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HEMERA

New Science opportunities using stratospheric balloons

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on behalf of the HEMERA team:

CNES, ASI, Airstar, ASC, CNRS, Cranfield University, CSA, DLR, Heidelberg University, INAF, KIT, Rymdstyrelsen, SSC

AHEAD2020 Progress Meeting on Space Experiments

2 October 2020

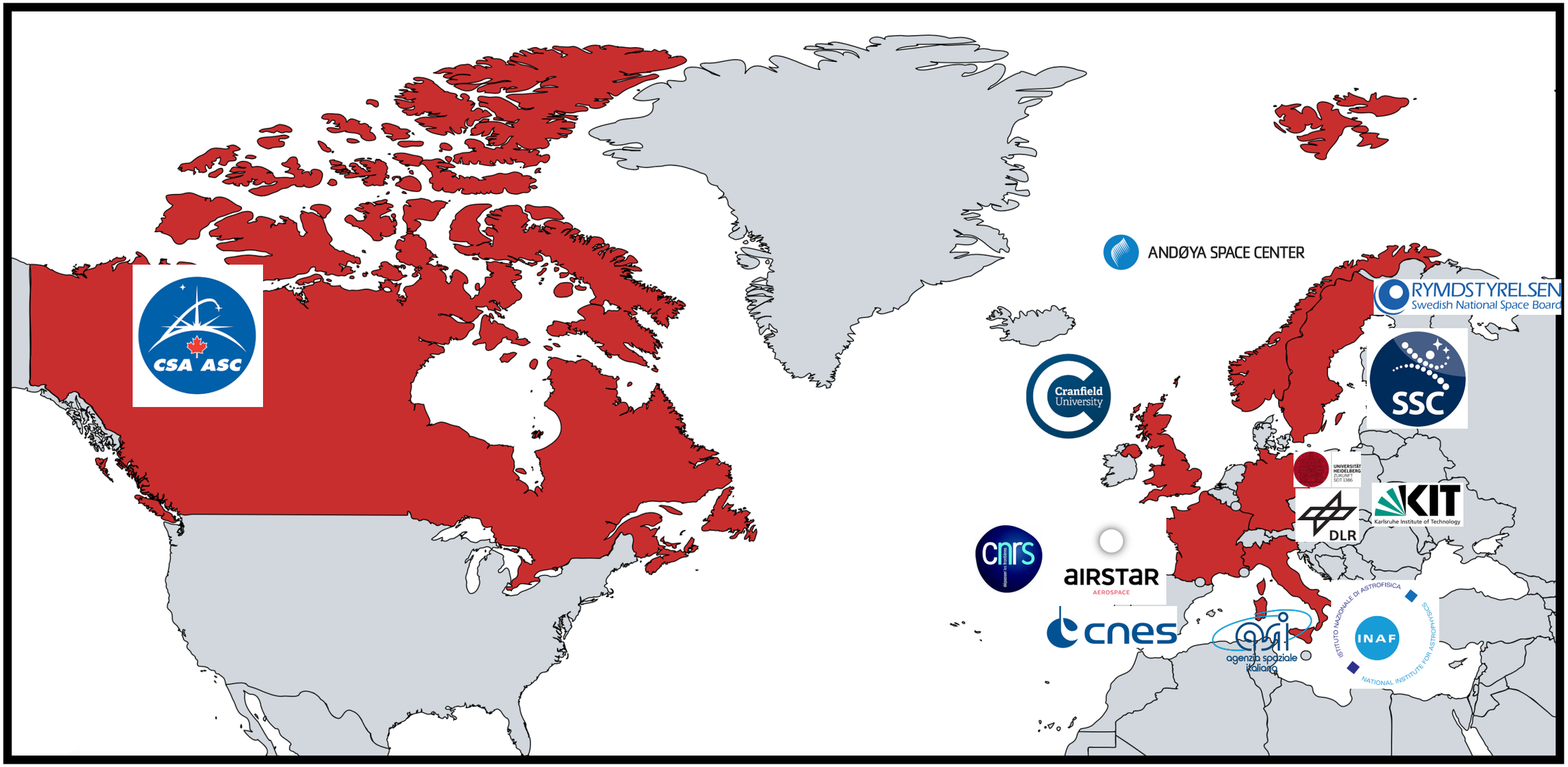
HEMERA

- **European Infrastructure** for scientific ballooning funded by the Horizon 2020 framework program of the European Union

- HEMERA has three major elements:
  1. **Provision of Trans-National Access to balloon flights**
  2. **Networking** to strengthen and enlarge the user community
  3. **Joint Research** to improve ballooning technology and scientific instrumentation

HEMERA PARTNERS

13 PARTNERS



Partners are space agencies and space access providers, scientific bodies (research centres and universities) and industry

WHAT HEMERA OFFERS YOU

- Balloon flights:

possibility to fly small to medium payloads at no cost on CNES or SSC gondolas under Zero Pressure Balloons (ZPB) and Sounding Balloons (SB).

