

## Final report for Centre of Advanced Research (CAR)

Submit the report to [sns@slu.se](mailto:sns@slu.se) by 24:00 CET, 1<sup>st</sup> of March 2022, at the latest.  
The report should not exceed 4500 words (including words in the template).

Please adjust the size of the box according to the length of your answer.

1. Project title:	CARISMA - Centre of Advanced Research for the innovative use of 3D remote sensing in mapping of forest and landscape attributes based on national forest inventories
2. Reporting year:	2022

3. Project coordinator:	Johannes Breidenbach
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### Activity report

4. Provide a project summary, including:
<p>a) The purpose of the project</p> <ul style="list-style-type: none"> <li>- Strengthen the research advantage in the Nordic NFI teams by streamlining research activities in the field of 3D remote sensing and forest mapping</li> <li>- Initiate research proposals to increase the funding base of common activities</li> </ul> <p>b) A short description of the main activities of the project</p> <ul style="list-style-type: none"> <li>- monthly meetings of the steering group</li> <li>- annual workshops</li> <li>- organization of the 100 years NFI anniversary conference in Norway in 2019</li> </ul> <p>c) Achieved targets and to what extent the research plan was fulfilled</p> <ul style="list-style-type: none"> <li>- All planned workshops and conferences were organized as planned. In the COVID times unfortunately as a digital event.</li> <li>- Two large-scale research proposals (Horizon Europe and ERA-GAS) initiated by NIBIO and supported by the partners were successful.</li> </ul>
5. Published outputs achieved as a consequence of the project (peer-reviewed articles, other publications)
<p>Because CARISMA was a networking project, publications are typically associated with other projects. The outcome of the CARISMA funded conference can be found here and includes more than 120 abstracts:  <a href="https://nibio.pameldingssystem.no/nfi100years#/program">https://nibio.pameldingssystem.no/nfi100years#/program</a></p> <p>Peer reviewed:</p> <p>Kangas, A., Astrup, R., Breidenbach, J., Fridman, J., Gobakken, T., Korhonen, K.T. Maltamo, M., Nilsson, M., Nord-Larsen, T., Næsset, E &amp; Olsson, H. 2018. Remote sensing and forest inventories in Nordic countries – roadmap for the future. Scandinavian Journal of Forest Research 33:397-412.</p> <p>Breidenbach, J., Ellison, D., Petersson, H. et al. Harvested area did not increase abruptly—how advancements in satellite-based mapping led to erroneous conclusions. Annals of Forest Science 79, 2 (2022).  <a href="https://doi.org/10.1186/s13595-022-01120-4">https://doi.org/10.1186/s13595-022-01120-4</a></p>

6. Other practical outputs of the project (websites, policy recommendations, conferences, scientific meetings, large-scale project applications, research training etc.)

Website:

<https://www.nibio.no/en/projects/carisma>

Conferences:

- 2019: The 100th anniversary conference of National Forest Inventories was co-funded by CARISMA: "A century of national forest inventories – informing past, present and future decisions" in Norway from 19 to 23 May 2019. Approximately 200 participants came from many European countries, the US, Canada, and Myanmar. More than 100 posters and presentations were shown, and six key-note speakers gave their talks. Relevant companies presented their products and services. We received very much positive feedback from the participants and think that the conference helped to set the Nordic NFIs on an international map. More info is available at <https://nibio.pameldingssystem.no/nfi100years>

Workshops:

- 2016: Joint CARISMA and EFINORD-SNS LiDAR workshop on large-scale mapping and estimating of forest resources, 26 - 28 September 2016, Ås, Norway, 40 participants.

- 2017: CARISMA workshop on Innovative 3d plot level measurements in forest inventories, 21 to 23 August 2017, Helsinki, Finland, 40 participants.

- 2018: Joint CARISMA and Nordic Co-operation for Forest Inventory workshop, Copenhagen, Denmark, 35 participants.

- Due to COVID, the 2020 workshop to be held by SLU was postponed to 2021 and finally organized as a two-days online (Zoom) training course on Deep Learning. 50 participants.

Successful project applications:

- 2017-2020: INVENT - Improving National forest inventory-based carbon stock change estimates for greenhouse gas inVENTories, funded by: ERA-GAS, coordinator: NIBIO, partners (among others): UCPH, SLU.
- 2022-2026: PathFinder - Towards an Integrated Consistent European LULUCF Monitoring and Policy Pathway Assessment Framework, funded by: Horizon Europe (in Grant Agreement Planning phase), coordinator: NIBIO, partners (among others): LUKE, subcontractors: UCPH, SLU.

7. How and within which areas was the project beneficial for the Nordic countries?

The network

- helped educating young and senior researchers with new methodologies such as deep learning
- supported the partners to seek for external funds; two of which have been successful
- was an important meeting point for idea exchange in the Nordic NFIs
- bolstered a corrective response to a policy-relevant but erroneous article in a highly profiled journal

## Participation

8. Number of participants at 4 workshops and 1 conference. NB: i) Some events were co-organized with other funding organizations. ii) The split between researcher types and genders was based on estimates as this information was not always collected. For one workshop, also the number of participants per country was estimated. The grand total is nonetheless reliable. iii) Most participants from other countries joined the international 100 years NFI conference that was organized in Norway in 2019.

