小型UAVを用いた積雪分布の3次元計測
Measuring of snow distribution using small UAV

*小花和 宏之1、河島 克久2、大前 宏和3
*Hiroyuki Obanawa1, Katsuhisa Kawashima2, Hirokazu Ohmae3

1.東京大学工学系研究科、2.新潟大学災害・復興科学研究所、3.株式会社センテンシア
1.School of Engineering, The University of Tokyo, 2.Research Institute for Natural Hazards & Disaster Recovery, Niigata University, 3.Sentencia Corporation

Recently aerial photography using small UAV (Unmanned Aerial Vehicle) carrying a compact camera and SfM (Structure from Motion) technique has been carried out in many areas. As one of the advantages of the small-multicopter survey it can closely shoot and measure the mountain slope where the existing manned airplane cannot survey enough because its flight height is relatively high and so it cannot come close to the object. In addition, because running cost of the small UAV survey is far less and its operation is relatively easy, repetitive measurements are easier than the existing methods such as aerial photogrammetry and laser scanning with a manned airplane. We have carried out the topographic measurements using the above advantages at snow covered area in Niigata Prefecture, Japan. By the repetitive UAV measurements we have constructed the multi-temporal 3D models of the surfaces of the ground and snow field and could quantitatively clarify the snow distribution with higher spatial and temporal resolutions. The snow-depth values estimated by the UAV surveys corresponded reasonably well with the actual data measured by snow probe. The UAV-SfM technique has a great potential for a wide range of application, because of its high data accuracy, low initial and operational costs, allowing high spatial and temporal data recording.

キーワード：無人航空機、Structure from Motion、積雪分布
Keywords: UAV, SfM, snow distribution