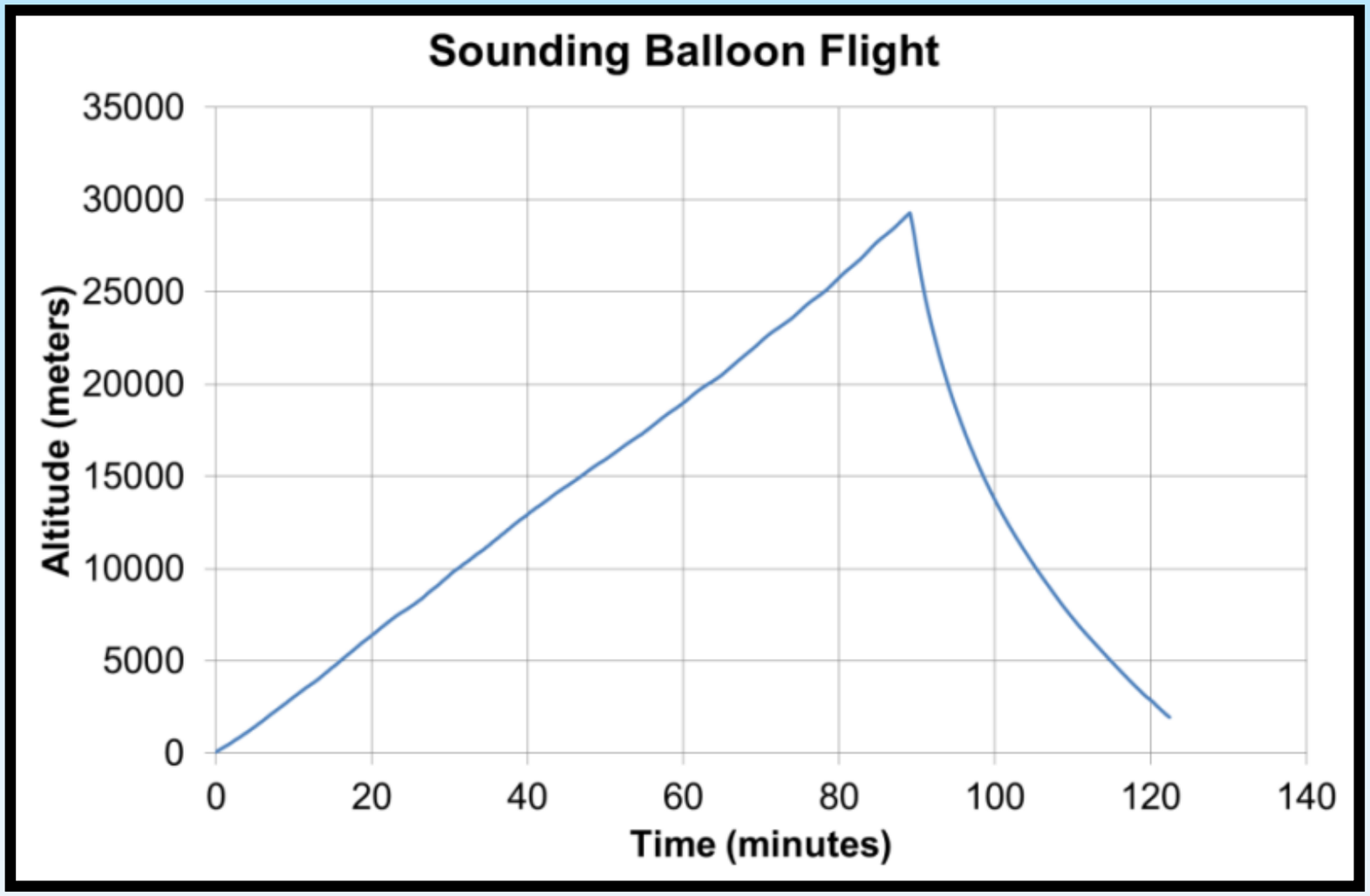
The cost for the development and construction of the payloads is not included!

