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Field report from the journey to North-East Greenland 2023

Sandodden - 100 years young !

Sandodden, Nanok's base on Daneborg and the oldest building at the site, is probably one of the most legendary and easily recognisable huts in North-East Greenland. It has formed the framework for countless events, but also trials and tribulations. Built in 1923 and completely renovated by Nanok in 2020, the now 100-year-old house is still in perfect condition and is used every summer by both Nanok and other travellers on the coast. Nevertheless, Sandodden was not on Nanok's restoration programme this year. A range of other historical huts were, however. Read more about this and much more in this report.

33rd field season

Introduction

This year Nordøstgrønlandsk Kompagni Nanok has completed its 33rd field season as planned.

There have been two Nanok field teams in North-East Greenland. In addition, a research team with close affiliation to Nanok. One Nanok-team, the South team, has completed tasks using Nanok's station on Ella Ø as base. The other team, the North team, has achieved the restoration of Kulhus on Hochstetter Forland using Sandodden/Daneborg as point of departure and later completed the field season in Danmarkshavn. The research team from Arctic Research Centre, Aarhus University, has continued and expanded its work utilising Nanok's station on Ella Ø as base.

Throughout the entire field period, the weather has been reasonably good with many calm sunny days, ideal for sailing and working. The ice conditions have also been favourable for both Nanok teams.

As beforementioned, this was Nanok's 33rd field season in North-East Greenland. We have sent field teams up there each summer since 1991. Looking back at the time passed, almost unbelievable changes have happened. In 1991, only very few people knew about North-East Greenland, the Trapper Era, and the huts left behind by this period. There had been established no environmental research; the research stations at Zackenberg and Daneborg were only founded in the middle of the 1990's. There was no public awareness of climate change. There was no cruise tourism. Communication with the exterior world was limited to the permanent stations' HF transmitters. Navigation in the terrain was still done using a map and a compass. Internet, satellite phones and GPS did not exist.

Today, North-East Greenland and its history is known widely, and the old trappers' huts have become an important part of the history and infrastructure of the area, thanks to Nanok. Extensive research, monitoring the environment, the climate and its effects, is taking place. Internet connection is possible – almost like here at home – no matter your location, via the Starlink and Oneweb systems. GPS and satellite phones have made it uncomplicated to navigate and communicate with the exterior world. Cruise ships with several hundreds of passengers travel in still growing numbers in the region.

Much of this development has been useful, among other things for personal comfort and security travelling in the area, as well as for our common knowledge about North-East Greenland and its significance in relation to the global systems. But the development and the increasing activity also raise some important and pressing questions – directed at the authorities, especially, e.g.: What are the concrete visions for the future of the National Park, and how will these be realised in a coherent manner? How will the administration of the access to the National Park be improved to be more up-to-date efficient than it is today? How will cruise tourism in the area be managed and capitalised, ensuring that it is carried out in a proper and sustainable way? How will it be ensured that sufficient resources are allocated to carry out the authorities' obligations?

Nanok first and foremost owes an immense thanks to our sponsor, Aage V. Jensens Fonde, for never-failing trust and support. Without such continuous support, Nanok would not be able to carry out its work, which oftentimes is costly, logistically challenging, and demands years of preparation.

We also owe a special thanks to a wide range of the Danish Defence's units and individuals for extraordinary collaboration as well as ready and quick assistance to overcome different logistical challenges.

An especially big thanks also to Tusass and the personnel on Vejrstation Danmarkshavn for great helpfulness and hospitality.

Also, a great thanks to logistics personnel and scientists at Ella Ø, Daneborg and Zackenberg research stations for good neighbourliness.

Furthermore, a great thank you for the support that family and friends show our dispatched Nanok'ers, who spend an entire summer holiday working for Nanok. Such support and understanding from home mean the world to the individual Nanok'er.

Moreover, many thanks to the large circle of individuals who continue to show positive interest in our work and support this.

Finally, a warm thank you to all other good collaborators as well as private and public authorities which in different ways have contributed to making our work possible.

On behalf of Nanok

Peter Schmidt Mikkelsen

This field report is also available in English and Danish at: www.xsirius.dk/nanok.html

Field report of the Nanok North team 2023

Tasks

The North team had the following tasks:

a) complete the final part of restoration and culture historical preservation of Kulhus [511] on Hochstetter Forland
b) inspect huts and stations in the Hochstetter region. En route taking photographs/making research for the next books about the National Park. The field team finishes in Danmarkshavn
c) inspect, count and maintain Nanok equipment and depot at Daneborg
d) receive goods for Nanok at Daneborg
e) prepare for the Nanok expedition Danmarkshavn-Daneborg 2024.

North team

Peter Schmidt Mikkelsen (Sirius '77), Asger Lakmann Nielsen (Sirius '77), Jens Chr. Worm "Goffi" Gotfredsen (Sirius '77).

Introduction

The six participants from Nanok's North team and South team 2023 met at Gate B10 in Copenhagen Airport on Wednesday 9th August 2023, and from here Icelandair brought us to Iceland, where we had accommodation at Hotel Cabin in Reykjavik. The following day we were to continue with Norlandair's commercial flight from the airport in Reykjavik to Constable Pynt, but due to a few days of rain on the East Coast, the runway in Constable Pynt had become unsuitable for landing and had been closed for traffic. Luckily, the rain had just stopped, and the next day, 11th August, the runway had become dry enough for us to take off. In Constable Pynt Norlandair's Twin Otter TF-NLP was ready, and immediately after arrival here, we could continue towards our destination, Daneborg, after a short stopover on Ella Ø, where the South team disembarked.

Arrival and preparations for sail

In Daneborg we were kindly received by Leader Sirius, Henrik Tranekær Jakobsen, and were instantly invited for dinner in Sirihus. It was a very cosy reunion with old and new friends. After dinner, we were accommodated in Sandodden and did inspection of our depots and equipment. Everything was in perfect order. The weather, too: It was an absolutely magnificent, calm evening at Young Sund with a clear blue sky.
Next day, directly after breakfast, we began preparing our sail further north. Asger took charge of servicing our RIB (Rigid Inflatable Boat), while Goffi and Peter packed the rest of the equipment. When the RIB was ready, we did a short test sail to try it out as well as our emergency motor. Both worked fine.

Nanok's North team 2023 on their way.
From left: Asger Lakmann Nielsen, Jens Chr. W. "Goffi" Gotfredsen and Peter Schmidt Mikkelsen.

Kulhus is situated on a gravel bank on the west side of Hochstetter Forland. Next to the nearby small river is a pool, perfect for anchoring a RIB (rubber dinghy).

From Daneborg to Kulhus

Sunday 13th August at 10.30, we left – for the time being - Sandodden and Daneborg. Our RIB was heavily loaded with equipment and fuel, so it did not come as a complete surprise, when we were unable to make it plane. Apprehending this, we decided to make the entire journey to our first accommodation, Germaniahavn, at reduced engine power to save fuel. March speed was therefore only just 12 km/h, but it was no trouble, since the sea was completely calm, not one ripple, and we enjoyed the trip, even though it took us 7 hours.

One part of the North team's assignment this year was to photograph and do research for Peter's next publication in the book series on the National Park. Therefore, the journey from Daneborg to Kulhus did also include visits to Bass Rock, Hansa Bugt, Hvalros Ø as well as the Lindeman and Fligely fjords. Later – having arrived at Kulhus – we did individual trips during 18th – 19th August with the same purpose to Grandjean Fjord, Smalle Fjord and Brede Fjord. On these trips we also inspected different huts and stations in the area.

The restoration of Kulhus

In the afternoon on 16th August, we arrived in calm weather to Kulhus. Here there appeared to be a small "pool" at the mouth of the creek near the hut, which served perfectly as harbour for anchoring our RIB, protecting it from the drift ice that regularly flows along the coastline near Kulhus. The hut appeared to be in good condition, and we could admire the fine restoration work that last year´s Nanok team had carried out on the exterior of the house. Now, our job was to refit and furnish the interior of the house and thus complete the restoration.

We set about the tasks in order of priority as soon as we had dragged our equipment into the house. First on our list were floors and walls. Goffi began installing the door in the partition between the two living rooms of the house and repair the floor in the smaller room of the two. In the meantime, Asger and Peter put new boards onto the old floor in the larger room. In the following days we continued the work on Kulhus.

The large living room upon arrival.

Replacing floorboards in the small living room.

Old floorboards put outside for drying, sorting, and reuse.

Measuring for installation of door between the two living rooms.

New boards put onto the old floor in the large living room.

Finished installation of the new floor in the large room.

Restoration of fixture.

The newly renovated kitchen section.

Establishing bunks.

Cutting zinc plate for fire protection.

Mounting zinc plate behind coal stove.

Puttying of the original windows.

Restoration of old dining room chair.

Installation of the stovepipe sealings to ensure that meltwater does not seep through.

In short, this work covered: Building two bunks in the small room and two bunks in the large. Installing two stovepipe sealings. Installing skirting boards. Applying putty to windows. Installing kitchen section. Producing fittings for window shutters. Repairing the ceiling in the small common room. Restoring the original dining tables and chairs. Fixing hooks for clothing and clotheslines. Constructing repos for petrol drums. Creating nameplate for the house. Painting the house outside with wood tar (pine tar). Producing kindling sticks from leftover materials.

Besides the work on the house itself, we found an area for a STOL natural runway (Short Take Off and Landing) for future Twin Otter transport to and from Kulhus. The runway is located on a slightly sloping plateau just 175 meters from the house. Here we marked off a runway of 270 x 25 meters.

In the afternoon on 22nd August we made a trip to Sigurdsheim on Kuhn Ø to assess its condition. The hut appeared to be a bit worn, however, in good condition, why an extensive renovation does not seem to be necessary.

Time for journaling– in the large room …

… in the small room …

… and in the attic.

Sirius´ depot lay-out-team stopped by.

Painting with wood tar – on the extension …

… and on the end of the A-house towards south.

Kulhus with the creek and the little pool, where our RIB was in safe harbour.

At Ejnar Mikkelsen Gletscher in Bredefjord.

Freshly caught Arctic Char – caught with blinker on the beach near the house.

Levelling the new runway. It is situated on a flat plateau just 175 meters from the house.

Section of the refurnished large room in Kulhus.

Late afternoon 23rd August Sirius´ depot team arrived with our 2 x 200 litres of petrol along with other equipment, which had been delivered in Daneborg after our departure from there due to late arrival of this year's RAL supply ship. The Sirius men came ashore to see Kulhus and stayed for a few hours.

On 26th August we finished our stay at Kulhus counting depot and packing equipment for our sail north. We had enjoyed some good days at Kulhus, and it has become a wonderful hut, maybe the very best on the entire Coast. We realised that it will be very suitable as Nanok's base station in the Hochstetter-area in the future.

Kulhus upon departure. Freshly painted and refurbished. From left: Goffi, Peter and Asger.

From Kulhus to Danmarkshavn

Sunday 27th August 8 am we took our leave from Kulhus to sail north towards Danmarkshavn. We had been awaiting the ice situation in Shannonsund. Here, the sea ice often remains unbroken until well into the summer, and after breaking up the drift ice often packs and can therefore create an obstacle to sailing. Fortunately, we had already received good information and ice maps both from Sirius and from "Malik Arctica", so we were optimistic.

The old Danish trapper station, Aalborghus, is located in beautiful surroundings in the south-western parts of Dove Bugt.

