Field season report 2007
North Greenland Eemian Ice drilling (NEEM) 2007-2011:

Surface traverse from NGRIP to NEEM and construction of NEEM seed camp

Prepared by Ice and Climate Group, NBI

for

The NEEM Steering Committee and Danish and Greenlandic authorities.

Picture 1: The traverse ready to depart NGRIP July 2007.

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Preface

This report has been prepared by the NEEM logistics group. The purpose is to provide the NEEM Scientific Steering Committee, the relevant authorities and the NEEM 2007 participants with documentation of the events of the field season. The report contains information on the activities leading up to the field season and activities on the ice sheet. The SITREPs and camp life diary and some pictures are included.

Besides listing the facts, it is our hope that the report can relay some of the special experiences which were part of the multinational efforts on the ice sheet.

Report on the 2007 activities of the NEEM project

Objective.

During 2005 and 2006 the interest for a new deep drilling in Greenland increased. A drilling to bedrock at the NEEM location to obtain an undisturbed sequence of Eemian ice layers was supported by IPICS (International Partnership in Ice Core Science) and by the IPY (International Polar Year) community.

After a successful test at Flade Isblink in 2006 of a new drilling fluid, the Ice and Climate Group approached the international ice core community for support and collaboration for a new deep drilling operation in North Greenland.

The Ice and Climate Group suggested an international effort with a logistical and scientific organization similar to the NGRIP project, i.e. a Danish led international effort with the main financial support from Danish funding agencies.

The Danish national committee for IPY did not succeed in securing funds for IPY during the fiscal year 2006. In order to keep momentum to ice core science in Greenland and to insure that a future NEEM activity would be able to start during the IPY. The Ice and Climate Group sent in a proposal for a small scale operation, a traverse from NGRIP to NEEM to map the ice divide and move vehicles and assets from NGRIP to NEEM. The proposal was submitted in September 2006.

Representatives from the group participated in the Arctic Planning Conference at Stratton Air Base in October 2006, where we filed a request for 3 LC-130 flights in support for the traverse. In December 2006 we received notification from the Danish Research Council that they were unable to support such a large logistical operation. At the same time, the U.S. National Science Foundation expressed a wish to support the NEEM project with a significant contribution. Over Christmas 2006, NEEM became a political issue involving members of Parliament and by January 2007 NEEM was granted special funds under the Danish IPY initiative.

By this time we had to reactivate the planning for a 2007 field campaign, which had been put away in December. For that reason the planning for NEEM 2007 was started a bit late. There is a time lag between a political decision and action. Money for NEEM 2007 was not available to spend before April 2007 – two months before scheduled start. Also, what was planned as a skeleton operation now suddenly grew as the perspective now was a full 4 year drilling operation. Hence as the time came for the put-in of the field crew, the amount of cargo was larger than anticipated. It therefore required a lot of good will and flexibility of planning from the CPS Polar Field Services and the 109th TAG, NYANG to make the put-in a success. The NEEM crew wishes to express their

sincere gratitude to Robin Abbott and Mark Begnaud, CPS and the New York Air National Guard for their assistance.

Kangerlussuaq (Søndre Strømfjord, SFJ)

NEEM did not have a field operations manager in 2007, but we made good use of the logistical assets from the NGRIP project. The lease of warehouse 442 has been renewed, and 442 is now leased until 2016. Kangerlussuaq International Science Support (KISS) accommodated all participants while in Kangerlussuaq.

NEEM operates the following vehicles in Kangerlussuaq: A 8 ton forklift, a 5 ton forklift, a 8 ton Ford flatbed truck with hydraulic crane, a Toyota landcruiser (which was lent out to the IPY office operated by Danish Polar Center), a F-250 truck and a step-van.

The CPS Polar Field Services maintained contact with the field crew by telephone, internet and radio throughout the season. The CPS crew also organized the pull-out plane at NEEM.

Preparation of the Field Season

The start of the season was planned for mid-June, just after the airshow in Aalborg, Denmark. Because of the late funding of the project we had not been able to make major purchases for ship transport in September 2006, so we had a transportation problem for getting large items to Greenland. The airshow in Aalborg provided a unique opportunity for NEEM to get a new Toyota Cruiser 500 and 4 new snowmobiles to Greenland. The transport occurred under the agreements of the Danish/Greenlandic and U.S. Joint Committee for science support in Greenland with approval of the coordinator, Morten Rasch from Danish Polar Center.

Food was purchased at SYSCO in the U.S. and was repacked into the newly designed ice core boxes for NEEM.

The 4m x 4m walk-in freezer modular unit which was used at Station Nord for the Flade Isblink ice core has been setup in warehouse 442. It was used for storing frozen food, and in the future it will be used to store ice cores from NEEM. It is capable to keep temperatures at -22 C.

The applications for permit to conduct an expedition in Greenland, permit for use of radios and permit to carry weapons were sent at a late stage to Danish Polar Center, Greenland radio authorities and Greenland Police; but we managed to obtain the permits in time. However due to the fact that the NEEM site is outside the NE Greenland National Park it legally is part of Upernavik Kommune. Therefore the Greenland authorities ruled that NEEM should file an application for land use. This application was sent in June 2007 and it started a lengthy process of negotiations on environmental conditions on camp operations, of documentation of camp activities and documentation on plans for accident preparedness. Also, NEEM began negotiations with the

Greenland tax authorities for procedures of customs clearance and taxation which would allow for maximum flexibility during operations

At the time of writing the negotiations are almost finished. NEEM will get a land use permit for 5 years, and the Homerule will stipulate a set of rules on documentation of camp activities and rules for camp operations, such as handling of fuel spills and handling of waste. Also NEEM will get a flexible agreement for procedures on customs clearance and taxation.

In the planning of the 2007 field season, we evaluated that we did not need for a NEEM Field Operations Manager in Kangerlussuaq because of the limited number of flights and no personnel exchange. All the loads going into the field at NGRIP and out at NEEM could be composed before we left. We asked CPS (VECO) if they could be the point of contact for us, which was accepted. In retrospect, due to a lot of unforeseen problems with weather conditions in particular, we had to rely on far more assistance from CPS than we expected. We are deeply grateful to Robin Abbott, Mark Begnaud and Ed ? for their help. The lesson to be learned is that even smaller operations require a FOM in Kangerlussuaq.

Start of field season.

The Field Season started at the air show in Aalborg on June 10. NEEM shared an exhibition with the 109th on IPY activities with snowmobiles the new Toyota Landcruiser on display along with a LC-130 on a hot summers day with 31 C temperatures. After the show, the equipment was pcked in the plane and flown to Greenland.

Put-in at NGRIP.

On June 12 two participants arrived in Kangerlussuaq to ready cargo and repack equipment. On June 15 and 17 the remaining 7 participants arrived. From the start, we were aware that the amount of cargo had grown beyond the planned amount. It proved extremely difficult to reduce loads and the problems were made worse by a wrong use of our scales. By June 20 a solution was found. The put-in plane to NGRIP would carry 6 PAX and a total of 10,000 lbs, at the same time a plane would fly 16,000 lbs to Summit for a shuttle pick-up of the second put-in plane.

The put-in plane departed SFJ at 8:20, June 20 and landed at NGRIP at 10:50. After one single try to take off in the soft snow, the crew shut off engines at 11:40. The NGRIP maindome was only accessible through the top hatch. The maindome was found in good condition. A generator was rigged on the snow and a cable fed through the hatch. Most people including the flight crew then started to dig out the Lucht Kastel garage. At 16:00 the first Flexmobil was running and grooming of the skiway began. Grooming was finished at 23:30. The maindome kitchen served as dining

area. On June 21 the plane attempted a take off at 5:30, however due to increasing cross-winds at 25 knots the attempt was not successful. Weather got worse during the day and developed into a blizzard. The flight crew left the plane and moved into the maindome. We turned on the old main generator 18:30 Thursday. This heated the maindome and lifted the spirits of all marooned people. The bad weather lasted until Friday, June 22 afternoon, and grooming began again. By this time it was clear that it was impossible to get another plane to NGRIP with the remaining 3 people and 10,000 lbs plus the 16,000 lbs in hold at Summit to NGRIP before the 109th had to redeploy to the US. It was decided that everybody should fly out on the plane and that the NEEM field season had to be postponed by 2 weeks. On Saturday, June 23 the plane left NGRIP at 6:05 using only 2/3 of the skiway and leaving only 10 cm deep ski tracks. After a fuel stop at Summit, everybody returned to SFJ at 10:00.

On Monday,July 9 we came back to SFJ for a new attempt. We had time to put the finishing touches to the 3 pallets of cargo for NEEM to go in on the pickup plane. Due to expected high temperatures, it was decided to make night operations. 1 st attempt was on July 10 at 19:30. While flying over NGRIP a fault in one engine forced the crew to shut it off and to return to SFJ. 2nd attempt was successful on July 12 at 2:20. All 9 PAX arrived at NGRIP at 4:40. The plane was able to take off using 2/3 skiway at 5:15. In preparation of the next plane from Summit we groomed the skiway. The weather was again starting to play tricks on us as ground fog came and went in an unpredictable fashion. However after some anxious waiting the plane from Summit arrived at 10:47. It drifted the cargo, and was airborne again at 11:07 in the second attempt, leaving only 10 cm deep ski tracks. Ground fog came rolling in as the plane was on the ground. The deployment at NGRIP was finally completed.

Work at NGRIP.

All heavy sledges were pulled from their parking spots, and rearrangement of cargo and fuel began. The German team began mounting their radar and mounting of the Kansas radar in the Toyota and construction of the antenna sled began. By Sunday, 15 July the logging of NGRIP deep hole was completed. All heavy sledges were cleaned off and ready for loading for the traverse. A 32 drum fuel depot was placed on the old NGRIP apron, and the Kansas radar construction was completed. On Sunday it was discovered that we had forgotten engine oil in SFJ. Two people left NGRIP Monday, 16 July on two snowmobiles at 17:30 heading for Summit to pick up some oil. They arrived at Summit at 1:00. They returned to NGRIP on Tuesday at mid night. By that time both Flexmobiles were ready for the traverse after service and a change of the main drive belts. Due to problems with setting up the Kansas radar we now had to wait until it was working. Everything was ready to go by Friday, July 20.

Due to the delays, it became clear that we would not make it with a second traverse back to NGRIP to pickup remaining cargo and the Caterpillar. Everything was packed up for winter, and the

Caterpillar was parked inside the Lucht Kastel. We hope the tent can hold out until 2008. The weight of snowdrifts in the SE corner has caused the canvas to rip and sink in. The NW end is still free of snow. With the Caterpillar we also placed 60 l 2T-oil and empty bottles, enough to match a conversion of the 32 drums A-1 on the apron to diesel. Because of the cancellation of the second traverse, we decided not to lay out fuel depots on the way. The generator in the main dome was switched off one last time, and we noticed that finally the old drain system in the maindome had ceased to work. There is now ice on the ground floor.

The traverse.

The traverse train departed NGRIP Sunday, July 21 on 18:15. It consisted of 2 Flexmobiles, each pulling two heavy sledges, one snowmobile with the DK shallow drilling equipment, one snowmobile with the German radar setup, one snowmobile with strain net and GPS equipment and the Toyota with the Kansas radar system. Throughout the traverse the teams maintained contact by Iridium phones. Fuel at start: 39 drums A-1 and 5 drums Mogas.

We had agreed that we should try to do the traverse by night and sleep by day. Based on our experiences with skiway preparation,the -17 to -22 C by night should improve snow conditions compared to the -7 to -10 C by day. It quickly turned out that fresh snow behaved quite the opposite of groomed snow, and we quickly abandoned the idea. The speed of the traverse during the first days were slow, as snow conditions were soft and the crew had to go into a routine of setting up camp and breaking camp every day. Average speed of the main train was 6 km/h. Already on the first day of the traverse one of the diesel Hatz 5 kW generators suffered an engine break down due to bent rocker arms of a badly serviced valve gear. In the remainder of the season the crew relied on the other Hatz and a 4 kW Honda mogas generator. By Wednesday, July 25 we reached the first drilling site some 165 km from NGRIP. By Friday, July 27 drilling to 60 m and temperature logging of the hole was complete and the traverse moved on. Drilling at the second site some 265 km was completed to 60 m by Sunday, July 29. A Mattrax belt broke off on the Toyota and we needed another day to repair the belts. Departure from drill site 2 was Tuesday, July 31, and on Wednesday, August 1 we approached NEEM. Lars had driven ahead with GPS to make the final location of the ice ridge. We decided to approach NEEM from down wind. We followed the traverse route 2 km past Waypoint 73 towards Waypoint 74. From there we drove 3 km to the SW and finally arrived to NEEM after driving 2 km SE.

