

Progress on the development of innovative, floating, biodegradable radio- probes for atmospheric monitoring inside warm clouds

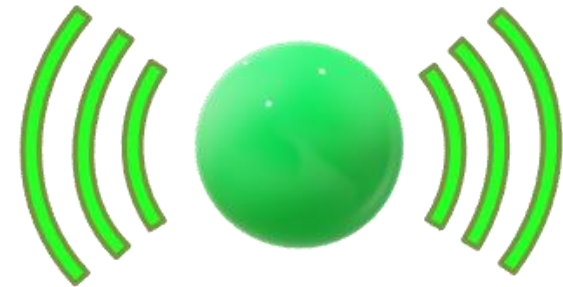
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INTRODUCTION

RESULTS

FUTURE WORK



ACKNOWLEDGMENTS:

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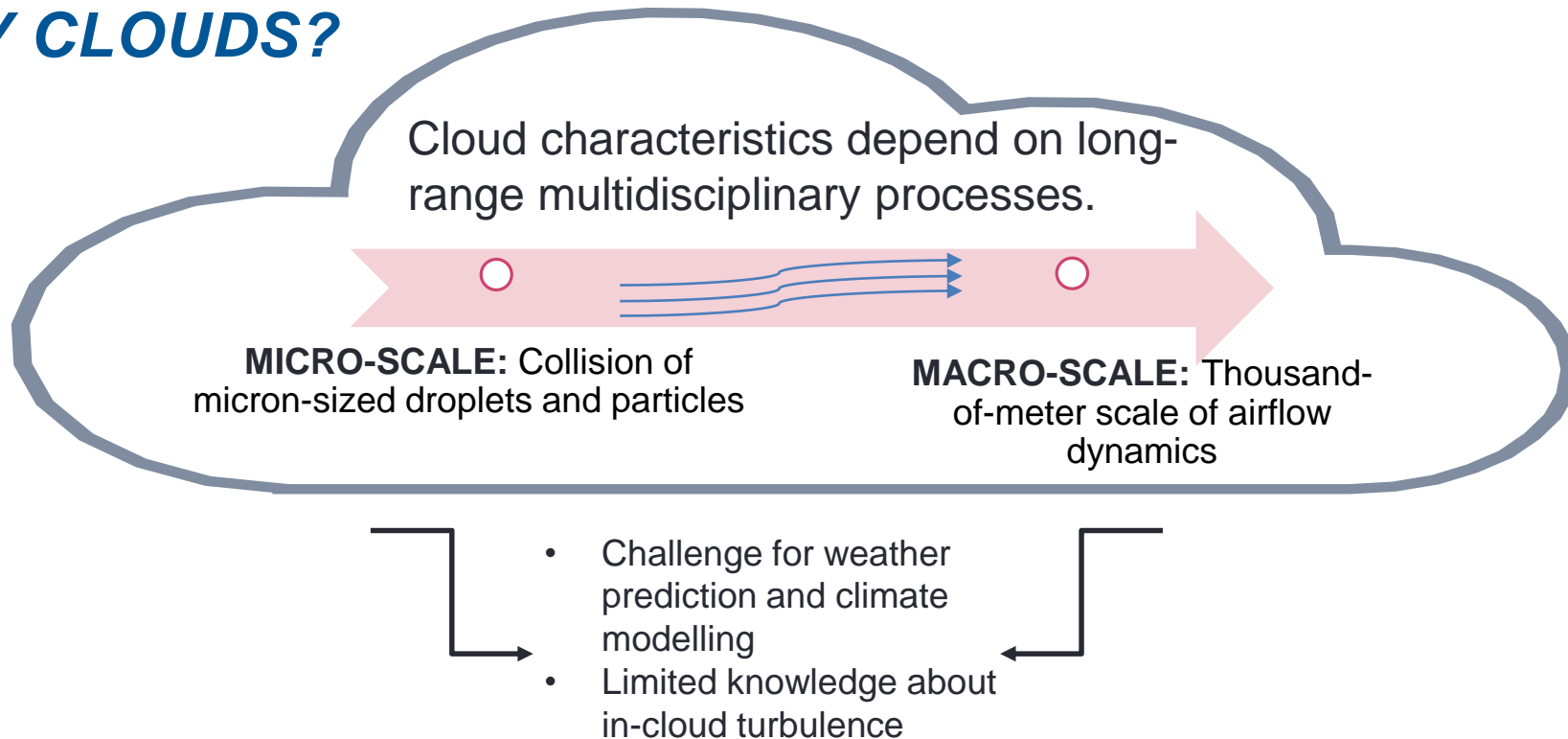


H2020-MSCA European Training Network

Cloud-MicroPhysics-Turbulence-Telemetry: An inter-multidisciplinary training and research network for enhancing the understanding and modeling of atmospheric clouds "



WHY CLOUDS?