- Virtual Access:

the data acquired during those flights are collected and made publicly accessible on a dedicated web portal on www.hemera-h2020.eu

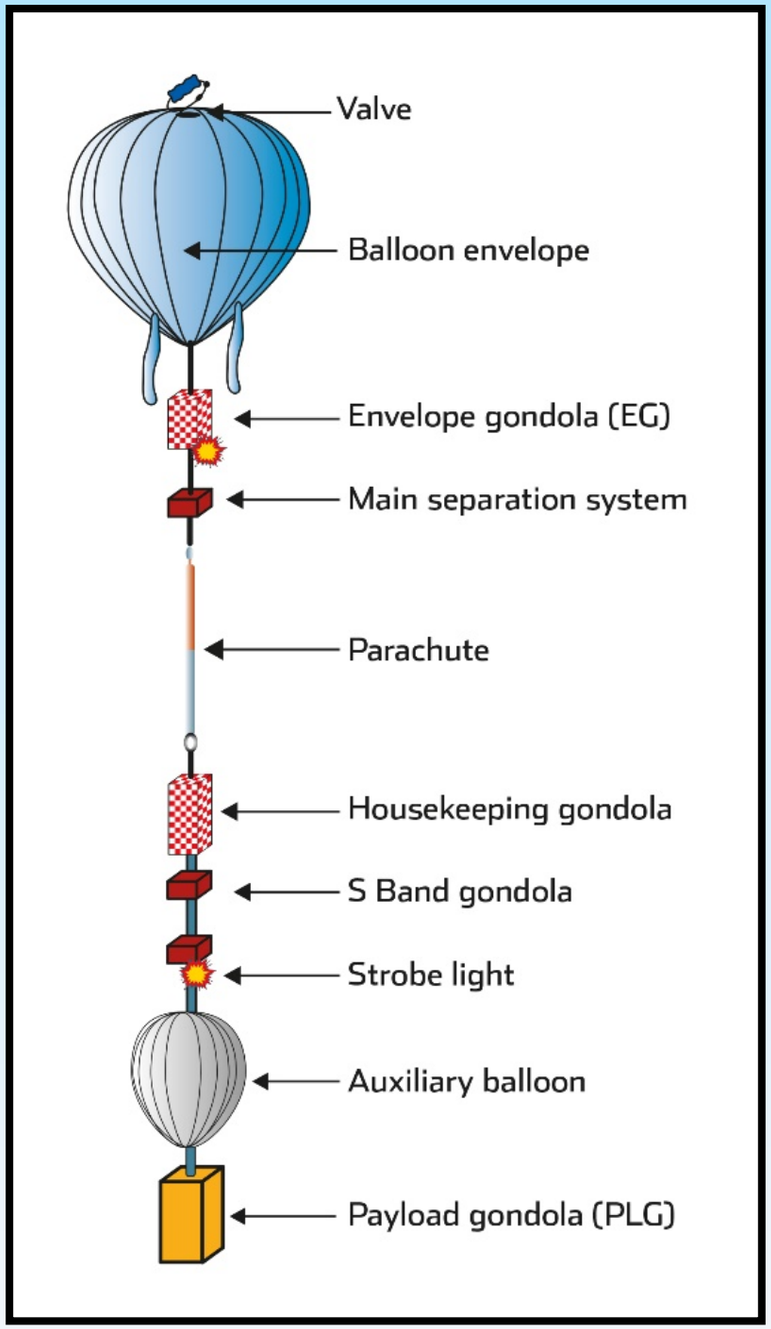
Sounding Balloons (SB)

