

FARO Annual Meeting 2024

Greenland / Denmark

- Input from annual Logistics Workshop in Denmark, February 2024

- Major logistics operations 2024
 - Campaigns, stations, vessels
- Logistics sharing platforms
- ICARP IV
- Green transition

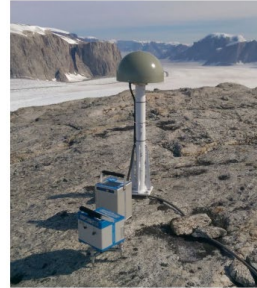


Fieldwork plans 2024

DTU

2024 GNET Twin-Otter – gravity

August (St Nord – NE Greenland – SCO - Tasiilaq area)

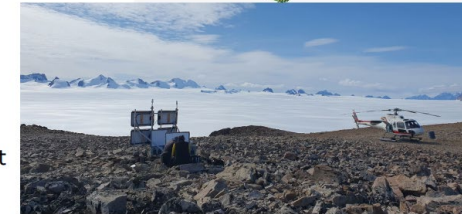
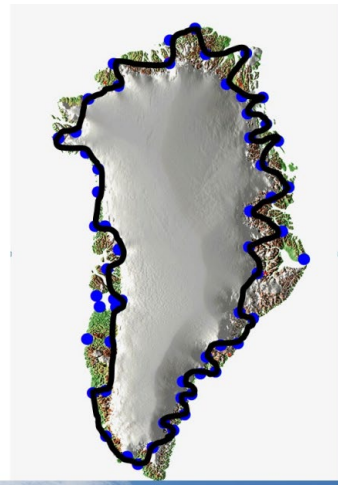


- Precision navigation • Climate research
- Meteorology • Space weather



GNET plans 2024

- Circumnavigating Greenland with AS350-B3 helicopter visiting all stations.
- Deployment of materials and fuel with Norlandair Twin Otter prior to helicopter campaign.
- Filling depots in:
 - Hjørnedal
 - Søndre Mellemløb
 - Centrum Sø
 - Kap Harald Molkte
 - Kap Morris Jessup
 - Nares Land
 - Hall Land
 - Cass Fjord
 - Hiawatha Gletscher
- Timeframe
 - Twin Otter 1.– 8. August
 - Helicopter 2. august – 31. august



2 DTU Space, Technical University of Denmark

2024 Helicopter – lakes on icecap

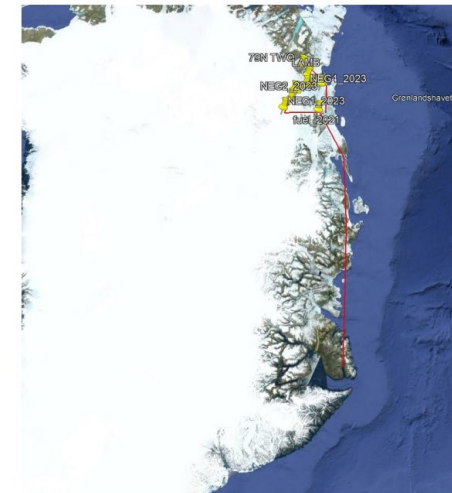
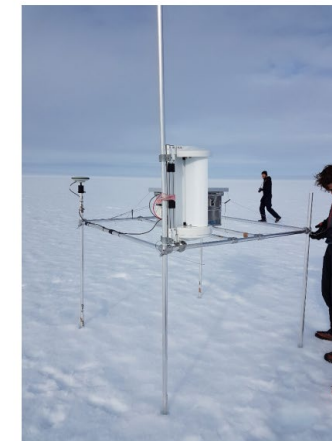
- Melt lake bathymetry using drone
- One day in August – in coordination with GNET activities
- Out of Kangerlussuaq
- Will also be measuring (off-ice) lakes in the area close to Kangerlussuaq.



Survey of GPS network in Northeast Greenland using AS350

20 May 2024

CNP -> Daneborg -> Danmarkshavn



6 DTU Space, Technical University of Denmark

Fieldwork plans 2024

Aarhus University



WESTGREENLAND

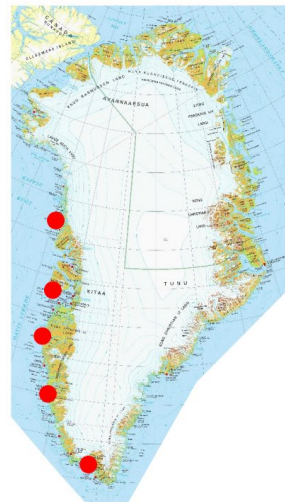
Systematic surveys on marine litter in Greenland (SUMAGS)

Field Locations: Nuuk, Disko, Qaqortoq, Sisimiut, Upernivik

- Period: Primo June-October
- Logistic: Local support
- PI: Dorthe Jakob Strand
- Contact info: jak@ecos.au.dk



LOGISTIKWORKSHOP DTU | EGON BANDA FRANSEN
9. FEBRUARY 2024 | LOGISTICS COORDINATOR



EASTGREENLAND

GIOS - Greenland Integrated Observing System

- Field Site: Ella Ø
- Period: August - September
- PI: Torben Rølle Christensen
- Logistic needed: One day of helicopter
- Contact info: torben.christensen@au.dk
- Isaafltk: Yes



LOGISTIKWORKSHOP DTU | EGON BANDA FRANSEN
9. FEBRUARY 2024 | LOGISTICS COORDINATOR



EASTGREENLAND

Greenland Gradients

- Field location: Ella Ø area
- Period: 13-28. August
- PI: Søren Rysgaard
- Logistic: Small boats from Ella Ø
- Contact info: Rysgaard@bio.au.dk



