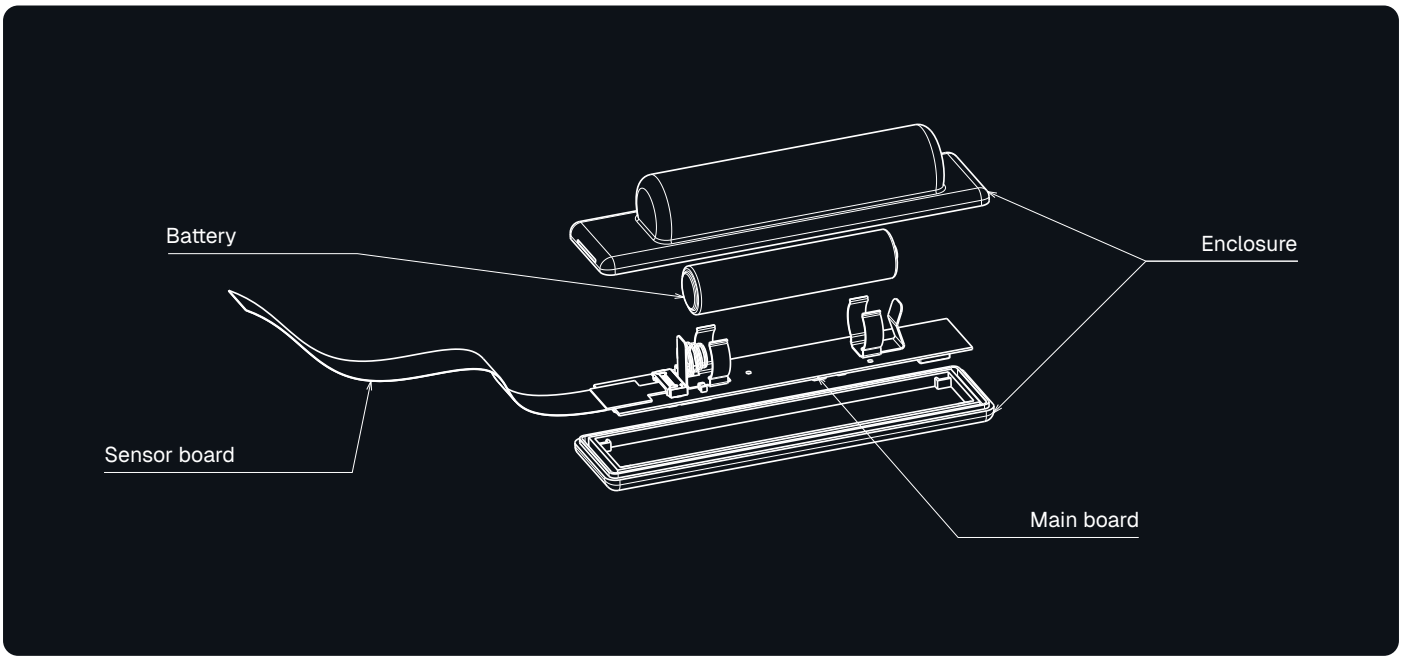
Radiosonde FD-11

Ultralight atmospheric weather probe



The FD-11 is highly miniaturized compared to conventional radiosondes, yet delivers more than 20x the measurements over its extended lifetime. We achieved this groundbreaking performance thanks to our focus on low-power hardware and firmware architecture.

It measures standard meteorological variables (temperature, humidity, pressure) and GNSS wind profiles. In addition, we included an accelerometer for special applications like turbulence tracking. It also outperforms competition in transmission range with a novel radio transceiver.

Specification highlight

Operating time >4 days (1 Hz rate)	**Weight** 10 g (including battery)	**Maximum radio range** up to 500 km
Global coverage Complete coverage of EU and US through LoRaWAN	**Supported constellations** GPS, GLONASS, Galileo, BeiDou, SBAS, QZSS	**Data loss** negligible (acking enabled)
Motion sensor Integrated accelerometer for turbulence tracking	**External sensor support** XDATA, I2C, ADC	**Data storage** Radiosonde can log and later retransmit measurements

Temperature

Sensor type	platinum resistive
Measurement range	-80 to 60 °C
Resolution	0.01 °C
Repeatability in calibration	unavailable (lab testing underway)
Reproducibility in sounding	unavailable (flights scheduled for Q4 2025)

