Can we make radiosondes reusable?

Yohan Hadji, R2Home founder | EPFL Microengineering

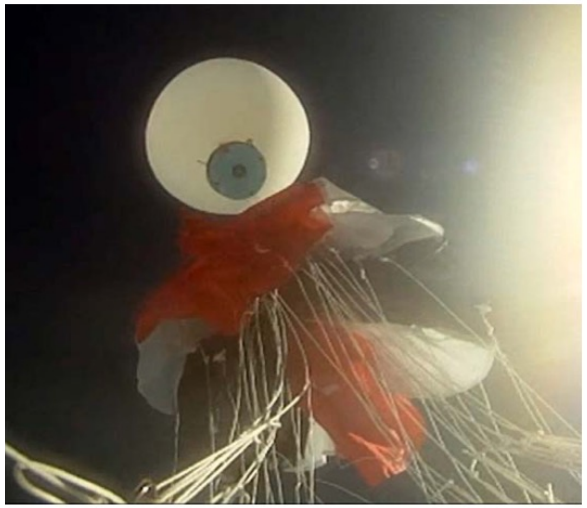
Supported by MeteoSwiss

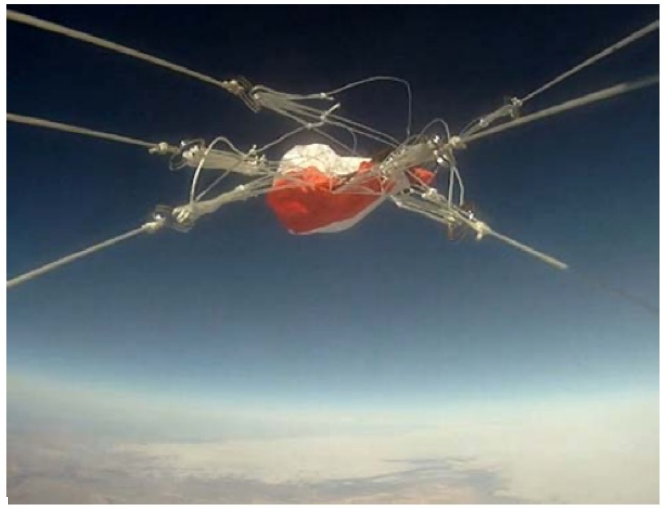
A radiosonde that returns home has been the Holy Grail for 50+ years now.

