North Pole Fiber, a step in the Polar Connect initiative

Katarina Gårdfeldt, Director-General
Swedish Polar Research Secretariat
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SWEDISH POLAR RESEARCH SECRETARIAT
POLARFORSKNINGSSEKRETARIATET

Project No. 101133585
Project acronym: 22-EU-DIG-NPF

Co-funded by the European Union

The Secretariat's mission

- Promote and coordinate Swedish polar research
- Follow and plan research and development
- Organise and lead research expeditions
- Train researchers in fieldwork and safety
- Open data and environmental monitoring
- International negotiations and partnerships
- Represents Sweden in polar matters
- Issues permits according to the Swedish Antarctic Ordinance (2006:1111)

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Dagmar Egelkraut and Niklas Rakos collect water samples in Almbergarsjön in Abisko.

PHOTO **ANNA-KARIN LANDIN**

Polar regions

Arctic

A simple definition is north of the Arctic Circle

Antarctica

According to the Antarctic Treaty, south of 60 degrees

Swedish mountain areas

Sub-polar

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Infrastructure

The research platforms are continuously developed and adapted to meet the needs of scientists

Abisko Scientific Research Station

Wasa and Svea in Antarctica

The icebreaker Oden

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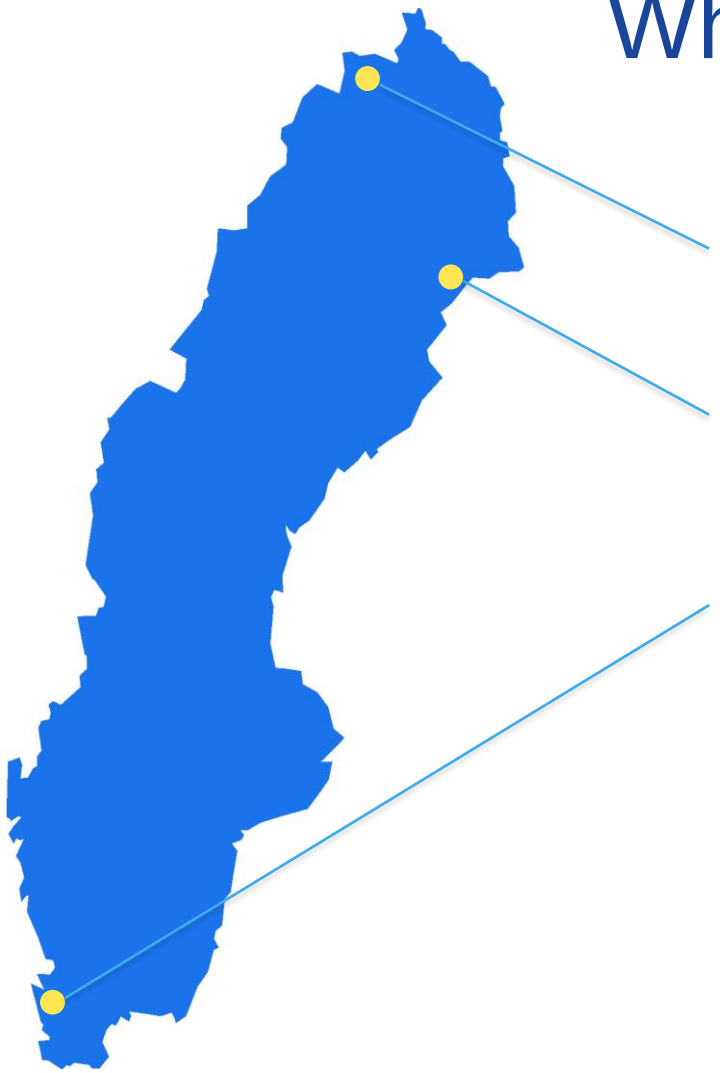
Where are we located?