Humidity

Sensor type	capacitive thin film
Measurement range	0 to 100 %RH
Resolution	0.1 %RH
Repeatability in calibration	unavailable (lab testing underway)
Reproducibility in sounding	unavailable (flights scheduled for Q4 2025)

Pressure

Sensor type	piezoresistive
Measurement range	1200 to 10 hPa
Resolution	0.01 hPa
Repeatability in calibration	unavailable (lab testing underway)
Reproducibility in sounding	unavailable (flights scheduled for Q4 2025)

Geopotential height

Measurement range	-500 to 50,000 m
Resolution	0.1 gpm
Uncertainty	±10 gpm
Reproducibility in sounding	unavailable (flights scheduled for Q4 2025)

Wind speed

Measurement range	0 to 200 m/s
Resolution	0.1 m/s
Uncertainty	±0.2 m/s

Wind direction

Measurement range	0 to 360 deg
Resolution	0.1 deg
Uncertainty	±2 deg (>5 m/s)

Motion

Type	accelerometer
Purpose	turbulence tracking and automatic activation
Range	±16 g
Accuracy	±40 mg
Date rate (internal)	50 Hz

GNSS receiver

Supported constellation	GPS, GLONASS, Galileo, BeiDou, SBAS, QZSS
Number of channels	24
Frequency	L1 C/A, E1, L1OF, B1, B1I
Acquisition time (cold start)	35 s
Reacquisition time (hot start)	1 s
Position accuracy	±5 m 2DRMS

Radio

Type	synthesized LoRa/FSK transceiver
Frequency band	862 to 928 MHz
Bandwidth	125 kHz
Output power	25 mW
Maximum range	up to 500 km
Global coverage	complete coverage of EU and US through LoRaWAN
Data downlink rate	<5.5 kbps
Data loss	negligible (with uplink acking enabled)
Sampling rate	1 Hz

Power

Power source	1x Lithium AAA, replaceable
Battery capacity	1800 mWh
Operating time	>4 days (1 Hz rate)
Operating time (reduced rate)	>50 days (2 / min)

Data storage

Purpose	the radiosonde can log and later retransmit measurements
Storage size	1 MB
Capacity	125,000 measurements with delta compression (1.5 days at 1 Hz)

Physical parameters

Dimensions (body)	80x15x15 mm
Weight (including battery)	10 g

External sensor support

Protocol	XDATA, I2C, ADC
Power supply	<50 mA (impacts operating time)
Data rate	20 bytes/s (with delta compression)

Supported balloons

Picoballoon JL-1: floating up to 50 days at up to 16 km
Hwoyee 100g: sounding up to 27 km
Hwoyee 200g: sounding up to 31 km
Hwoyee 350g: sounding up to 37 km

Balloon JL-1

Superpressure flight system

Our new superpressure balloon system redefines how atmospheric observations are performed, with an unprecedented float duration of up to 50 days.

Constructed from aerospace grade TritaX film, our envelope weighs just 136 g, while carrying payloads up to 50 g. Combining JL-1 with FD-11 results in a 96% reduction in lifting gas usage.

Integrated gas valve

The integrated spring-loaded composite valve ensures safe and effortless inflation with a variety of lifting gases and enables precise mid-flight superpressure regulation.

Adjustable float level

Our novel method of mixing lifting and ballast gases enables operators to select custom float levels with great accuracy, critical for collecting data from specific atmospheric layers.

With adjustable ascent rates from 0.5 to 5 m/s, our system seamlessly replaces traditional sounding profiles while unlocking possibilities for extended missions.

This unique combination of high performance and flexibility will transform both day-to-day data collection and advanced atmospheric research.

Specification highlight

Lifting gas volume	Flight duration	Float level range	Targeting accuracy
135 l	up to 50 days	500 to 16,000 m	±100m

Balloon

Type	4-gore prolate spheroid superpressure envelope
Material	TritaX
Thickness	26 µm
Total volume	915 l
Mass	136 g

Inflation and pressure release valve

Type	proprietary spring-loaded composite valve mechanism
Material	glass-filled engineering resin, silicone
Opening pressure	1 to 4 kPa
Mass	15 g

Tether

Material	braided high-modulus polyethylene
Lenght	10 m
Tensile strength	65 N
Mass	0.4 g

Gas compatibility

Compatible lifting gases	H2, He
Compatible ballast gases	Ar, synthetic air
Lifting gas volume	135 l

Performance

Float level range	500 to 16,000 m
Float level targeting accuracy	±100m
Flight duration	up to 50 days
Payload capacity	up to 50 g (compatible with FD-11 radiosonde)
Ascent rate	0.5 to 5 m/s

Picoballoon hub

End-to-end weather observation platform for radiosondes

Our software platform empowers you to manage the complete lifecycle of your Picoballoon launches. Plan, track and analyze all your missions through a cloud-first solution. Designed for accessibility and ease of use, the hub enables control and monitoring from any device.