LOGISTIKWORKSHOP DTU | EGON BANDA FRANSEN
9. FEBRUARY 2024 | LOGISTICS COORDINATOR



WESTGREENLAND

Test of Rover in Nuuk

- Field Location: Nuuk
- Period: 22. February - 7. March
- PI: Claus Melvad
- Logistic: ARC/GNI
- Contact Info: cme@ese.au.dk
- Isaafltk: Yes



LOGISTIKWORKSHOP DTU | EGON BANDA FRANSEN
9. FEBRUARY 2024 | LOGISTICS COORDINATOR

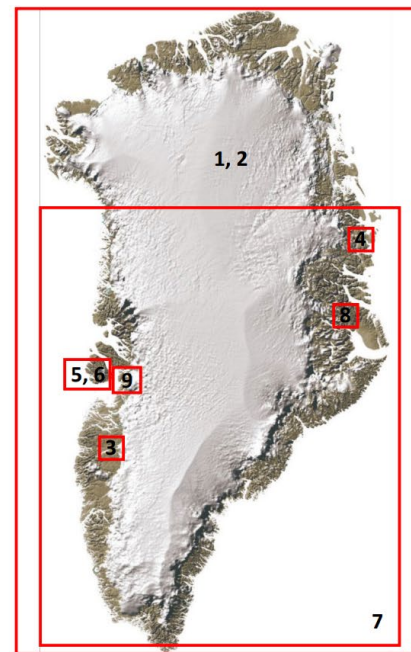


Fieldwork plans 2024

GEUS

GEUS FIELD ACTIVITIES 2024

1. PROMICE maintenance
2. GC-NET
3. PROMICE, Watson River
4. Glaciobasis Zackenberg
5. Glaciobasis Disko
6. Thawing mountains
7. Seismic stations upgrade/maintenance
8. Bjørnbo Gletcher intrusion
9. Geological mapping, Ilulissat area

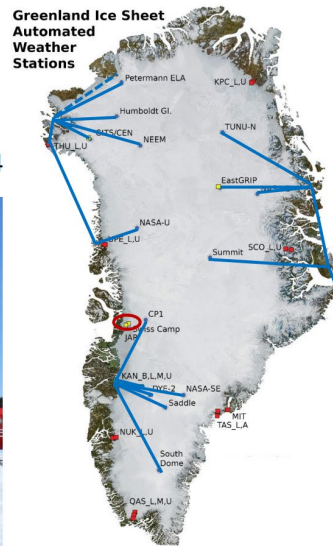


GEUS

GC-NET



Fieldwork 2024



Twin Otter campaigns

Blue flight lines

PAB/NAQ 14/5 – 28/5: William Colgan + 4
 SFJ 20/5 – 2/6: Andreas Ahlstrøm + 6
 ZKB/DNB 10/6 – 18/6: Nanna Karlsson + 3

Fieldwork collaboration with:
 KU-PICE, DTU Space, FMI, ECCS, BAS

Norlandair Twin Otters

Contact: Andreas P. Ahlstrøm
apa@geus.dk

Helicopter campaign

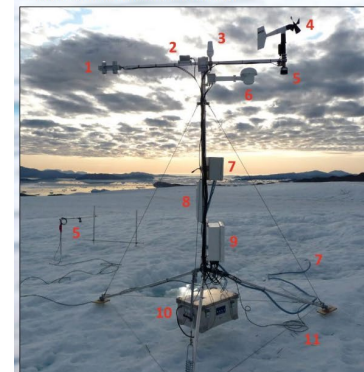
Red oval

Ilulissat Aug 16 – 18: Jason Box + 2

Air Greenland AS350

Programme for monitoring of the Greenland ice sheet (PROMICE)

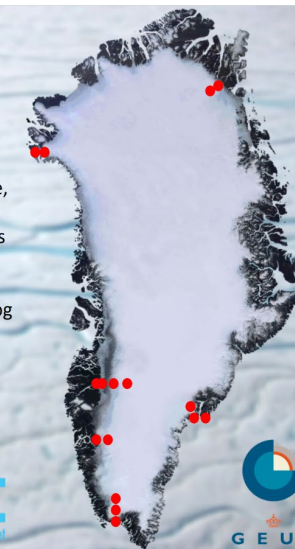
Automatic weather stations



Maintenance 2024

- Where: red dots on map (Thule, Kangerlussuaq, Nuuk, Narsarsuaq, Tasiilaq, Kronprins Christian land (KPC))
- When: spring and summer
- How: Helicopter, Twin Otter, dog sledge or car.
- Contact: Robert S. Fausto
rsf@geus.dk

PROMICE
 Programme for Monitoring of the Greenland Ice Sheet



Geological Survey of Denmark and Greenland

Fieldwork plans 2024

University of Copenhagen

EGRIP logistics 2023 and 2024 plans.
M.Kirk, I.Koldtoft and J.P.Steffensen - Bo Vinther presenting!
Ice and Climate group, K.U. Niels Bohr Inst.