Work at NEEM

The NEEM drilling site was selected with the aid of a wolleyball, and then the skiway area was surveyed and marked. After three days of survey and flagging, the new skiway, apron and taxiway were ready for grooming. Grooming was done by August 7. On August 2 a 15 x 20 foot weatherport was erected on a snow hill and camp personnel immediately moved into the new kitchen facilities. The German team finished their survey with a grid around NEEM. They managed to do more than half of their planned grid until they stopped on August 3. The Kansas radar

suffered an unexpected problem as the radio authorities of Greenland notified us that our radio permit had expired, and that due to a lot of Search and Rescue alarms being triggered by the radar on the satellite system, we would not get an extension. By hard work in Copenhagen we managed to negotiate an extension provided that the bandwidth of the radar was narrowed down to 130MHz-230MHz to avoid the SAR frequencies of 121.5 MHz and 243 MHz. The Kansas radar was modified and the team did not trigger any more alarms. On August 4 one of the main bearings of a Mattrax broke 2.5 km from camp. After being refitted with a new bearing, radar survey could continue and the 10 km x 10 km grid (1 km res.) was completed by August 6. The German team performed a pit study August 4 and 5. Ice core drilling began on August 5 and continued until August 7 at 80 m depth. While setting up a strain net around NEEM, the PARCA automatic weather station some 7 km NE of NEEM was visited and new batteries were mounted. The seismic station was setup some 500 m S of NEEM on August 6. Packing down of camp began August 6 and three pallets with cargo and ice cores were ready for pull out August 7. The plane on August 8 was cancelled due to snow fall and poor visibility. The pull out plane departed August 9 at 9:15. It was on the snow at NEEM 13:23 after an extra survey flight over the planned future traverse route for a Thule Summit cargo traverse. The plane landed in very warm temperatures (-4 C), and the next 36 hours became quite dramatic. Here are some notes from the Field Leader diary:

"Attempted take off at 15:00. Skis stuck (-2.5 C). Could not get loose. Air crew digging 4 times then free and taxi. In first attempt only 30 knots were obtained on skiway. The plane creates deep ruts each attempt. Field Leader called to cockpit. Snow so heavy that crew not able to stop. All cargo was drifted on apron. This did not help. The air craft was parked at 17:00. The air crew complained about the poor grooming of the skiway; but Field Leader told them it was a temperature problem. Next attempt tomorrow at 4:00. Kitchen weatherport re-opened. All camp personnel stayed up after supper and watched films. Grooming 17:00 to 21:30, all ruts removed, several were 1 m deep. Weather at night: -21 C, clear and winds at 10 knots from 170 magnetic. Skiway rock hard. Ground fog at 3:30. At 4:00 the plane was found frozen in. Col. Mark Doll has never seen so much ice under skis. The crew battled the ice. Many attempts to get loose. Plane got our last 6 drums of fuel. At 7:30 the crew gave up, as a broken hydraulic shock was discovered on the front ski. Very cold night in the plane. Plane shut down. Tents erected and camp to sleep at 8:30. Re-fuel and repair plane scheduled for Friday evening. This plane will bring repair kit, ATOs, 20 drums A-1 and 4 drums mogas. Our plane will get 9 drums A-1."

On Friday, August 10 the re-fuel plane arrived at 22:05. At 23:00 it departed for Thule with two of our PAX to accompany the pallet of ice cores that went on that plane. They were airborne using ½ skiway and ATO. After repairs and fuelling 9 drums of fuel the final pull out occurred Saturday, August 11 at 1:35 using 2/3 skiway and no ATO. NEEM temperatures were -20 C at that time. In Thule the re-fuel plane with the ice cores was not able to get a re-fuel due to week-end, so it had to wait until Monday morning for the last leg to Kangerlussuaq. The ice cores were stored in a freezer in Thule

A short note on weather at NEEM.

Most clear days mid day temperatures were at -9 to -12 C with a 4 – 12 knot wind from 180 magnetic, i.e. straight down the new skiway. On August 7 to August 9 a weak front passed with winds from 250 magnetic at 14 knots, cloud cover and snow fall. Temperatures rose to -4 C by mid day and -9 C by night. On the day of arrival of the pull out plane, August 9, snow fall had stopped and the wind had died. At noon the wind again had jumped back to 180 magnetic at 6 knots; but cloud cover and high temperatures at -4 C lasted until late afternoon. The following clear night temperatures dropped to -21 C and ground fog started to appear at 3:30. On the final day, August 10, ground fog lifted at 11 o'clock and temperatures dropped from a mid day high of -11 C to -16 C in the evening. Winds were at 8 knots from 180 magnetic.

Work schedule, planned and actual.

Date	Activity (planned)	Date	Activiy (new schedule)	Date	Activity (actual)	Days behind.
19-Jun	Arrival at NGRIP	11-Jul	Arrival at NGRIP	11-Jul		
20-Jun		12-Jul		12-Jul	Arrival at NGRIP	1
21-Jun		13-Jul		13-Jul		1
22-Jun		14-Jul		14-Jul		1
23-Jun		15-Jul	Departure NGRIP	15-Jul		1
24-Jun		16-Jul		16-Jul		1
25-Jun	Departure NGRIP	17-Jul		17-Jul		2
26-Jun		18-Jul	Arrival Drill Site 1	18-Jul		3
27-Jun		19-Jul		19-Jul		4
28-Jun	Arrival Drill Site 1	20-Jul	Departure Drill Site 1	20-Jul		5
29-Jun		21-Jul	Arrilval Drill Site 2	21-Jul	Departure NGRIP	6
30-Jun	Departure Drill Site 1	22-Jul		22-Jul		6
01-Jul	Arrilval Drill Site 2	23-Jul	Departure Dill Site 2	23-Jul		6
02-Jul		24-Jul	Arrival NEEM	24-Jul		6
03-Jul	Departure Dill Site 2	25-Jul		25-Jul	Arrival Drill Site 1	7
04-Jul	Arrival NEEM	26-Jul	2nd traverse departure NEEM	26-Jul		7
05-Jul		27-Jul		27-Jul	Departure Drill Site 1	7
06-Jul	2nd traverse departure NEEM	28-Jul		28-Jul	Arrilval Drill Site 2	7
07-Jul		29-Jul		29-Jul		7
08-Jul		30-Jul	2nd traverse arrival NGRIP	30-Jul		7
09-Jul		31-Jul		31-Jul	Departure Dill Site 2	8
10-Jul	2nd traverse arrival NGRIP	01-Aug		01-Aug	Arrival NEEM	8
11-Jul		02-Aug	2nd traverse departure NGRIP	02-Aug		
12-Jul		03-Aug		03-Aug		
13-Jul	2nd traverse departure NGRIP	04-Aug		04-Aug		
14-Jul		05-Aug	2nd traverse arrival NEEM	05-Aug		
15-Jul		06-Aug		06-Aug		
16-Jul	2nd traverse arrival NEEM	07-Aug		07-Aug		
17-Jul		08-Aug	Pull out NEEM	08-Aug		
18-Jul				09-Aug		
19-Jul				10-Aug		
20-Jul				11-Aug	Pull out NEEM	3
21-Jul						
22-Jul						
23-Jul						
24-Jul						
25-Jul	Pull out NEEM					

Fuel statistics:

Fuel left in depot at NGRIP:	34 drums A-1
Fuel at start of traverse:	37 drums A-1 and 5 drums mogas
Fuel at Drill Site 1 (WP 33)	27 drums A-1
Consumption:	12 liter/km (incl. Toyota and generators)
Fuel at time of pick up at NEEM	6 drums A-1 and 100 liter mogas.
Fuel at first attempt to take off	0 drums A-1 and 100 liter mogas
Fuel left at NEEM over winter	11 drums A-1 and 4.5 drums mogas.

Loads carried:

Mission	**Date**	**Time:**	**Hours**	**loads**	**PAX**	**Route**
No.1	20/6	8:20-10:50	2:30	10,000 lbs	6 PAX	SFJ-NGRIP
No.2	20/6		4:30	16,000 lbs		SFJ-Summit-SFJ
No.1	23/6	6:05-10:00	2:35	2,000 lbs	6 PAX	NGRIP-Summit-SFJ
No.3	12/7	2:20-4:40	4:40	10,000 lbs	9 PAX	SFJ-NGRIP-SFJ
No.2	12/7	9:55-13:30	3:12	16,000 lbs		Summit-NGRIP-SFJ
No.4	9/8	9:15-13:23	3:08	7200 lbs		SFJ-NEEM
No.4a	10/8	19:15-22:05	2:50	11,000 lbs		SFJ-NEEM
No.4a	10/8	23:00-24:00	1:00	3720 lbs ice	2 PAX	NEEM-Thule
No.4	11/8	1:35-4:05	2:30	8200 lbs	7 PAX	NEEM-SFJ
No.4a	12/8		2:30	3720 lbs ice	2 PAX	Thule SFJ
Estimated Total:			22:25 (29:25) hours			

Resume of logistic and scientific outcome:

Inspection of the work schedule above reveals that we ended up being pressed for time. This partly due to the necessary re-scheduling of the field work as weather and delays in June forced us to work in July, and partly due to a late departure of the traverse from NGRIP. However, we managed to fulfill the following objectives.

1. The NGRIP hole was logged and temperature profiled to 2930 m depth.
2. A 60m ice core was drilled at Drill Site 1, and the hole subsequently temperature profiled.
3. A 60m ice core was drilled at Drill Site 1, and the hole subsequently temperature profiled.
4. A 80m ice core was drilled at NEEM, and the hole subsequently temperature profiled.
5. The AWI team performed accumulation radar profiling along the traverse route, pit studies at Drill Site 1 and at NEEM.
6. A strain positioning network was set up and recorded along the traverse route.
7. The Kansas radar performed successful accumulation radar profiling along the traverse route. The data quality is extremely good.
8. The NEEM Site was selected, a seed camp constructed and a skiway was marked and groomed.
9. Heavy vehicles, heavy sledges and many assets were moved from NGRIP to NEEM.
10. The AWI team performed an accumulation radar grid around NEEM.
11. The Kansas radar performed a 10 km by 10 km accumulation radar grid around NEEM
12. The PARCA weather Station at NEEM was serviced.
13. A seismic station was setup at NEEM.

Some objectives that were not met:

1. The planned second traverse was not done due to lack of time. We therefore plan to make a traverse to NGRIP in July 2008 to pick up the Caterpillar and other remaining cargo at NGRIP.

2. Due to noise generated internally in the Kansas depth sounder, the data collected this season were not useful. The Kansas group returns to NEEM in August 2008 to make a 10 km by 10 km grid around NEEM with the depth sounder.

The NEEM 80 m shallow core is presently being processed in Copenhagen. The Oxygen isotope profile ties in with Kansas accumulation radar results. NEEM accumulation rate is around 230 mm (ice equivalents) per year.

SITREPS:

NEEM 2007 SITREP no. 1

Sunday 17. June 2007.

This SITREP covers the period 11. June to 17.June, inclusive.

Movement of personnel:

12.June: Lars Berg Larsen (DK) and Sverrir Hilmarsson (IS) from CPH to SFJ
by Air Greenland.
15.June: Maria Herholt (D), Peter Sperlich (D), Susanne Lilja Buchardt (DK), Simon Sheldon (DK), Steffen Bo Hansen (DK) and Joergen Peder Steffensen (DK) from CPH to SFJ by Air Greenland.

Movement of Cargo:
11.June: Three snowmobiles and Toyota Landcriser with Mattrax from Aalborg to SFJ by 109th LC-130
13.June: 950 kg scientific equipment from AWI to SFJ and
15 June: 5285 kg supplies and scientific equipment from CPH to SFJ by Air Greenland.
12.June: 900 kg CReSIS radar equipment from New York to SFJ by 109th

Activities:
The activities in SFJ have been focused on preparing the put-in flights scheduled for Tuesday and Friday.
The new snowmobiles have been assembled and are ready to go. The Toyota is ready to go.
Several pallets have been built, but they cannot be finished off before the last cargo arrives from CPH and New York on Monday.