The journey did go smoothly, although we had to wind our way among ice floes in the area from Kap Rink until we reached Kap Copeland. After that, there were no challenges with drift ice.

On the trip to Danmarkshavn, we spent the night in Aalborghus and Hvalrosodden, a.o. Aalborghus is located in some of the most beautiful surroundings a trapper station can possibly be located in, surrounded by beautiful mountains and wide-ranging fjords. The house itself has gradually become quite crooked, but still usable.

The sail on 29th August from Aalborghus to Hvalrosodden was probably the most breathtaking experience of the summer. The weather was wonderful: calm sea and cloudless sky from start to finish. And the area in the south-western part of Dove Bay contains countless icebergs that you have to navigate among. At Isfjeldsund, the icebergs even lie so close together that for safety reasons we chose to turn around and instead sail east around Andreas Lundager Ø. From there we set course west of Bratskæret and directly towards Vindsel Ø and finally towards Hvalrosodden. A fantastic and unforgettable day.

In contrast, the next day, 30th August, it was quite windy with foaming waves in Dove Bugt. So without much deliberation we chose to stay in Hvalrosodden and experience its close surroundings. The next day the weather was back to fine, calm sailing weather, and we therefore took the opportunity to pay a short visit to Mørkefjord Station, before heading directly towards Danmarkshavn Weather Station, from where we were to start our journey home a few days later.

Arrival at Danmarkshavn

A little past midday on Thursday 31st August, we arrived in fresh weather and brilliant sunshine at Danmarkshavn. It turned out to be extremely good timing, because less than half an hour later a thick fog descended over Danmarkshavn. The fog remained for three days and on the fourth day was gradually supplemented by heavy rain and strong wind. It was not until Monday 4th September that the weather began to clear up a bit again, however, at the same time densely packed drift ice had been pushed into the bay and thereby precluding any kind of sailing to and from Danmarkshavn.

Our arrival at Danmarkshavn was expected, and we received a friendly welcome from station manager Frederik Maki Poulsen and the station's five other employees: Lars, Jens, Kalle, Elias and Søren. To our very pleasant surprise, we were accommodated in the guest house and at the same time invited to participate in the crew's daily meals. Along the way, the good company gave

View of Danmarkshavn in early September. Winter is coming, and the peaks of the mountains on Store Koldewey in the background are covered with the first snow of Autumn.

rise to many pleasant moments and the exchange of both useful knowledge and old memories from Danmarkshavn and the rest of the Coast. The following days in Danmarkshavn were spent inspecting and cleaning our equipment, preparing it for next summer, when a new Nanok team is expected to arrive in Danmarkshavn to start their field season from there. In addition, there was time to carry out some repairs on "Villaen".

Impressions from this year´s field work

In total, we have sailed approx. 1,140 km in our RIB with a total fuel consumption of 450 litres of petrol = an average of 2.54 km/l.

We have been blessed with very favourable weather and ice conditions throughout the trip. On the days we have been sailing, it has been cloudless and with a calm sea for the most part. So, perfect weather for sailing with an inflatable boat. Of course, there have also been times when we have tasted the fresh flavour of salty sea water. Similarly, we have had no problems with the ice conditions either. The only place where we had to wind our way among the ice floes was along Hochstetter Forland. Here, it is a good idea, too, to keep a good distance (at least 1 km) from the coast between Kap Rink and Kap Oswald Heer, as virtually the entire stretch of coast is very shallow.

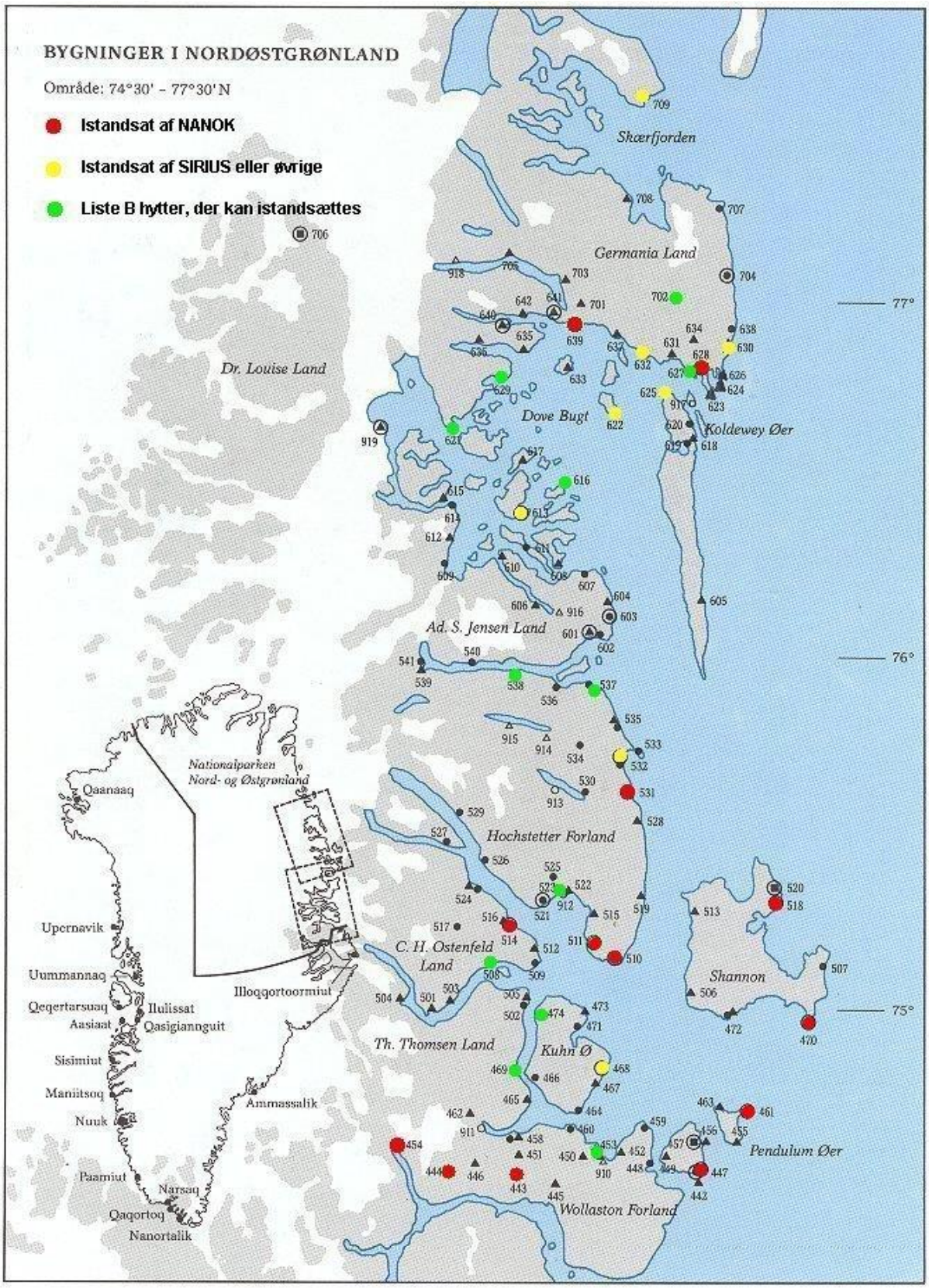
The huts we have inspected have generally been in good condition. Only the hut on Bass Rock had been seriously razed by bears. Also, the salty, humid climate out there on this outermost rocky island had taken its toll on the coal stove, which has now become very rusty and effectively useless. We cleaned up the hut and repaired the damages left by the bear; but we couldn't do anything about the oven. At the huts Germaniahavn, Aalborghus, and Hvalrosodden, we have carried out various repairs and adaptations to the coal stove pipes, which have either been blocked, disconnected and/or loose.

There has been little wildlife on this trip. We have only seen one polar bear, a few handfuls of musk oxen - and a seal every now and then. In terms of birds, we mostly saw gull, northern fulmar and loon - and then flocks of barnacle goose on their migration south.

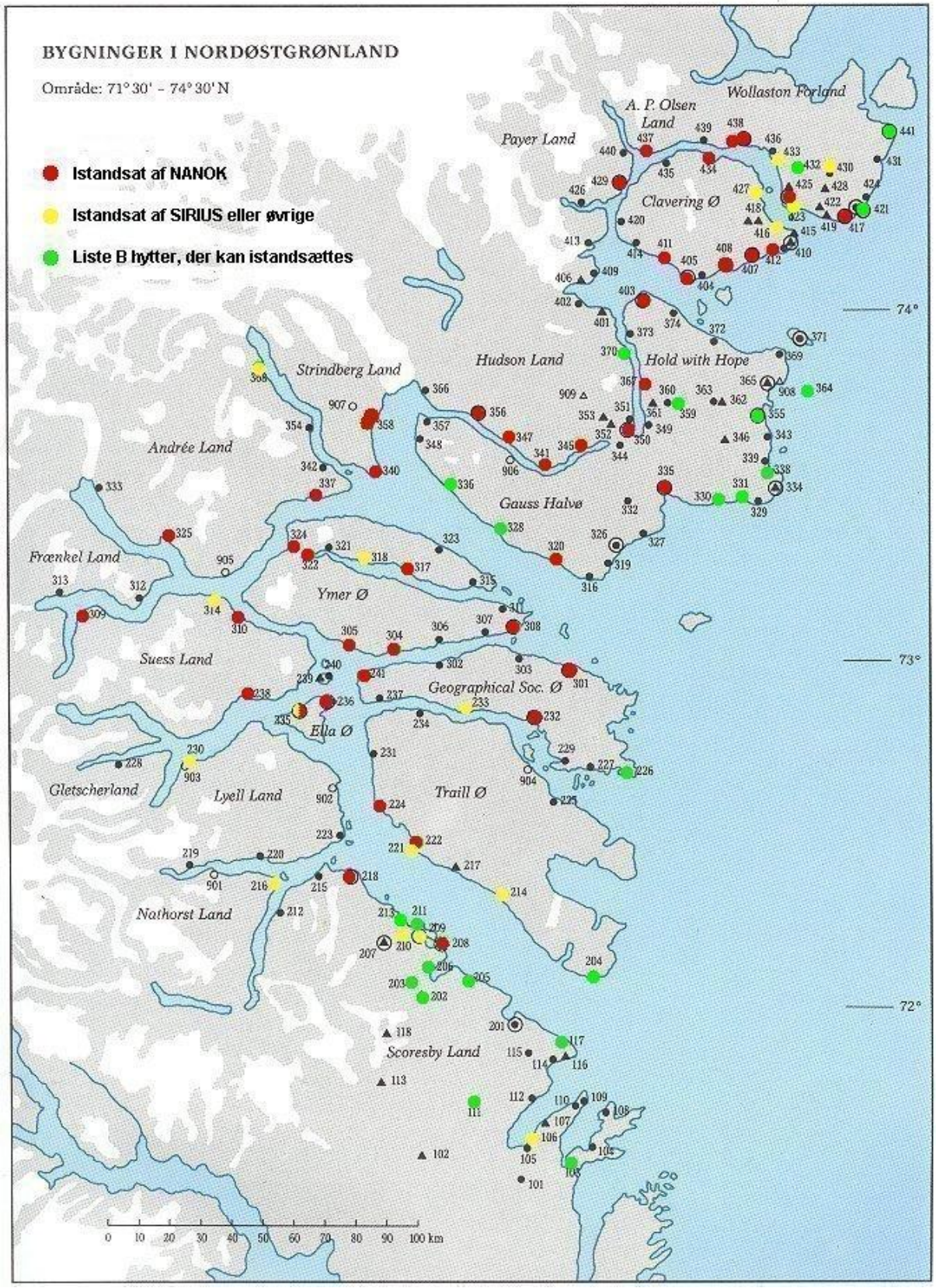
Closing

We have had a successful field season and have solved all our tasks. Along the way, we were met with extremely benevolent hospitality and helpfulness from both Slædepatruljen Sirius and the staff at Vejrstation Danmarkshavn. This is deeply appreciated.