H2020-MSCA European Training Network

Cloud-MicroPhysics-Turbulence-

Telemetry: An inter-multidisciplinary training and research network for enhancing the understanding and modeling of atmospheric clouds "



RESEARCH & DEVELOPMENT ACTIVITIES

Requirements:

- Lightweight (≈ 20 grams)
- Compact size ($\approx \varnothing 20\text{cm}$)
- Low cost
- Low power
- Environmentally friendly (as much as possible)
- Expendable
- Accurate
- Microprocessors and solid state sensors
- Ability to follow small scale turbulence fluctuations inside clouds and in surrounding air

Laboratory and numerical simulations

Field experiments

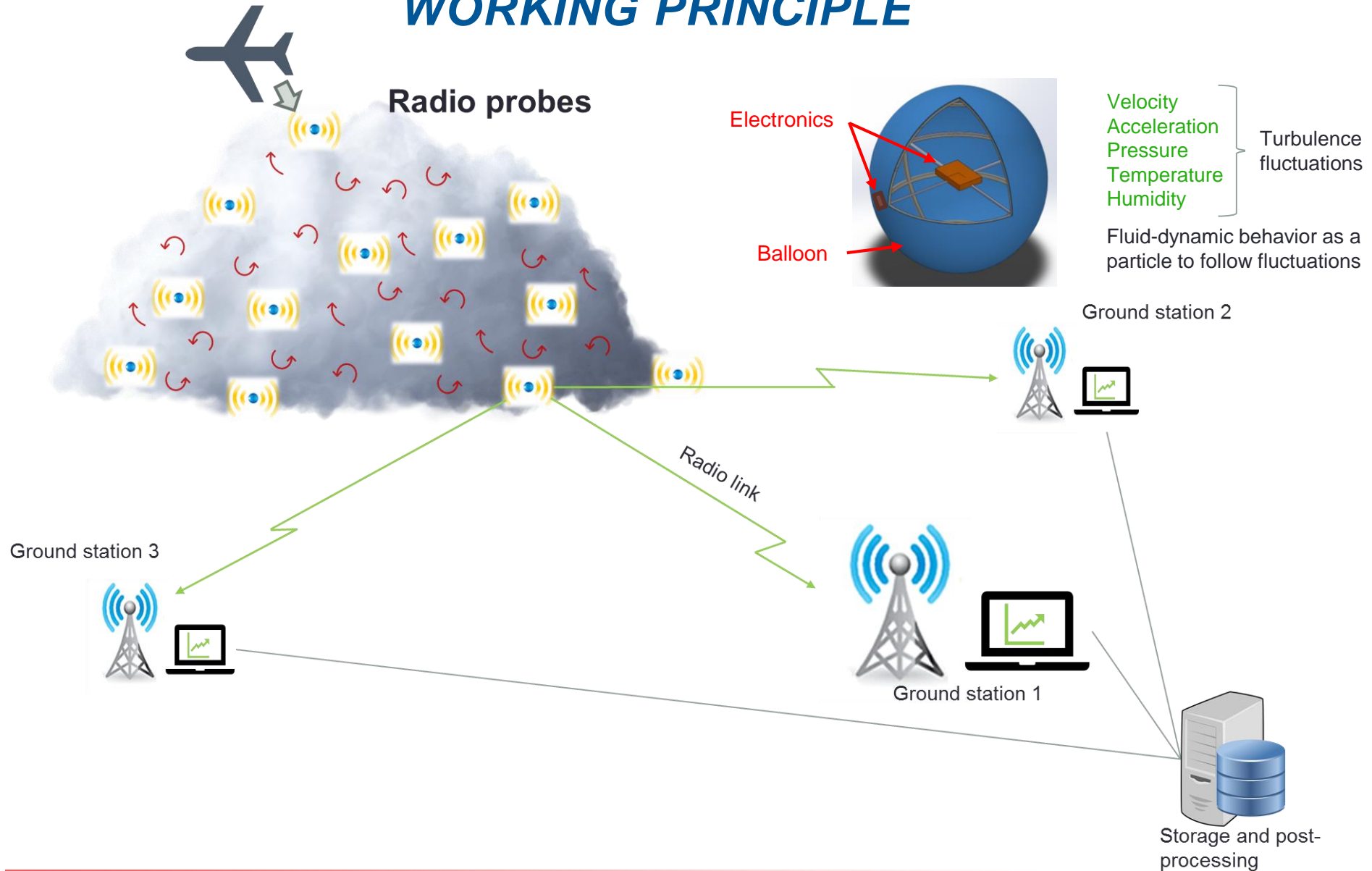
New cloud
Lagrangian-based
fluctuation datasets