The warehouse 442 has been emptied for vehicles to provide floor space for sorting out cargo. Cargo is sorted not only for the put-in flights but also for the pull-out flights, so that the flight opportunity at the end of the season will be used to transport cargo to NEEM.

Weather in Kangerlussuaq (SFJ): 5 to 14 C, cloudy, showers. Mosquitos are out.

FL J.P.Steffensen

NEEM 2007 SITREP no. 2

Tuesday 26. June 2007.

This SITREP covers the period 18. June to 25.June, inclusive.

Movement of personnel:

18.June: Claude Laird (US) from Schenectady to SFJ by 109th.
20.June: Maria Herholt (D), Susanne Lilja Buchardt (DK), Simon Sheldon (DK), Steffen Bo Hansen (DK), Sverrir Hilmarsson (IS) and Joergen Peder Steffensen (DK) from SFJ to NGRIP by 109th.
22.June: Peter Sperlich (D) from SFJ to CPH by Air Greenland
22.June: Claude Laird (US) from SFJ to Schenectady by 109th
23.June: : Maria Herholt (D), Susanne Lilja Buchardt (DK), Simon Sheldon (DK), Steffen Bo Hansen (DK), Sverrir Hilmarsson (IS) and Joergen Peder Steffensen (DK) from NGRIP to SFJ by 109th.
23.June: Lars Berg Larsen (DK), Maria Herholt (D), Susanne Lilja Buchardt (DK), Simon Sheldon (DK), Steffen Bo Hansen (DK) and Sverrir Hilmarsson (IS) from SFJ to CPH by Air Greenland.
25.June: Joergen Peder Steffensen (DK) from SFJ to CPH by SAS.

Overnighting 109th crew 20-23. June:
LtCol Pete Thalheimer, LtCol Joe Zotto, Maj Stephen Yandik, Maj Blair Herdrick,
CMSgt Dan Robertson, CMSgt Dennis Morgan, MSgt Brian Alix, Sra Brett Gatta

Movement of Cargo:
18.June: 2000 kg Food and equipment from Schenectady to SFJ by 109th.
20.June: 8200 lbs. Equipment and supplies from SFJ to NGRIP by 109th.
20 June: 16000 lbs food, radar, weatherport and spareparts from SFJ to Summit by 109th .
23.June: 200 lbs Batteries and radios from NGRIP to SFJ by 109th

Activities:
The ice core freezer used at Station Nord last year has been built inside warehouse 442 and after installation of 3-phase 400 V it was switched on and running nicely.
The final cargo for the put-in arrived in Kangerlussuaq with the 109th Monday afternoon. Monday evening saw hectic activity around the warehouse to distribute the loads and weighing pallets. We were perhaps too pressed with time, because at the time the put-in plane was loaded Tuesday morning, it turned out that our measurements of cargo weight were wrong and that the cargo was too heavy for the Aeroplane. We were not able to corrrect this in time, so to avoid upsetting the flight schedule, the Deployment Commander decided to move the put-in to Wednesday.
All Tuesday until midnight we repacked all our cargo, and calibrated our scales against the scales of the 109th.
A new plan had to be made: Put-in plane no.1 should fly to NGRIP with the put-in crew. At the

same time three pallets (16000 lbs) were flown to Summit on a space available basis.
On Thursday put-in plane no.2 should then fly 10000 lbs cargo to NGRIP on a groomed skiway and certify it for a 16000 lbs cargo landing. Plane no.2 should then fly to Summit, pick-up the 16000 lbs cargo and fly this to NGRIP.

The put-in at NGRIP occurred in beautiful weather at 10.50 L with Skier 96. The snow was very soft so the crew shut off engines to await grooming of the skiway. Along the skiway the markers are still visible, they can also be picked up by radar. The NGRIP main dome is only accessable through the top hatch. Inside, the main dome is intact. The only windows not covered in snow are the top hatch and the two sky lights. At 15.30 L the garage was open and the tracked vehicles were running. Grooming of the skiway began at 16.00 L and continued until mid-night. Everything in the garage was found in good order, but the garage cover was torn several places on the SE side due to the weight of overburden snow and abrations by the frame.
The 5 kW Hatz diesel generator was running at 15.30 and powered the main dome for light, cooking and snow melting.
Weather Wednesday: blue sky, no wind, -4 C.

Thursday, Skier 96 attempted take-off at 5.45 L. Due to a relatively soft skiway (groomed, but not consolidated) and heavy cross winds (15-20 knots, 220 mag – skiway is 300 mag) the take-off was stopped after two attempts. The plane was shut down and abandoned by the crew and the crew took shelter in the main dome. The weather continued to deteriorate.

Grooming was started and continued until the weather made it impossible to continue.

Weather at 11.00 L:
Temp. -5 C, wind 30 knots from 220 mag, overcast, surface nil, horizon nil, visibility ½ mile.

At 13.30 L the wind turned to 280 mag. We had snow, blowing snow and visibility reduced to less than ¼ mile. Sometines the plane could not be seen from the main dome.

Camp personnel and the Air Crew participated in getting all cargo to shelter, digging down to free the windows at the top floor of the main dome and opening one of the air vents to the main generator room. At 18.30 L we started the main generator after preheating with the Herman Nelson. The air hose was let through the window on the radio room and through a hole in the floor to the main generator. After that the temperatures in the main dome rose to above freezing and spirits rose likewise.

By Friday morning the weather had improved. Temperatures were -8 C outside and +15 C inside. Grooming started at 8.00 and continued until 16.00 L. It was decided, that everybody in camp should leave on Skier 96 since the options of getting all necessary cargo into NGRIP in this flight period were gone. A launch Friday evening was prevented by bad weather at Summit, because the plane needed fuel at Summit to return to SFJ. Friday evening everybody participated in a candle light dinner made by the Air National Guard.

Saturday morning at 4.00 L the weather was good: -13 C, 14 knot from 320 mag. The camp was

shut down, and Skier 96 departed NGRIP in first attempt without using ATO. Observed main ski depression on skiway: 4 inches. After refuelling at Summit 7.05 – 8.25 everybody arrived at SFJ at 10 o'clock.

Although conditions were far from ideal, camp crew and flight crew got along very well, and the eagerness of the flight crew to assist in any way was impressive. We thank the flight crew for their help and positive attitude.

All expedition personnel agreed to postpone the field season by 2-3 weeks. Thus we plan to re-deploy the expedition with put-in July 10 and pull-out 7 – 10 August. After this all expedition personnel went home.

As a consequence of this, there will not be a SITREP Sunday 1. July and Sunday 8.July.

NEEM personnel in Greenland: 0

FL J.P.Steffensen

NEEM 2007 SITREP no. 3

Sunday 15. July 2007.

This SITREP covers the period 9.July to 15.July, inclusive.

Movement of personnel:

9.July: Claude Laird (US) from Schenectady to SFJ by 109th.
9.July: Maria Herholt (D), Susanne Lilja Buchardt (DK), Simon Sheldon (DK), Steffen Bo Hansen (DK), Sverrir Hilmarsson (IS), Lars Berg Larsen (DK), Peter Sperlich (D) and Joergen Peder Steffensen (DK) from CPH to SFJ by SAS.
12.July: Maria Herholt (D), Susanne Lilja Buchardt (DK), Simon Sheldon (DK), Steffen Bo Hansen (DK), Sverrir Hilmarsson (IS), Lars Berg Larsen (DK), Peter Sperlich (D), Claude Laird (US) and Joergen Peder Steffensen (DK) from SFJ to NGRIP by 109th.

Movement of Cargo:
12.July: 12700 lbs Toyota, snow mobiles, loose load from SFJ to NGRIP by 109th.
12.July: 16000 lbs food, radar, weatherport and spare parts from Summit to NGRIP by 109th.

Camp activities:
After an aborted put-in 8th July due to engine problems on the LC-130, all personnel were successfully put-in at NGRIP Thursday morning at 4.40. The plane departed without any problems. The skiway was still hard after grooming 2 weeks ago. At 6.40 a second LC-130 arrived with the cargo from Summit. Unfortunately the landing had to be aborted due to fog, and the plane returned to Summit. The fog lifted, and at 10.45 the plane landed at NGRIP. At 11.10 the plane

took off in second attempt, which concluded the put-in of NEEM traverse.

The NGRIP main dome is used as shelter and power supply. The main generator is running providing heat and power.

All arriving cargo has been unpacked and sorted. The radar teams are assembling their systems in preparation of the traverse. The first tests of the German system look good, and the German radar is set to go. For the Kansas radar, the electronics is mounted inside the Toyota, and the antenna array sled has been constructed. Tomorrow the units will be connected. The drive belts of one Flexmobil have been changed, and the vehicle has been serviced. All large sledges have been retrieved from depot in the cargo line, and the cargo is being re-distributed.

Scientific activities:
A GPS reference station has been setup. This station will be taken down again when the second traverse arrives.

Logging of the NGRIP bore hole is successfully concluded. Final logging depth was 2950 m, i.e. well below the problematic layer of 2000. At 2950 m a layer with very small diameter was encountered, this is possibly an ice bridge. The first scientific objective has been reached.

Weather at NGRIP:
-4 C to -8 C, mostly overcast and gentle winds at 3 - 5 m/s from 240 degrees true, visibility good but surface contrast is low due to the overcast.

NEEM personnel at NGRIP: 9

FL J.P.Steffensen

NEEM 2007 SITREP no. 4

Sunday 22. July 2007.

This SITREP covers the period 16.July to 22.July, inclusive.

Movement of personnel:

No movement of personnel by air.

Movement of Cargo:

No movement of cargo by air.

Camp activities:

The heavy vehicles have been maintained. Both have got new main drive belts. Drilling equipment has been readied. The four heavy sledges have been loaded with traverse and NEEM equipment. All radar systems have be setup and work well. The only setback encountered was damage to the German radar antennas due to the power output from the Kansas radar. The antennas were exchanged.

Monday, two people on two snow mobiles set off to Summit (300 km away) to pick up a drum of engine oil for the tracked vehicles. They returned Tuesday after spending 15 hours on snow mobile. We thank our American colleagues for their kind assistance.

During the week there have been several issues with the setting up of the Kansas radar. Departure from NGRIP was delayed to insure good radar operation. This radar system is important for the site selection of the NEEM deep drilling site.

Friday at 5 PM the radar was operational.

Saturday at 18.15 the traverse departed NGRIP.

The traverse is organized in the following way: The center of the traverse consists of the two Flexmobil tracked vehicles with heavy sledges and a snowmobile with Nansen sledges and drilling equipment. The Kansas radar team drive a Toyota on Mattrax with the antennae on a separate sled along a parallel line. One person drives a snow mobile with Nansen sledges for GPS strain net in the area around the traverse. The German radar team drives a snow mobile with Nansen sledges with an accumulation radar at least 10 km away from the Kansas radar.

All satellite teams report to the main traverse by satellite telephone on a regular schedule, and everybody sleeps in camp at night.

Sunday evening the traverse was 52 km from NGRIP. Due to the cold nights, the traverse will operate by day.

The NGRIP main dome has served the team well as shelter and power supply. The main generator has been running providing heat and power during the day. At departure, the main dome was sealed, and the Alpine snowmobiles and the Caterpillar placed in the old Lucht garage. A depot of 32 drums of Jet A-1 has been set on the old NGRIP apron. An inventory of the garage was done before it was closed. This way, we have secured the assets at NGRIP in case the planned second traverse does not go to NGRIP this year. Alternatively, a traverse may go to NGRIP next year.

Scientific activities:
The GPS reference station at NGRIP has been taken down again.

Both radar teams and GPS strain net operate to satisfaction.

During the traverse the phone +8816 41439864 will be monitored most of the day.

Weather: :
-5 C to - 21 C, in the beginning of the week overcast, later clear blue sky, little or no wind. visibility good, but some ice fog during night.

NEEM personnel at NGRIP: 0

NEEM personnel on traverse: 9

FL J.P.Steffensen

NEEM 2007 SITREP no. 5

Sunday 29. July 2007.

This SITREP covers the period 23.July to 29.July, inclusive.

Movement of personnel:

No movement of personnel by air.

Movement of Cargo:

No movement of cargo by air.