Asger, Jens Christian and Peter



The map shows the maintenance status for the old huts, houses, and stations in North-East Greenland. The sites marked red or yellow can be expected to be in reasonably usable condition. Other sites, however, cannot be expected to be usable. Sites marked green are other huts with the classification B, which Nanok may renovate and maintain in the coming years.



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Field report for Nanok South team 2023

Tasks

The South team had the following tasks:

a) inspect and, if necessary, repair huts and stations from Ella Ø in south to Strindberg, Moskusoksefjord, and Myggbukta in the north
b) inspect, count and maintain Nanok's equipment in depot Ella Ø
c) receive shipment for Nanok on Ella Ø
d) prepare for Nanok expedition Ella Ø 2024
e) collaborate with Arctic Research Centre.

South team

Stian Graakjær Jørgensen (Sirius '12), Brian Nissen (Sirius '13) and Søren Østergaard.

The beginning

Kulhus team and Ella Ø team met in Kastrup Airport. For the two new Nanok'ers especially, Stian og Søren, the excitement of anticipation was huge – not unlike a couple of herring gull on their way to an open buffet at Royal Greenland. After an unintentional extra night's layover in Reykjavik due to delayed air traffic, the Dash 8 landed on the runway on Constable Pynt 11th August. The Twin Otter was already set to go in the airport, and immediately after arrival here, our luggage was loaded into the small airplane, which took off a short while later. All with a precision that would make any special operation envious. An hour later the Twin Otter landed on Ella Ø. Here Stian, Brian and Søren were dropped off. We said goodbye before the plane again took off towards Daneborg with the North team on board. The two teams wished each other a good couple of weeks in North-East Greenland.

The Nanok team 2023 at Constable Pynt. From left: Søren, Asger, Jens Chr., Stian, Brian and Peter.

Having been received well by the Sirius men at the station, we immediately started preparing "Agsut" – our vessel for the next three weeks.
After a delicious dinner from the hands of the scientists that same evening, we asked for some advice about ships from Henrik, Lillebror, Farmer, Bjarki, and Hanni, the inhabitants of Ørnereden. The old Sirius-men had gone on "vacation" in the boat "Jytte", which Henrik had anchored in Nyhavn. It became an hour-long visit in Ørnereden, with lots of good stories about the life as a Sirius-man, tales, sail experience from the fjords, and construction of Lauge Koch's huts for the Three-Year Expedition. As a young, new Nanok'er, having studied the huts and in this connection also Lauge Koch's expeditions in North-East Greenland, you could really feel the whir of history. It gave me goosebumps when I saw Henrik, Sirius year 62, sitting in Lauge

The first days on Ella Ø were spent packing provisions, shooting training, rescue practice and preparing the cutter "Agsut" – our home for the next 14 days.

You could really sense the whir of history in the Eagle's Nest, where Sirius veterans from the 60s and 70s gathered in Lauge Koch's old stronghold.

Departure from Ella Ø. There are three happy Nanok'ers standing on deck, ready to go on an adventure.

Varghytten in Blomsterbugten was a really good renovation task, which took 4 hours - in a magical view and high sun.

The entrance to Renbugten – what a welcome to our first accommodation.

Koch's old armchair by the window in the Eagle's Nest, while stories from a great time were told.
The next few days were spent preparing "Agsut", packing provisions, shooting practice, rescue practice and planning the sailing route and which cabins we were going to inspect. As RAL's supply ship was delayed, we could not participate in "skibsmik". On 13th August, "Agsut" sailed from Ella Ø, loaded to the breaking point and
ready for 14-day dispatch. The sun was shining and there was shelter in the fjord. All in all, an absolutely perfect start to the trip.

Varghytten and Strindberg

After visiting [310] Bjørnheimen, [314] Polarheimen, and [325] Renbugthytten on the first day, the second day's first stop was [324] Varghytten. On the trip there, we had so much wind in the stern that we chose to put both sails on "Agsut", which gave a whole 3km/h more on the way - to the great pleasure of the 3 sailors. Varghytten is a very well-visited cabin, which is located in Blomsterbugten on a plateau raised a good distance above the fjord. There were large

Nordfjordhuset stood tall in the misty landscape. A really nice cabin with an exciting history that goes back to Lauge Koch's Three-Year Expedition.

On the way to the Research Ship "Tulu". We were treated really well by the ship's crew - a very pleasant hour flew by in their company.

With the wind at our backs and both sails up, we could squeeze 3km/h more out of Agsut. It was fun sailing.

Time passed with many things on board – here a little practice in watercolour painting.

icebergs in the fjord - a breathtaking view. The hut's roofing felt was hanging loose in several places. The south side was particularly affected. The repair of the cabin took three men a good 4 hours, and we sailed away with a feeling that we had really made a difference here.

Due to the many hours at Varghytten, we were now late, but chose to stick to the plan, and arrived at Strindberg at 02.15 on the night of 15th August. At Strindberg, the researchers filled the landscape and the cabins well. There had been a storm over Strindberg, tents had been blown over, and the researchers had in need stored much of their equipment in [358-3] Strindberghytten, wherefore this hut could not be properly inspected. Nordfjordhuset [358-2] stood tall and beautiful in the landscape.

During the morning of 15th August, we were invited for coffee on the research ship "Tulu", which was anchored off Strindberg. Of course we agreed to that. Arriving dirty from little "Agsut" without luxury and with directional stability in open sea like a 5-year-old in Legoland, and onto a big, beautiful research ship like "Tulu", you could perhaps be hit by the fist of envy. After all, "Tulu" had both a sink with soap (several, actually), radiators, a television, and a coffee machine. But despite obvious admiration for the research vessel's modern facilities, envy thankfully did not appear. "Agsut" is the perfect

Hoelsbu was our roof over our heads both in and out of Moskusoksefjord. The cabin was levelled and refurbished by Nanok in the summer of 2021.

The small, fine Petrahytte.

For most of the trip we sailed on crystal clear fjords – absolutely fantastic conditions that exceeded any hope for good sailing weather.

Ready for inspection of [348] Huttetu.

vessel for an expedition like ours - small, but with the necessary space and safety. It turned into a really nice cup of coffee with the crew, a tour and good talks on the bridge, before we jumped back on the lovely "Agsut", which headed for [356] Hoelsbu. On the way there, the fog was dense, and the ice floes even closer. A reverse manoeuvre resulted in the tow of the RIB falling into the propeller. After 20 minutes of work with the propeller, rope and ice flakes, the screw was free again, and we could sail the last kilometre to Hoelsbu, which is at the far end of the Moskusoksefjord.

A completely perfect day in North-East Greenland

The following is a description of a full day in Moskusoksefjord Fjord on 16th August – a very good example of many of the expedition's days. After waking up, breakfast and some small repairs, we left Hoelsbu at 10.00, heading into the fjord. After more than an hour of sailing zigzag among ice floes, we arrived at [347] Petrahytten. Brian and Søren went ashore, while Stian stayed on the boat. The cabin was photographed and inspected. Both were quite excited about the small cabin, which was in almost perfect condition. It was as if this cabin had extra soul - a really good experience. We then continued our journey further into the Moskusoksefjord. The ice floes had now disappeared, and the way forward was on a beautiful and calm fjord. On board the ship, the time passed with book reading, relaxation and watercolour painting. Approx. at 2.30 pm we arrived at the [341] Halle cabin, which was generally in good condition. However, the roofing felt hung on the door. This was changed so that it matched the rest of the cabin's fine exterior - a good job. Halle was built in 1929, so in a little while it will be 100 years old. You really have to take a few minutes in such a cabin to reflect about the time, the place and the work that went into the cabin almost 100 years ago. Back on the ship, the direction was now set towards [345] Bråstad. Amazingly beautiful scenery to move through. When we arrived at Bråstad, the welcome committee was ready in the form of three handsome musk oxen. The wild photo-hunt immediately began, with the amateur nature photographer Søren (no one below, no one

Halle got new roofing felt on the door, and we then continued through Moskusoksefjord.

Without rudder, without direction. At some point the rudder stopped responding. It turned out that a bolt had broken. Fortunately, Machinist Jørgensen sorted it out in a jiffy, helped along the way by countless good advice from Nissen and Østergaard.

next to him) flanked by 2 sharp-shooting Sirius men. After a few hundred metres of running, we were in position. It turned out to be some really nice pictures of the animals. Back at the cabin, Brian had the loose roofing felt tapped into place with cardboard nails, while Stian and Søren did an inventory and had the cabin cleaned. The snout was then returned "home" to Hoelsbu. Moskusoksefjorden was really good to us. Completely calm water and magical surroundings. Arrival Hoelsbu at 22.30. Some delicious dried food was consumed and then to bed at 00.00. A completely perfect day in North-East Greenland!

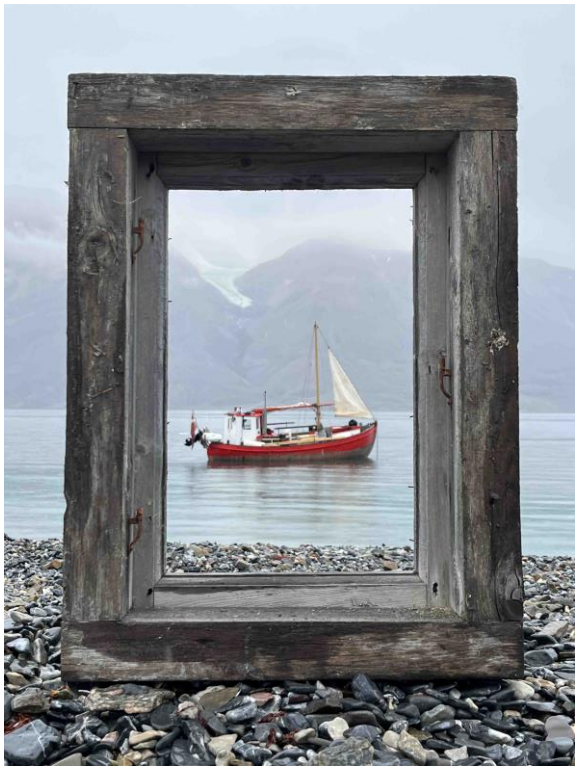
On the way out of Moskusoksefjorden on the morning of 17th August, a lot of drift ice had gathered, and at one point we actually doubted whether we could get through. We did, and the course was now set back to Strindberg, where the research ship was located. Doubts had arisen as to whether the amount of gear oil was enough for the rest of the trip, so we wanted to borrow some from "Tulu". Skipper was very helpful and in addition to gear oil we also left with fresh supplies of chocolate and Matador mix.

