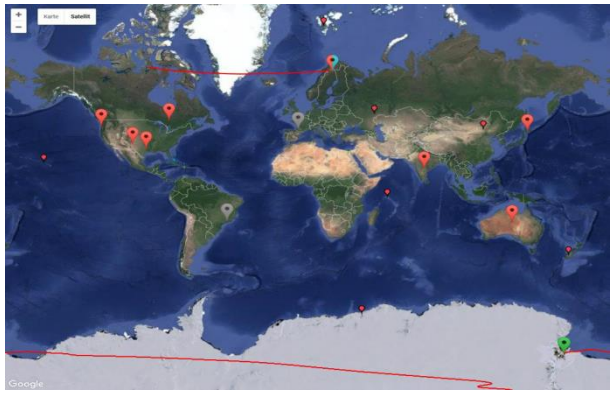
General Information

Scientific Balloons travel at altitudes of up to 42 km with a typical speed of 40 km/h (25 mph). Their travel-time can vary from a few hours to 50 days and more. The largest ones offer a payload capacity of 3.6 tonnes, very similar to the mass of space telescopes.
There are numerous launch sites for scientific balloons around the world *(red pins)*. For flights up to approx. 40 h, the balloons can be maintained right above these sites.



Longer flight routes *(red lines)* start from Esrange (Sweden), Wanaka (New Zealand), and McMurdo (Antarctica) and carry the balloons half or even several times around the globe.

Source: Stratocat

Source: Wired

Partners

University of Stuttgart,
Institute of Space Systems

Swedish Space Corporation

University of Tübingen, Institut für Astronomie und Astrophysik

Max Planck Institute for extraterrestrial Physics, Garching

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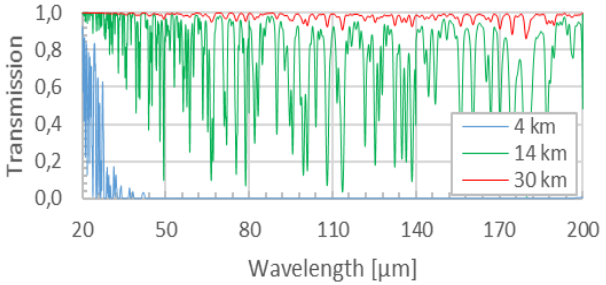
Astronomical Balloon Missions

ESBO DS

European **S**tratospheric **B**alloon **O**bservatory
– ***D**esign **S**tudy*

Astronomical Ballooning

Balloons have been used for scientific – and particularly astronomical – purposes for decades. They provided the first possibility to observe the stars from almost outside our atmosphere. While their functionality has not changed, their capabilities and reliability have increased.
Today, they still give scientists a chance to observe and study aspects of galaxies, stars, and planets that otherwise would be obscured by our atmosphere.



Balloons, flying at 30 km and above, particularly enable observations of UV and far infrared light – which does not reach the ground even at the best and highest observatory sites. Thus, astronomical balloons offer an attractive alternative to expensive space telescopes.

ESBO *DS*

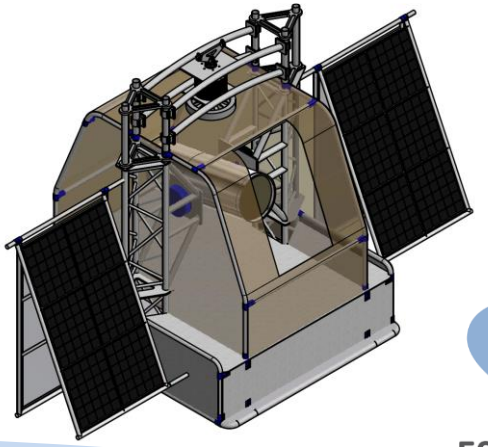
ESBO *DS* stands for **E**uropean **S**tratospheric **B**alloon **O**bservatory - ***D**esign **S**tudy*. It is a research project designed to pave the way for astronomical observatories based on stratospheric balloons. Within the three-year pilot project ESBO *DS*, two main steps will be taken:

- The development and construction of a gondola and telescope, which shall perform technology tests as well as deliver first scientific results with a newly developed UV-instrument.
- The development of a strategy for the long-term establishment and operation of the observatory with the study of the technical feasibility of balloons with larger telescopes (5 m aperture class for far infrared observations).

ESBO DS has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 777516.

STUDIO

STUDIO (**St**ratospheric **U**ltraviolet **D**emonstrator of an **I**maging **O**bservatory) is the first mission of ESBO *DS*.
It consists of a prototype gondola and telescope, which shall perform technology tests as well as deliver first scientifc results from astronomical observations. Its main optical payload includes a 0.5 m aperture telescope with ultraviolet and optical instruments attached to it. The science cases of STUDIO are the search for variable hot compact stars and the detection of flares from cool dwarf stars. The maiden flight is planned for 2021.



ESBO *DS*