Country	Young researchers / PhD students	Senior researchers	Stakeholders	Others (specify)	Gender			Total
					Women	Men	Other	
Denmark	4	10	0	0	5	9	0	14
Finland	15	45	0	0	21	39	0	60
Iceland	3	8	0	0	1	10	0	11
Norway	26	57	0	0	14	69	0	83
Sweden	13	38	0	0	9	42	0	51
Estonia	2	7	0	0	0	9	0	9
Lithuania	0	9	0	0	0	9	0	9
Latvia	1	7	0	0	0	8	0	8
Other countries including Germany, Italy, Poland, UK, Switzerland, Canada, US, among others.	29	85	0	0	24	90	0	114
Total	93	266	0	0	74	285	0	359

### 9. List the participating institutes/sectors

NIBIO, LUKE, University of Copenhagen (UCPH), SLU

## Economic report

### 10. Received grant from SNS in total (1000 SEK):

1,752

Note that 1,750k SEK were granted by SNS but due to exchange rate changes over time, the received total amount in NOK converted to SEK using March-2022 exchange rates corresponds to 1,752k SEK.

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### 11. Transfer of SNS funds to project partners

Country	Partner organization	Sum (1000 SEK)
Denmark	University of Copenhagen (UCPH)	94
Finland	LUKE	412
Sweden	SLU	422
Norway	NIBIO	823
<b>Total SUM</b>		<b>1,752</b>

### 12. Costs (1000 SEK)

	SNS funding	External funds	Total
Travel and hotel	320		
Meeting costs	536		
Consumables	61		
Salary	519		
Communication	0	0	
Other costs (specify)	0	0	
<b>Total SUM</b>	<b>1433</b>	<b>38600</b>	<b>40033</b>

### 13. Economic result (deficit or surplus):

The economic result was a surplus of 306k SEK which is the sum of the surplus of 25k SEK by UCPH and the surplus of 281k SEK by SLU. The main reason for the underconsumption of funds was that the final workshop had to be organized online and therefore required fewer funds than originally planned.

### Optional: Comments to the economic reporting:

Calculations are based on SEK exchange rates of March 2022 for NIBIO (NOK\*1.03=SEK), UCPH (DKK\*1.35 =SEK), and LUKE (EUR\*10.4503=SEK).

As for the total amount of funding (see Table 10.), exchange rate changes during the project period are responsible for an inconsistency in the total sums: The largest effect is for LUKE which used all funds according to their system (400k SEK) but according to the exchange rate changes NIBIO **seemingly** had transferred 412k SEK. These 12k SEK were not reported as a surplus as they only are a result of exchange rate changes and explain why the difference between the total grant of 1752k (Table 10.) and total reported of 1436k (Table 12.) is a surplus of 318k while we reported a surplus of 306k SEK.

NIBIO received the full amount of funding per year in NOK and distributed it among the partners that independently used the funds in their currencies. The CARISMA budget varied from year to year. As the same amount of funding was transferred each year from SNS to NIBIO, NIBIO transferred parts of the funds to the following years in order to balance the budget.

External funds for the period Jan-2016 to Dec-2021 for

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- Norway sum to 14,800,000 SEK and includes the NFI-related WPs of the project ERA-GAS INVENT, projects on developing the forest resource map SR16, and non-SNS project funding for the NFI100 conference.
- Sweden sum to 4,000,000 and includes the Forest Resource Map (Skoglige Grunndata) project.
- Finland sum to 19,800,000 SEK and includes the Spearhead project for NFI development: Improving the efficiency of NFI with remote sensing.

Salaries paid by SNS are for managing the CAR and for preparing the planned workshops.

**14. Submit a policy brief as a separate document.** Provide pictures (size at least 500x500 pixels and resolution at least 72 pixels) in the policy brief as well as separate files (.jpg). Include caption to each picture, and the name of photographer.

I hereby declare that the above statements are true to the best of my knowledge

Main applicant's signature, place and date



NIBIO

18/March/2022

.....  
(Signature)

.....  
(Institution)

.....  
(Day / Month / Year)

Signature of the head of the main applicant's research institution

.....  
(Signature)

.....  
(Institution)

.....  
(Day / Month / Year)

Bjørn Håvard Evjen

.....  
(Printed name, function)

## Final report for Centre of Advanced Research (CAR)

Second applicant's signature, place and date



.....  
(Signature)

SLU, Dept. Forest Resource Management

.....  
(Institution)

21/03/2022

.....  
(Day / Month / Year)

Third applicant's signature, place and date



.....  
(Signature)

Natural Resources Institute Finland

.....  
(Institution)

18.3.2022

.....  
(Day / Month / Year)

Fourth applicant's signature, place and date



.....  
(Signature)

IGN, University of Copenhagen

.....  
(Institution)

23/3/2022

.....  
(Day / Month / Year)