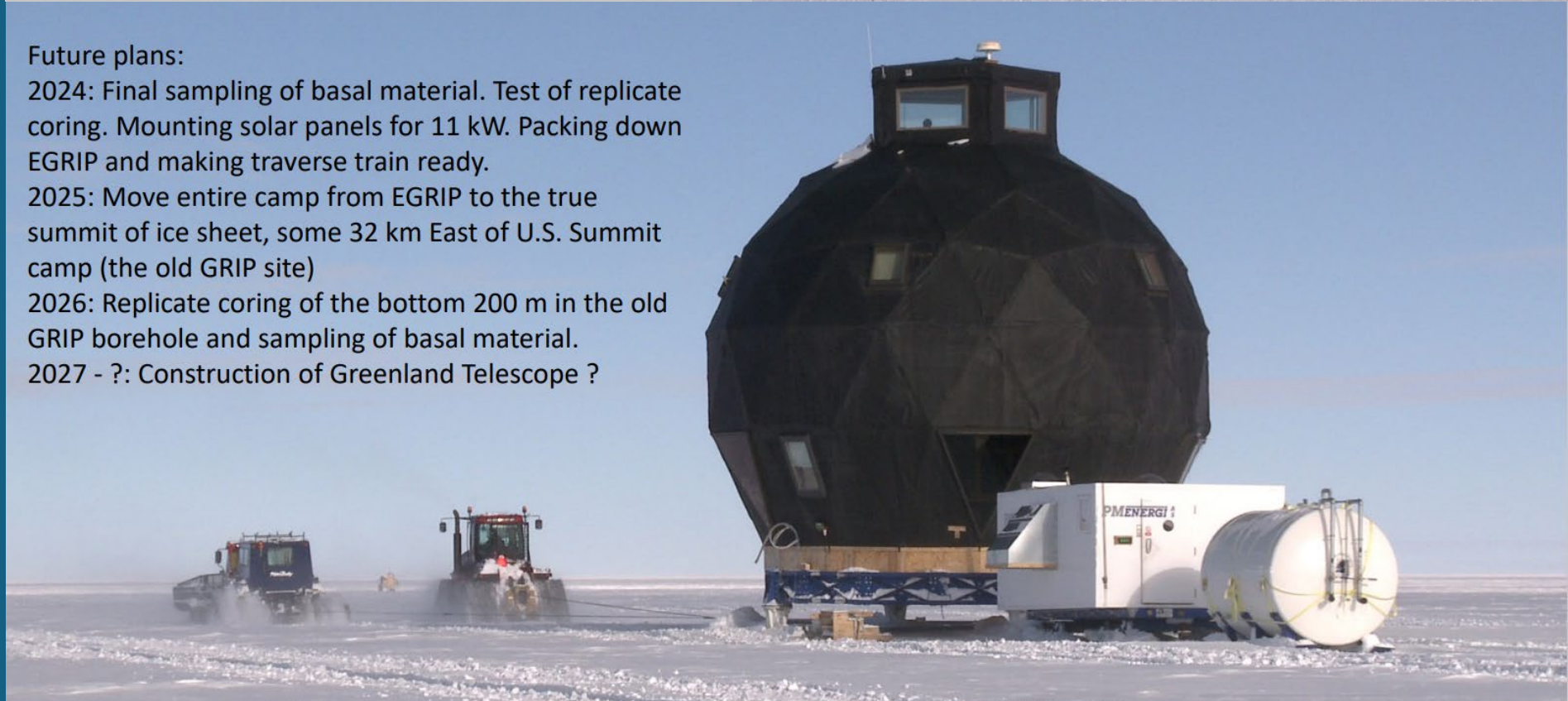


EGRIP 2023 statistics:
10(11) LC-130(Hercules) flights,
100 people in and out of EGRIP
1630 man-days at EGRIP
530 man-days at KISS, Kangerlussuaq.

EGRIP 2024 plans:
4 LC-130(Hercules) flights,
35 people in and out of EGRIP
700 man-days at EGRIP
250 man-days at KISS, Kangerlussuaq.



Future plans:
2024: Final sampling of basal material. Test of replicate coring. Mounting solar panels for 11 kW. Packing down EGRIP and making traverse train ready.
2025: Move entire camp from EGRIP to the true summit of ice sheet, some 32 km East of U.S. Summit camp (the old GRIP site)
2026: Replicate coring of the bottom 200 m in the old GRIP borehole and sampling of basal material.
2027 - ?: Construction of Greenland Telescope ?