The ideal system

Technical Challenges

Regulatory Challenges





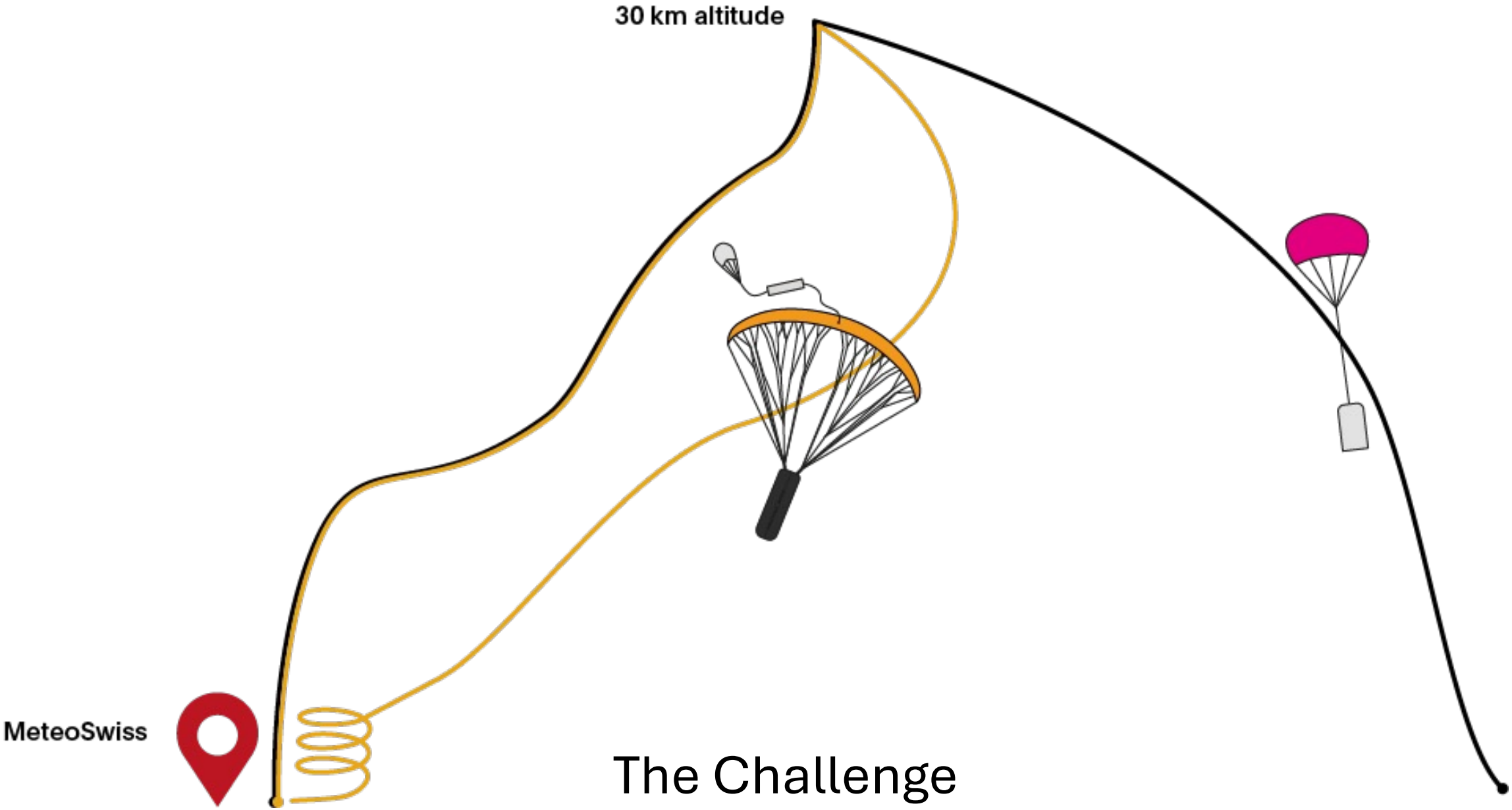
Above: HAHO, Benton and Yakimeko, 2013
Left: HABLEG by DLR, 7kg and 3m wingspan, 2015

But planes were too large to be operated legally,

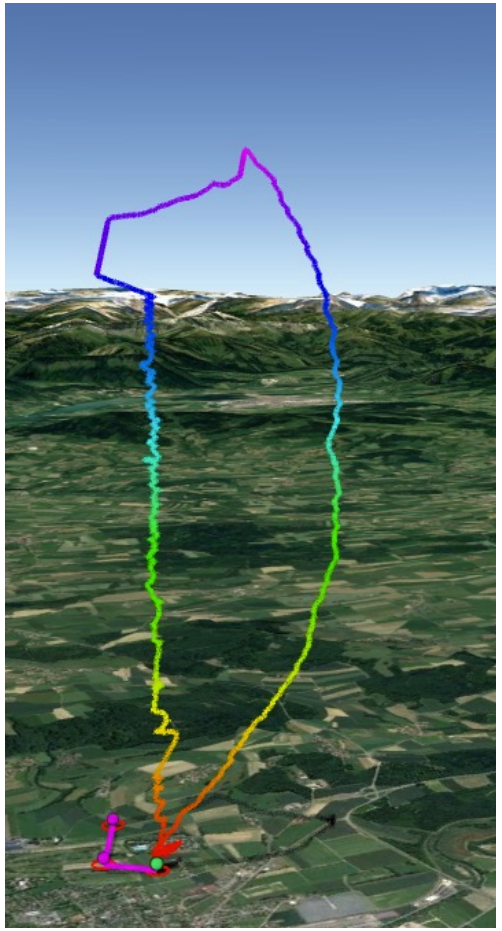
and parafoils were not successfully deployed at high altitude.