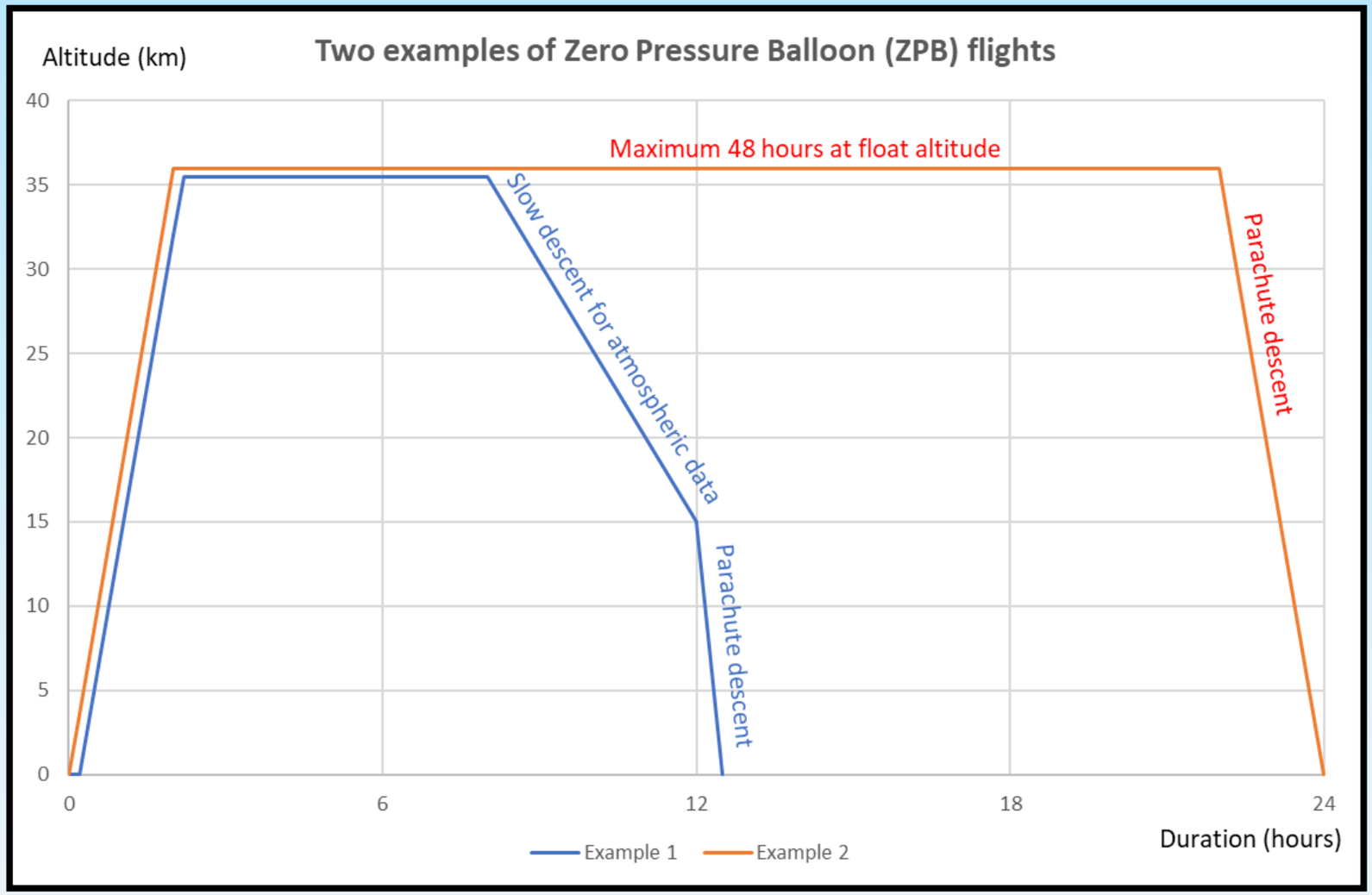
Payload: up to 3 kg
Altitude: up to 30 km



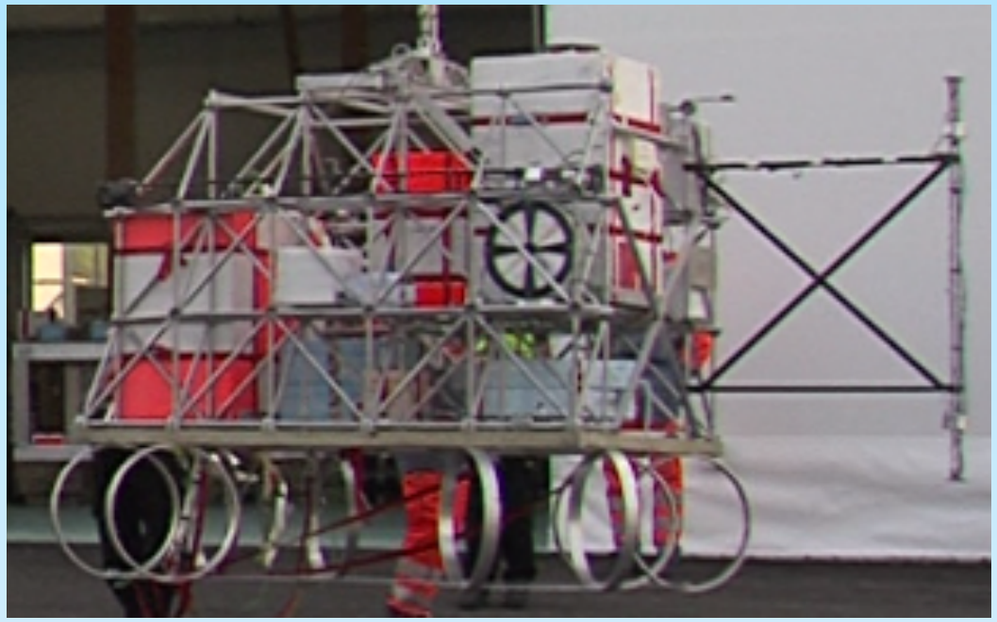
Zero Pressure Balloons (ZPB)