UNIVERSITY OF COPENHAGEN

INTERACT stations Greenland/Faroe Islands



DMI Geophysical Observatory



Arctic Station



Arctic DTU



GINR



Sermilik Station



FINI



Villum Research Station



EastGRIP



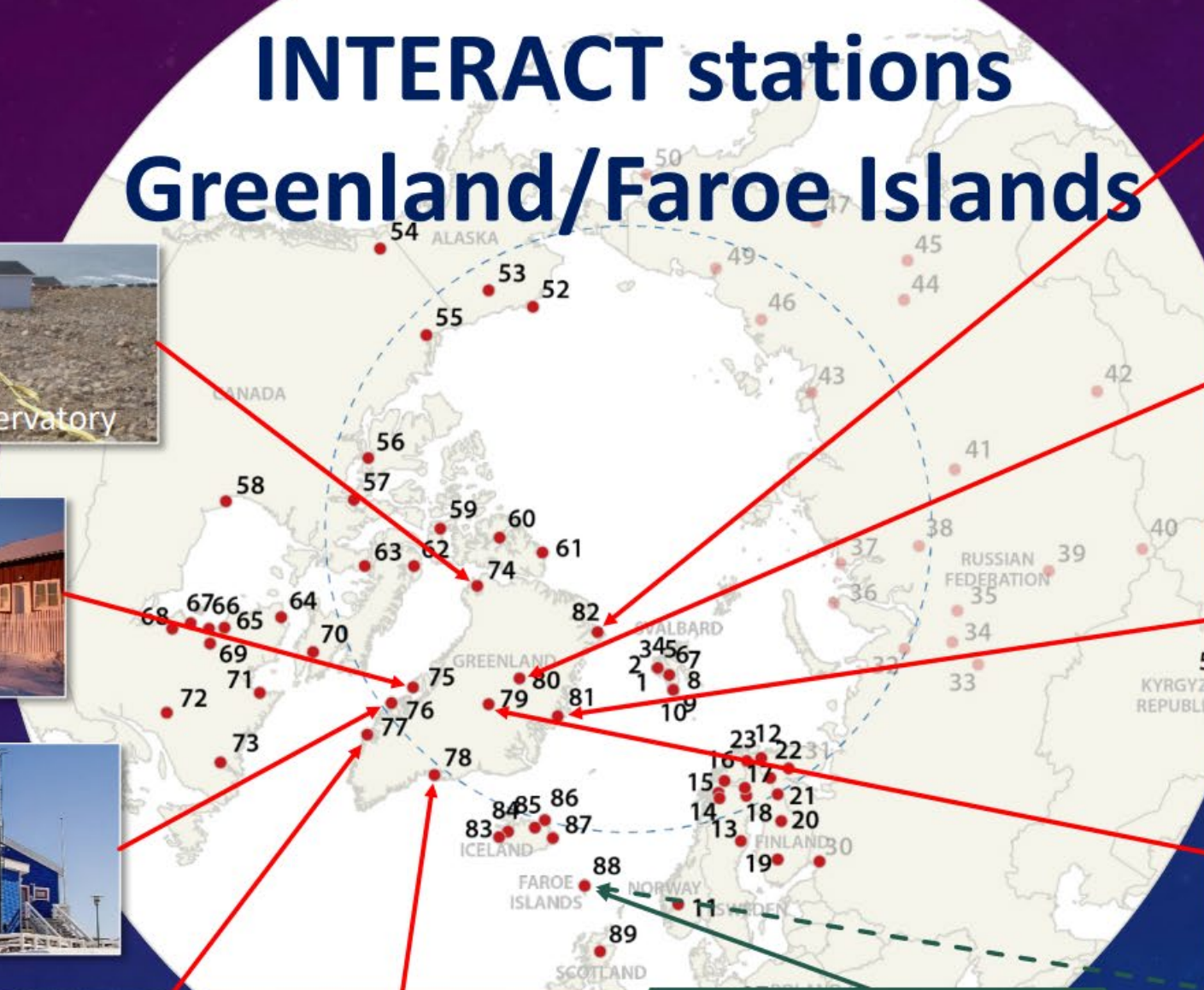
Zackenberg Research Station



Summit Station



Koltur



Research vessels

Greenland Institute of Natural Resources

Ships - Greenland Institute of Natural Resources



Advice Research Communication Education About us Encyclopedia Facilities Tagged and banded animals

Ships

SANNA



TARAJQ



Cruise plans 2024

Tarajoq: 18 May - 16 Nov. 2024

Sanna: 27 April - 23 Sept. 2024 (external chartering 7 July - 5 August).

Ships open for chartering

Cruise period can vary between years

Tajaroq charter costs pr day (2024): 220 000 kr. (c. 30.000 €)

Sanna charter costs pr day (2024): 75 000 kr. (c. 10.000€)

Contact: Helle Siegstad: hesi@mail.gl

Address

Pinngortitaleriffik
Greenland Institute of Natural Resources
Kivioq 2
PO Box 570
3900 Nuuk
Greenland

Contact

T: +299 36 12 00
F: +299 36 12 12
E: info@natur.gl



Vessels and ships

Danish defence and Joint Arctic Command



DEFENCE COMMAND DENMARK



ARCTIC COMMAND

Danish Defence
Joint Arctic Command

JOINT ARCTIC COMMAND

HOW TO REQUEST SUPPORT

ISAAFFIK - the arctic gateway

Dansk
Center for
Havforskning

ANSØGNING OM SKIBSTID

SKIBE

UDSTYR

AKTIVITETER

INSTITUTIONER

NY

English

Facilitating Scientific Collaboration

Infrastructure

Projects

Logistics

Courses

About Danish Centre for Marine Research

Danish Centre for Marine Research is initiated by the Danish academic community.

The overall aim of the center is:

Administration of the funds to cover ship chartering

The Research and Innovation Agency allocates a sum to support ship charter for the Danish marine research groups.

[Click here to find application forms \(in English\)](#)

Coordinate and cooperate with the Navy about the use of naval ships to research cruises

Naval ships have on many occasions, including Galathea 3 expedition, been successfully used for research. However, there is no formal agreement on the use of these ships. Danish Centre for Marine Research will together with the Navy develop guidelines for the use of ships and serve as the contact point between the navy and scientists.

and facilitate rental of equipment between institutions

Research is dependent on specialized and often expensive equipment which only exist in a few institutions. Access to borrow or rent

Start a search and get overview of Arctic research **infrastructure**, including habitations, research facilities, gear and more. You can also filter your search result on either list or map. Ask your [local ISAAFFIK representative](#) to add new research infrastructure items.