R2Home Project start in 2019

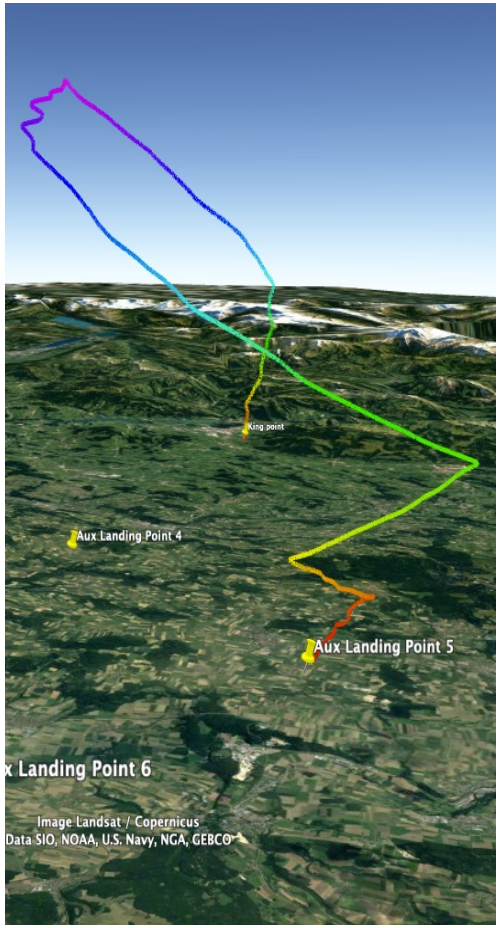
Initial goal: explore what’s possible with guided parachutes



The Challenge



First high-altitude flights at MeteoSwiss (July 2022)



First reliable deployment at 15km altitude (Sept 2023)

Making the Science Easier

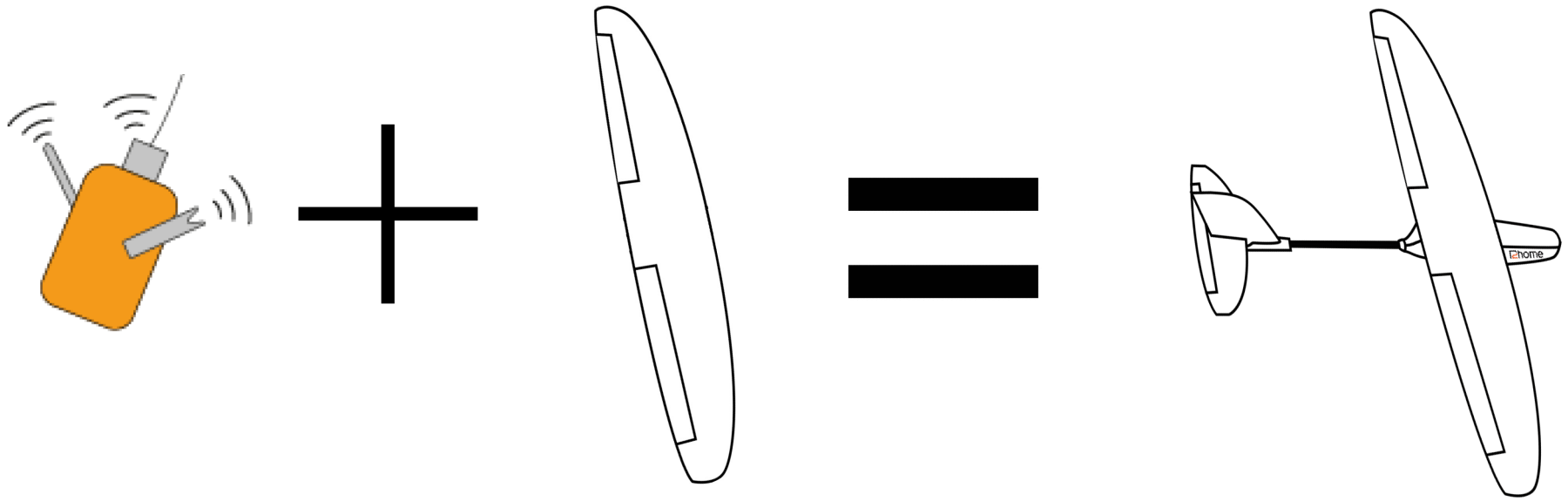
- Never again landing in trees, lakes, cities
- No need to wait for perfect window anymore
- Flying more expensive sensors with less risk
- Chose where you collect your data