Innovative atmospheric
mini-radio probes

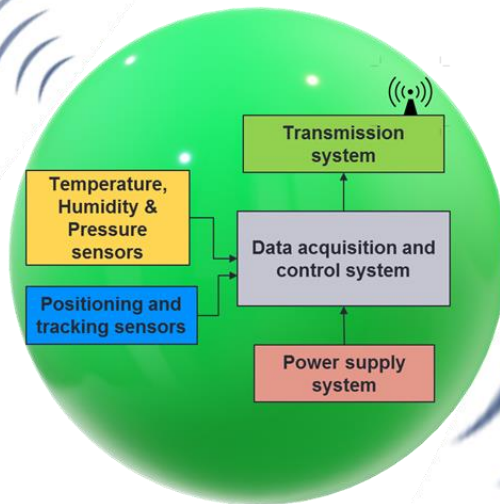
Design and development of
advanced fast
temperature probes

Velocity MEMS

WORKING PRINCIPLE



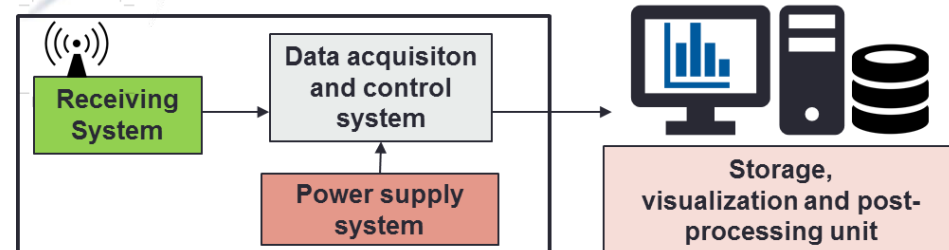
ELECTRONIC SYSTEM CONFIGURATION



Radio probe

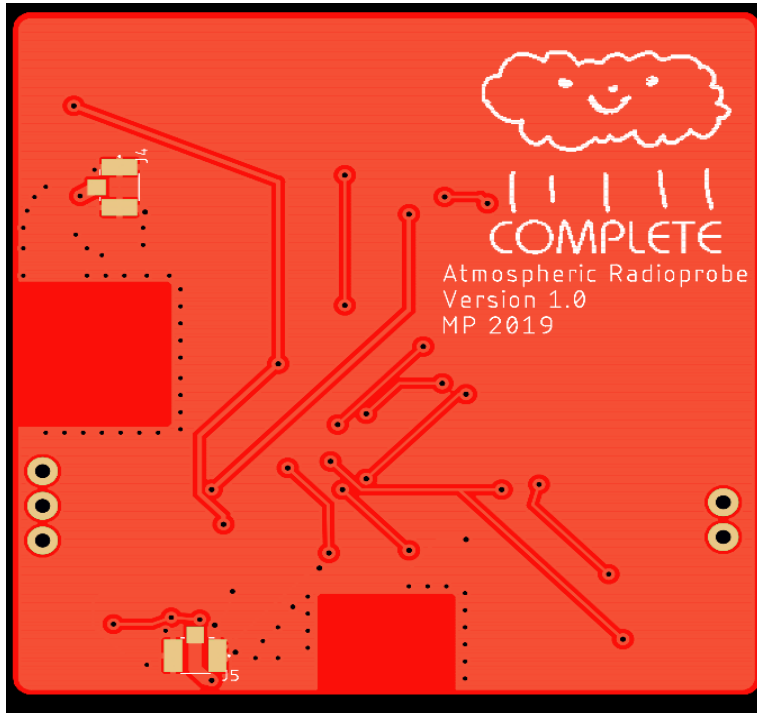
Radio link

Receiving and ground station



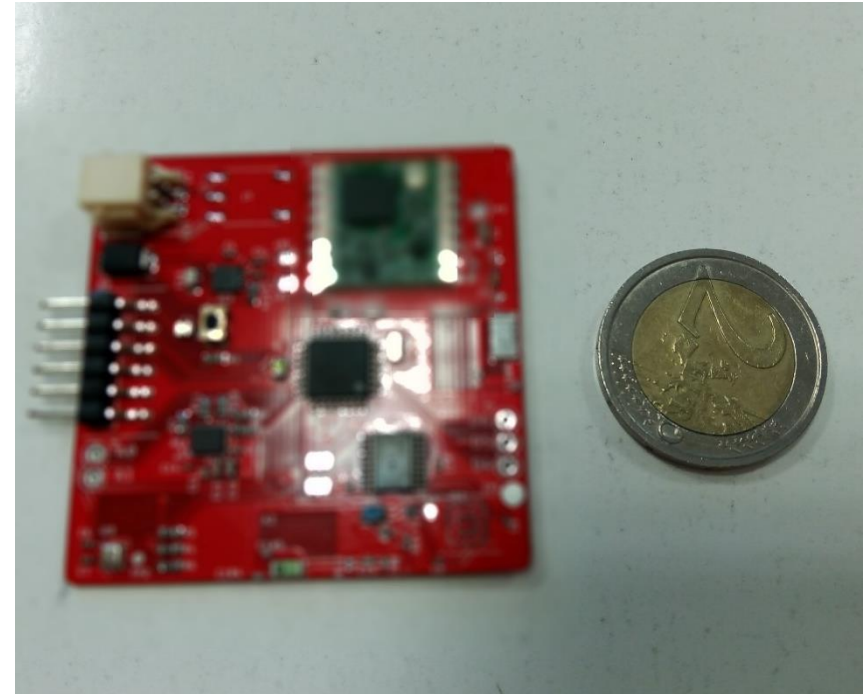
FIRST RADIOSONDE PROTOTYPE

5 cm



Board layout. Bottom view

5 cm



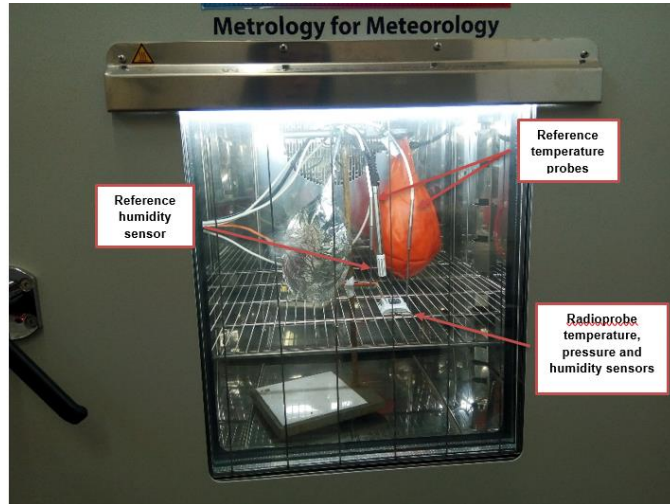
Radiosonde's electronic board

Characteristics:

Dimensions: 5 cm x 5 cm

Weight \approx 7 grams (without battery)