Without rudder, without direction

On 17th August at 20.49 Stian stops the engine. The rudder does not respond. We were in the middle of a sea of ice floes, but luckily the water was calm. Machinist Jørgensen established that it was the bolt that goes through the shaft to the rudder that had been broken for a long time and had now worked its way out of the hole and had fallen out, which made the rudder unfit. With unusually good advice from Brian and Søren, the problem was fixed after a good half hour. The solution was a pal from a crossbar, which was passed through the hole with a home-made split through a drilled hole on the other side. There was great joy on board when we again had direction on "Agsut", and we actually agreed that she has never maneuvered better.

The bear hole

On 17th August we arrived significantly late at [320] Smedal at 01.30, very tired and ready to jump in the bags. Stian stayed on the boat while Brian and Søren went ashore to check the cabin's condition. From a distance we could see that the outer door was open. But when we got to the cabin's entrance, everything else looked fine. The door to the cabin's main room was closed. We knocked gently in case someone was lying in the cabin. No answer. Brian wanted to go around to open the shutter, while Søren tried to open the door to the main room. But the door was stuck. At the same time, Brian found that it was not worth opening the shutter. For a bear had visited the cabin, and when it had apparently knocked down



"Agsut" framed.

The interior of the Smedal cabin upon arrival.

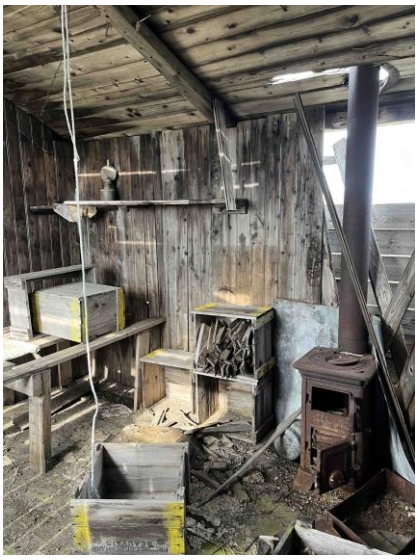
A bear had caged itself inside the Smedal cabin, and since it had blocked the door with the coal stove, there was only one way out – through the laths beneath the window.

After an exciting renovation task of just over 3 hours, the bear hole was closed, and Smedal was once again ready for guests.

the oven and chimney in front of the door, so that it could not be opened, there was only one way out – full speed towards the laths beneath the window. The teddy bear had left a huge hole beneath the window and a nice mess in the room. We took a few quick photos of the clean-up work inside after the prisoner's escape, and then agreed that further photo documentation had to take place in better daylight after a night's sleep. The next day it took a good three hours, and then the Smedal cabin was again ready to receive overnight guests.

A cabin in need of love

On 18th August we sailed to Myggbukta. On the way we rounded [319] Franklin Strand. At the front of the cabin, we were greeted by a funny sight. An old cabin in disrepair, but still full of atmosphere from a bygone era. Outside were cans, the oven, scrap metal and muskox skulls. All in one jumble. Inside the cabin, there were still remains from the last occupants. A large stack of newspapers, primarily Jyllands-Posten, took us back to "the time when Nixon led the election big". It is our clear opinion that Franklin



A funny sight greeted us at Franklin Strand. Here, the history of trapping was spread over a large area, and there were many objects to look at.

Inside the Franklin Strand cabin are still plenty of old items, ready to tell their stories from a bygone era. Jyllands-Posten is from Thursday 31st October 1968.

Strand can still be renovated, but if it has to happen, it has to happen soon. Wind and weather have taken a toll on the cabin, and the many fine historical objects will soon be gone. We found the old cabin book, well damp and close to total decay.

Bacon bear and buffer days at Myggbukta

On arrival at Myggbukta on 18th August in the evening, pictures were taken of all three cabins and sheds. Stian started cooking the famous Team 5 Sled Pizza, while Brian and Søren started with repairs, waste burning and diary writing. We found that the woodwork on the shutters and window frames screamed “Gori” more than a bunch of teenage girls can scream at a Justin Bieber concert. Therefore, we decided to use two of our buffer days as extra repair and painting days at Myggbukta. Incidentally, Stian came up with a question the same evening, which proves how well you are doing on the Nanok expedition in North-East Greenland: "What day is it today?"

Today's tasks on 19thAugust were determined in advance. Patching various holes with roofing felt, fixing loose roofing felt with cardboard nails, repairing “gable antlers”, and painting shutters, windows and red door. The work took place in the most beautiful sunshine until the afternoon, when clouds came in with a light to fresh wind. Søren had a crooked eye for clouds, because as the son of a farmer's daughter, he had learned that "if the clouds look like a sheep’s belly, we’ll have rain within tree days".

On 20th August we woke up to rain, so the painting work was suspended. In return, the cabin was washed down inside, and the workshop was cleaned up. In the evening, Søren jumped into the kitchen and made “fiery love” (mashed potatoes with fried bacon and onions). And while he was standing there giving the bacon extra love on the pan on the coal stove, Stian shouted "BEAR", from inside the living room. A wonderful mixture of euphoria and chaos spread in the cabin. Just outside the front door, close to the famous

The woodwork needed painting, the gable antlers were loose and there was a lot of work with the roofing felt.

Daddy Teddy on his way out of the water. We had the pleasure of following him cautiously at a distance for a good distance before he went ashore and walked up the mountain. A great experience!

Stian fixed the antlers at Myggbukta.

Myggbukta as it looked when we left it again, after some beautiful days in the cabin and the area.

flagpole, a handsome bear in good condition strutted past. Almost simultaneously, all three of us stepped out of the front door. Søren with the camera in hand, and an armed Sirius soldier on either side. Stian immediately shouted at the bear, which luckily ran away before we did. The rest of the evening was spent with bear talk, robber stories and cabin coziness.

Conservation before it's too late

August 21st - a good day: At 7.00 everyone was up. After shutting down [335] Myggbukta and loading the ship, we set to sea again. The goal was to visit 5 cabins up the east coast of Hold With Hope. But it wasn't long before the first obstacle arose. After barely half an hour of sailing, the water depth suddenly dropped drastically. Slowly but surely "Agsut" sat down on her belly in the soft sandy bottom. The tide was not with us. An hour later, however, the water rose enough for us to sneak among ice floes and out into the deep, open sea. Patience was now under lighter pressure, because today's program was packed. We decided to stick with the plan and then we had to see, how far up the coast we could go before we would be forced to turn back.

First stop on the day's journey was [330] Geisha, a Norwegian trappers' cabin built in 1926 for the Folkvik Expedition. The aim was to investigate its condition and whether it was possibly worthy of renovation. It was a beautiful sight that greeted us when we went ashore at approx. 13.45. Even though the cabin was dilapidated, it still stood beautifully in - what had arrived for the occasion - sunshine. Some good pictures were taken, and the carpenter inspected the structure. The assessment is that the cabin can be renovated, but the question is of course what benefit a renovation will have. It doesn't have the best location and there weren't many items of sentimental value in the place. This will perhaps be one of those cabins

Despite the dilapidated exterior, the [330] Geisha stood beautifully in the sun that broke through the dense fog.

There was not much hut left at [331] Kap Broer Ruys Syd – more firewood for a Midsummer fire.

[338] Kap Broer Ruys Nord - or the "Cathedral" as it is also called - is a very atypical cabin with its "church tower". It is not an impossible task to renovate it, but it will require a greater effort.

[355] Knudshoved - a piece of Danish trapper's history - is particularly in need of renovation. It will be a shame if it is lost to nature. We very much hope that in the future there will be an opportunity to renovate the cabin.

that wind and weather will wash out of history at some point.

Back on "Agsut" the trip now continued to [331] Kap Broer Ruys Syd. In the book "North-East Greenland 1906-60" there is a picture of the cabin from 2004. But it wasn't much of a cabin that met us when we went ashore at 2:30 p.m. There was just a pile of sticks that wouldn't be used for much other than a nice Midsummer bonfire. We sailed on with Brian at the helm. Suddenly he shouted "bear, bear, bear - find the camera". Incredibly far away, he had spotted a bear jumping from an ice floe into the water. Søren found the long lens, Stian took the helm and slowly but surely we chugged forward. In the water between floes its head emerged. We decided to sail a little closer, but still at a good distance and without disturbing Daddy Teddy too much. It resulted in some nice pictures of the polar bear, which we could follow for a long time on land.

Highly exalted, we continued the determined course towards [338] Kap Broer Ruys Nord, also called the Cathedral. At the front of the "church", Søren started as usual with the camera, and Stian and Brian immediately set about making a professional assessment of whether the cabin could be renovated. Unfortunately, it is our assessment that the cabin cannot be renovated without major work. The joist layer is rotten. So is the floor, and then the sides of the cabin are pushed askew by the floor/foundation. It is a shame that such a special cabin has to perish. But there is a long way home if it is to be saved.

After a trip up the church tower, we went back to the RIB and sailed out to the good cutter, which turned her bow towards the [339] Skandalen. The Skandalen was built in 1927 from driftwood found off the east coast of Hold With Hope. The hope was that the walls and rafters were still standing, so that we could catch a glimpse of this cabin and its special design. Unfortunately, it was just more logs for the Midsummer bonfire that met us. Here, the harsh north-east Greenlandic nature had taken its toll – a beautiful cabin was

Beautiful Laplace upon arrival. The exterior was in good condition. The interior had been ravaged by a bear.

Some renovaton of Laplace before we sailed on. Unfortunately we did not have material for repairing the interior.

now scattered in a radius of up to 100 metres. After some quick photos, we crawled back to the rib disappointed.

It was now almost 7.30 p.m., and the question was whether we should "call it a day" and head south, or whether we should sail the last almost 20 km north to [355] Knudshoved. As all three of us apparently suffer from excessive curiosity and a desire for adventure, we naturally chose to sail the last bit up the coast in the clear water to Knudshoved. We arrived in early sunset. The place was magical! As the three of us stood inside the old trapping station, an idea began to sprout. This cabin should simply be put in order. A piece of Danish trapper history, which started with the arrival of "Godthaab" almost 100 years ago, should not be lost in the fury of the elements,

as we have seen the other cabins on today's route do. Unfortunately, there is an unresolved ownership relationship which prevents Nanok from renovating this cabin.

Do owls land on water?

On 22nd August, 15 hours of sailing to [301] Laplace lay before us. It was a fantastic trip on clear water between countless ice floes. Along the way, there was a sudden shout "all men on deck, there's a snowy owl". Everyone let go, and looked joyfully for the white bird, which floated past us - and then landed in the water some distance away. Mysterious! Closer investigations have shown that either it was a very atypical owl, or we have been fascinated by a seagull. Unfortunately, it is probably the latter that applies.

On land at Laplace, we found that a bear had been at play – all over the cabin. Sirius had stopped by earlier and taken the worst of the cleanup, but there was a lot that needed to be done. Everything was torn apart, from walls to furniture. While Brian started on the roofing felt and covering for the chimneys, Stian set about fixing the sign and

[308] Kap Humboldt.

[236] Maristua.

The trip out through Dusén Fjord was MAGICAL!

A GPS and the "cabin book" have been our navigation instruments for 14 days.

fixing the roofing felt with nails, and Søren tackled the cleaning inside. Laplace needs a proper repair inside after the bear visit. We also discussed whether the cabin should be made more bear-proof in the form of new windows and doors. According to Brian and Stian, Laplace is known to be a "bear magnet", which contributes to people preferring to bypass the hut and instead drive to [308] Kap Humboldt. We took measurements of windows and doors and panels inside, and then sailed on towards Dusén Fjord.