That being said …

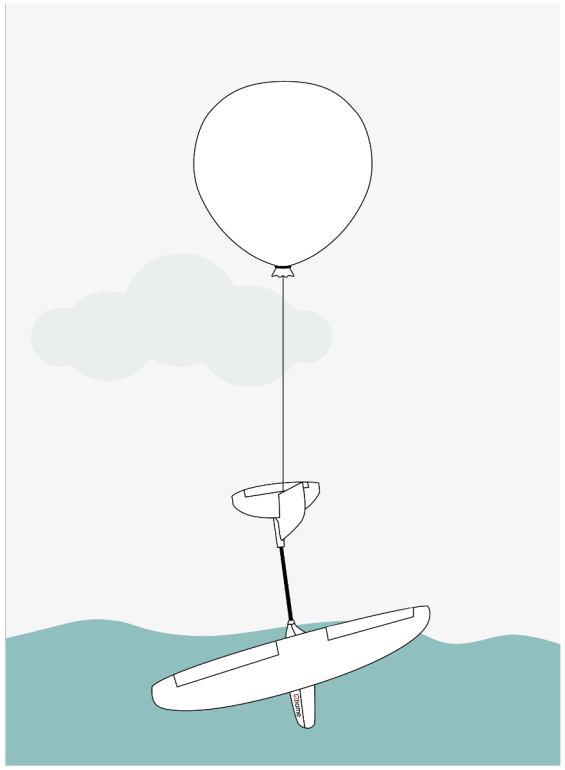
- Additional prep prior to flights required
- Return to *launch* not possible on most days
- Less suitable for small payloads

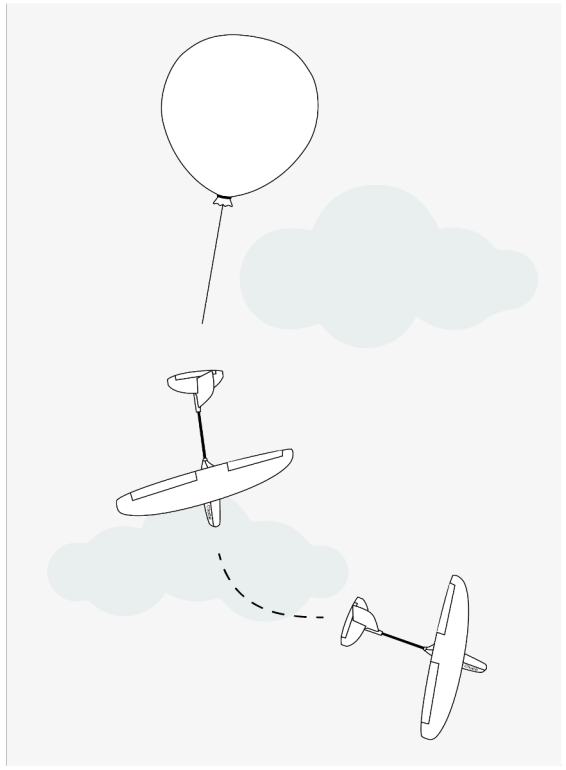
Could we make the solution smaller?