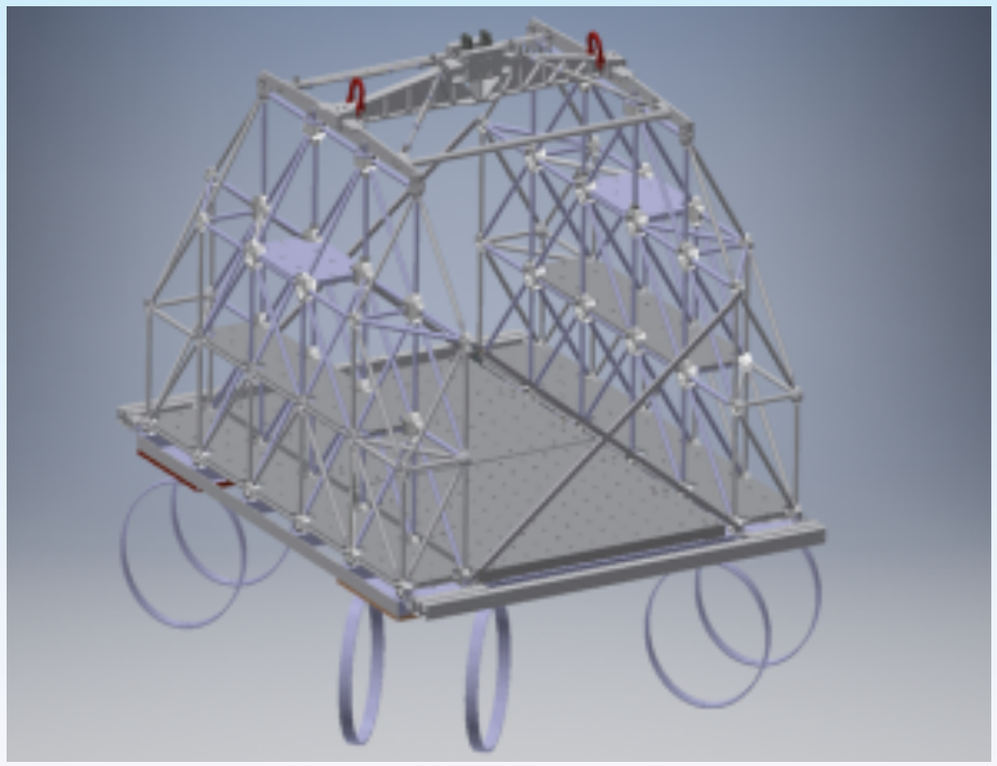
Payload: up to 150 kg
Altitude: up to 35 km