Camp activities:

This week has been spent on traverse. The crew has quickly adapted a daily routine of setting up camp and taking down camp. Both are normally achieved in one hour. The roaming teams of strain net and radars maintain routine contact by Iridium telephone at fixed hours. This works well, and all show up at the new campsites within an hour after arrival of the traverse train.

One 5 kW diesel generator has broken down due to lousy service at a company in Denmark, a spare 5 kW generator is now running. This has no impact on activities.

Saturday, a hydraulic hose burst in one tracked vehicle; but it was repaired in less than 2 hours. Sunday a Mattrax drive on the Kansas radar Toyota broke off, luckily only 900 m from camp. It will be welded tomorrow. A similar thing happened to another Mattrax 7 years ago, and the welding from that repair still holds.

Sunday evening the traverse was at drill site 2, 265 km from NGRIP and 100 km from NEEM site.

Scientific activities:
All teams report satisfaction with obtained results, and they can all keep up with the pace of the main train.

However, the German team have problem with their re-chargeable batteries for their radar. They have now only one pack operational. This will slow them down. A system has been rigged with a power supply to substitute the batteries. This will be tested tomorrow.

A 70 m shallow drilling has been completed at drill site 1. We noted a total absence of melt layers. Even the meltlayer of 1889 was not spotted. Temperature profiling has been completed in the hole.

A 2.2 m pit sampling has been conducted by the German team at drill site 1.

Drill site 2 was reached Saturday. Sunday evening the drilling has reached 60 m. In this core, several melt features were noted.

During the traverse the phone +8816 41439864 will be monitored most of the day.

Weather: :
-6 C to - 25 C, blue sky and no wind most of the week. From Saturday overcast and snow. 10 kn SSW-winds Saturday. Sunday evening calm,

NEEM personnel at NGRIP: 0

NEEM personnel on traverse: 9

FL J.P.Steffensen

NEEM 2007 SITREP no. 6

Sunday 5. August 2007.

This SITREP covers the period 30.July to 5.August, inclusive.

Movement of personnel:

No movement of personnel by air.

Movement of Cargo:

No movement of cargo by air.

NEEM camp activities:

The traverse came to a successful conclusion on Wednesday, 1.August as the NEEM site was reached. The previous day, a GPS transect was done close to the NEEM site to locate the exact position of the ice crest. This was 3 km South of the traverse route. As the traverse had been

traveling in SE winds for several days, it was decided to approach the NEEM site from the North and West. Thus we approached the future camp site downwind. The camp was setup 300 m West of the future NEEM camp, leaving the upwind snow completely undisturbed for science. The present camp is the future cargo line.

The future deep drilling location was selected, and then the skiway was laid out using theodolite and GPS. The center of the skiway is 500 m at 40 degrees true from the drill hole position. Grooming of skiway commenced Thursday.

Sunday evening, the skiway and apron are flagged and groomed three times. Skiway data:
Center position: N 77 deg. 26 min. 54.93 sec., W 51 deg. 03 min. 19.89 sec.
Altitude: 2484 m a.s.l. or 8140 feet.
Skiway direction: 310 – 130 degrees. TRUE, or 350 – 170 Magnetic (declination 40 degrees West)
Skiway is NE of camp. Length: 10000 feet, width 200 feet.
Apron length: 2500 feet, width 400 feet.

A 20 x 12 feet weatherport has been erected on a 1 m snow hill. This weatherport will remain standing as storage over winter. A full propane gas stove has been installed and is operational. HF radio and VHF radio have been installed, and successful radio check on 8093 kHz with VECO in Kangerlussuaq has been done.

Fuel status: The traverse brought from NGRIP 37 drums of Jet A-1 and 5 drums of MOGAS. At present we have 200 l MOGAS left and 15 drums of Jet A-1. Since most of the snowmobile driving is done, everything seems to work out fine.

Monday, the Matrack of the Toyota was welded. As a crack was discovered on another one, we chose to wait one day at drill site 2 to repair this as well. At that time, three Mattracks have been repaired. Saturday afternoon, the main bearing in the fourth Mattack broke, and the Toyota was transported back to camp on Air Force pallets. Sunday morning, a full spare bearing kit was installed, and the Kansas radar resumed it's grid around NGRIP Sunday afternoon.

NEEM scientific activities:

100 m ice core drilling in progress.
AWI accumulation radar grid around NEEM completed.
Kansas radar finished half their planned 1 km grid around NEEM. Radar still working fine.
2/3 of the NEEM strain net is in position.

Tomorrow we will conduct a pit study, mount the battery on the PARCA weather station, some 8 km NE of camp, install the seismometer, finish drilling and begin to pack down for departure on Wednesday.

Traverse scientific activities:

All teams report satisfaction with obtained results along the traverse route. Traverse activities of

radar profiling , strain net and drilling are successfully concluded.

Note on Kansas radar: During the week complications arose due to expiration of our radio transmitting permit in Greenland. In the application we had not accounted for the 2 week delay at the start of the season. The Kansas radar transmitted at 121.5 MHz (civilian SAR frequency) and 243 MHz (military SAR frequency). The radar continuously triggered the SAR satellite alarm system so the authorities refused to give an extension of the permit. After some negotiations, we were granted an extension provided the emergency frequencies were taken out. The Kansas radar was modified and measurements could continue. The radar has been running in the new configuration in three days, and so far we have not been notified of any problems.

NEEM Iridium phone +8816 41439864 and BGAN phone +870 772 213 205 will on in the weatherport all day.

Weather:
Several days thick overcast with poor contrast. Other days fine.
At NEEM -8 C to - 15 C, mostly blue sky and 5 m/s wind from 170-180 magnetic (straight down the skiway).

Persons at NEEM: 9

FL J.P.Steffensen

SITREP no. 7, Sunday 12. August 2007.

This SITREP covers the period 6. August to 12.August, inclusive.

Movement of personnel:
10. August: Sverrir Hilmarsson (IS), Steffen Bo Hansen (DK) from NEEM to Thule by LC-130.
11. August: Peter Sperlich (D), Maria Hörhold (D), Claude Laird (US), Susanne Buchardt (DK), Lars Berg Larsen (DK), Simon Sheldon (DK) and J.P.Steffensen (DK) from NEEM to SFJ by LC-130.
11. August: Simon Sheldon(DK) and Susanne Buchardt (DK) from SFJ to CPH by Air Greenland.
12. August: Maria Hörhold (D), Peter Sperlich (D) and Lars Berg Larsen (DK) from SFJ to CPH by Air Greenland.

Planned:
13. August: Steffen Bo Hansen (DK) and Sverrir Hilmarsson (IS) from Thule to SFJ by LC-130.
13. August: Claude Laird (US) from SFJ to Schenectady by LC-130.
13. August: J.P.Steffensen (DK) from SFJ to CPH by Air Greenland.
14. August: Steffen Bo Hansen (DK) and Sverrir Hilmarsson (IS) from SFJ to CPH by Air Greenland.

Movement of Cargo:
10. August: 3000 kg weatherports, snowblower and bamboo from SFJ to NEEM.
10. August: 3000 kg (11 drums Jet A-1 and 4 drums Mogas) from SFJ to NEEM.
10. August: 2100 kg icecores, DK-scientific equipment + Kansas antenna from NEEM to Thule.

11. August: 2100 kg radar equipment from NEEM to SFJ.
12. August: 850 kg AWI radar equipment from SFJ to Bremerhaven.

Planned:
13. August: 1500 kg Cresis radar equipment from SFJ to Schenectady.
13. August: 2100 kg icecores, DK-scientific equipment + Kansas antenna from Thule to SFJ.
14. August: 1900 kg icecores, DK-equipment from SFJ to CPH.

Camp activities:
Work on science continued Monday and Tuesday. Tuesday afternoon all camp activities were focussed on packing and winterizing camp and grooming the skiway. The planned pull out Wednesday was delayed to Thursday due to bad weather. The pull out plane arrived Thursday afternoon and was stuck in the warm snow. Attempts to get airborne failed, and at the attempt to get airborne Friday morning at 4 was interrupted due to a broken front ski. Friday evening, a second LC-130 landed on site with fuel and spare parts. The two pallet cargo was split between the two planes. The second plane went to Thule due to lack of fuel with two personnel from camp to take care of cargo, and the first plane took off without complications in the cold weather and reached SFJ Saturday at 04.00.
The Neem camp has been winterized and documented. The weatherport remains standing on the 1m hill over winter. This weatherport contains a complete kitchen with food supplies and propane gas stove. The two Kässbohrer flexmobiles and the Toyota are parked on the snow with 50 m distance. Three skidoos are parked in a snow cave. The groomer is parked on the snow. Five pallets are left along the out side of the apron: Pallet with 8 drums Jet A-1 and 4 drums mogas. Pallet with 9 empty and 3 full drums of Jet A-1. Pallet with Yanmar snow blower. Pallet with 10' x 10' weatherport and 12' x 20' weatherport. Pallet with 8 ATO bottles (igniters are in Toyota). All other cargo is placed on the four heavy sleds which are parked at 200 m distance on the snow, downwind from camp.

Most logistic objectives have been reached, except for the second traverse. The time window for this traverse had become too narrow, particularly due to the 14 days delay in the start of season.
At NGRIP a depot of 32 drums of fuel, a caterpillar loader and spare parts, 2 Alpine skidoos, furniture and other infrastructure awaits pickup next year.

Scientific activities:
After repair of Mattrack, the Kansas 10 km x 10 km radar grid around NEEM at 1 km track separation was completed Monday. The setup of strain position network was completed Monday. The seismic station was setup and activated 500 m West of present camp on Monday. An extra battery was installed at the PARCA Automatic Weather station, some 7 km –NE of camp on Monday. Shallow ice core drilling and pit studies continued to Tuesday, and drilling stopped at 80 m.
All scientific objectives for this years campaign have been reached.

Weather:
-2 C to - 25 C, Tuesday, Wednesday and Thursday cloudy, snowy and warm, winds at 5 - 7 m/s from 240 - 260 Mag.

From Thursday evening blue sky and 3 - 4 m/s from 170- 220 Mag. Ground fog at 03.00.

Personnel at NEEM: 0

FL J.P.Steffensen

Daily Reports:

Monday, June 19

We are now preparing for the expedition to the ice sheet.Currently in Kangerlussuaq, the skidoos, generators and other equipment are being examined and packed. We plan on being flown to our previous camp, NGRIP, which was abandoned in 2004.

The danish airforce flew over NGRIP on May 10th, and took some important photos concerning our ”put-in”

One important discovery, is that the old dome is just poking above the snow, which means we may be able to use it for accommodation during the first week.

Hopefully we will be able to get the first group flying tomorrow (June 20th), and the rest of us will follow the day after.

When our communication is up and running, we will be able to send daily reports and pictures from the trip.

Wish us luck,

The NEEM 2007 Traverse Team

Wednesday June 20,

8:30 L The plane took off.

10:00 L Landing at NGRIP - very soft snow. Plane shut down and vehicles excavated.

15:00 L Grooming of the skiway started. The NGRIP main dome entered through top hatch.

22:00 L Stopped grooming.

Thursday June 21

5:00 L One take-off attempt made. But still too much friction and cross wind.

7:00 L Plane shut down and grooming started…

8:45 L Next attempt to take off at NGRIP will be 16: 00 L.

16:00 L 30 knot wind gusting to 40 knot snow and no visibility. It is not possible to even groom the skiway.

Instead they try to clear the ventilation ducts around the main dome in order to start the generator.

21:00 L Generator started. Temperature in first floor of dome is 13 C.

Still snowstorm, the weather forecast says the wind might go down a little tomorrow morning, but only leave a window of 4-6 hours. An attempt to groom the skiway and a possible take-off is considered.

Due to these weather delays we will not get our needed two flights to NGRIP with more food and spare parts.

It is therefore decided to bring all people back to Kangerlussuaq whenever possible..

A new attempt to go to NGRIP will probably be made in 3 weeks. Next update 7:00 L.

Friday June 22

7:00 L Weather has improved a little and they will start to groom the skiway again.

12:00 L Two more hours of grooming to come then the skiway will setup some hours and it should be ready for a new take-off attempt.

13:00 L So far communication has been via Iridium phones. Now they have the BGAN satellite system running. Here is a report from the camp:

"This is a very brief status report from NGRIP.
The main generator is up and running fine. It was started at approx 18:00 yesterday and has been running well since. The main dome is very pleasant with all power & heating we need.
The skiway is being groomed
Weather is a moderate breeze running up the runway.
wind direction 320 magnetic
wind speed 12-14 knots
Air Temperature = -10.5'C
visibility - good to horizon
cloud cover - none, clear blue sky
People are in good spirits. Preparing to close down camp but allow fast camp set up on return."