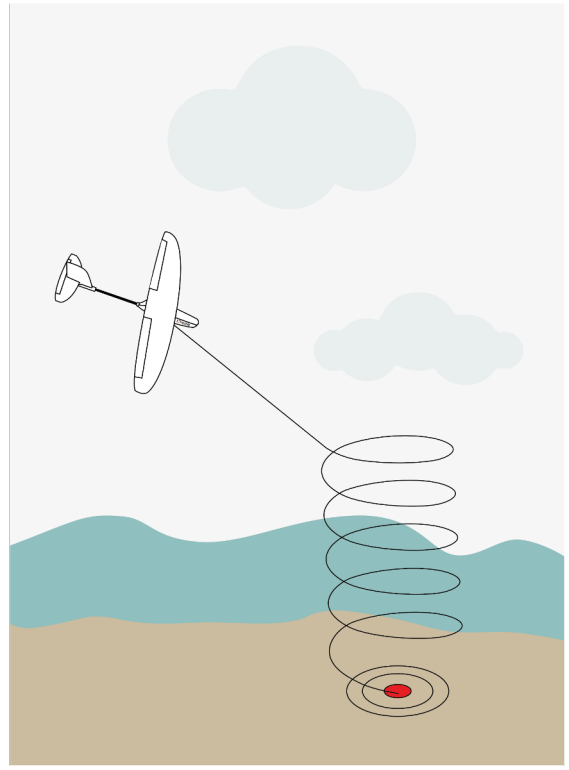
Not a system to return radiosondes…



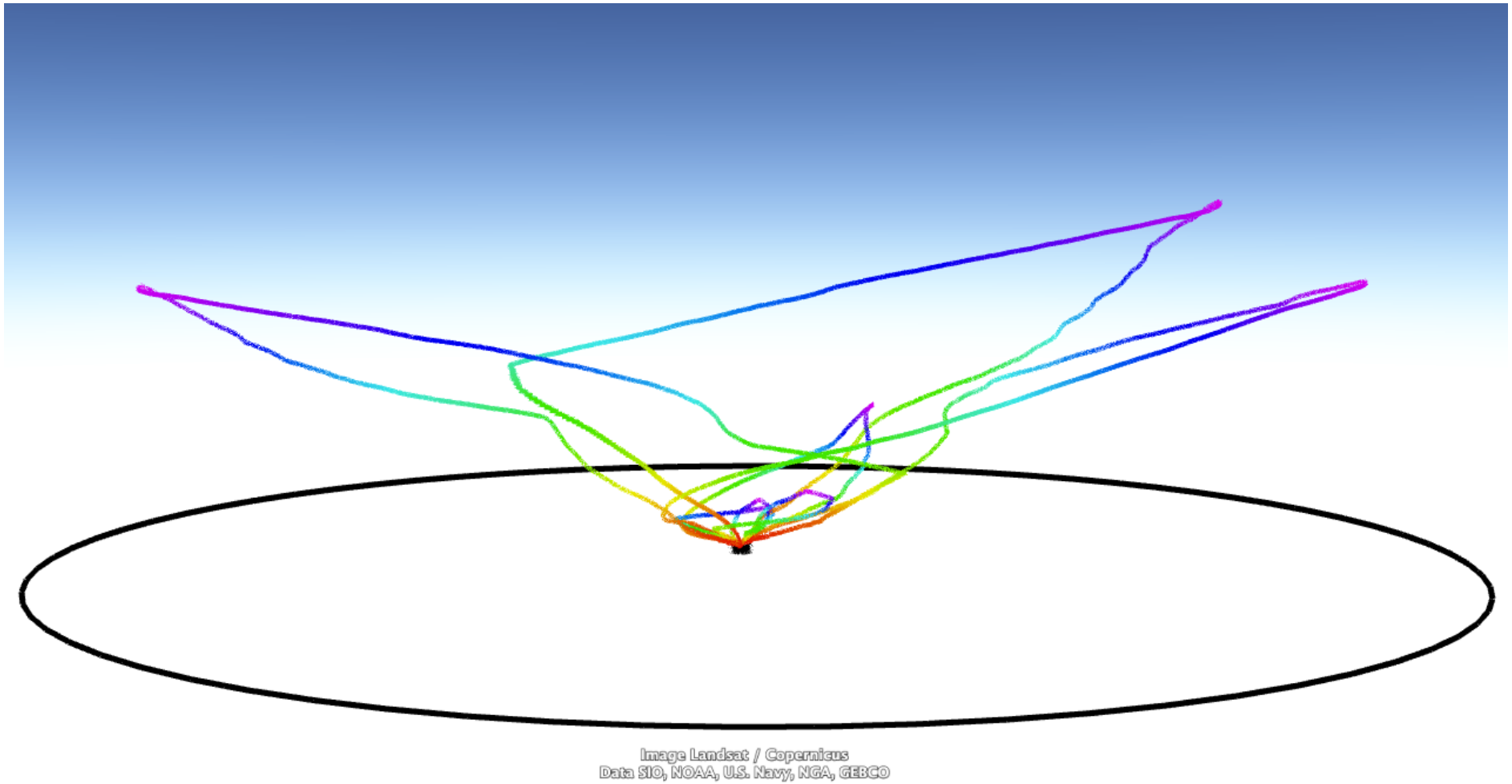
A radiosonde with wings!