Abisko – Abisko Scientific Research Station

Luleå – Administration Office

Helsingborg – Marine Logistics Center (I/B Oden)

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Abisko Scientific Research Station

68° 21‘N, 18° 49‘E

- 200 km north of the Arctic Circle
- The surroundings have a high variability
- Leading role in international climate and environmental research
- Environmental record that extends 100 years back and 3,000 scientific publications
- Also teaching, conferences and scientific meetings

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Abisko Scientific Research Station
PHOTO **ANNA-KARIN LANDIN**

Wasa and Svea in Antarctica

Wasa
73° 03‘S, 13° 25‘V

- Located on the Basen nunatak next to the Finnish Aboa Research Station
- 133 m², can accommodate 12 people
- Using systems that minimise its adverse environmental impact

Svea
74° 35‘S, 11° 13 ‘V

- Heimefrontfjella mountain range
- Can accommodate 4 people

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Nordenskiöld Base Camp
Research Stations *Aboa* (FIN) and *Wasa* (SWE)
Photo **ÅSA LINDGREN, 2016**

Icebreaker Oden

- One of the world‘s most powerful icebreakers
- Four engines, 24,500 hp
- Versatile scientific equipment; research containers, scientific laboratories, deep ocean winches
- Researchers are able to use the vessel based on their needs
- Has been used for marine geology, oceanography, ecological research and atmospheric research in the Arctic and Antarctica
- Owned by the Swedish Maritime Administration, expeditions are organised by us

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Icebeaker Oden on the Arctic Ocean.
PHOTO **IDA KINNER**

Teachers Programme

- Take part in expeditions, international conferences and workshops
- Spark an interest in the polar regions and research among pupils
- Started in year 2000

Artists Programme

- Invited to accompany Swedish research expeditions and the Abisko station
- Run their own projects during the expedition
- A polar tradition for more than 100 years

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Christina Fröjd participated in the Teacher's Programme in 2015.

PHOTO **JARI KRUTZFELDT**

NORDUnet
Nordic Gateway for Research & Education

North Pole Fiber, a step in the Polar Connect initiative

Connectivity and sensors across the Arctic Ocean, a new digital route between Europe and East Asia

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Polar Connect
Vision 2030

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POLAR-CONNECT

Far North Fiber

Co-funded by
the European Union

NORDUnet
Nordic Gateway for Research & Education

ADVANTAGES OF POLAR CONNECT

- Connectivity: increasing international collaboration and globalization drives an increasing demand on secure, stable and redundant connectivity.
- Shortest route between Europe and East Asia safeguarding minimum delay time.
- Complementary to existing Suez Area connections
- Strengthens and supports digital sovereignty of the involved regions
- Digital infrastructure brings broader economic benefits, productivity, trade and consumer welfare.
- Submarine cables can also serve as scientific instruments for Earth observation, marine and seismic research.
- Be aware of the geopolitical situation.

Co-funded by the European Union
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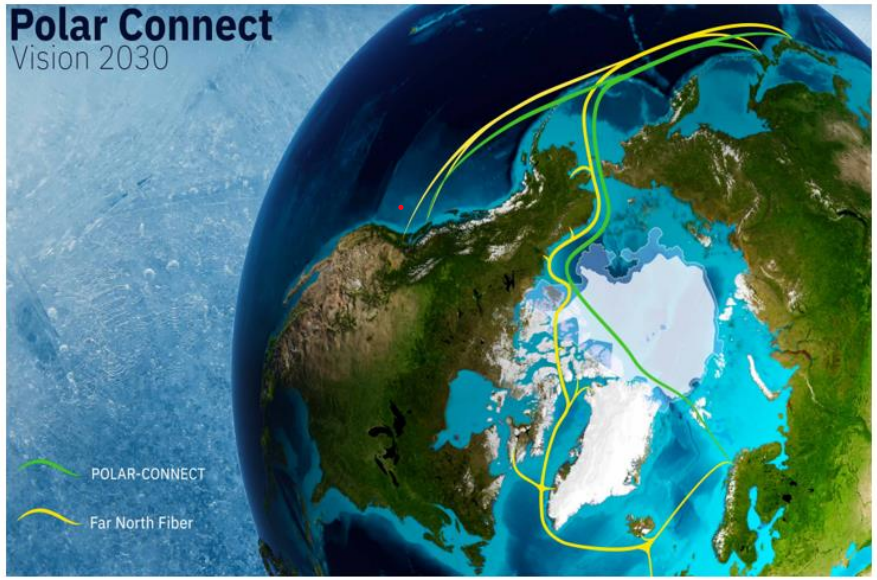