16:30 L Wind condition very promising stable 10-12 knot down the skiway. Everybody gets ready to leave.

18.00 L Everybody on hold due to high crosswinds at the Summit station. They have to go to Summit for refuelling. Now waiting for the weather to improve at Summit. The weather forecast is promising. They prepare for a take-off 4.00 L.

Saturday, June 23

10:00 L **Skier 96 safe back in Kangerlussuaq…**

Pictures and more info about the "trip" to NGRIP will appear soon.

6:30 L Skier 96 Airborne and on its way to Summit. Check out Summit webcam at 7:00 L.

5: 00 L The Skier's APU up and running. Estimated time of departure (ETD) 6:00 L. The ETA Summit 6:45 L, refuelling at Summit and ETA Kangerlussuaq 11:00 L.

4:00 L Everything looks fine for a take-off, NGRIP -13C, 15 knot and Summit -23C 7 knot.. Packing down the camp.

Sunday, July 8:

The 9 people will once again leave for Greenland, Monday July 9th, depending on the weather situation at NGRIP, especially the temperature. It will be decided on the Mission Commander Meeting in Kangerlussuaq late Monday how to do the details of the put-in.

So far we have some cargo sitting at the Summit station, waiting to be shipped to NGRIP, and then we have people and additional cargo in Kangerlussuaq that need to go to NGRIP as well. This means two more missions into NGRIP.

However this time we know what to expect, we have the shelter (Dome) ready, generators and vehicles should be fairly easy to get going, and most important we have a skiway that was groomed by a C-130 and the Kässbohrers.

We cross our fingers for a smoother Put-in this week

You may follow how our expedition progress in the next weeks on this page..

Wednesday, July 11: Put-in aborted..

After two hours of flying, during approach and a couple of minutes before landing at NGRIP, Skier 96 encountered a technical problem and had to abort the landing…

Next try, Thursday 03:00L

One engine was shut down on the return to Sonde (Kangerlussuaq)..

At todays meeting with the mission commander a it was decided to try a new put-in tuesday evening.

People entering the Skier 96

Thursday, July 12. Finally we got going.

The departure was set to Thursday morning at 01.30. This time, the 109th (the Hercules crew), wanted to be sure that everything would go right. At present there are stable high pressure weather conditions over the ice sheet so the nights are nice and cold. This is important, for otherwise the snow gets so soft that the aeroplanes cannot get airborne again. At 2 o'clock we all sat in the plane. The engines started; but after a short while they were switched off again. We thought: "This is not true, will we have to cancel again?" Luckily the mechanics showed up and exchanged a box that had some red lights on. At 02.30 we took off. Half an hour later another

plane flew to the American camp at Summit. This plane would then fly to Summit for the Americans, and at Summit it would load the 8 tons of our cargo that was abandoned there in June.

Over the ice sheet there was quite a lot of fog. This caused some concern; but as we approached NGRIP, the weather cleared and we landed at 04.40 in bright sunshine and -19 C. The unloading of the Toyota and the snow mobiles went fine, and at 5 o'clock the plane could depart and return to Kangerlussuaq. In the mean time, the second plane had departed Summit towards NGRIP with our cargo onboard – and then the fog came. At 06.30 we could just stand there and watch as the plane made several low passes over camp without being able to land. The plane returned to Summit where it landed at 07.40. It was suggested to return to Kangerlussuaq with our cargo! At NGRIP the weather ironically had become beautiful again, so we agreed with the pilots to give it another shot. They flew towards NGRIP at 09.55, and lo and behold: The fog came rolling in 10 minutes before they arrived. Luckily they found a hole in the fog and landed at 10.45. Through the fog we could make out the plane as it taxied pass the camp and laid three large "eggs". These "eggs" were our pallets with cargo that were drifted out the rear as the plane taxied by. Then we lost track of the plane in the fog, but we could hear the roar of the engines as it tried to take-off on the skiway. First attempt did not succeed; but the second time they got airborne. So at 11.10 we could all smile at each other and get to work. The NEEM traverse was finally ready to begin. The first thing we did was to go to bed. Everybody had been awake all night until noon. At 16.00 we all got up again and went ahead to unpack the cargo. We now live in the old NGRIP main dome. The generator runs, the kitchen works, heat is spreading through the building and music can be heard playing down below. All in all, a very good day.
The start of this project has been a complicated delivery. A lot of people have been extremely helpful in the effort to make things succeed in spite of adverse weather conditions. We want particularly to express our gratitude to the personnel of the 109th for their "can do" attitude and the staff at Summit Camp who had to work hard loading and unloading and fuelling planes several days and nights on our behalf.
-The NEEM traverse crew.

Friday, 13 July Preparations for the traverse are well on the way.

Everybody was out today. Weather was o.k. Overcast, little snow, winds at 8 knots from South West and -5 C. We got a lot done.

Steffen, Simon and Sverrir built a platform around the casing from the NGRIP borehole to support tower and cable for our borehole instruments. The cable winch was put into position, so tomorrow we can go ahead and start measurements of the shape of the hole, i.e. diameter, inclination and direction of inclination. When these measurements are compared to similar measurements from 2001, 2003 and 2004 we obtain information on how the hole changes shape due to the flow of the ice sheet. The most interesting measurement is the borehole temperature. We read the temperature meter by meter along the entire borehole length (3090m) with 1/100 degree precision. These numbers tell something about past cold and warm periods (The ice sheet still remembers the cold of the last glacial period) and about the geothermal heat flow from the bedrock below the ice.

Claude and Susanne have filled the Toyota with advanced radar equipment, and they are almost ready to test it and mount radar antenna.

Maria and Peter are mounting the German radar system. It is mounted on a Nansen sled and pulled by a snow mobile.

Most of our cargo is now sorted out in nice piles.

Sverrir and J.P. have pulled the heavy German sledges out from under three years of snow.

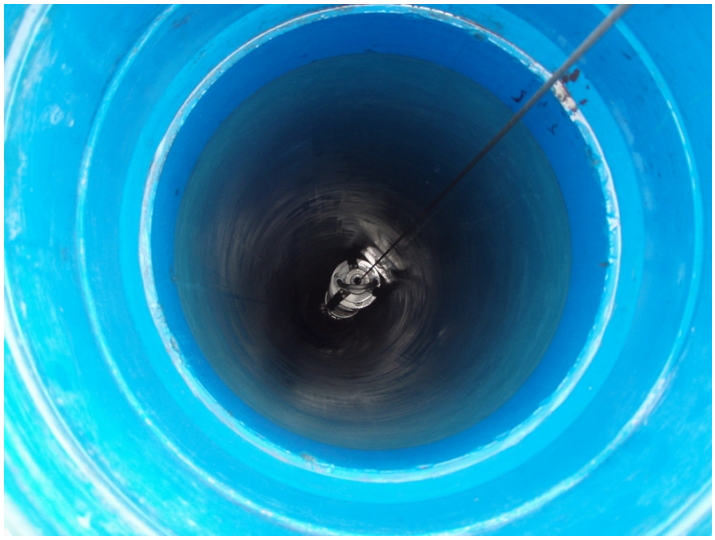
Lars has unpacked the GPS-equipment for position measurements along the ice ridge.

For dinner, Lars cooked very nice steaks and mashed potatoes.

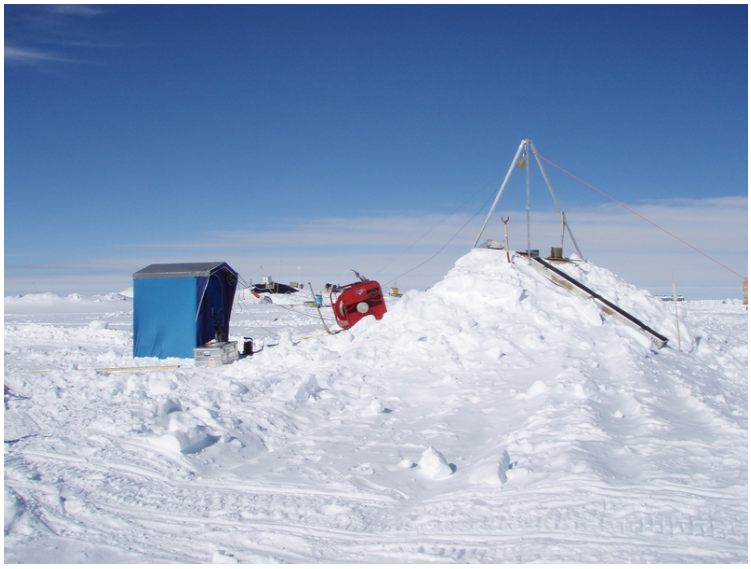
- The NEEM traverse crew.

Saturday, 14 July:

Everybody has been busy making equipment and vehicles ready for the traverse, except for Simon and Steffen. They have made measurements down through the deep NGRIP bore hole.



The logging, as these measurements are called, could be done down to a depth of 2950 m, i.e. down to 140 m above bedrock. Down there an ice plug prevents the instruments to go any deeper. All the most important data are secured, so it doesn't matter too much that we couldn't go any deeper.



J.P. and in particular Sverrir have changed the drive belts on one of the tracked vehicles, and Maria and Peter have carried out the first tests of the German radar.

All electronics is now mounted inside the Toyota so Claude and Susanne have begun construction of the sled that will hold the antenna array.

Lars has mounted a GPS reference station, and is now readying the GPS equipment for the traverse.

We celebrated Saturday night as is proper with shirt and tie for the men and nice dresses for the women. Dinner was italian inspired pasta with blueberries and vanilla cream for dessert.

Weather is nice, but warm. -6 C, overcast and not very much wind.

- *NEEM traverse team.*

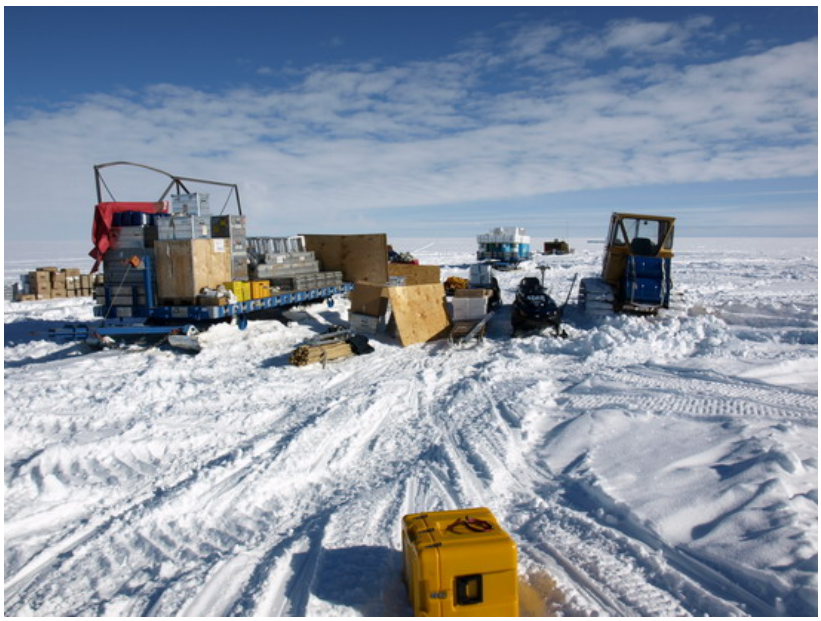
Sunday, 15 July:

Preparations of equipment and vehicles continue. Simon and Steffen are packing down the logging equipment.

Sverrir has finished maintenance of the first tracked vehicle and Maria and Peter have finished preparations of their equipment. This means that Maria and Peter can help out in loading the traverse train.

Claude and Susanne have finished construction of the antenna sled for the Kansas radar, now they only need to connect the antennas and the electronics in the Toyota. Testing can begin tomorrow.

Lars has sorted out cargo and he is now in the process of making sure all GPS units of the traverse train have the same route in memory.



J.P. has been driving the caterpillar. One large sled has been emptied for fuel to make room for other cargo. 34 drums of fuel have been put in depot. This fuel will be collected on the next traverse.