DANISH DEFENCE



Enter search



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- Logistics sharing platforms

ISAAFFIK: A gateway to Arctic scientific overview and collaboration across borders

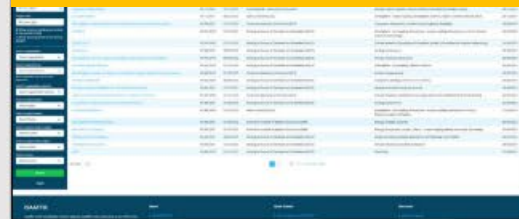
- ISAAFFIK Arctic Gateway ver. 1 was launched in April 2015
- Primary focus area: Greenland
- User driven – independent – organic growth – open to all in Arctic Research

1. Danish Meteorological Institute (DMI)
2. Geological Survey of Denmark and Greenland (GEUS)
3. Government of Greenland
4. Greenland Institute of Natural Resources (GINR)
5. Ilisimatusarfik – University of Greenland
6. International Arctic Hub (IAH)
7. Joint Arctic Command (JACO)
8. Ministry of Higher Education and Science
9. National Museum of Denmark
10. Technical University of Denmark (DTU)
11. University of Copenhagen (KU)
12. University of Southern Denmark (SDU)
13. Aarhus University (AU)
14. AWI - Alfred Wegener Institute (Germany)
15. CEOS - Centre of Earth Observation Sciences (Canada)
16. NSF / ARMAP - National Science Foundation (USA)
17. UiT - The Arctic University of Norway
18. Svalbard Integrated Arctic Earth Observing System (SIOS)

ISAAFFIK – a gateway to Arctic scientific overview and collaboration across borders

Lists (who)

Users: 830



Maps (where)

Registered infrastructure: 933



Timelines (when)

Projects: 214



Details (what)

Fieldwork: 477



Link to Government of Greenland Expedition Website
<https://exp.gl/> (New website on its way – prefer e-mail contact)

www.isaaffik.org





ARCTIC CONNECT HUB 2024

Making Arctic research Accessible

- We connect people, institutions, and countries within Greenlandic research

Canada Kalaallit Nunaat
 Norway Denmark Storm United Kingdom
Greenland
 Finland
 Switzerland USA DK United States
 United States, New York Netherlands



Oceans Mediaarchives Communications
 Groundwater education internationalconnections
 Community health sea level dessimination arts monitoring archaeology
 theaterscience maritime **climate** oceanography Decolonization Vulnerability
 Lakes Integration fishes sustainability Aerosols Welfare landscape
 Funding former dean geology Glaciology
 Halibut Communication Pedagogy Cryosphere
 Connecting

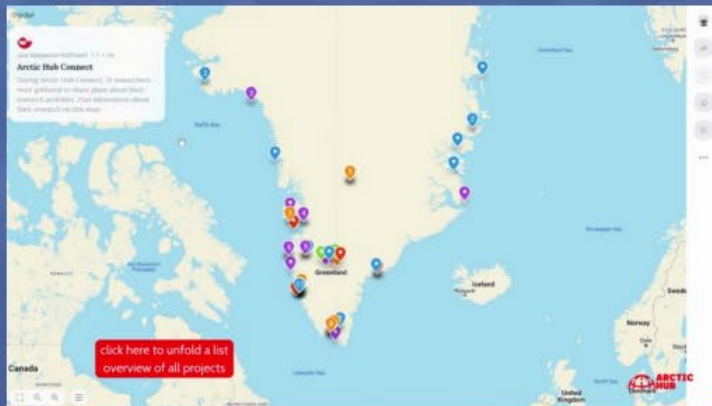


Link to map



From an online workshop with researchers & research stakeholders

... to our Connect map...



... to a broader audience



... to www.isaaffik.org - the gateway for researchers in Greenland



... to videos and articles on www.artichub.gl and social media



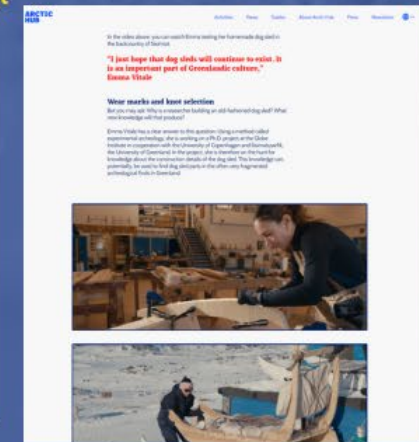
Arnârak teaches survivors across Greenland to fight suicide

Kornelia Rungholm from Qaqortoq is one of more than 500 people who have attended researcher Arnârak Patricia Bloch's suicide prevention courses. No...



Researchers are flocking to South Greenland: It costs working hours and resources

Innovation South Greenland is working to prevent the local sheep farmers from becoming overwhelmed.



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Danish participation

Topic Area 7: Technology, Infrastructure,
Logistics, and Services:

- Marie Frost Arndal (FARO)
- Morten Rasch (INTERACT)
- Elmer Topp-Jørgensen (INTERACT)

