GOSPACE TECHNOLOGIES

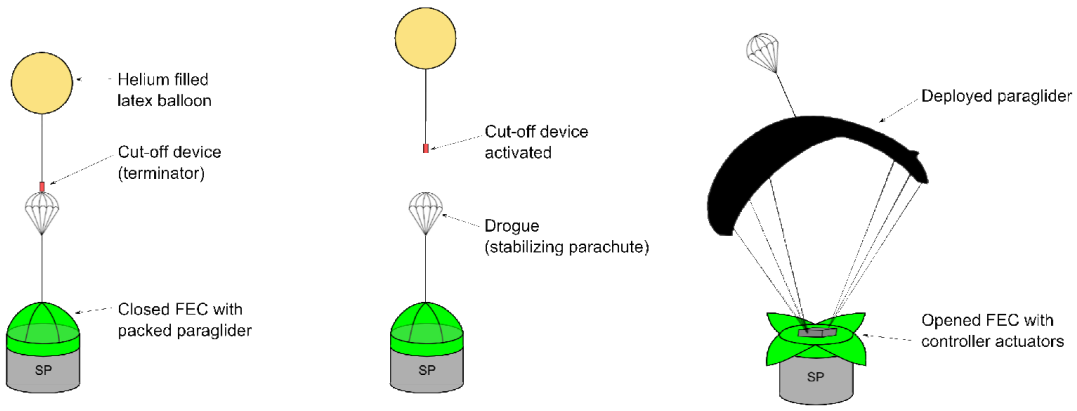
SALSA

Stratospheric Autonomous Landing System Application

Stratospheric ballooning has become a very common and popular way to conduct various experiments in the extreme environment conditions of upper layers of Earth's atmosphere. Those conditions, ranging from very low atmospheric pressure and temperatures or increased radiation, are hard to be reproduced simultaneously in ground laboratories. The stratosphere, ranging from 10 - 50 km above sea level, and often nicknamed as "near space", is therefore considered to be a very valuable environment to test and verify scientific or technological concepts, many of them designed to operate later in true space environment (above 100 km of altitude). Moreover, Earth's stratosphere is a good analogue environment of Martian surface atmosphere, and can serve therefore also as a testing environment for planetary exploration technologies.

In GOSPACE, we have flown many scientific missions to the stratosphere. We currently operate with the fourth generation of our stratospheric probe, which is smaller in dimension and weight and provides more functionality. However, one particular challenge still remains: to find and recover the payload after landing. As Slovakia, our homeland, where we conduct those flights, is a very mountainous country, we often find our stratospheric probe landed in difficult terrain, taking many hours and sometimes also professional mountain rescue forces to recover the payload and deliver on-board data to the customer of the flight.

The objective of this "SALSA" project is therefore to define, develop and test an autonomous landing system of our stratospheric probe, making use of on-board GPS receivers (and other motion sensors such as gyroscopes and accelerometers), a gliding parachute driven by servomotors and an on-board computer with proper controlling software. Such a system would significantly shorten payload recovery times and most importantly reduce the risk of landing in danger zones (e.g. lakes, mountains, densely populated areas, etc.), allowing stratospheric flights to be conducted with increased safety and applicability to time-sensitive payloads.



1) Ascend phase

2) Pre-deployment phase (uncontrolled descend)

3) Post-deployment phase (controlled descend)