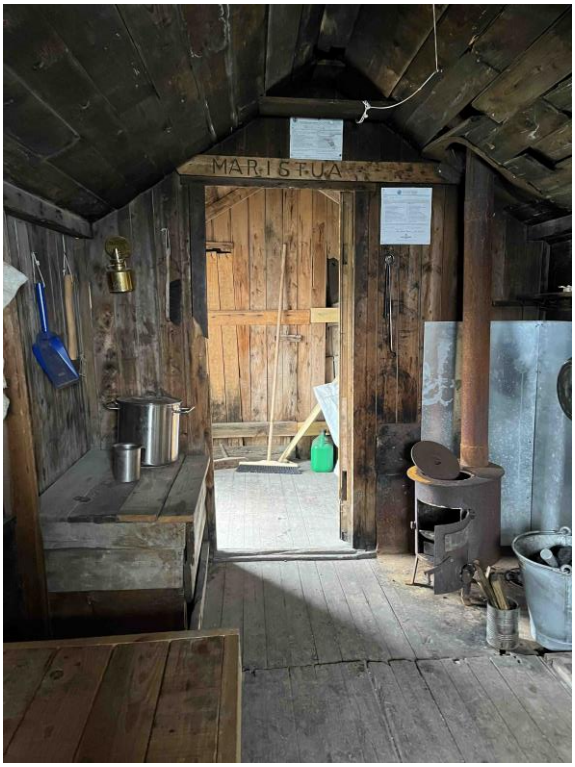
Going home

After a good voyage in Dusén Fjord, where we inspected, carried out minor repairs and cleaning of three cabins, the last major renovation of the trip was carried out at [308] Kap Humboldt on 24th August. We went ashore to a very well-kept cabin. However, there were holes in the roofing felt, a damaged chimney box and some tired woodwork outside. After photography, Overroofingfeltmaster Nissen got started with the welding machine. Jørgensen threw his love on the chimney, and Østergaard took a firm hold of the paintbrush. Towards the end of the evening, a wonderful scent of Sled team 7 pancakes spread from the glow of the coal oven. Fantastic evening in a historically important trapping station.

On 25th August we had 4 cabins on the programme, which was also successful. There were minor repairs on 3 of them. After the latest change in the sailing plan, we would have spent the night in [236] Maristua. But in the early night during the voyage we changed course from Maristua to Nanok's Ella Ø station due to bad weather. We spent the night instead in Ørnereden. As we landed in the middle of the night on Ella Ø, we didn't get up until 10.00 on 26th August to the sound of Chinese voices. It turned out that there was a cruise ship right outside the window, and it was teeming with camera-clicking tourists all over Nanok's grounds. The Sirius hoaxes said that there had been 3 cruise ships in 3 days.

The last days

The last 5 days on Ella Ø went quickly with inspection of Maristua, side trip to [239] Maria Ø Station, unpacking of supplies, cozying up with the scientists, dinner with Sirius, counting, washing down "Agsut" and shutting down the base. Time passes quickly and things take time on



Maristua - the tour's official last hut. We have visited 34 cabins (plus the Ørnereden, Fjøset. and 12 mandsbarakken). We have repaired 18 of the cabins to a greater or lesser extent. Maristua was a really nice final task with a bit of roofing repair and the classic "new-covering-for-the-chimney".

The Ella Ø team says thank you for a fantastic summer. From left: Brian Nissen, Søren Østergaard and Stian Graakjær.

the Coast. The historic trapping cabins and stations in North-East Greenland are of vital importance to the users of the coast, including researchers, the Sled Patrol Sirius and tourists. For them, the cabins are shelter or an opportunity to extend the journey. The cabins also contribute to increased understanding of natural history for many of their visitors. The coast will be a poorer place without these cabins.

We have sailed 1041 km in 14 days, inspected and counted 34 cabins (plus 3 on Ella Ø), and have carried out minor or major repairs on 18 of them. We have repaired countless walls with loose roofing felt due to lack of welding overlays on the old felt, damage from bears and musk oxen, broken windows and rotten boards. We have swept several tons of rubbish out of the cabins. We've dragged and we've laughed. We have had long working days that have lasted late into the evenings. We have had the experiences of a lifetime. Above all, we feel that we have made a difference for the preservation of Greenland's trapping history, and for the people who have to visit this magnificent nature in the future. In the area around Kejser Franz Joseph Fjord there are some fantastic cabins. We hope that these may be of benefit to many generations to come, as they have been to generations of the past 100 years. And sitting in Lauge Koch's old armchair here in Ørnereden, one can only be humble, grateful and a little bit proud to have participated in Nanok's work with the maintenance of these cabins and their stories. Thanks!

A huge thank you must also go to the Sled Patrol Sirius, the researchers from Aarhus University, GEUS, the crew of the Research Ship "Tulu", the crew of "Jytte", the weather gods, the board of Nanok and the Aage V. Jensen Foundation.

Stian, Brian og Søren

Field report for the Ella Ø 2023 Research Team

Assignments

The Ella Ø research team had the following tasks:

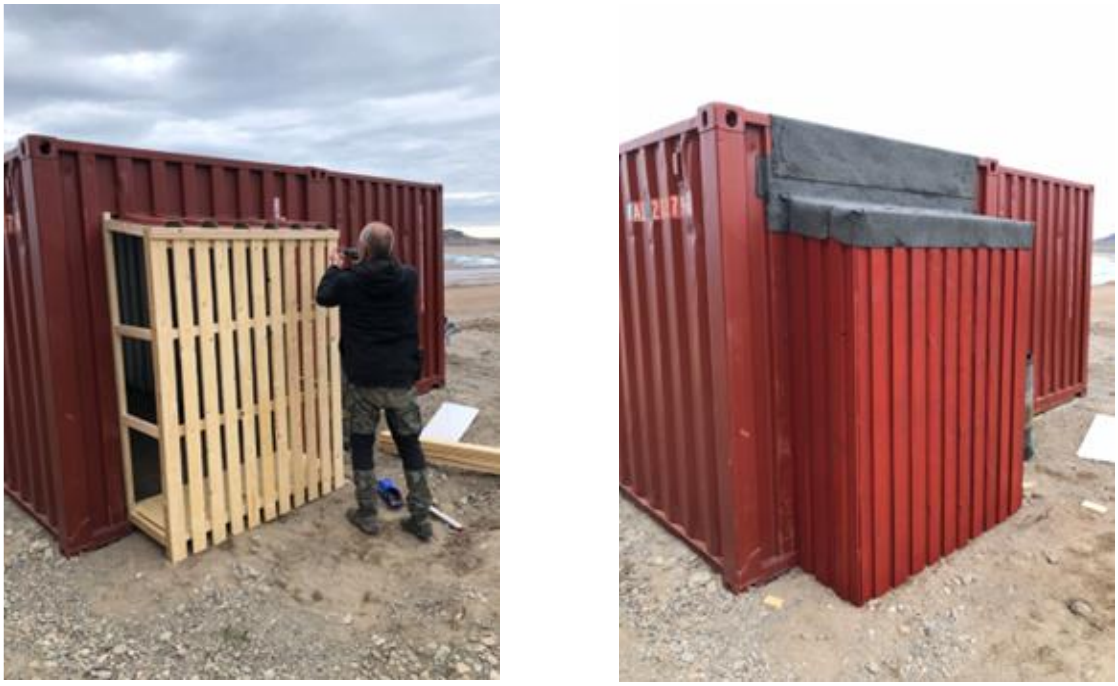
- establish a boat garage in Mestersvig - Skibsmik
- set up a solar system
- measure oceanographic conditions, record and deploy measuring instruments in the fjord system
- monitor and collect data from automatic cameras for fauna and flora monitoring on land
- set up GIOS measuring station on Ymer Ø - service on Ella Ø GIOS ARC-MO measuring station
- upgrade the GIOS-light measuring station on Ella Ø, Dickson Fjord, Maria Ø, and in Sverresborg
- camera setup and Disko2 satellite project
- record and deploy water samplers at Ella Ø
- test student ROV at Hisinger glacier
- precipitation sampler
- film project
- packing and journey home

The Ella Ø team

- Andreas Kjær Dideriksen (Arctic Research Centre, Aarhus University)
- Claus Melvad (Arctic Research Centre, Aarhus University)
- Eugenio Ruiz Castillo (Arctic Research Centre, Aarhus University)
- Egon Frandsen (Arctic Research Centre, Aarhus University)
- Jeff Kerby (Arctic Research Centre, Aarhus University)
- Lars Ostenfeld (Film director)
- Peter Kofoed (Sound technician)
- Roland Develter (VLIZ - Flanders Marine Institute)
- Simon Kortegaard (Mopa Boats Vilsund)
- Simon Skytte Eggert (Arctic Research Centre, Aarhus University)
- Søren Rysgaard (Arctic Research Centre, Aarhus University)
- Wieter Boone (VLIZ - Flanders Marine Institute)

Travel to Ella Ø - Establishment of a boat garage in Mestersvig - Skibsmik

Egon and Simon went up a week before everyone else (2nd August) to establish a boat garage in Mestersvig and to receive shipping cargo from the Royal Arctic Line (RAL). The journey to Ella Ø went according to plan, and we were received on Ella Ø by Sirius and the crew of "Jytte". After a short time we had the station opened, water and drainage connected, so that daily life could begin. The plan was that we should receive the RAL ship on Ella Ø a few days later and then sail to Mestersvig and pick up one more Mopa boat and get news about the finished skibsmik there. But since the RAL ship was delayed, we chose to sail to Mestersvig a day earlier than planned. It turned out that Sirius had planned a trip to Mestersvig



New boat garage in Mestersvig. Photo Egon

Egon in his right element. Photo Søren

New solar system on Ella Ø replaces petrol generator - now you can finally enjoy the silence and the view. Photo Søren

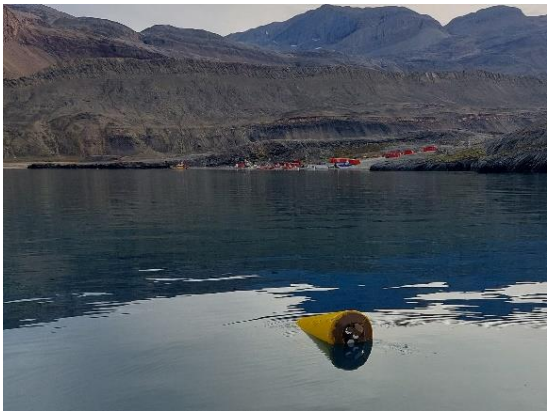
the same day, so we ended up getting a ride with Sirius instead of sailing ourselves. At Mestersvig we were well received and accommodated at the Grand Hotel. After that we borrowed a couple of bikes, which we made extensive use of back and forth between Nyhavn and Mestersvig in the following days. In Nyhavn, we had the engine mounted on the Mopa boat, which has been sitting unused for a couple of years in a container there, waiting to get into the water.

On one of the containers in Nyhavn, we also had to build a small bay similar to those we have already built on the containers on Ella Ø, so that the Mopa boat can be stored in the garage after the season without us having to dismantle the engine again. This work went well, and we benefited greatly from Nanok's stock of timber in Nyhavn, of which we had agreed to use some for the purpose. As RAL had not yet arrived, we could not carry out the second part of our planned work, which consisted of moving the contents of the container from Denmark to the container which was empty at Nyhavn. The agreement with Mestersvig was therefore to place the container next to the other two when it arrived, then we would have to move it around later. After four good days in Mestersvig, we sailed back to Ella Ø, and prepared for the rest of the team to arrive and for Simon to go home.