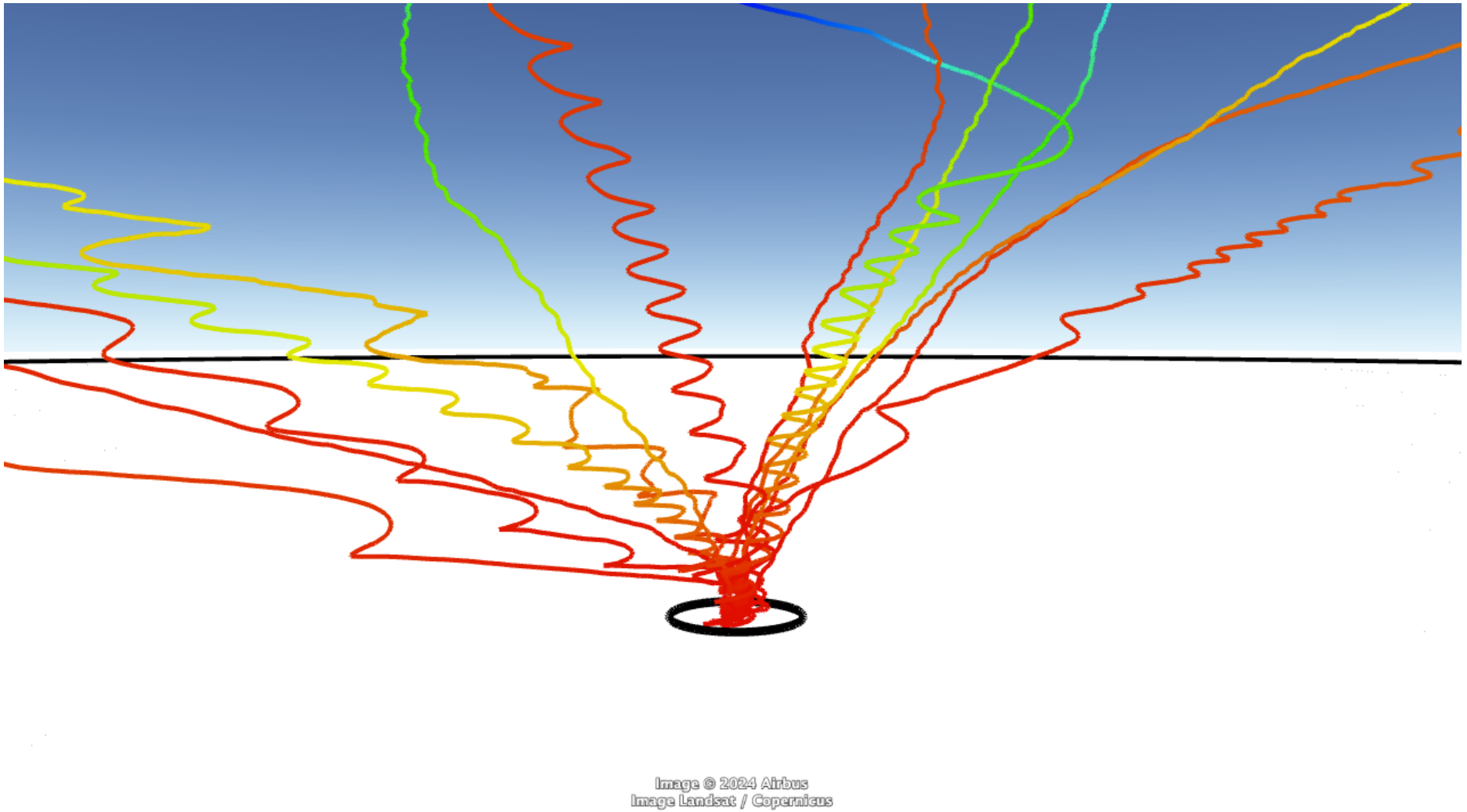




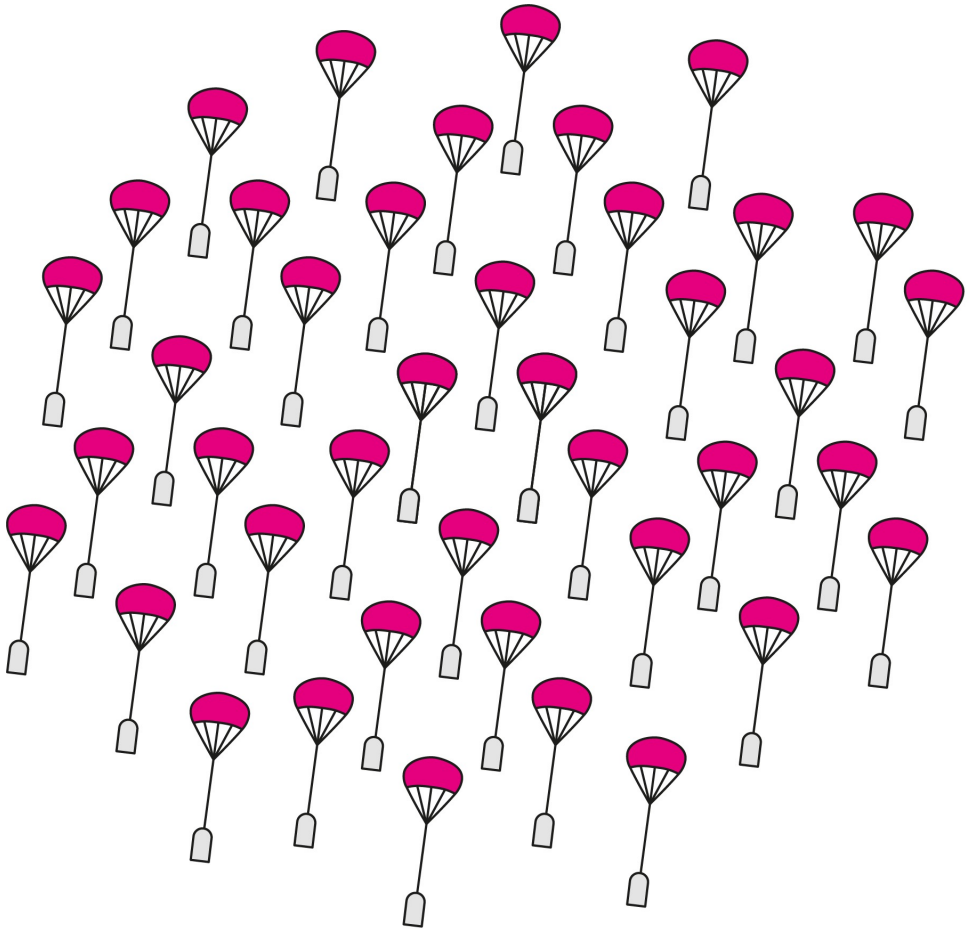
New Approach: integrating the same software into a smaller glider



