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Stratochip, a dual balloon high-altitude platform: controlled altitude flight experiments and potential applications in geosciences.

Christian Burlet and Yves Vanbrabant

Royal Belgian Institute of Natural Sciences, Geological Survey of Belgium, Brussels, Belgium
(christian.burlet@naturalsciences.be)

A high-altitude dual balloons system, the "Stratochip", was designed at the Geological Survey of Belgium to serve as a development platform to carry measurement and earth observation equipments, in altitudes comprised between 1000 and 25000m. These working altitudes far exceed the range of current motor powered unmanned aerial vehicules, with a higher weight carrying capacity (up to 10-15kg). This platform is built around a two helium balloons configuration, than can be released one by one at a target altitude or location, allowing a partially controlled drift of the platform. Using a "nowcasting" meteorological model, updated by flight telemetry, the predicted path can be refined live to follow and retrieve the equipment in a predicted landing area.

All subsystems (balloon cut-off devices, flight controller, telemetry system) have been developed in-house. Three independent communication channels, designed to work at extremely low temperature (up to -60˚C) ensure a continuous tracking until landing. A calibrated parachute is used to control the safe descent of the equipment.

Several flight tests have been performed in Belgium to control the meteorological model accuracy for wind predictions (model based on National Oceanic and Atmospheric Administration data). Those tests demonstrated the capability of the platform to maintain its altitude in a predicted path, allowing using the platform for new types of atmospheric studies and affordable high-altitude remote-sensing applications (i.e. sub-meter resolution stereo imagery).