On the morning of 18th August, RAL finally arrived at Ella Ø, and we got our freight ashore, which partly consisted of the container we had shipped from Denmark, as well as a boat trailer we brought from Mestersvig. We now have the same number of boats and boat trailers both in Nyhavn and on Ella Ø. The last ARC goods consisted of petrol for the many sailing hours we would have from Ella Ø. In addition, we received Nanok goods and helped where it was relevant and emptied our own container so that it could be returned again. A sad thing we discovered in Mestersvig is that our 600 litres of petrol is gone. It was clearly marked with the Arctic Research Centre, address etc. We will probably have to store fuel in containers in the future.

Setting up solar systems

As part of the infrastructure grant that ARC has received from the Ministry of Research, we had to set up a solar cell plant and wind turbine at the Ella Ø station, so that the primary power supply at the station in the future is based on solar and wind energy instead of a petrol generator.



GIOS underwater instruments are acoustically triggered and come to the sea surface after measuring for a year. New instruments for the next season are deployed. Photo Søren

Going home to Ella Ø after a long working day in the fjord. This year we had 3 Mopa's operating at the same time to handle all the different activities. Good to know there is a Mopa nearby in case of an accident. Photo Jeff

The system consists of 9 solar panels, which are mounted on the west facing side of the containers. From here, cables are fed into one container, where there are twelve 12V batteries which store the power. A converter ensures that the voltage on the batteries is transformed to 230V and that 2,000 Watt can be delivered, which is the same as the generator we normally use. After the system was put into use, at no time was it close to the consumption reaching over 2,000W, even though there were 11 of us at the station, with a freezer running and various equipment to be recharged. We also put an extra wind turbine on the GIOS-ARC-MO systems to ensure enough power over the winter when the sun is absent.

The actual set-up took place over a few days, with the fixing of rails on the containers and digging down cables from one container to the next. Then placing of batteries, charge regulators, and converter in one of the containers. All in all, the installation went well, and the result seems to work well.

Measure oceanographic conditions, record and deploy measuring instruments in the fjord system

The second part of the research team arrived at Ella Ø on 9th August after a nice trip according to plan via Iceland. The first week was spent taking up oceanographic measurement buoys from 2022 and making measurements in the various fjord systems as in previous years. All buoys were found and had measured as planned. It looks like we're getting into the routine of collecting data in these fjord systems despite challenges from icebergs and sea ice. We were thrown into the mischievous Greenlandic weather right from the start, when we gallantly slipped away to Sverresborg the next day with the wind at our backs and slightly high seas. It turned out to be quite a trip. We had a whirlwind, where our hats were sucked off into the air and sea from all sides at the same time. At Sverresborg, however, the weather improved, and we came ashore without a polar bear visit.

However, earlier in the spring the bears had eaten our cable for the marine instruments. It's incredible how inventive those bears are. Egon had dug down the cable all the way from the house to the shore last summer. It's quite impressive that the bears can dig a hole in the middle of nowhere and pull up the cable. They must be able to smell that we've been there. Fortunately, the instruments in the sea store data in their memory, and we quickly recovered instruments and data. New instruments were deployed, but this time without a cable and direct real-time transmission from the sea from this

station, while the weather station and camera are still transmitting in real-time as planned. The journey home lasted seven hours and we had to seek shelter in a few places. Good to learn that you shouldn't think everything has to be easy. We made it safely back to Ella Ø, where the wind suddenly dropped, and everything became calm. Something you have to experience - it's incredible that the weather can behave so differently in these different fjords at the same time.
Soon there was a smell of good food in Tolvmandsbarakken, and people ate and talked until the late hours. This first week was used to revisit as many oceanographic sections in the various fjords as possible to expand the measurement series that was initiated in 2016. We are getting ready with the material for scientific publications on the general oceanography of the area. Due to delayed skibsmik and lack of the expected instruments and equipment, we decided to extend the measurement program and also revisit several of the stations that we visited in 2021 with the Navy's inspection ship "Lauge Koch". On 16th August the rest of the research team arrived at Ella Ø, ready to help with skibsmik and receiving equipment.

Monitor and collect data from automatic cameras for fauna and flora monitoring on land

The following days, Jeff visited all camera systems on Ella Ø and in Sofia Sund to inspect and collect data from the automatic cameras for fauna and flora monitoring on land. The new camera systems have performed well. There was only minor damage to one of the new GIOS camera systems on Ella Ø, and it was fixed. A new computer hardware and software system was installed on all cameras on Ella Ø to increase operational reliability going forward. In addition, a new more bear-proof system had been developed for Ymer Ø. Unfortunately, we could not postpone the system due to the helicopter cancellation, but plan to do this in the summer of 2024. Despite days with bad weather, Jeff visited Ymer Ø to find the most optimal location for the container system for next year. Surveys of soil and vegetation conditions were carried out in several places to get a solid basis for the location next year. Camera systems for land and fjord surveillance were also slightly changed in design with input from Wieter, Roland and Jeff and replaced the systems in Sverresborg, Ella Ø, and a new system was installed at the head of Dickson Fjord. These systems send photos back to Denmark in real time via satellite connection. High-resolution three-dimensional maps of vegetation and landscapes were made by drone near Dickson Fjord, Ella Ø and at Sverresborg. Gradients of multispectral landscape maps will be combined with satellite data and "time-lapse" cameras and will subsequently be used to characterize gradients in timing and intensity of plant growth from the Ice Sheet to the outer coast of the fjord systems. In some of the locations, thermal recordings were also taken from a drone. These images will be calibrated with temperature and humidity loggers deployed in the landscape and with GIOS light moorings and direct measurements at sea level. In addition, temperature and humidity data were downloaded from a number of data loggers that were deployed last year. Jeff also managed to establish 11 long-term vegetation plots, where he investigated the biodiversity and mapped the vegetation with a drone and precision GPS in order to study changes in the plant composition over a short and long-time scale. This will also be done on Ymer Ø in the coming years.

The flowers are in full bloom - here Greenland's national flower, willow-herb. Jeff tests the thermal and optical camera on the drone. Photo Jeff & Søren

Oceanographic sections are measured from the glacier in Dickson Fjord to the outer coast at Sverresborg and Mestersvig. Nice to go together. Completely calm weather at the head of the fjords and often waves and wind at the mouth of the fjords. The GIOS ARC-MO system has worked well this year. Thanks to Sirius for checking it out this winter too. Photo Søren & Jeff

Deploy GIOS measuring station on Ymer Ø - service on Ella Ø GIOS ARC-MO measuring station

Unfortunately, we had to cancel the installation of the GIOS ARC-MO measurement station on Ymer Ø. However, it was nearly successful. Due to the very late arrival of the Royal Arctic Line, we only received the container and equipment on 18th August. Everyone worked like mad to get everything ready for the helicopter transport from Ella Ø to Ymer Ø on 19th August. We had agreed with GEUS that we could hire a helicopter from them on the 19th of August, but it was cancelled at the last minute as the helicopter pilots had run out of hours! They had apparently forgotten to include hours for flying people home from field work. Now we must figure out how to get the container in place next year instead. Hopefully we will succeed, now that the container is already on Ella Ø and "just" has to be flown to Ymer Ø.

We also serviced the GIOS ARC-MO unit on Ella Ø. Almost everything has worked as it should. We had some corrosion on an underwater chlorophyll sensor. The company (RBR) has - without telling us - changed an underwater plug so that it cannot last a whole year underwater. After some correspondence with the company last fall, we had the entire system replaced with some better sensors that can also measure dissolved organic matter at the same time. Three underwater systems are now being replaced with these improved systems at no charge, so even though we didn't get all the chlorophyll readings from May to August in 2022, hopefully we'll get a better data set in 2023. The rest of the sensors worked as planned. Picking up, servicing and deploying the large ARC-MO GIOS mooring worked according to plan, although it is quite heavy equipment to operate without a large ship and crane. But with a little ingenuity, most things can be done if you have the time, and the weather doesn't play tricks.

The wind turbine itself and the solar cell systems on land had also lasted. However, a bear had tried to eat the electrical cables for one of the wind turbines. Fortunately, we had installed a metal rail - on the underside of the reinforcing pipe - that encloses the cables. It's obviously not nice to chew on metal rails, as the cables inside were undamaged. We repaired the minor damage, and let's hope the bear next year has learned that it doesn't taste good. A bear had also tried to gnaw through 3 layers of reinforcing cables in the weather station mast itself. He had chewed on the cable, even though it was mounted inside a mast - and up to a height of 3.5 metres. Fortunately, no data or power cables were damaged. To be safe, we have fitted a reinforcing tube around the whole thing.

Oceanographic sections are measured from the glacier in Dickson Fjord to the outer coast at Sverresborg and Mestersvig. Completely calm weather at the head of the fjords and often waves and wind at the mouth of the fjords.

Upgrade GIOS-light measuring stations on Ella Ø, Dickson Fjord, Maria Ø, and at Sverresborg.

A newly developed "ARC-MO_light_v2" system was installed at several other locations in the fjord and sends data in real time. This seems to work. Nice to have inventive Belgians on the team. The idea is to combine atmospheric data, camera systems for analysing processes in the landscape (plants, animals, snow, ice conditions etc.) and ocean data and transmit in real time. These systems are independent of the "mother" ARC-MO GIOS system but generate the necessary power themselves and transmit directly to the

Results from real time automatic cameras from various locations in the 2022-23 season. Photo Wieter

satellite. The development of satellite communication is rapidly developing, and this means that it is easier to send data from the Ice Sheet to the sea along our atmospheric, oceanographic and terrestrial sections without having to use relay stations. ARC-MO_light_v1 last year sent in real time for a few months, but then stopped sending. Over the winter and spring, a better and more robust version (v2) of the system was developed, which is now in place and sends data in real time. Roland found a software error in the v1 system and has fixed this, so now the v1 is sending again. These systems are cheap, and the hope is that it can be used on a Greenlandic scale to cover the existing east-west climatic gradients. The v1 system was placed on Ella Ø next to an advanced "state-of-the-art" atmosphere measuring station and appeared to provide comparable measurements as long as data could be transmitted. With v2, the hope is to be able to complete a full year of real time data and document that the data is of good quality.

Real-time photos from various cameras are also part of the GIOS-light setup. First version worked as intended throughout the 2022-23 season and sent photos all year round. An updated version was developed this winter where the white balance can be configured on better automatic time lapse cameras. The system is deployed in Dickson Fjord, Ella Ø, Sverresborg and Daneborg and covers both sea and land. In addition to research, GIOS-light data can be used to improve local weather forecasts, make tide tables for the various fjord systems, and get an overview of iceberg drift, fog, sea ice conditions.