Project No. 101133585
Project acronym: 22-EU-DIG-NPF

Cable-laying project from Svalbard to the Bering strait through the Arctic Ocean

15 December 2023

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Technical consultancy by **Aker Arctic** is highly appreciated on:

Ice management and a Pre-feasibility study for a polar research vessel

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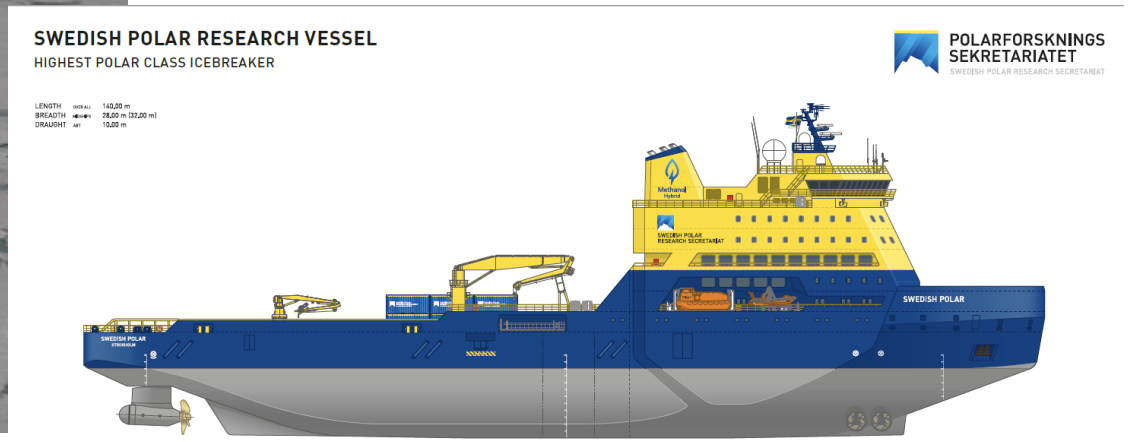
How to deploy a fiber optic cable across the Arctic