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- Green transition

- Sustainable energy solutions
- Remote Access
- New technologies

Solar power system

Zackenbergl Research Station



Generator power production
10.9 kW

Generator off

Solar power production
3.00 kW

Battery voltage
50.8

Solar output
3.00 kW

Current battery charge
94%

Power usage
3.41 kW

Hot temperature
15 °C



426 w



2.06 kW



292 w

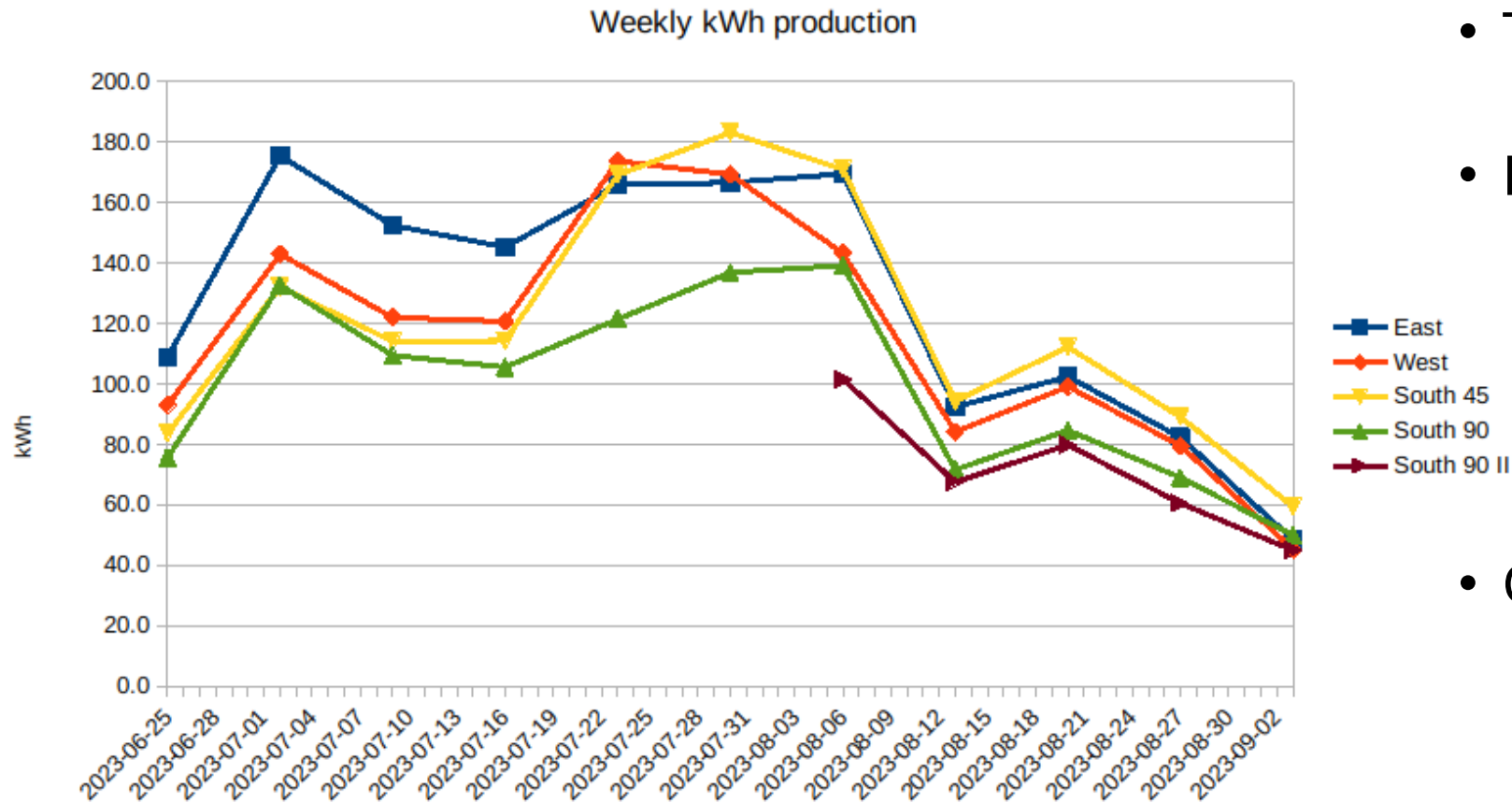


298 w



Power loss % to inverter

2023



- From 06.22 to 08.31.:
 - Total output of all panels:
 - 5300 kWh
 - Panel outputs (% of total):
 - East 26.3%
 - South 45° 24.7%
 - West 23.8%
 - South 90° 20.5%
 - South 90° II 4.7%
 - Generator use down by 80%
 - June 14%
 - July 20%
 - August 22%
 - On average, generator is in use 4.5 hours each day

New or updated

solar power systems



Future plans:

2024: Final sampling of basal material. Test of replicate coring. Mounting solar panels for 11 kW. Packing down EGRIP and making traverse train ready.

2025: Move entire camp from EGRIP to the true summit of ice sheet, some 32 km East of U.S. Summit camp (the old GRIP site)

2026: Replicate coring of the bottom 200 m in the old GRIP borehole and sampling of basal material.

2027 - ?: Construction of Greenland Telescope ?



Kobbefjord Research Station



Accommodation building (2019)

- 4 rooms with 2 beds in each
- Toilet
- Technical room

Storage building (2019)