The hub enables you to manage your inventory, simulate launches, configure radiosondes, and get operational insights. Your data will always be secure and readily available.

We utilize the global LoRaWAN radio network to receive data anywhere across continental Europe and the US. No need for dedicated ground stations and data processing hardware.

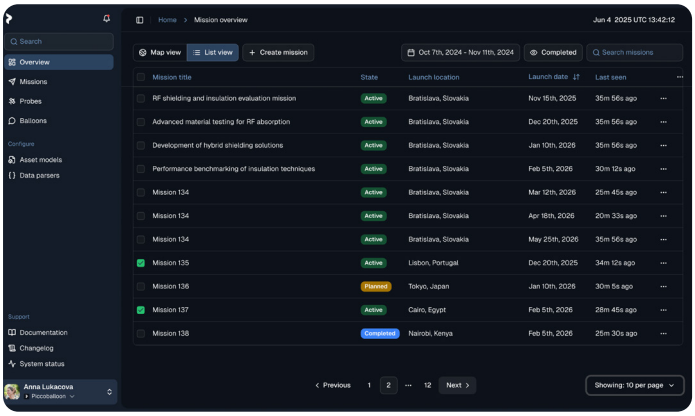
Online demo

Scan the QR code and see the Picoballoon hub for yourself!

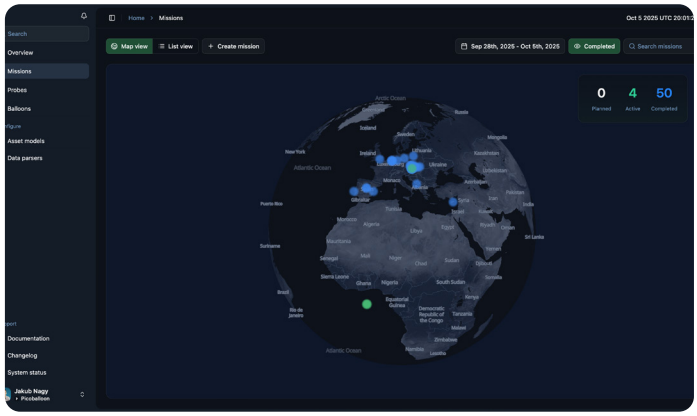
Hub features

Weather data analysis & export	**Launch operations**	**Radiosonde configuration**
Inventory management	**Flight path simulation**	**Operational insights & intelligence**