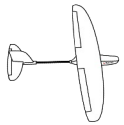
Return to launch site from 20km+ altitude 3 times (Feb 2024)



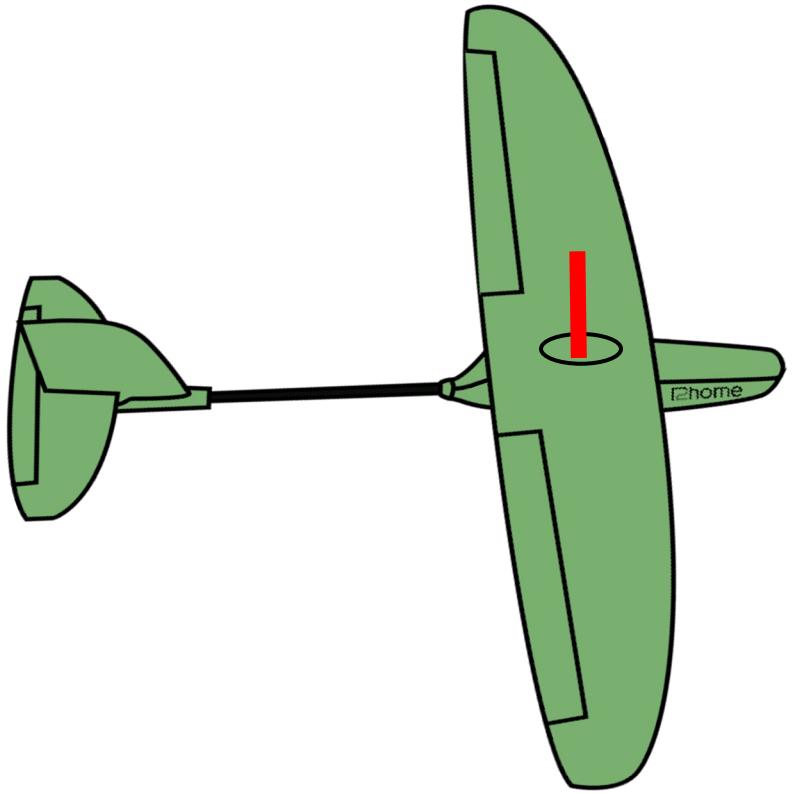
Landing within a 30-meter radius (for now)