- To rooms for storage and snowmobile

Solar power facility/plant 15x300W with 12X120Amp battery bank

Old cabin rebuild in 2021

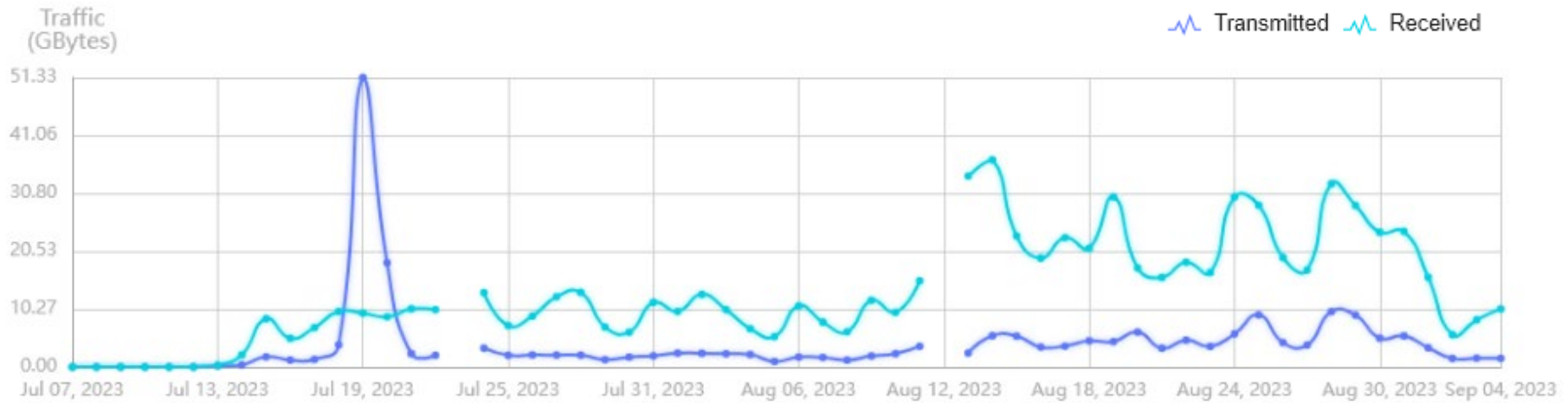
- New kitchen



Photos: K. Langly, K. Raundrup and H. Philipsen

Villum, EGRIP and Zackenberg online

Starlink connection brought Zackenberg to the Internet



Broadband Comes to Station Nord

Starlink Standard Terminal installed 2023-08-06
at the welfare building at Station Nord
81.60086°N 16.65879°W

First powered up on August 5, 2023
Time from power ON to viable link: <15 min.
100-150 Mbit/s downlink, 10-20 Mbit/s uplink.
World's first video conferences from Station Nord were conducted without a hitch

