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The HEMERA Balloon Research Infrastructure

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Stratospheric balloons are useful platforms for various research and technology needs. They allow to collect valuable data in many science fields, e.g. atmospheric science and astrophysics; they can be used for demonstrations in preparation of new space and Earth observation missions; they can be used to provide calibration/validation data for Earth observation space missions, or for dropping test objects from the stratosphere.

Various types of balloons are available, corresponding to different missions: Zero Pressure Balloons (ZPB) for heavy payloads (100 kg to 3 tons) and short to medium duration (1 day to several days), Sounding Balloons (SB) for very light payloads (3 kg).

Payloads can be flown at various altitudes between the ground surface up to 40 km, according to the type of balloon and the kind of mission. Compared to satellites, stratospheric balloons can be operated at relatively low cost and with shorter lead times from the experiment idea to the flight.

Mid-2017, a new Research Infrastructure called HEMERA has been selected by the European Commission within its programme Horizon 2020. The HEMERA objectives are to:

- Provide better and coordinated balloon access to the troposphere and stratosphere for scientific and technological research, in response to the scientific user needs.
- Attract new users to enlarge the community accessing the balloon infrastructure and foster

scientific and technical collaboration.

- Enlarge the fields of science and technology research conducted with balloons.
- Improve the balloon service offered to scientific and technical users through innovative developments.
- Favour standardization, synergy, complementarities and industrialization through joint developments with greater cost-effectiveness.

The project is coordinated by CNES and involves 13 partners in total, from various European entities and Canada. The project was kicked-off in late January 2018 and will be executed during 2018-2022.

Six ZPB flights with a target payload mass of at least 150 kg are foreseen within HEMERA, offering free of charge access to users and scientists for various science measurements and/or for technology tests. In addition, several SB flights are foreseen. The launch sites will be Esrange in Sweden, Timmins in Canada, for the ZPB and Aire sur l'Adour in France for the SB. The selected experiments will fly on balloons during the years 2019-2022.

Two Calls for Proposals were planned in the HEMERA project, the first was launched in 2018 and 39 answers from 12 countries have been received; 23 experiments have been selected. 31 answers have been received in the frame of the second call, from 10 countries. In total 39 experiments from 13 countries have been selected. The first HEMERA flights occurred in summer 2019 from Kiruna and Timmins.

In addition, Open Access to balloon data will be organized in the frame of the Data Center, giving access to science data collected during the flights. Networking activities are planned in order to promote the Infrastructure in the European countries, and Joint Research activities are conducted in order to improve as far as possible the balloon offer in the view of the user needs.