CALIBRATION AND MEASUREMENTS



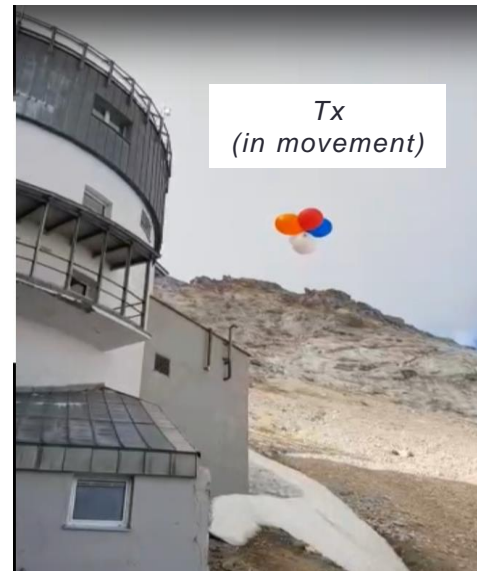
Sensor calibration. Climate chamber INRiM.



Sensor measurements. open environment



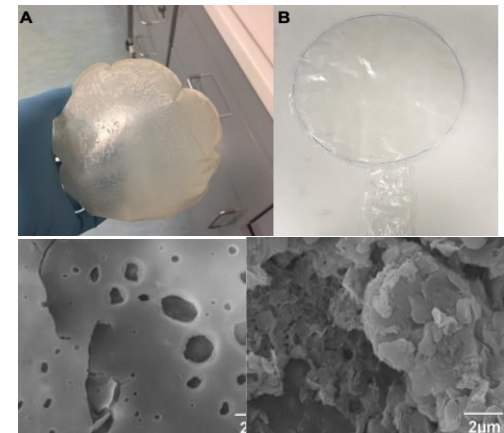
Communication link measurements POLITO



Communication link. Umweltforschungsstation Schneefernerhaus, Mt. Zugspitze



Communication link measurements



Some balloons. A. Mater Bi balloon, B. PLA balloon (T.C. Basso et. Al, 2019)

WHAT IS NEXT:

- Further laboratory and field measurements campaigns
- Further size and weight optimization of the radioprobes

Thank you!

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