The Cable-Laying Operation

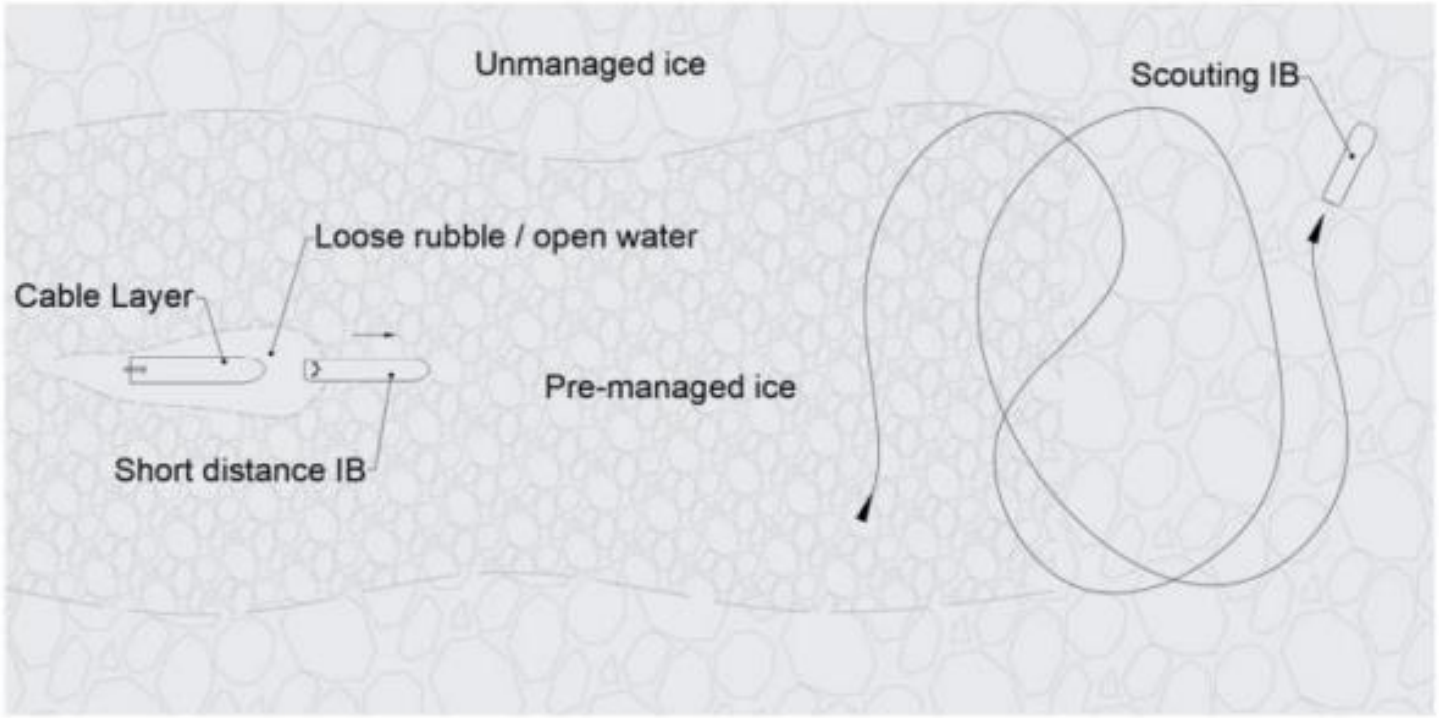