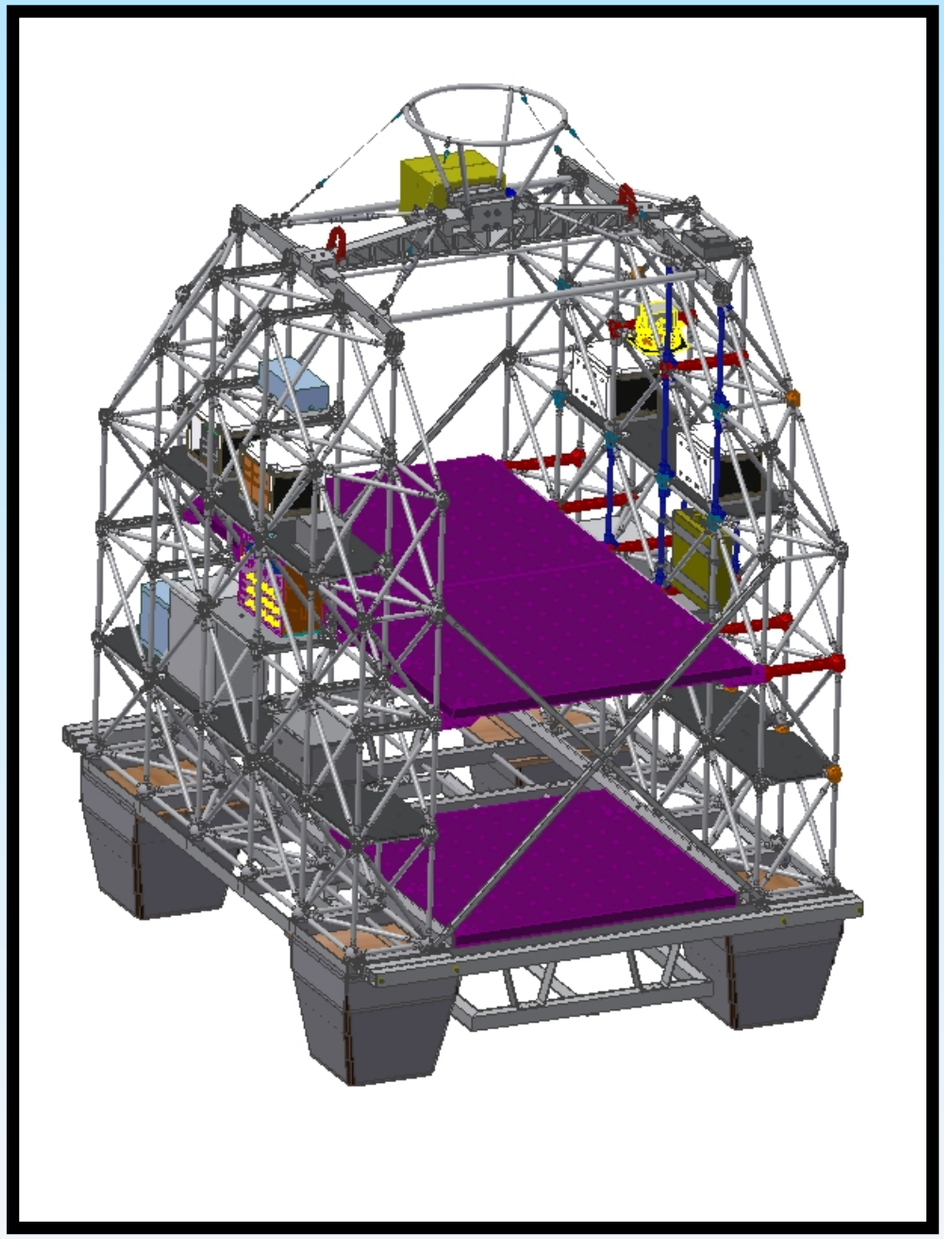


Zero Pressure Balloons (ZPB)





CNES gondolas up to 150 kg



What can you achieve with a stratospheric balloon payload?

- Useful in all science fields where a stratospheric vantage point is needed
- Contribute to Earth observation:
  e.g. to atmospheric science in the fields of stratospheric chemistry and dynamics
  1. Upper Troposphere and Lower Stratosphere (UTLS) chemistry and dynamics
  2. lower atmosphere & remote boundary layer

- Contribute to astronomy and astrophysics in the fields of e.g.
  1. solar physics and cosmic ray physics
  2. infrared and microwave (CMB) measurements
  3. gamma ray astronomy