Camera setup and the Disko2 satellite project

In connection with setting up the GIOS-light measuring station at Dickson Fjord, a wide-angle camera system covering 220 degrees was also set up. The camera is mounted on a separate tripod near the GIOS light station with a good view of both the glacier and the outlet of Dickson Fjord. It takes pictures every 2 hours to examine current

GIOS Light stations at Sverresborg and Dickson Fjord. Photo Wieter

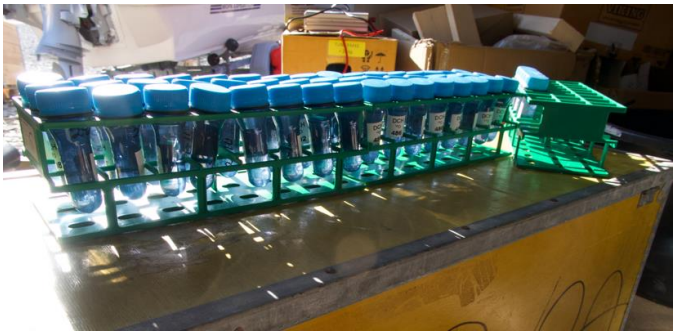
The new measuring stations in Dickson Fjord. Photo Andreas

Newly developed GIOS-light underwater system. Can collect data from the sea and transmit data all year round. Is now located in several places in the fjord systems. Photo Wieter

conditions (ice movement) and calving. The images are only stored locally on the camera, but the camera has the option of continuously sending images over an internet connection, if we can create this at the measuring station in the future. Since the camera is bought as an off-the-shelf item, if it proves to be effective and viable in arctic weather, it will be able to be set up quickly and relatively inexpensively in several places.
Observations of a.o. glacier calving in the future, will also be used to make follow-up observations, as well as look for archival data from the DISCO-2 satellite. This satellite is currently being developed and will be in a polar orbit, giving the opportunity to observe the same area of e.g. NE Greenland approx. 3-4 times daily. The satellite will have 2 optical cameras and an infrared camera to measure e.g. surface temperature around glacier fronts. In interaction with the GIOS and GIOS-light stations, the thermal observations from DISCO-2 will also be able to be calibrated to ground-truth measurements from these stations.

Record and deploy water samplers at Ella Ø

The automatic water sampler at Ella Ø has collected water samples for oxygen isotope determination in the sea throughout the year. Everything has worked as planned. We must now have the isotope data analysed when we get home to the laboratory, and this opens up the possibility of using isotopes all year round as a marker to distinguish meltwater from the ice sheet, Atlantic water and the Russian rivers when it flows down Greenland. A new design, where the water sampler can also measure pressure and temperature simultaneously, was postponed to take measurements until next summer. This version can also be charged and programmed without having to be opened. In addition, the sample bottles can also be mounted on the outside of the sampler, which makes it very easy to handle.
We have also further developed the water sampler to be able to take samples at different pressures. This means that you can now take water samples from 13 different depths in the fjords from small Mopa boats. The sampler can go down to 350 metres, but this can easily be changed if you want to go deeper. With a temperature sensor, we get the temperature profile in the water column at the same time. The next project is to install a conductivity sensor, then we have a combined



The water sampler worked perfectly. Water isotopes are now collected in the fjord all year round. Photo Søren

Meltwater from the Ice Sheet flows out from under the Dickson glacier before the big calving. Photo Jeff

water sampler and CTD. There is plenty to do in a new bachelor's project.

Testing student ROV at Hisinger Glacier in Dickson Fjord

Last year's investigations close to the edge of the glacier with a drone helicopter and CTD showed that, in addition to a thin warm and fresh surface layer, there are temperatures close to -1 degrees in the upper few hundred metres of the seawater in front of the glacier. The water is slightly warmer than the Polar water, which is a little further out in the fjord, which is close to the freezing point of sea water -1.8°C. The Atlantic water (0.8°C) lies somewhat deeper but is present in the fjord in the deeper water layers. The Atlantic water, however, cooled a lot, since this water has been around the Arctic Ocean first. It made us think about whether the fresh meltwater from the Ice Sheet would freeze when it ran into the cold fjord water. This would cause the temperature to rise slightly due to the freezing process and the ice crystals to float up in the water column until they reach plus degrees, where the ice will then melt. We had collected data from last year, which showed that there was a water isotope signal precisely in the transition from plus to minus degrees in the water column in the fjord. Perhaps we could see these ice crystals as proof of this hypothesis.

Simon, Claus and Søren send the underwater robot in to the glacier.

Eugenio in front of a small glacier in Dickson Fjord. Photo Søren


Søren and Claus discuss how ROV can be improved. Data from the underwater robot is studied and discussed. From left Lars, Søren and Simon. Photo Jeff & Lars

A team of undergraduate students was given the task of building a ROV (Remotely Operated Underwater Vehicle), which should be able to measure this using sonar, video recordings, temperature and saline measurements. The bachelor project went well, and a prototype was made that seemed to work in a swimming pool and in Aarhus harbour. We therefore decided to invite one of the students to test this at the glacier. Tests were carried out at Ella Ø, where the fibre optic cable for communication with the ROV unfortunately broke. It was fixed and we went to the glacier to measure. It succeeded in diving to a depth of approx. 200 m, 400 m from the glacier and send the ROV to the edge of the glacier and make a dive down along the glacier front to the seabed at 170 m.

Closer analysis of the data showed that the lighting was not optimal, and several tests were subsequently made at Ella Ø with this. The weather was fantastically good for a longer period with very high air temperatures and ice melting in the fjord, so we slipped away again for a trip to Dickson Fjord. We dropped Jeff off next to the glacier where he could climb up the terrain and take thermal and optical drone measurements from above, along with ROV measurements and our standard oceanographic observations in the sea (we were doing 3 Mopa boats at the same time). The first deep dives went according to plan. We could not see ice crystals from the surface to a depth of 200 metres at a distance of 300-400 m from the glacier front. In contrast, the number of small particles (clay and silt) increased when approaching the glacier front. We then decided to sail the ROV to the glacier front and measure a profile down the glacier itself. We reached the glacier just fine, got good measurements on the surface, but suddenly there was a bang above the usual rumble in the glacier. It turned out that a good chunk of the glacier had fallen close to the ROV.

We knew we had barely a minute to get away before a bigger wave would reach us, so we waited a bit. Suddenly the glacier calved on one side of the fjord and then the entire glacier front continued to collapse over the entire width of the fjord. Large icebergs came up from the sea from below and the ROV got a good "whack" from a chunk of glacier, so we cut the communication line and slipped away to safety.

Tsunami waves are a bit fascinating, especially when you are sitting safely in deep water with no ice around. The entire glacier front fell once more, and the calving continued for several hours. There was ice everywhere in the inner bay, so we sailed away a bit, had lunch and sailed in and picked up Jeff when the ice had opened up a bit more. We made some more oceanographic measurements and then went back home to Ella Ø after a long and eventful day. We returned after a few days and repeated the oceanographic measurements to find out how such calving affects the water column. The good thing is that we now have all the underwater instruments in place through the fjord to follow the signal.

Precipitation sampler

A team of students has developed a prototype of a precipitation sampler through their bachelor's thesis. The sampler had to collect precipitation for analysis of water isotopes (18O, 2H). It tells something about where the precipitation comes from. It is still unknown where the fresh water in the fjords comes from and one of the uncertainties is how much comes from precipitation over the year and from where. After submitting the bachelor's thesis, the students continued to work to get the sampler ready for deployment on Ella Ø, but due to job offers, the students did not complete the sampler on time. Claus tried to get the sampler ready at the last minute, but it turned out that the version was not ready for deployment on Ella Ø. Too bad, the mechanics worked, but the electrical system was not ready. We continue to work in Denmark to develop the system completely and deploy next year.

Nice toilet conditions this year. Nanok has upgraded the standard. From left: Wieter and Roland. Photo Jeff

Dining together with Sirius in the Eagle's Nest. Photo Søren

Film project

First of all, I (Lars) would like to say a big THANK YOU for the opportunity to experience and photograph Ella Ø as well as the surrounding landscape and the people who were there. The experience is indescribable and will always stick in my memory. Right now, a fascinating event is unfolding deep in the Arctic Ocean: a meeting between salt water and fresh water. Or is this meeting happening? The purpose of our film on this trip was precisely to capture this clash in the form of ice crystals. In the untouched landscape we followed Søren Rysgaard and Claus Melvad. Three of Claus' students had constructed a remote-controlled submarine, a so-called ROV, designed to safely dive into the depths and search for ice crystals. The main focus of the film was on Søren and Claus exploring, sailing, reflecting, but most of all just being in the grandeur of nature. Greenland's nature is both harsh and breathtakingly beautiful. In addition to the expeditions to the glacier, the camera also captured everyday life in the cabins as well as the preparation and construction of the ROV.

I am happy with the footage I got. They reflect research in nature and the many associated questions. They capture the field work and people in the magnificent nature, which was filmed in all lighting conditions and weather types. However, there were some recordings that were missed. I had planned to film the ROV below the surface of the water during the week that Claus was not present. Unfortunately, this became impossible when the ROV was lost during a glacier calving. And when Søren was stranded for two days in Mestersvig with Egon due to bad sailing weather, we had to think creatively with the available filming options. I was joined by Peter Kofoed, who was responsible for the recordings of the sound. Together, armed with a rifle for safety, we explored the island and found new perspectives to capture the impressive scenery.

Packing and journey home

The last days were spent taking up boats, changing oil, servicing, packing and making inventory. We had to get one of the boats to Mestersvig, where it had to go into its new boat garage. It was a slightly longer trip than expected. It lasted 2½ hours to get there with tailwind, but at Mestersvig and along the outer coast the wind had increased strongly. However, we got the Mopa inside and packed all the gear in Nyhavn but had to seek shelter for a few days in Noret. A rather exciting entry between rocks and waves, but we got in, even if it took a while and we had to use the punts along the way. We dropped anchor near Mestersvig and were picked up by the "Owls" in the Jeep, as they took pity on us, should we have to walk all the way. What a hospitality. We were totally spoiled - there was food, a warm bed and good company for a few days. The researchers at Ella Ø just thought we were at a party in Mestersvig and didn't bother coming back. On Ella Ø it only rained a little, but no waves or wind. Again a reminder of Ella Ø's fantastic location when the weather is bad.

The last days of packing at the same time as Nanok was efficient and pleasant. There were several joint meals with both Nanok and Sirius in Ørnereden and in Fjøset. Everyone helped each other and it was a pleasure to close the station and prepare it for winter. We received a lot of packages of pancake mix from an unknown donor. It came with Sirius with Twin Otter with a message that it had to go down to the scientists in the Tolvmandsbarakken. If the person who sent pancakes is reading this report, thank you for the donation. Pancakes were very popular this year.

Group photo of the Research Team 2023. From left: Lars, Jeff, Wieter, Roland, Søren, Andreas, Simon, Eugenio, Egon, Claus & Lars. Photo Jeff

Everyone said goodbye to Ella Ø on 31st August and the trip went with Twin Otter to Constable Pynt and on to Reykjavik and Denmark. However, Søren had to meet with Torben Røjle Christensen and Lise Lotte Sørensen in Keflavik on 2nd September to fly to Tasiilaq and make reconnaissance for the possibilities of locating a GIOS ARC-MO measuring container next year in this area.

Closing

It has been a pleasure to be on the coast again. We achieved most of what we came to do. Should you mention something that could be improved, it would be the arrival time of the Royal Arctic Line ship to Mestersvig and Ella Ø. This year the arrival was delayed more than 2 weeks. This makes it difficult to plan what equipment to bring up. We are already planning the work in February and must have permits etc. in place to enter the National Park. It must be reported which researcher is coming and when. If equipment, food, fuel etc. are not in place before the researchers arrive, time is wasted. It is too expensive to send all the equipment by air and it will mean that we have to plan more than 2 years in advance if transport by ship is to be used and if we need to have something done by the beginning of August.