Dinner was a Chinese inspired dish. Cooks: Maria and Peter. For desserts, blueberries and ice cream.

Weather is nice, but warm. -4 C, overcast and almost no wind.

- *NEEM traverse team*

Monday, 16 July:

Preparations and packing continues. Both heavy tracked vehicles are now almost ready, we only need to do an oil change.
Camp begins to look tidy. Cargo is arranged in nice little piles.

The very advanced Kansas radar has been tested tonight and the operators, Claude and Susanne are very pleased with the outcome.

Dinner was gullash and mashed potatoes. Cooks: Simon and Steffen.

Weather is nice: - 5 C, overcast, snow and 5 – 8 m/s from South West. Small snow drifts here and there.

- NEEM traverse team

Tuesday, 17 July: Almost ready for departure.

The Germans, Maria and Peter, reports their snow mobile train ready for departure.

The American, Claude, and Danish Susanne report their luxury express, Toyota with antenna array, ready for departure. Tonight the radar is tested on full effect. We have informed the Greenland Search and Rescue authorities about the
testing, since some of the transmitted frequencies might trigger an alarm on the international Search and Rescue satellite system.

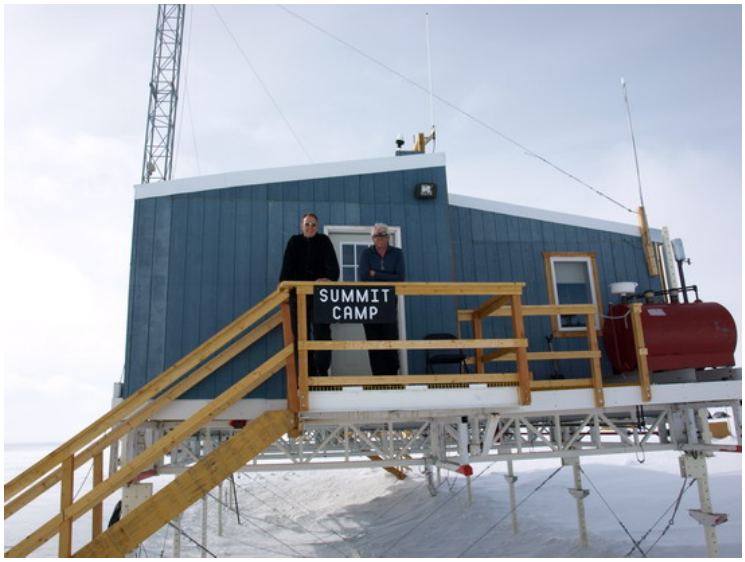
Danish Steffen and Danish/English Simon report the ice core drilling train ready for departure. This train is also snow mobile powered.

Several cars on the heavy freight train are loaded, we just need to load the caboose, which is the workshop car with tools and spare parts.

All points to a departure from track 1 tomorrow afternoon. We have agreed that at these warm temperatures, we turn the traverse into a night train. We will work at night and sleep by day. In terms of light this is no problem as the Sun is in the sky 24 hours a day.

Weather is nice, -5 C and cloudy in the morning, with winds at 10 knots from SW. Later in the day it cleared and temperatures dropped to -11 C.

Since yesterday afternoon we have only been 7 people in camp. At 17.30 Sverrir and Lars departed towards the American camp at Summit, some 300 km to the South. They travelled on two snow mobiles with survival equipment and satellite telephones. They arrived at Summit at 0.30. At Summit they have collected a drum of engine oil, which we had arranged with the local staff that we could “borrow”. We have decided to pick this engine oil up to make sure we could perform the planned traverses. This afternoon they started towards NGRIP at 16.20. They arrived at NGRIP at 24.30 in good spirits. During their travels, they have maintained regular contact with NGRIP.



To our American colleagues at Summit: Thanks for the oil and your kind help. Our “tourists” comment on arrival: “Now NGRIP and Summit have been neighbours on the Greenland Ice Sheet for 9 years. It was high time to pay them a visit”.

- *NEEM traverse team*

Wednesday, 18 July: Greenland Ice Sheet Railways report irregularities in train services.

We are basically ready for departure; but there are problems with the radars.

The Germans were happy, their radar worked fine. It is a small compact radar system that examines the topmost 50 m of snow. The radar is capable of detecting layer structures in the snow, that can be interpreted as annual layers. Radar results yield a picture on the development of annual snowfall in the area for the past 100 years.

Even though we were aware that the two radars, the German and the US, could influence and in fact damage each other, we were unaware that the German radar antenna amplifier ran on batteries and remained on, even though the radar was switched off. As the US radar was switched on, it fried the electronics in the German radar antennas. The Germans have now changed their antennas, and to avoid similar things in the future, they keep a 10 km distance to the other radar.

The US radar is a very complex prototype system, and the tuning and adjustments take time. The team is in constant contact with headquarters in Lawrence, Kansas, and we remain optimistic for it to run soon.

The radar surveys are important to the project, so we have decided to wait a few days until they work.

Weather is lousy, -3 C with dense cloud cover and snow, almost no wind and the lighting conditions are so poor that it is impossible to see any structures on the snow, like deep tracks or snow drifts. We can only drive and walk with great care. In these conditions, all dark surfaces reach temperatures above freezing causing water to drip off vehicles and equipment – a really sticky experience.

- *NEEM traverse team*

Thursday, 19 July: While we wait for the radar.

Simon, Claude and Susanne have worked on the radar the whole day, and now it looks as if we are getting somewhere. They report that by tomorrow we should be going.

The rest of the team have packed down the last cargo on the sledges. Lars has made sure that all GPS systems have the same waypoints, and that the German radar team and Lars's system for ice positions and survey follow routes which are a bit removed from the main train route.

It is soon time to say goodbye to the old faithful NGRIP main dome, which we sometimes refer to as the "submarine". The only entry to the dome is through the top hatch.

For dinner we had outdoor barbecue. Steffen and Sverrir had converted an old oil pan from one of the tracked vehicles to a suitable grill. Weather made sure this dinner became a very nice experience.

Weather today has been really fine, -7 C with sunshine from a blue sky. It has been a pleasure to work outside all day. Everything you do just becomes more successful under these conditions.

- *NEEM traverse team*

Friday, 20 July Radar is ready, we can go.

At 5.30 PM the radar people reported their systems ready, and immediately thereafter the camp was buzzing with activity. The last minute things had to be packed, and items awaiting pick-up by the 2nd traverse had to be packed down properly, in case the 2nd traverse doesn't make it this year, but has to wait until next year.

We agreed to finish packing and go to bed early to start early and get a long full day of travel. Of course things do not play out as planned. In the midst of all the shunting back and forth with heavy sledges, one of the tracked vehicles got stuck in reverse! No good. Some people noted, that we would have to split the traverse in two: One half going to NEEM and the other half backwards to Summit. It turned out the fault was electric, and it was found and repaired at 1.30 AM.

Departure tomorrow at Noon.

Weather today has been really fine, -7 C with sunshine from a blue sky. In the evening temperatures dropped to -19 C and the snow attained this wonderful squirky sound, when walking around.

- *NEEM traverse team*

Saturday, 21 July: Departure..

Finally, we got moving. As we are somewhat delayed in our schedule, we are not sure we can make a second traverse to NGRIP this year. Therefore we spent some time to close down camp and park two snow mobiles and our small Caterpillar in a garage tent. The generator in the old NGRIP dome has served us well, and it was turned off at 2PM. We cleaned the main dome and sealed the top hatch.

We departed NGRIP heading North at 6.30PM. Just before we left camp, we had a photo session where pictures were taken of people and the traveling circus.

At 1:00AM we camped 27km from NGRIP. About 4 km before the camp J.P. got his tractor train stuck. It took two hours to get it free again.

Weather today at NGRIP has been really fine, -7 C and sunshine from a blue sky. In camp temperatures dropped to -20 C and it was with very cold hands that the tents were erected. We had supper at 2AM in the big tomato (that's our nickname for the round red fibreglass kitchen cabin) and went to bed.

- *NEEM traverse team*

Sunday 22, July: Traveling.

We woke up in the middle of nowhere – white snow all around to the horizon. We broke camp and began to develop methods to both pack down in a practical way and to distribute tasks. A lot of small things were dealt with, e.g. the way the kitchen was laid out.

We started at 4.30 PM and stopped again at 9.30PM after 25 km driving, 52 km from NGRIP. It was originally intended that we would drive by night and sleep by day; but it has turned out, that at the low temperatures at night the snow becomes so loose, that the tracked vehicles loose traction. Therefore, we stopped early to obtain a long day Monday. This decision suits the snow mobile drivers very well, as there is a huge difference in comfort, driving at -20 C at low sun and at -7 C in intense sunshine.

All teams: The German radar team, Kansas radar team, Lars doing the GPS position network and the main team are satisfied with things so far.

The whole camp was constructed in 40 minutes.

Weather today has been really fine, -7 C and sunshine from a blue sky. After 8PM temperatures dropped to -18 C. Almost no wind and some ice fog in the night.

- *NEEM traverse team*

Monday 23 July: 3rd day of journey.

After breakfast we broke camp and started our activities. Maria and Peter went one way, Lars another. Claude and Susanne in the Toyota run parallel to the main train. Steffen with the drilling equipment does the same. Sverrir drives the first tracked vehicle and Simon and J.P. drive the last.

Departure at 12.20PM and arrival at the new camp site at 8.50 PM. We are now 92 km from NGRIP and need to go 75 km to the first drilling site. Everybody came back to camp content with the accomplishments of the day. During the day, all teams have reported in to the main train on a regular schedule via satellite telephone.

Weather today has been really fine, -7 C and sunshine from a blue sky. After 8PM temperatures dropped to -18 C. Almost no wind and some ice fog in the night.

The whole gang just before going on the traverse. Click on the pic, for full size.
Also be sure to check our photo page with new photos from the trip.

- *NEEM traverse team*

Tuesday, 24 July: 4th day of journey.

After breakfast we broke camp and went off in all directions. With a GPS in the pocket and contact by satellite telephone, life is easy. All around is only a flat white surface. The sky is blue with a few clouds in the distance. There is nothing to break the monotony, except when the main train encounters a solitary flag straight ahead in the middle of its

path. It is a flag that Lars has set up the previous day as a survey point. The only things to be seen are a few footprints and a snowmobile track that disappears over the horizon.

Departure at 11.40 AM (We become better and better at striking camp), and arrival at the new camp site at 9 PM. We are now 137 km from NGRIP and 30 km from the first ice core drilling site.

The arrival was deeply fascinating. Everybody has GPS'es with the same set of way points programmed into memory. In this way we can easily communicate with each other about our whereabouts. By telephone, we agreed to meet at way point 27 for camping. As the heavy vehicles came trundling with roaring engines hauling their load of 30 tonnes with a speed of 6-7 km per hour towards way point 27, Lars came on snowmobile from the West
and Maria and Peter came on snowmobile from the North. Everybody came to the same spot at the same time, like flies to an old cheese. At way point 27 there is nothing, the point is just a position in the middle of nowhere. One begins to appreciate, how absolutely essential navigation has been to sailing at all times.

We saw two seagull type birds pass us on our way today. We are not totally alone up here.

Everybody came back satisfied with the days work.

Steffen made spaghetti with meatballs for supper.

Weather today has been really fine, -7 C and sunshine from a blue sky. After 8PM temperatures dropped to -18 C.

- *NEEM traverse team*

Wednesday 25 July: 5th day of journey – first drilling site, 165 km from NGRIP, 200 km from the end at NEEM…

We arrived at the first drilling site, which most probably is the remotest point on the Greenland Ice Sheet. Right here the ice cannot decide which way it wants to flow towards the coast. Along the centre of the ice sheet runs a crest, an ice divide. On the eastern side the ice flows towards the East coast, on the western side towards the West coast. Until now, we have been driving along the ice divide. At this place, the ice divide splits into two, one ice divide runs towards NNE and the other towards NW. The ice here may flow North, West or East. Our route will take us along the North Western ice divide. Our position is: 75.45 degrees North, 44.77 degrees West.

We started this morning at 10.30AM and arrived at the drilling site at 4.15PM. Steffen and Simon had snow mobil'ed ahead, and the drilling equipment was installed at the time of arrival of the main train. Weather is almost too good, for drilling at least. Even though temperatures are below -7 C, the sunshine is so intense that we have to make shadow using a tarp. We decided to drill late. At 1.20AM we had reached 20 m.