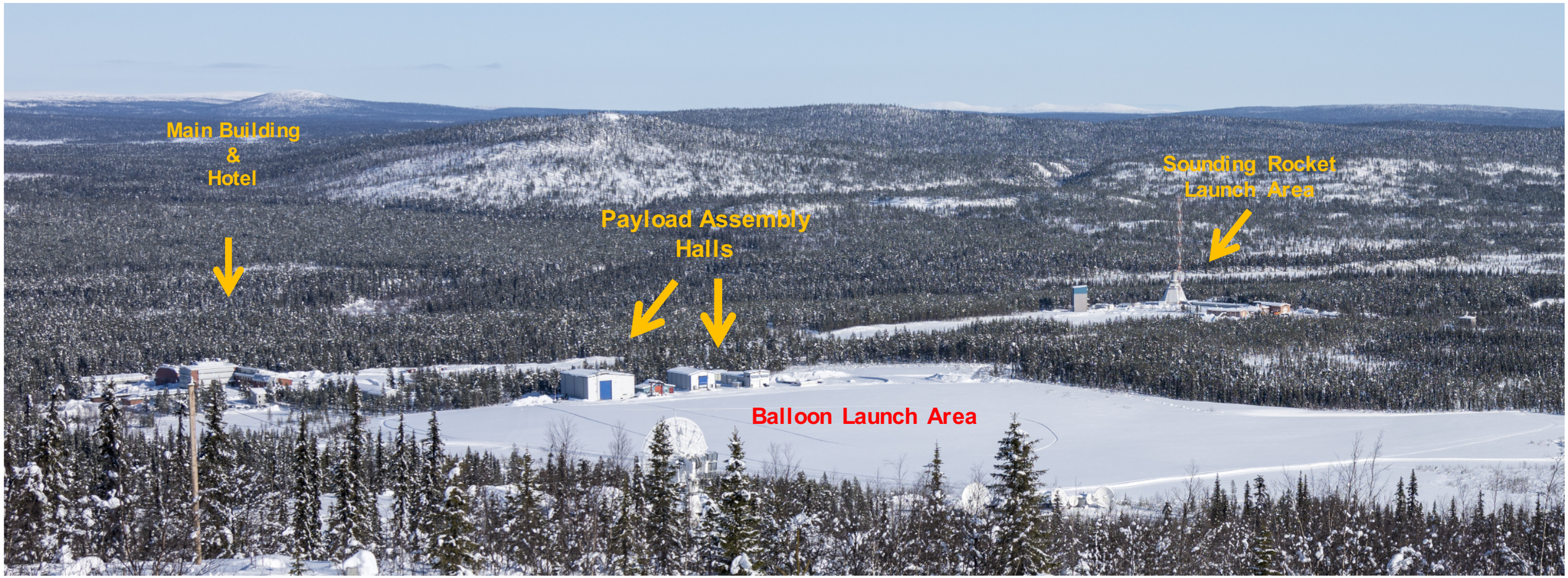
HEMERA LAUNCH SITES

HEMERA LAUNCH SITES

HEMERA is considering a new launch site in Trapani-Milo, Italy in order to perform medium latitude flights of 24 h. The direction of those flights will be to Spain in summer and to Turkey in winter.

Esrange Launch Site

Esrange is the space operations centre for SSC and it has been conducting balloon flights since 1974. The launch facility offers flights in air space with low air traffic density and over sparsely populated areas.



Timmins, Ontario, Canada

Timmins was selected in March 2012 as the Canadian ZPB launch site because of its favourable latitude, wind and weather conditions, low population density in areas surrounding the city and optimal on-site infrastructure.

Aire-sur-l'Adour, France

only for SB

Flights from Aire sur l'Adour have been conducted since the early 1960s. Aire sur l'Adour, located in southwestern France, is the main launch base of CNES and is also the home base for the CNES balloon operations team.

Aire-sur-l'Adour :

- Operational base for SB
- Facilities available for scientists
- Flights are performed all the year
- Compliant with safety rules
- Flight monitoring
- Recovery for all the experiments
- Actually, 2 scientific flights per month

HEMERA flights plan

- **6 flights** with ZPBs for up to 150 kg payload
  3 flights will be performed by SSC from Esrange near Kiruna, Sweden
  3 flights will be performed by CNES (1 x Esrange, 1 x Timmins, Canada, 1 x TBD)

- **20 flights** with SBs for up to 3 kg payload
  performed by CNES from Aire sur l'Adour, France