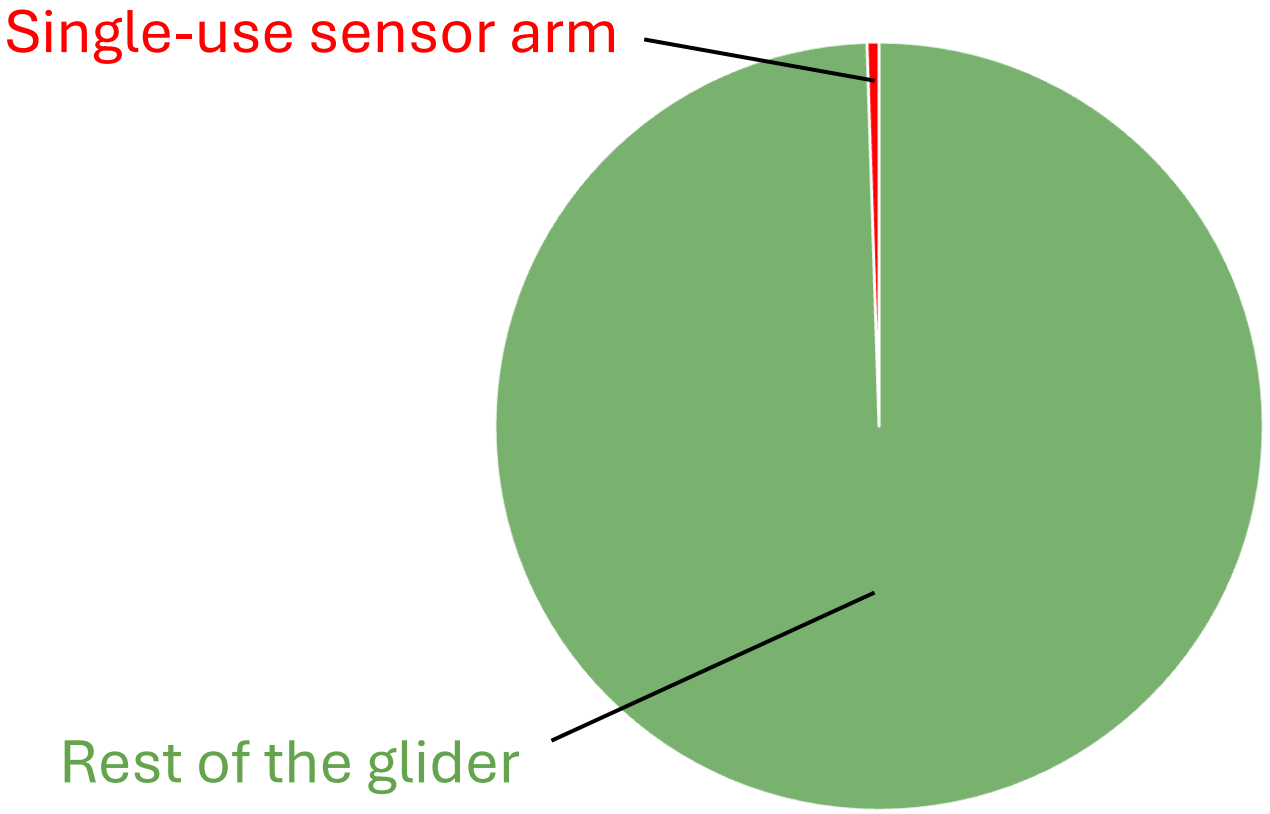


=



We can finally make radiosondes sustainable





Every component should be used to its maximum lifetime

Reusability allows us to fly with more expensive sensors

We are here

50+ years of single-use radiosondes

The technology is ready

We’re looking for partners in the Radiosonde Industry to finally make radiosondes reusable

I’m putting a team together

Let’s talk

yohan@r2ho.me





	Total Weight	Wingspan	Tangling	Repacking	Safety	Target Use Case
Parachute	2kg	2m	Yes	Yes	High	Atmospheric Research
Wing Glider	250g	60cm	No	No	Higher	Operational Weather

Why this new glider approach?

Full operational testing of parafoil system with MeteoSwiss since 2022

Unlimited permission to fly already granted by FOCA (Swiss Aviation Authority)