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FLY HIGHEST MOUNTAIN

SNÊŽKA IS THE HIGHEST MOUNTAIN IN THE CZECH REPUBLIC, ONLY ACCESSIBLE BY FUNICULAR AND WITH MOVEMENT RESTRICTED TO MARKED PATHS. SO HOW DO YOU SURVEY IT IN LESS THAN A DAY? JAKUB KARAS EXPLAINS HOW HE DID IT

In October last year, surveying company Upvision mapped the highest mountain in the Czech Republic, Sněžka, which is 1.6km high. Situated on the border with Poland in the Krkonoše mountains, Sněžka is one of the most visited natural places in the Czech Republic and Krkonoše National Park wanted to create a detailed 3D model and digital elevation model of the mountain, as well as determine an accurate height for it.

The area of four square kilometres around the mountain was large and bumpy, with poor access. Movement off marked paths is also banned in the park, so mapping the peak and surrounding areas required the use of a UAV. While it is possible to get to the peak by funicular, we would need to bring our UAV and equipment by car. That and the stoney and steep mountain meant we chose a plain with tall grass and small trees 200m below the peak for take-offs and landings.

Being situated so low below the peak, it was necessary to create a UAV flight plan for the individual strips of flying. This climbed simultaneously with the height of the scanning area and maintained the same image resolution for the aerial images. Due to the steep terrain, we chose an image resolution of 7cm/pixel and an overlap between aerial photographs of 80/70 to the top of the mountain.

Five ground control points were measured using RTK with a GPS TopCon Hiper GGD with TopSurv SW. This was very difficult, as the points were distributed differently over the top of the mountain with a variety of elevations, meaning a walk of several kilometres in total length, as well as in climbs and descents, to measure them. The points were measured in the evening during low temperatures and twilight in the mountains.

For our UAV, we picked a MaVinci Sirius with a calibrated Panasonic GX-1 camera, for several reasons: it could map a large area in one flight; it could take off from the hand; it could be manually landed;it was made of a strong material to withstand damage on landing; it could be repaired in the field; and it was registered with the Civil Aviation Authority. The UAV receives GPS and GLONASS information using an inertial measurement unit and logs the external orientation for all aerial photos it takes.