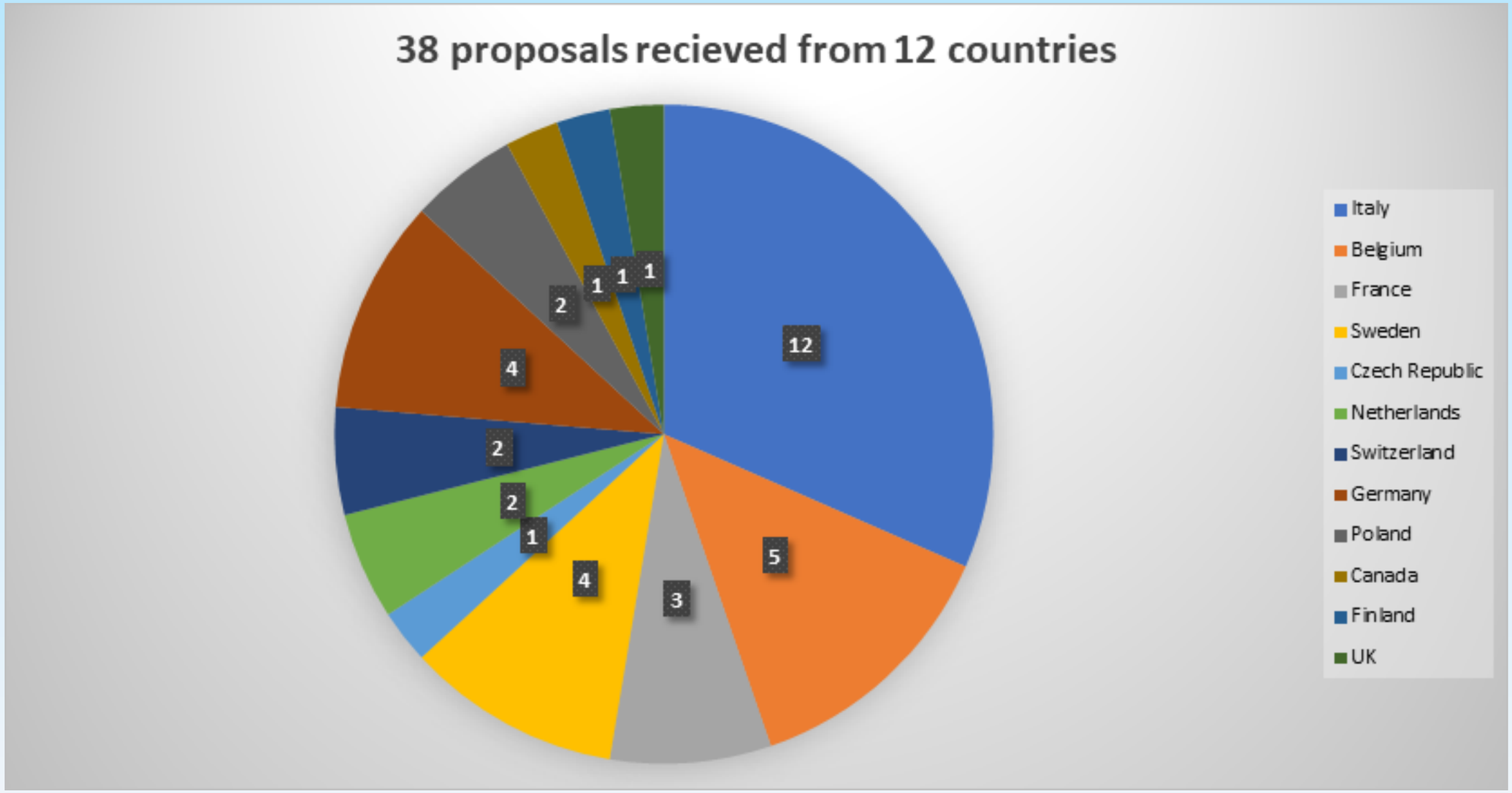
- **Gondolas** will be provided by CNES/SSC
  several instruments will fly on one gondola
  light instruments are preferred to allow more users to fly
  all instruments/gondolas will be recovered

- **Flight levels** from 38 km down to 15 km can be reached
  depends on total mass of payload and gondola

First Call for Proposals

issued in 2018

Results



Status of HEMERA

- 1 Call for Ideas issued in 2018
- 2 Call for Proposals issued in 2018 and 2019
- 1 flight campaign performed successfully in 2019
- 2 Campaigns postponed to 2021 and 2022 because of COVID-19 pandemic

HEMERA Events

- Summer School in Heidelberg, Sept. 9 to 13, 2019 for Students, Scientists and Engineers

Themes:

1. Fundamental aspects of atmospheric physics & meteorology
2. Balloon-related technology and safety
3. Scientific and industrial applications

- HEMERA Workshop in Rome postponed to 28-30 Sept., 2021

HEMERA 2

Preparation of the proposal ongoing

Scopes:

- extend the offer with larger balloons for scientific payloads
- enlarge the user community
- provide the users a regular access to the stratosphere
- focus on the Trans National Access

HEMERA2 will maintain the European access to near space. Only a European stratospheric balloon infrastructure like HEMERA2 will provide this access and will strive to satisfy multiple user needs.

Country and Partners:

France: CNES, CNIM Air Space, CNRS
Italy: ASI, INAF
Sweden: SNSA, SSC
Germany: DLR, UHEI, KIT
UK: CU
Norway: ASC
Canada: CSA

Conclusions

- HEMERA is a successful European Infrastructure for scientific ballooning
- It offers to European users stratospheric flights for small to medium payloads at no cost
- in view of the large request for flights from several European countries, an HEMERA 2 proposal is ongoing

More information at Hemera website:
www.hemera-h2020.eu

Thank you