Another thing that failed this year was the transport of the GIOS ARC-MO container system to Ymer Ø. We hoped until the end that it would succeed. But even though we got ready, despite RAL's delayed arrival, the last transport to Ymer Ø by helicopter unfortunately missed due to some administrative "fikumdik".

One last thing for thought and discussion is that it can feel a bit overwhelming with 4 cruise ships visiting while we were working at Ella Ø. Some days there were hundreds of tourists in the station area and some days it could even be difficult to pee undisturbed at "Sjask" (which is only covered on three of the sides) when you had to go through an army of tourists with cameras. Some even photographed through the windows of the Tolvmandsbarakken. On one visit, they sailed into our boat mooring and got it entangled in the outboard motor of one of their inflatable boats. There was a big difference among the ships. Some ships had control over the flow of tourists, so they went along marked routes, while others just sent people in all over the area.

The collaboration with Sirius and Nanok has again worked extremely well this year. Thank you for a great season and we are all looking forward to coming back.

Søren, Egon, Andreas, Claus, Eugenio, Jeff, Lars, Peter, Roland, Simon, Simon, Wieter

Supplement: Events after the field season

Just over a week after our return from NE Greenland, we received a message through the Joint Arctic Command (JACO) from a former Sirius man who had arrived at Ella Ø with a cruise ship that something was terribly wrong. On the "Sirius side" of the station, containers and other things were floating around. A house and a boat had floated into the fjord! On the "Nanok side" the Busterjollen had floated around for a while and was now lying overturned on its side. The researchers' barge had also moved and landed elsewhere. One of our GIOS containers including 1 ton of batteries and all kinds of electronic gizmos had floated to the place where Sirius usually chain their sledge dogs. There were signs of severe erosion across the entire Ella Ø station bay, as if something big had passed.

We immediately checked satellite photos and data from our ocean buoys and got in touch with Sirius who was on their way to take a closer look at the situation. Data showed that there had been a large tidal wave (tsunami) caused by a landslide inside the fjord. The tidal wave had spread from Dickson Fjord out into the fjord systems. Along the way, the wave has eroded large areas along the shores. The Kap Hedlund cabin has been razed to the ground, and it can be expected that several cabins in the fjord system have been affected.

When the wave had reached the Ella Ø area, it spread and lost height, but still almost reached the Fjøset and Tolvmandsbarakken. The researchers' GIOS container data system had gone free with 10 cm and had not moved, except that cables and wires to the sea were exposed. Hopefully the bears will leave the cables this winter now that they are not secured, but only time will tell. The amazing thing is that our measurement systems still send data in real time, and have measured during the entire process!

The wave has come around the corner at the Ella Ø station and hit the reefs off the coast. The skerries have mitigated the wave on the Nanok side, which has therefore not been hit as violently as the Sirius side. Another positive thing for us is that the GIOS container that should have gone to Ymer Ø appears to be undamaged. The tidal wave has moved it a few hundred metres; but it was still dry inside when Sirius examined it. It was good that we originally chose to seal the container so that snow could not get into it. It appears to be fairly waterproof as well.

Our research team is in contact with researchers from GEUS, who also recorded the incident on their instruments, and we are now working together on an publication with the further details of the process. Fortunately, of Nanok's equipment, it seems that only the Busterjollen has taken a beating.

A big thank you must go to Sirius and JACO for help with photo documentation and help in salvaging equipment and securing loose things and cases in the Nanok station area. It will be exciting to arrive next year and see how much extra work this tsunami has caused both in the station area and inside the fjords.

Søren Rysgaard and Peter Schmidt Mikkelsen

The Ella Ø station before and after the tsunami.


The Sirius side.




The Nanok side.


Kap Hedlund hytten before and after the tsunami.
Foto credits: Joint Arctic Command

About Nanok

Nordøstgrønlandsk Kompagni Nanok is a private, non-profit organisation founded in 1992 upon the former *Østgrønlandsk Fangstkompagni Nanok A/S*, founded in 1929.

Nanok's mission is to contribute *to disseminate knowledge of North-East Greenland and its cultural history and to contribute to securing the cultural monuments and buildings in the area*, a.o.

Nanok consists of a private group of six persons, the Board. These are Peter Schmidt Mikkelsen (managing director), Tommy Pedersen, Palle V. Norit, Søren Rysgaard, Fritz Ploug Nielsen and Jesper Mølbæk Stentoft (treasurer). Torben E. Jeppesen assists with purchase of assets and equipment. In addition to the above-mentioned, a number of private individuals actively participate in Nanok's work. All work in Nanok is voluntary and unpaid.

Each summer Nanok dispatches a field team of typically 6-10 participants divided into 2-3 teams who work in North-East Greenland for 3-5 weeks. The results of this work are documented and published in a field report. The expedition participants are chosen by the Board. In the years 1991-2023, a total of 214 Nanok'ers – or more than 75 private individuals – have been dispatched to North-East Greenland.

To perform its tasks Nanok controls a considerable amount of expedition assets. However, Nanok possesses no property in Greenland.

Nanok's work is financed by the Aage V. Jensens Fonde.

Among Nanok's many good collaboration partners and supporters are: Norlandair, Arctic Research Centre, Arctic Science Partnership, Greenland Self Government, Greenland National Museum & Archive, Greenland Institute of Natural Resources, oint Arctic Command, Sirius Sledge Patrol, Defence Guard Mestersvig, Station and Patrol Service Greenland, Royal Arctic Line, and Tusass A/S.

Since 1991 Nanok has renovated and maintained more than 60 culture historical buildings. For this work Nanok has gained considerable recognition and support from the Greenland Self Government, a.o. Since 2010 Nanok has had a formal cooperative agreement with The Greenland National Museum & Archive in Nuuk.

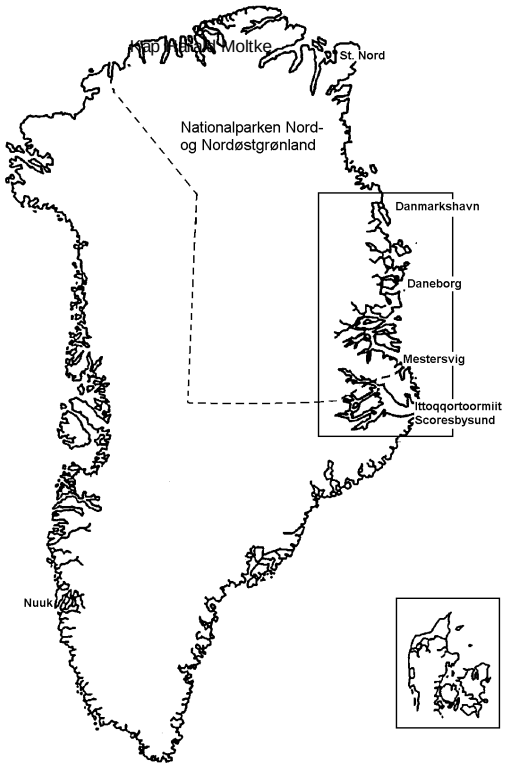
In the years 2003-2007, encouraged by the Greenland Home Rule at the time, Nanok developed a new, unique structural survey of all culture historical huts and stations in North-East Greenland. Extensive data from these surveys, incl. photos and GPS positions, is published in " North-East Greenland 1908-60. The Trapper Era" (Mikkelsen 2008).

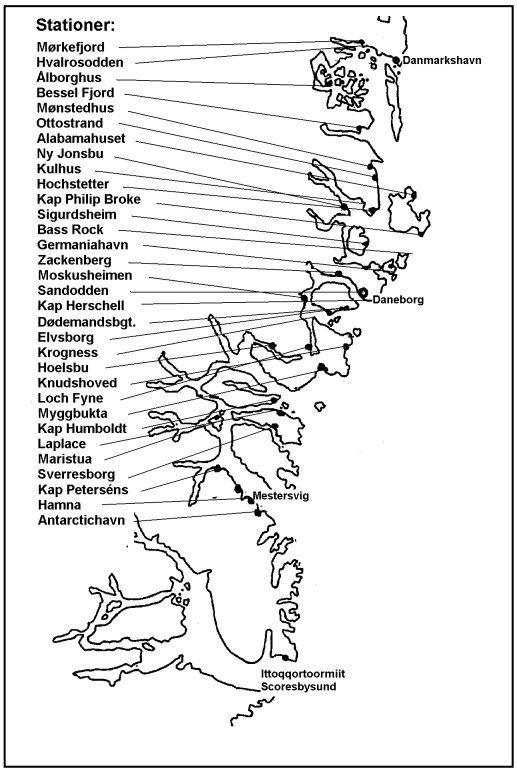
You can experience a range of the old North-East Greenlandic huts in Google Street View via a link from http://www.xsirius.dk/

List of North-East Greenlandic stations and huts renovated by Nanok 1991 - 2023:

No.	Name	Renovation year	No.	Name	Renovation year
201	Antarctichavn	2001 (crushed 2002)	358-2	Nordfjordhuset	2019
208-2	Hamna	2020	358-3	Strindberghuset	2013
209-2	Nyhavn	2007	367-2	Mellemhuset	2010
218	Kap Peterséns	1998	403	Krogness	2010
224-2	Kongeborgen	2001	405	Eskimonæs	1998
222	Holm Bugt hytten	2001	407	Elvsborg	2007-2008
232	Sverresborg	2014	408	Dødemandsbugten	2013-2014
235	Ørnereden, Ella Ø	2015-2019	411-2	Norma hytta	2010
235	Tolvmandsbarakken	2015-2019	412	Dahl Skær hytten	2010
235	Fjøset	2022	417	Kap Herschell	2002
236	Maristua	2008, 2023	425	Sandodden/Karina	1994, 2007, 2009, 2020
238	Mineralbukta	2010	429	Moskusheimen	1994
241	Svedenborg	2011, 2023	434	Leirvågen	2008
301	Laplace	2009, 2023	438-2	Zackenberg	1991-1992
304	Arentz hytten	2008, 2023	438-4	Fiskerhytten	2008
305	Namdalshytten	2010, 2023	437	Bjørnnesstua	2008
308	Kap Humboldt	1997, 2023	443	Blæsenborghytten	2017
309	Rendalshytten	2010	444	Antonsens hytte	2017
310	Bjørnheimen	2008, 2023	447	Germaniahavn	1999
317	Brøggers hytte	2012, 2023	454	Fjordbotten	2013
320	Smedal	2012, 2023	461	Bass Rock	2019
322	Noa Sø hytten	2008, 2023	470	Kap Philip Broke	2022
324	Varghytten	2002, 2007, 2023	510	Hochstetter	1996, 1998
325	Renbugthytten	2010, 2023	511	Kulhus	2022
335	Myggbukta	1999, 2002, 2011, 2023	514	Ny Jonsbu	1995
337	Ragnhilds-hytten	2008	518	Alabamahuset	2016
340	Kap Ovibos hytten	2000, 2007, 2012, 2023	531	Ottostrand	2009
341	Halle	2011, 2023	628-1	Villaen, Danmarkshavn	2017
345	Bråstad	2011, 2023	639-1	Hvalrosodden	2019
347	Petrahytten	2011	639-2	Alwin Pedersens hus	2019
350	Loch Fyne	1993, 2007	---	Kap Moltke /Brønlundhus	2001
356	Hoelsbu	1999, 2000, 2021, 2023			

Source of hut numbers and names: *North-East Greenland 1908-60. The Trapper Era* (Mikkelsen PS 2008).





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