

Project information

Keywords

Cultural heritage, Remote sensing, UAS, Svalbard, Monitoring

Project title

Remote sensing: Mapping and monitoring cultural heritage sites and environments in the Svalbard Archipelago (CULRES)

Year

2015

Project leader

Stine Barlindhaug, NIKU

Participants

NIKU: Alma Thuestad and Elin Rose Myrvoll

NINA: Hans Tømmervik

NORUT: Stian Andre Solbø and Bernt Johansen

NPI: Øystein Overrein

Flagship

MIKON

Funding Source

Fram Centre, NIKU, NINA, NORUT, NPI

(Research Council of Norway - CULPOL)

Summary of Results

The objectives set for 2014 have been accomplished in accordance with the project plan. The main focus of CULRES in 2014 has been on analyzing the image data as well as field observation data and evaluating the methodological approach with regard to cultural heritage sites, including the incorporation and interaction with data and results from CULPOL. A paper related to the development of monitoring protocols relevant for MOSJ is in process and will be completed in 2016. Three papers are published or are in press and four presentations have been given at seminars and conferences. A workshop in collaboration with CULPOL and the reference group are scheduled at 2. December 2015.

For the Management

Barlindhaug Stine had in October 2015 a presentation for- and a discussion with the MOSJ-board regarding CULRES/CULPOLs' work related to developing indicators and parameter for a monitoring system on cultural heritage on Svalbard.

Published Results/Planned Publications

Thuestad A., Tømmervik H., Solbø S. 2015 Assessing the impact of human activity on cultural heritage in Svalbard: a remote sensing study of London *The Polar Journal*

Thuestad A., Tømmervik H., Solbø S. Barlindhaug S., Flyen A. C., Myrvoll E. R., Johansen B. 2015
Monitoring cultural heritage environments in Svalbard - Smeerenburg, a whaling station on
Amsterdam Island. In press: *EARSeL eProceedings 14*, 1/2015

Storvold R., Solbø S., Thuestad A. E., Karlsen S. R., Johansen B., Myrvoll E. R., Barlindhaug S.,
Tømmervik H. Bruk av ubemannete fly (UAS) i miljøovervåking på Svalbard. In Press *Ottar 1*, 2016

Some preliminary results have been presented through the paper listed above as well as through
conference presentations and proceedings. In 2016 the plan is to submit three papers in international
peer-reviewed journals. Thematically the papers will focus on a) the use of UAS and other remote
sensing data for mapping and monitoring cultural environments (lead author Tømmervik), b)
monitoring protocols relevant for MOSJ (lead author Barlindhaug), and c) a synthesis of the main
challenges (impact factors) for the seven cultural environments encompassed by the CULPOL and
CULRES projects (lead author Thuestad).

Communicated Results

Tømmervik H., Johansen B., Solbø S. Storvold R. Thuestad A. E. Barlindhaug S. Hansen J. R. Aas H.
F. Bjerke J. W. Slitasje på vegetasjon ved landstigningsplasser og kulturminner. Fjernmåling og
intensiv overvåking. Kunnskapsseminaret - Svalbard 2014 (nov.)

Tømmervik H., Thuestad A. E., Barlindhaug S., Johansen B., Solbø S. Storvold R. Ekstensiv
overvåking av slitasje på ilandstigningsplasser og kulturminnelokaliteter. NP-seminar: Overvåking i
markvegetasjonen på Svalbard; 2014-10-23

Thuestad A. E., Barlindhaug S., Myrvoll E. R., Flyen A. C., Tømmervik H., Johansen B. & Solbø S. A.
2015. Poster; Monitoring cultural heritage in Polar Regions – a remote sensing study. 35th EARSeL
Symposium. European Remote Sensing: Progress, Challenges and Opportunities. 15-18.06.2015.
Stockholm, Sweden

Interdisciplinary Cooperation

Interdisciplinary cooperation is very important in CULRES; Dr. Hans Tømmervik (vegetation
ecologist), NINA and Dr. Bernt Johansen (botanist) NORUT has extensive experience using remote
sensing for mapping and monitoring vegetation cover and natural and human impact on both vegetation
and cultural heritage sites. Dr. Solbø and Tøllefen NORUT, has extensive experience in UAS remote
sensing, especially for research on arctic climate and environment. Øystein Overrein from NPI has
outstanding knowledge about environmental monitoring, cruise tourism and management having
worked with these issues on Svalbard for years. The research team from NIKU, Thuestad, Dr. Myrvoll
and Dr. Barlindhaug have extensive experience using satellite imagery and aerial photography in
cultural heritage monitoring. They have also a long experience in assessing cultural heritage
vulnerability and value as well as knowledge of the challenges facing cultural heritage management in
the High North.

The interdisciplinary team was a prerequisite for, processing and analysing the gathered data.
Furthermore, interdisciplinary collaboration is crucial in the ongoing process of assessing and
validating the use of such data as a basis for developing monitoring protocols and vulnerability as well
as for the ongoing publishing process.

The use of high resolution remote sensing imagery is an integral part of the NRC funded project CULPOL, but the use of Unmanned Aerial System (UAS) was not included. As CULPOL focuses on developing a cross-scale methodological approach to mapping and monitoring cultural heritage assets in Polar Regions, CULRES have been an important addition as UAS allows collection of image data for analysing vegetation cover and cultural heritage sites on several scales. In addition CULRES have added valuable resources to the publication process through possibilities for the team to meet regularly to discuss important interdisciplinary issues.

Could results from the project be subject for any commercial utilization

Yes

If Yes

Indirectly CULRES will benefit management authorities on both the local and national level through our contribution to MOSJ and towards establishing a knowledge base regarding vulnerability and current status of Svalbard's cultural heritage. Our work will provide a basis for recommendations on how to solve environmental issues and achieve a more sustainable governance of cultural heritage, thereby contributing to continued tourism in Svalbard.

Conclusions

This year we have focused on; The use of UAS data in cultural heritage research in Polar Regions. We have concentrated on data analysis and evaluation of the methodological approach and on writing papers for both conferences and for publication. The process of writing papers for peer reviewed journals will continue and be completed in 2016.