Steffen spent the waiting time to setup a shower on the snow. A bucket with an immersion heater, a shower head with a battery pump, a tent and a sleeping mat is all it takes. Several in camp are now clean for the first time in two weeks. Tomorrow the rest will visit the public baths.

A luxury in the middle of nowhere - a hot shower.
Remember to see many more pictures on our picture page...

Maria and Peter have made a 2.5 m snow pit for studies.

Lars and Susanne made spaghetti with shrimp and vegetables, however Lars let Susanne down as he spent very long time doing his shower and, as Susanne put it, she managed to make a mess of it. Nevertheless we all got our fill.

One of our generators has broken down less than 12 hours after major service at a company in Denmark. This company owes us an explanation. We now use a spare generator.

Everybody is fine and well.

Weather today has been really fine, -7 C and sunshine from a blue sky.
After 8PM temperatures dropped to -23 C.

- *NEEM traverse team*

Thursday, 26 July: First ice core drilling.

Last night Steffen, Simon and Susanne drilled and packed ice cores to 20 m depth. It was late and very cold. Today drilling continued all day. As the Sun moved, so did we move the tarp, always to keep the drilling and packing operation in the shadow. In the evening 60 m depth was reached.

Claude and Susanne used the opportunity to make a radar transect across our route.

Maria and Peter spent the day taking samples in the snow pit they dug yesterday.

Sverrir and Lars spent the time rearranging the cargo on the large sledges, so that for instance the ice core samples do not sit in the sun all day during transport.

Weather today has been really fine, -7 C and sunshine from a blue sky. Temperatures dropped to -23 C after 8PM.

- *NEEM traverse team*

Friday 27 July: On the road again.

We had planned to leave the drilling site at 10 AM; but it was as if the large sledges were not inclined to play along. One tractor train was stuck at the beginning, so we were not moving before 11.20AM. Afterwards everything went fine. We arrived at the planned camp site at 8.20PM after 50km of driving.

We are now 215km from NGRIP and 150 km from NEEM. We passed the halfway point at 3 o'clock.

Simon and Steffen were left behind at the drill site to drill the remaining 10 m of the planned 70 m of ice core and to measure the temperatures in the bore hole.

At 5PM the tractor train was suddenly overtaken by Steffen and Simon on snowmobile and sledges with drilling equipment and ice core samples…Our first drilling is complete, and we can tick off another of our planned scientific objectives.

Maria and Peter have been running their radar the whole day, and they came buzzing in from the left as we were setting up camp. Peter was so tired, that when he saw his sleeping bag, he went to

bed and fell asleep. During the day, they have had problems with their re-chargeable batteries on the radar, so they were tired.

Only ten minutes after Maria and Peter had arrived, Lars came buzzing in from the right from his work on setting up stations for a positioning network.

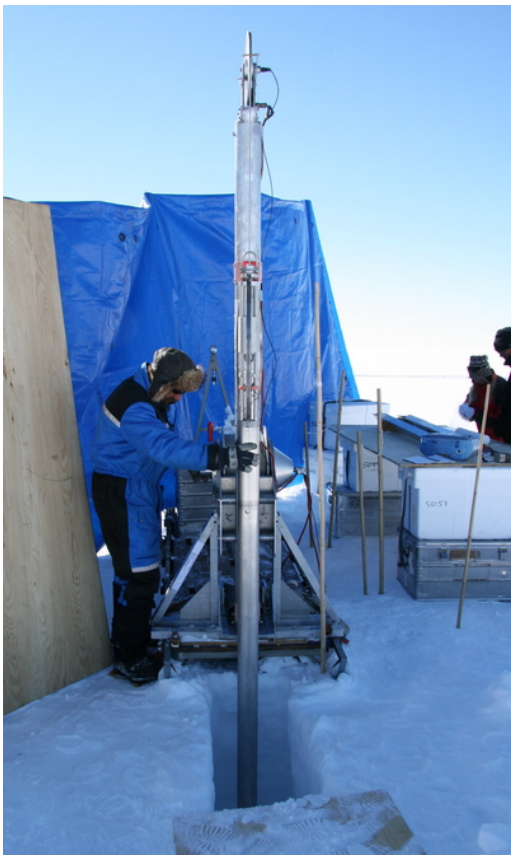
Everybody was tired, so after a small cup of beer and some readymade pizza, we all went to bed.

Weather continues to be really fine, in the daytime up to -7 C and sunshine from a blue sky.
At night -21 C. We sincerely hope the weather holds.

- *NEEM traverse team*

Saturday, 28 July: Drilling site no. 2

Ater breakfast at 8 we packed. The different teams went each their way, and the main train could depart at 11.15. Weather was nice, sunshine and -11 C; but with a wind at 10 knots from SSW. It cools things down. The main train did not get far. After a couple of kilometres travel one vehicle suddenly stopped in it's tracks. A hydraulic hose was blown. Sverrir did have spares, and a new hose was found in the bottom crate in a pile of crates on the workshop sledge. Repairs took 1.5 hours, and we could continue.



However, the problems continued. Our course is now NW. The wind from the South hit directly into the grate on the side of the vehicles, where the cooling exhaust for the hydraulic system has to go out. J.P.s vehicle continued to overheat so he had to drive at reduced speed.

From the South a cloud front came rolling in, and we hoped that this did not spell a blizzard. At 5 o'clock the whole sky was overcast. The wind did not pick up however, and it turned out to be a mild snow fall.

J.P. could again obtain sufficient cooling, and the main train arrived at drill site no. 2 at 9.15 PM.

When the tractor train arrived, Steffen and Simon were already drilling, and when we went to bed, 25 m of core were already drilled. Drilling is easier now in the overcast weather. We don't have to use a tarp to keep the Sun away.

We are now 265km from NGRIP and 100 km from NEEM.

For supper Lars cooked lasagne.

Weather is overcast with snow. Temperature – 11 C and 10 knot wind from SSW.

- *NEEM traverse team*

Sunday, 29 July Drilling site no. 2

We drilled all day. At 8.30PM the drill reached 60 m depth. Steffen and Simon will drill the last 10 m tomorrow, measure temperatures in the hole and overtake the main train some time tomorrow.

Sverrir spent the day servicing the tracked vehicles, installing a new fuel gauge in one vehicle and re-charging batteries.

Simon has rigged a system to compensate for the lack of serviceable batteries in Maria and Peters radar system.

Claude and Susanne wanted to make a radar measurement with the Toyota setup; but after only 900 m driving, the belt drive system on the front wheel broke off. The belt drive is now in camp, and will be welded tomorrow.

J.P. cooked curry rice with meatballs for supper.

Weather is overcast with Christmas snow. Temperature – 6 C and the wind died late in the day.

- *NEEM traverse team*

Monday, 30th July: Drilling site no. 2 and machine repair shop

Most of the day was spent repairing the broken Mattrack. The machine repair shop went into full swing. First, the break was ground down to prepare for welding. We unpacked the welding kit and, the plugs of the wires didn't fit the sockets on the electrical device. A Danish proverb says: "You've got to help yourself where you can", the crone said as she wiped off the table with a kitten. The very same happened here. A threading was cut into the sockets, a couple of bolts were added, and a plug was mounted. Sverrir could start welding.

All the while, the Toyota sat all alone on the snow with a jack under the missing belt. When jacks are used on the snow, a support of a sheet of plywood and a 4'' x 4'' beam is needed.

At 4 PM the repair was done and the car back in camp again. Steffen was impressed by Sverrirs welding. It was made with 0.5 mm precision.

As the car came back to camp, Sverrir observed a crack in another of the belt drives. Rather than wait for an accident to happen again, we decided to repair it on the spot.

While the repair was going on, a barbeque was started in the gorgeous weather. The car was finished in the evening and we ended the day with a glass of wine and “The Pink Panther Strikes Back”.

Blue skies and sunshine all day, no wind, temperatures from -7 C by day to – 18 C by night. Late in the evening: Ice fog.

NEEM traverse team

Tuesday, 31th Jul: On the road again.

We woke up immersed in pea soup: Totally overcast, snow and no contrast. In these conditions,

everything is white, both the sky and the ground. There is no horizon and tracks, marks and snow drifts are invisible. Luckily, the visibility was a kilometer or so, and we travelled trusting our GPS'es.

We drove off at 11.30 and left Steffen and Simon behind at the drill site. They were to finish drilling and to measure temperatures in the bore hole.

All day we drove by instruments. It made no difference to look out the windscreen, unless you were travelling behind somebody else and had a view to the "rump" of the vehicle in front as a dark blob in the middle of the all white nothing.

Speed was good however. At 8.15 PM we had travelled 60 km and setup camp.

Temperatures all day: -6 C.

We are now 325 km from NGRIP and 40 km from our goal, NEEM.

All teams report measurements running to satisfaction.

NEEM traverse team.

Wednesday, 1 August: Finally NEEM!

The caravan moved on at 10.45 AM. Weather improved during the morning, so driving went fine. We reached the end of our route at 5 PM. Yesterday, Lars had visited the future NEEM area with GPS, so he knew precisely where the ice ridge is. With Lars as pathfinder, the caravan lumbered the last few kilometres in a large U-turn into the future camp site. This way the approach was from the North and West, down wind from the future site.

Finally we were there. The two tracked vehicle drivers, Sverrir and J.P. shook hands. The vehicles held out without any major break downs. After setting up camp, we held a small ceremony. Lars

(former member of the Danish national team in volleyball) took a volleyball and kicked it out on the snow. Where it landed was designated as the site of the future deep ice core drilling. We always like a scientific approach. We placed a flag on the site and had a toast in malt whisky. Afterwards, Lars and J.P. began to mark out the future skiway (NEEM airport) with flags using GPS and survey equipment. They were done at 1.30 AM.

The rest of the camp were busy unpacking the sledges. How wonderful to finally have access to everything at once.

Weather at NEEM at 9 PM: - 7 C, overcast; but good visibility, no wind.

We are now 365 km from NGRIP and are at the destination, NEEM.

All parties report measurements running to satisfaction; but at 5 PM we received a call from the Search and Rescue authorities in Kangerlussuaq. They were tired of receiving false alerts on the emergency satellite system, so they asked us to shut down the Kansas radar until a solution was found.

- *NEEM traverse team*

Thursday 2 August: We are busy.

The day began in a panic. The permission for transmitting radar waves had expired, so we had to react quickly. After some negotiations with the Search and Rescue authorities and the Radio authorities in Greenland via the Principal Investigator, Dorthe Dahl-Jensen, and the International Polar Year representative in Kangerlussuaq, Henning Thing, we negotiated a reconfiguration of the radar. We could resume radar measurements – we were relieved. These radar measurements are a cornerstone in this years activities. Hopefully they will show, that the NEEM site is the optimum site for obtaining ice from the previous interglacial, the Eemian, in a deep ice core drilling.

Lars made GPS position files for Maria and Peter and Susanne and Claude. They are now ready to begin a radar survey in a grid around NEEM site.

We constructed a weatherport (a tent bulding of 12´by 20') on a 3' snow hill. The electronics of the Kansas radar was repaired. Peter and Maria produced 72 flags for the skiway (the ski landing strip). The skiway was groomed with a special instrument that breaks up the snow surface and compacts the snow so that it will become hard enough to support a Hercules aeroplane.

Weather at NEEM: -11 to -17 C, blue skies, wind at 8 knots from 185 magnetic. This wind is precisely down along the new skiway, which is optimal for flight operations. Luckily, we did not lay out the skiway at random. Last year our colleagues at the University of Colorado (the PARCA project) set up an automatic weather station in the vicinity, and thanks to this station, we knew which way the wind normally blows.

All teams report satisfactory measurements. The Kansas radar did not go today. They needed some repairs on the electronics.

- *NEEM traverse team*

Friday, 3 August: From nomads to homesteaders.

Today, we moved into our hilltop tent. A 20 square meter weatherport is much better than an 8 square meter fibreglass dome. We now have a full gas stove, windows and access to things without knocking other things over. This author does not need to sit hunched over in the back of a tracked vehicle, surrounded by medicine crates, communication equipment, sleeping bags and other stuff. Now he can sit upright with both feet under a table.

We have now planted 100 flags in a certain pattern around our snow landing strip (skiway). The skiway was groomed again today. One grooming takes 6 - 8 hours.