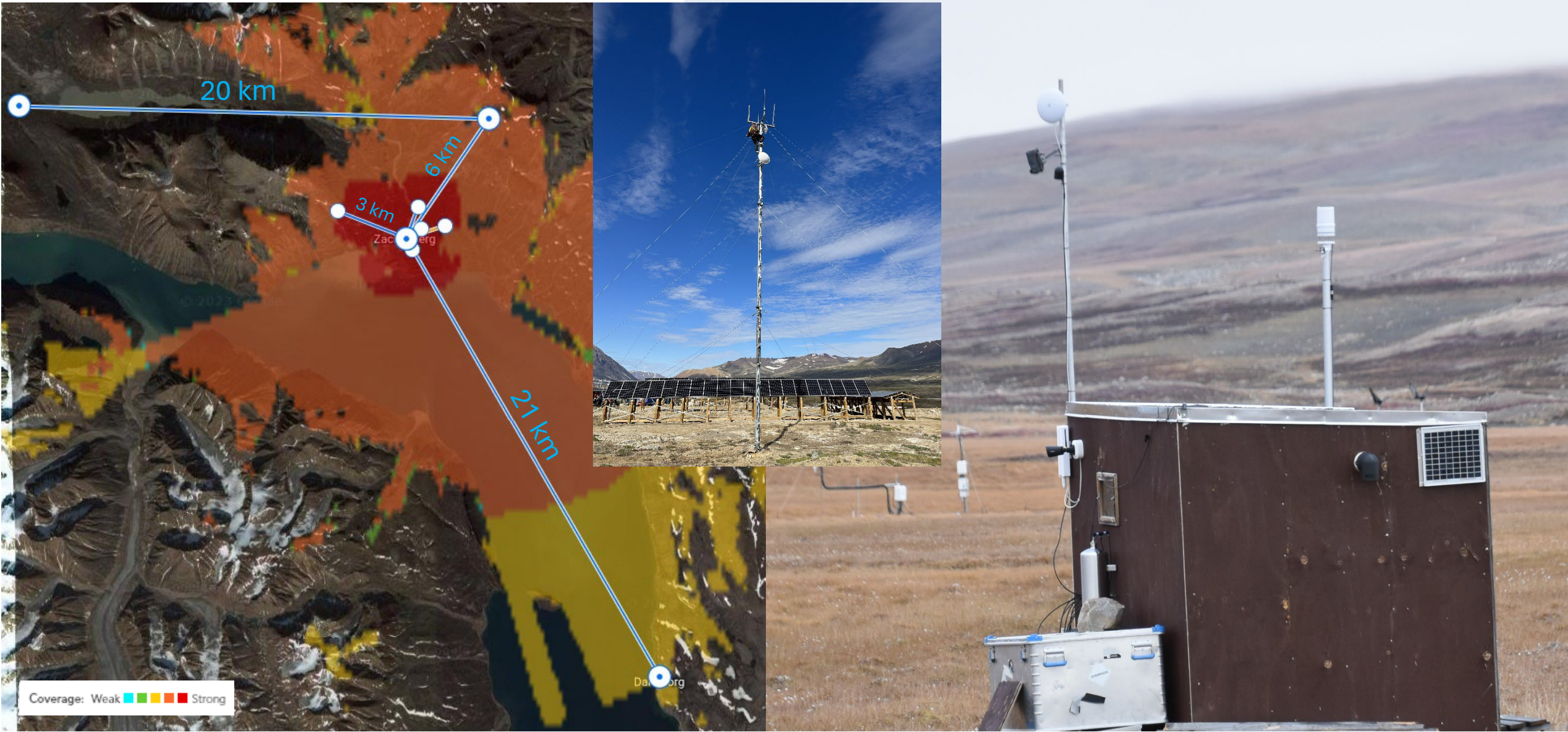


RadioLab
a clear signal



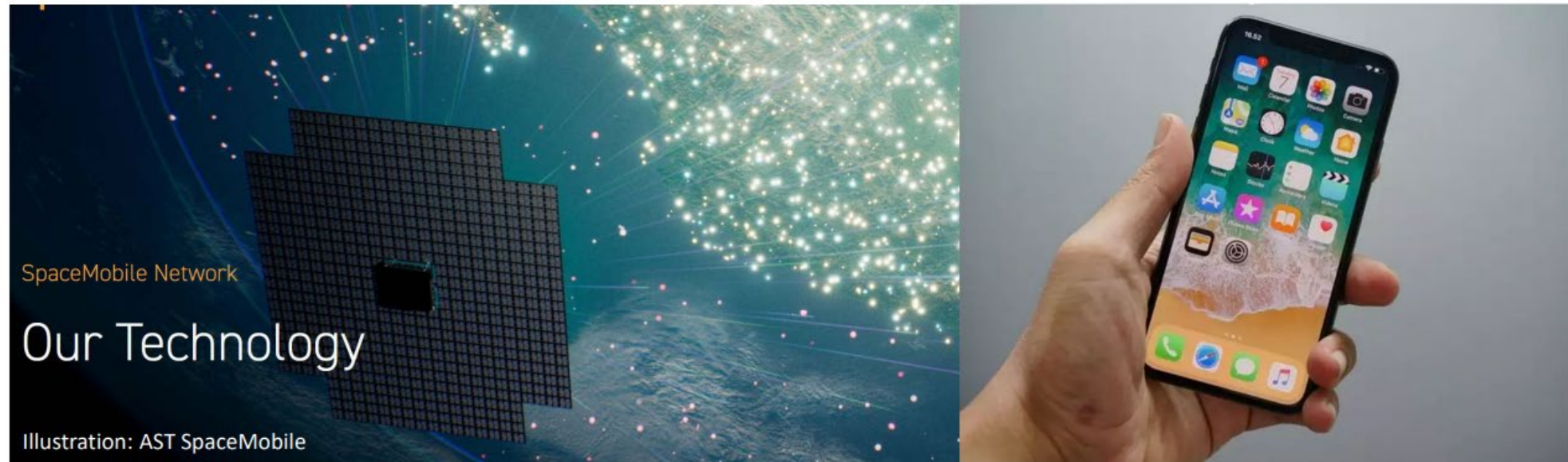
Zackenbergr online

Long-range Wi-Fi connections to Daneborg and over the Zackenberg valley



What's Next in Satellite Communications ???

What does the next generation satellite terminals look like ???



Direct Broadband Delivery to a Standard 5G Smartphone !!!

AST SpaceMobile

What's next from AST SpaceMobile ???

Operational satellites: "BlueBirds"

Full constellation: 243 satellites

Orbit Height: 725 – 740 km

Anticipated lifetime: 7 – 10 years

BlueBird 1, 2, 3, 4, 5 will launch during 2024 and will be similar to BlueWalker-3

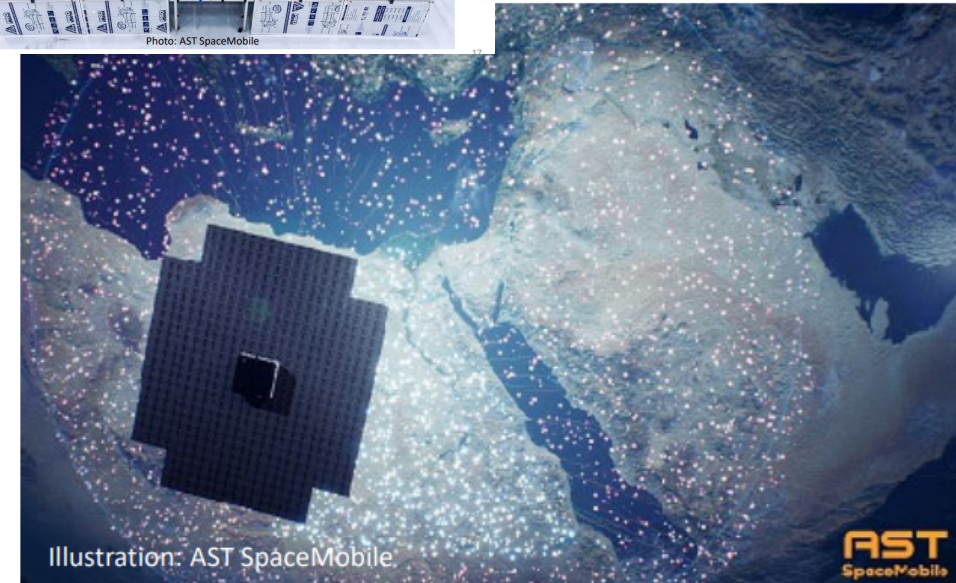
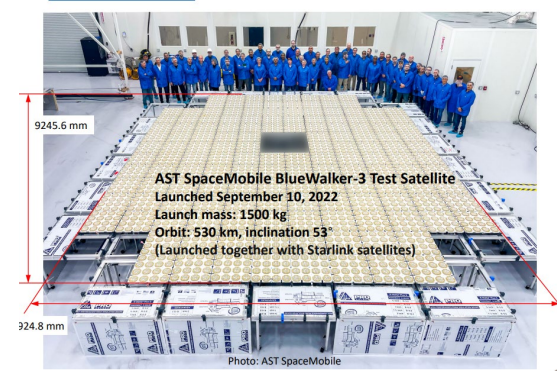
The BlueBirds will allow both 4G/LTE and 5G handsets to access the services

First two-way voice call via BlueWalker-3: April 25, 2023.

First 4G Internet connection June 21, 2023, from an unmodified Samsung Galaxy S22 smartphone located near Maui, Hawaii, in a wireless dead zone.

First 5G Internet and video connection September 8, 2023

Download speed: ≈ 10 Mbit/s. Later tests: ≈ 14 Mbit/s



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The End