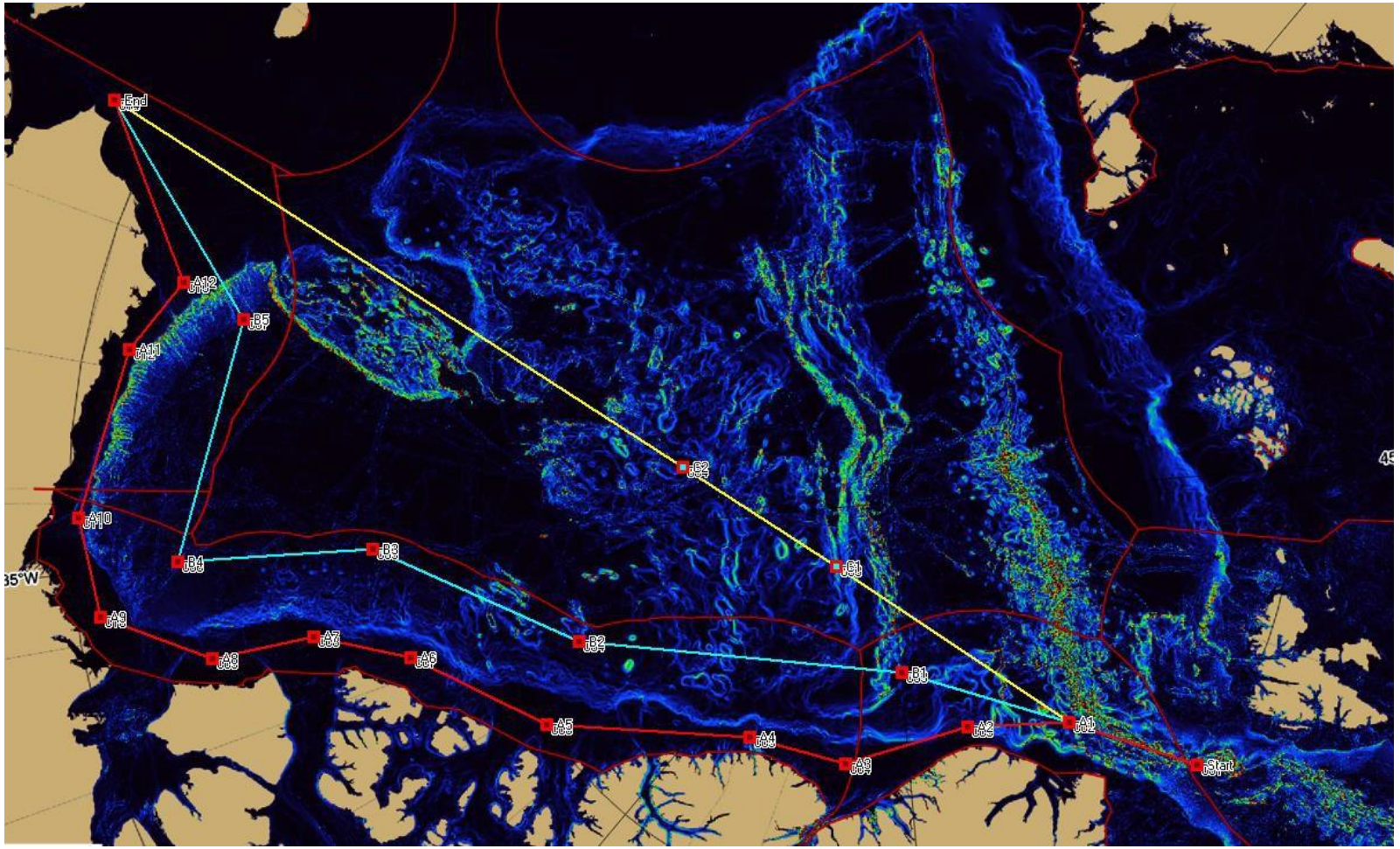