The Kansas radar has been repaired, and after close coordination with Search and Rescue, the radar was switched on. Apparently the new setting works. We have not been notified of any false alarms. Tonight the radar made several good passes.

Earlier today, Peter and Maria had problems with the computer that runs their radar. This is now fixed, and they worked out on the ice until after midnight. They have now done half their program around NEEM.

The inauguration of the tent on the hill was celebrated with three year old haddock. The Icelander, Sverrir, wanted fish so when we were at NGRIP, he dug 3 meters down to an old snow cave, where he knew there was some packs of frozen haddock. Steffen and Sverrir baked the haddock in the oven with onions, cream, butter and cheese, and it became an experience to be remembered. Three years at -31 C had not touched the haddock at all.

Weather today: -14 C, 10 knots wind from SE, straight down the skiway, few high clouds and good visibility.

- *NEEM traverse team*

Saturday, 4 August: Mechanics are busy.

Weather today has been lousy. A thick cloud cover makes it impossible to see anything on the snow surface. These conditions make it really difficult to prepare the ski landing strip. You cannot see where you have been and where you have to go. Sverrir used the GPS to navigate. It was slow going, but he made progress.

On one of the tracked vehicles there are now many loose electrical connections, many times we cannot get it to reverse, and today we could not get it into first gear. While we worked on the problem, a call came: Another of the Mattracks belts on the Toyota had broken down 2.5 km from camp. The car was put on pallets and towed to camp. A main bearing in the

belt drive had gone. Luckily, we have spares and it will be fixed tomorrow. A quick repair is necessary, as work with Kansas radar is not completed yet and time is running short.

The break down happened 4 PM, which meant, that our Saturday night dinner had to be postponed. We had dinner a 11PM. Several had the chance to take a shower in our little cabin on the snow. Peter and Maria have now completed their measurements with their radar. They are tired, but happy that the job is done.

Peter and Maria made supper: Chicken with bacon roasted in the oven with pasta and tomatosauce.

Weather today: - 10 C, 4 knots from SE, over cast and poor visibility.

- *NEEM traverse team*

Sunday, 5 August: Fine day.

Quite opposite from yesterday, the weather today was gorgeous. The Sun was shining, and we could see things. The broken belt drive was repaired at 5PM and Claude and Susanne immediately went to work. Measurements are going fine, and by 11 PM they passed by camp for a quick supper before heading out to continue their measurements. 1/3 of their program remains to be done.

The ski landing area is now ready. The skiway is hard and flat. It will support a Hercules plane on skis. The quick test on carrying capacity is to jump up and down. If you don't break through the surface, then it will carry a Hercules.

Steffen and Simon started drilling. It goes well.

Peter and Maria dug a pit for snow studies. Both they and Lars and J.P. will take samples tomorrow. When the sampling is done, a seismometer will be installed in the pit to samples earthquakes over winter.

NEEM camp now has an official position: N 77 degrees 55 minuttes, W 51 degrees 3 minuttes, 2483 m a.s.l.

For supper pork chops with mashed potatoes and spicy tomato sauce made by Simon.

Weather today: -12 C and 10 knots wind from SE, blue skies, and good visibility. This is the kind of weather we wish for when we will be collected by the Hercules aircraft. The skiway is hard and has a good glide, and the wind down along the skiway helps the aircraft in taking off.

- *NEEM traverse team*

Monday, 6 August: The end of field work is approaching.

Today, we could tick off several scientific objectives that have been met.

Measurements with the Kansas radar were completed at 6 AM this morning. Claude and Susanne ran measurements through the night. Now the radar is being packed down, and data is being backed up.

The Kansas radar, after work has been completed.
Remember to check the pictures page for more pictures...

Lars completed his setup of a network of position markers. In the future these will be used to monitor ice movements. As he passed close by, he also installed an extra battery at an automatic weather station, which has been set up by our colleagues in Colorado.

J.P. installed and started a seismic station, however in a different hole than was planned. The new hole is 500 m West of camp. The planned hole was too close to camp, so that camp activities would create “earthquakes”.

Maria and Peter took snow samples from a pit.

Steffen and Simon have drilled ice cores to 60 m depth. They will continue a little tomorrow.

Sverrir made a snow cave for the snow mobiles. This way they can over winter without being inundated by snow.

Tomorrow is great packing day. All cargo that has to accompany us on our flight out has to be ready Tuesday night.

Weather today has been fine, but windy. A 14 – 16 knot wing at -10 C has a certain cooling effect.

- *NEEM traverse team*

Tuesday, 7 August: Hopefully the last day.

While most people were busy packing, Steffen and Simon were drilling the last ice cores. They reached 80 m before they too had to start packing.

Now, everything depends on weather. During the last day, we have been hit by a somewhat unexpected weather situation. Clouds have been drifting in and the wind has turned, so that it now runs across the skiway. That is not good. We hope the wind will turn back, and the Met. Office in Kangerlussuaq tells us that we are not hit by any severe weather system. Things should change in the next 24 hours. We keep our fingers crossed.

Weather today has been cloudy, but windy and warm. Only -6 C, an entirely different sensation than yesterday.

- *NEEM traverse team*

Wednesday, 8 August: We are stuck in bad weather.

Weather has not improved. The whole day we have been stuck in snowy weather in Southern winds. It has been completely overcast making flight operations impossible. It has been snowing quite a bit, several inches which is quite a lot in these parts. It means, that the skiway has a new layer of snow on it, and that we have to go out on the skiway and groom it again as soon as the snow stops.

Since yesterday evening we have been ready to go home, so we have nothing to do except sitting out the weather in our tent, eating, talking and watching films. Until now we have watched four films. The last film on the program tonight was chosen with a certain irony: “Day after Tomorrow”. Somehow it has worked. At this time at 11 PM, the clouds are drifting away and we can see the blue sky for the first time in two days. If it stops snowing completely, Sverrir and J.P. will go out on the skiway tonight to groom it.

Weather today has been cloudy, but windy and warm. Only -4 C, and a lot of snow.

- *NEEM traverse team*

Thursday 9 August: Plane is coming; but….

The day began warm and cloudy; but visibility was fine. The flight crews were eager to pick us up, as they are scheduled to go back to the U.S. on Friday. At 9.15 AM “Skier 72” started from Kangerlussuaq heading for NEEM camp. With them flew a representative from the National Science Foundation. His task is to survey a route for future over land traverses between Thule and Summit camp. The route runs very close to NEEM camp.
During morning, the weather improved and clouds began to thin; but temperatures continued to rise from - 8 C in the morning to - 4 C at Noon. The plane landed in camp at 1 PM. In the last hours

before the landing, the whole camp was buzzing with activity. Everything should be packed down for winter. Tents were taken down and stowed. Two pallets with out-bound cargo were finished off with straps and nets and parked next to the airplane parking spot. People packed their personal luggage, and the heavy vehicles were parked on the snow. The snow mobiles were parked in a snow cave. Everybody was ready to go when the plane landed.
The plane brought cargo for next year. Two more weatherport tents, a snow blower and a bundle of bamboo flags. Our cargo was loaded and we were ready for take off at 3 PM. At this time, temperatures were risen to - 2.5 C. The skis were frozen in, and the plane couldn't get loose. The crew had to go out with shovels four times before they succeeded in getting the plane moving. Then they tried take-off several times; but the snow was simply too heavy, and at 5 PM they gave up and packed the plane. Now we were 18 in camp. We had to unpack a lot in order to provide people with shelter, heat and food. At the same time, we had to go out with the groomer to erase all the deep ruts in the skiway made by the plane.

During the evening the last clouds dissipated and temperatures came crashing down. At mid- night it was - 21 C, and the skiway became as hard as concrete. At 3 AM everybody boarded the plane for departure at 4 AM. That night we did not sleep. As tents had been taken down, we decided to sit in the warm comfort of the kitchen tent, enjoy some food and drink and watch some films. Members of the crew paid us visits several times and they were fed and warmed.
The crew told us that the plane now had fuel for only one attempt to get airborne, if we were not successful, we would have to wait for another plane to bring us fuel. When all were seated, the engines roared, and the plane didn't move an inch. Again the crew had to go out and dig. The ice underneath the skis was so tough however, that it had to be chiseled away with ice axes, and you're not really at ease nor comfortable crawling and lying in the snow at - 21 C beneath a 60 ton Hercules plane, hammering away on the ice underneath the very skis that support the plane. The process took hours and inside the plane several members of the expedition sat idle and felt the cold much more keenly than during the entire expedition. To buy time we fuelled the plane with

the last store of kerosene in camp.
When at last all skis were clean at 8 AM, it was discovered that an important bolt at the nose ski was broken. The landing gear was broken.
We all had to return to and reopen camp at 8 AM. Tents were set up, and people went to bed.

- *Neem traverse team*

Friday 10 August: Can we leave today?

The next plane with fuel and spare parts arrived at 10PM. Luckily, weather was still good for flight operations. Blue sky, 8 knot winds down the skiway and -18 C. Again, camp was packed down and the vehicles parked for winter.
When the second plane arrived, we were all wonderfully well fed. Early in the evening, the navigator of the first crew, Maj. Paul Delamagne, had produced a splendid dinner for all. It was a great pleasure.
The second plane parked along side of the first. Now the airport on the ice was busy. A hose was rolled across between the planes for fuel transfer. Three mechanics jumped out and started immediately repairing the damaged ski. The second plane also brought 24 drums of fuel for camp so we wouldn't have to leave it completely dry.

Our pallets with ice cores and equipment were distributed – one pallet on each plane. Fuel transfer was completed in one hour. The crew on the second plane was in a hurry to get going. Suddenly we were told, that the second plane was almost out of fuel and they had to depart immediately and go to Thule Air Base. Now we had to make quick decisions. Our ice cores were on that plane, and while Thule Air Base would allow the plane to land, there was no one there to re-fuel the plane so they could carry on to Kangerlussuaq. It was week-end.

Steffen and Sverrir packed their personal belongings in 5 minutes and hurried over to the other plane so they could follow the ice cores and take care of them during the stay in Thule. No time for good-bye's. The plane left at 11PM and had no problems getting airborne. The plane is now in Thule, and they cannot leave before Monday when the two fuel guys open shop after the weekend. Luckily Steffen and Sverrir and the ice cores are in good shape.

Our "damaged" plane was now repaired, and after we had topped off the fuel with some of the drums we just got, we took off at 1.35AM without any problems and landed in Kangerlussuaq at 4AM Saturday morning.

Finally out from the ice.

- *NEEM traverse team*

Saturday 11 August:. In Kangerlussuaq.

At the arrival everyone went for a shower and changed clothes. Simon and Susanne chose a cold turkey. They stayed awake and went straight to the airport where they purchased tickets and flew to Copenhagen.

Lars, Peter, Claude, Maria and J.P. spent the day sorting out cargo and making it ready for shipment. At dinner time, we invited Joergen Skafte from Danish Polar Center's International Polar Year Office and Mark "Sparky", Ed and Terry from the VECO office for dinner at the Roklub restaurant. The VECO office has been a tremendous help for us, lending us assistance in many ways and helping coordinate the flights.

On behalf of the NEEM project members, we thank VECO personnel for their outstanding willingness to help.

The VECO people have a row of problems to deal with this week-end. As a plane now is stuck in Thule because they couldn't find two guys to re-fuel the plane, at least 19 scientists are now stuck in Kangerlussuaq waiting for the plane home. All had to re-book their flights in the U.S. Our ice cores are in Thule, and we have two guys there. 40 personnel from the 109th are stuck as well, and will not return to their families as planned. One cannot help watching in total disbelief at the workings of a system which defies any reason and logic. But these are the conditions although it is a bit annoying here at the end.

Let us finish this diary on a more positive note. The expedition was successful. We have collected three ice cores. We have mapped the entire route from NGRIP to NEEM by radar. We have mapped the area around NEEM. We have established a position network from NGRIP to NEEM and around NEEM. We have transferred heavy equipment from NGRIP to NEEM, and we have constructed a seed camp and a skiway at NEEM. In other words, we have made a start of deep ice core drilling at NEEM in 2008 possible.

Tomorrow, Sunday, Lars, Peter and Maria will go to Copenhagen.

Monday, J.P. and Claude will leave and Steffen and Sverrir will arrive from Thule.

Tuesday, Steffen and Sverrir will go to Copenhagen. The 2007 NEEM traverse project is now completed.

- *NEEM Traverse team.*