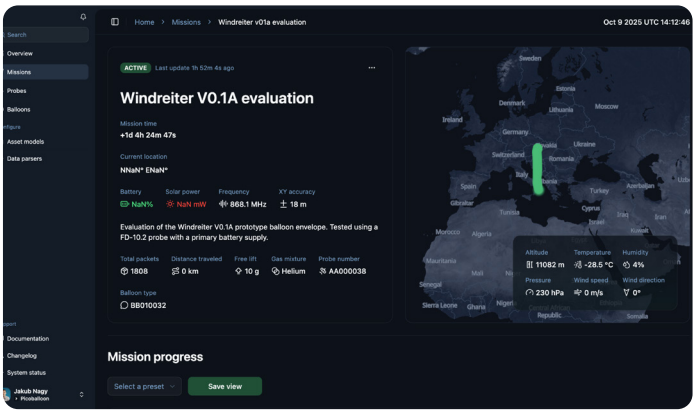
Desktop views



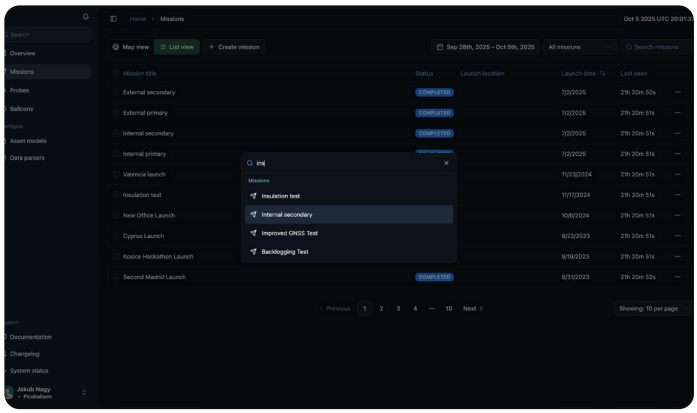
Missions overview - list view



Mission overview - map view

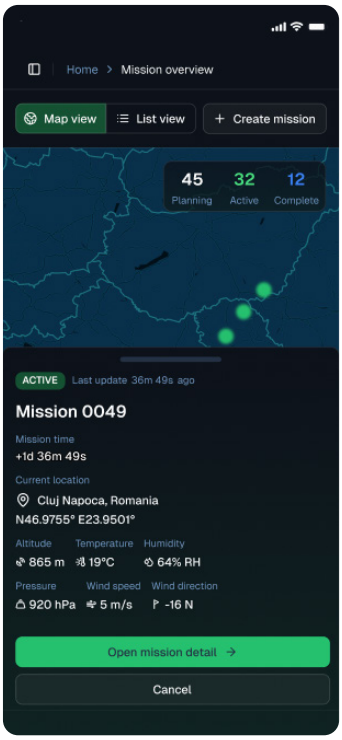


Individual mission overview

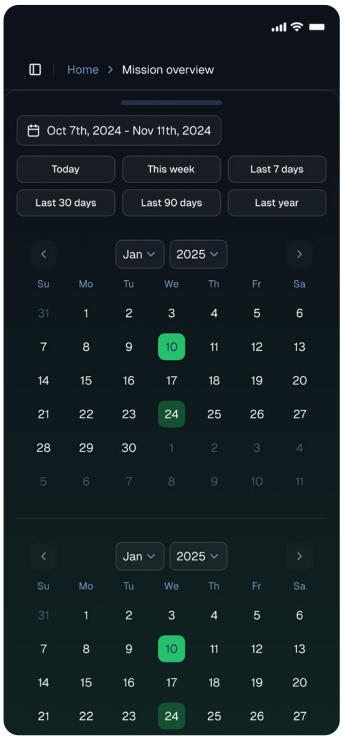


Missions overview - search

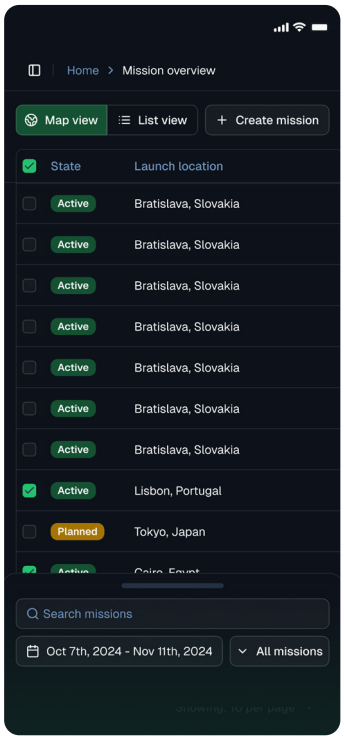
Mobile views



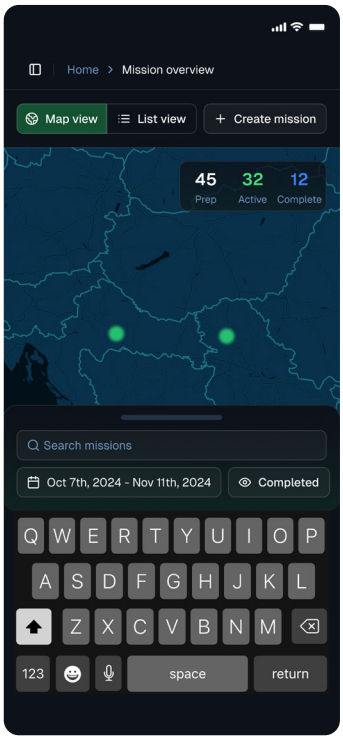
Mission detail



Mission detail - date picker



Mission detail - list view



Mission detail - search

PROJECT PICOBALLOON

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Calibration Partner

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All product information and specifications are preliminary.
Picoballoon products are in development and testing phase.

Noove and Project Picoballoon are not part of MicroStep-MIS.

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