Figure 3. As the cable-laying vessel and IB Oden approaches the "ice edge" there is already an ice broken area where IB Oden and the cable-laying vessel can enter the ice-covered area.

- The project is to include a Polar-class (PC) 3 or stronger, **converted into a cable-laying vessel**, and two, possibly three, Polar-class icebreakers.
- The Swedish polar **icebreaker Oden** will be one of the required icebreakers, and the second Polar icebreaker should be the **new Swedish Heavy Polar Research Vessel** (hereinafter SHPRV).
- The duration of the cable-laying operational phase of the project is estimated to be **approximately 60 days**, excluding the time required for vessel preparation (such as installing equipment), transit to and from the Arctic, demobilization, and other related tasks.

Three potential routes for the cable-laying project



Routes

Namn	Punkter	Distans
A Shelf route	14	2500,6 nm
B Economic zone...	8	2303,5 nm
C Arctic ocean	5	1889,5 nm

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The new polar research vessel

- Optimized for research
- Year-round use, thus available for research in both poles during all seasons of the year
- Climate-neutral operation
- Powerful propulsion and high ice class (PC2+) enable ice breaking in difficult ice conditions
- Modular design, can be adapted for different tasks
- Adapted for transport and various operations in open water (DP-2)

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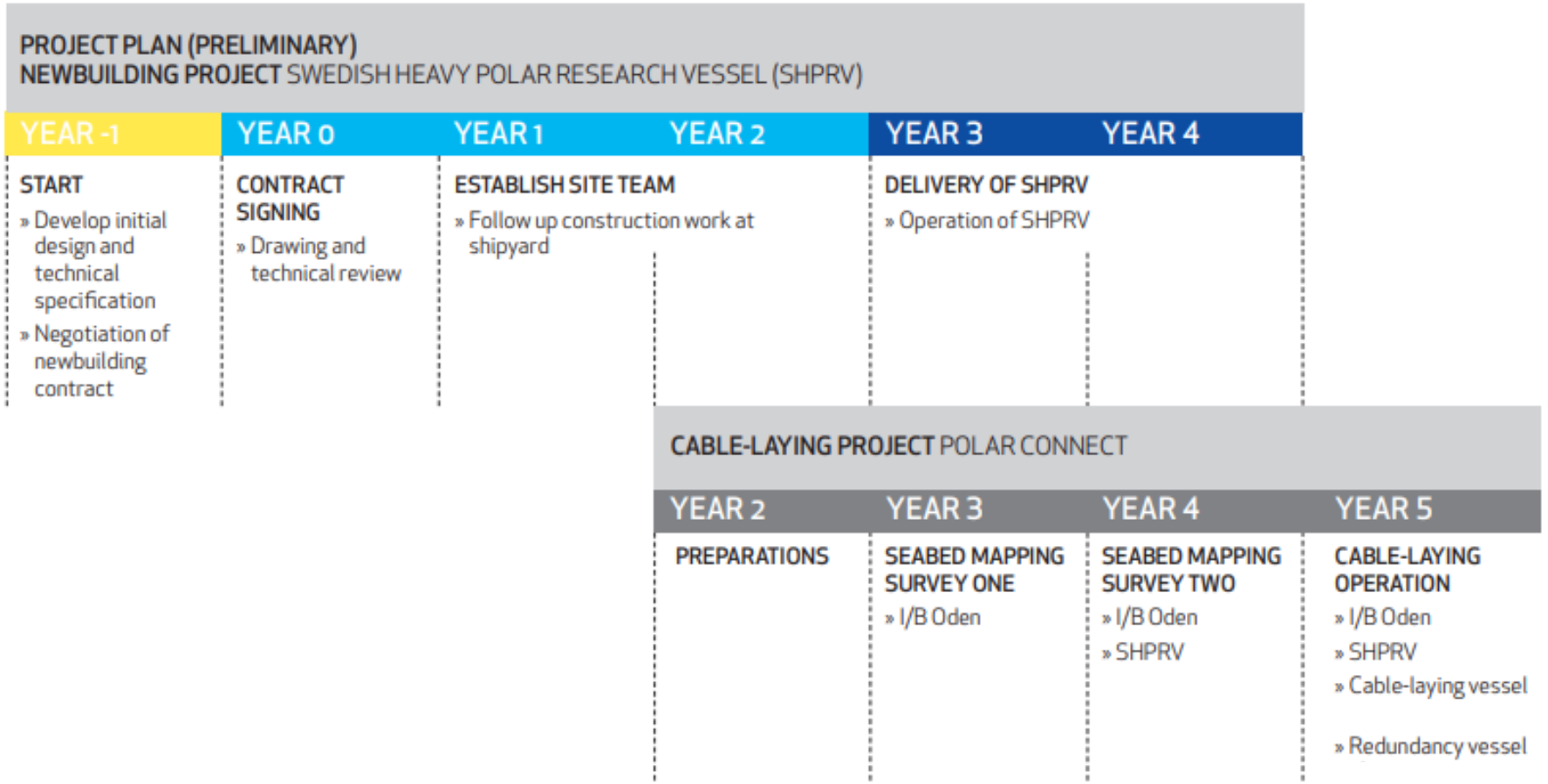
What does the time plan look like?



Project timeline

- Year Zero, ordering the new Swedish Heavy Polar Research Vessel (SHPRV)
- Year 3, icebreaker Oden to map the seabed along the entire planned cable-laying route,
- Year 4, SHPRV together with icebreaker Oden to map the possibly revised cable-laying route, and to gain experience from co-operation in ice-management between the two vessels
- Year 5, the actual cable-laying operation from Svalbard to Bering Strait.

The seabed mapping (Year 3 and Year 4) is necessary to gain knowledge and experience of the seabed conditions and expected ice conditions for all involved parties to be as well prepared as possible.

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Smart sensors for environmental monitoring

Today

Polar-tech CTD

ARGO floats

Future

SMART cable sensor

- Climate – sea level change and ocean energy content
- Oceanography – Sea bottom temperature and currents
- Seismology – Earthquakes and underwater volcanoes and tsunamis
- Biology – tracking large mammals and also being able to listen to them
- Security – With SMART cables you can enable awareness if someone is close to the cable

Thank you!

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PHOTO **JONAS BONNEDAHL**