APECS-ARICE Webinar
Polar marine robotics - Part 3

Moderation: Josefine Lenz (AWI, APECS & ARICE)






Speakers:

Massimo Caccia (CNR-INM)
Angelo Odetti (CNR-INM)
Raffaella Beroldo (CNR-INM)

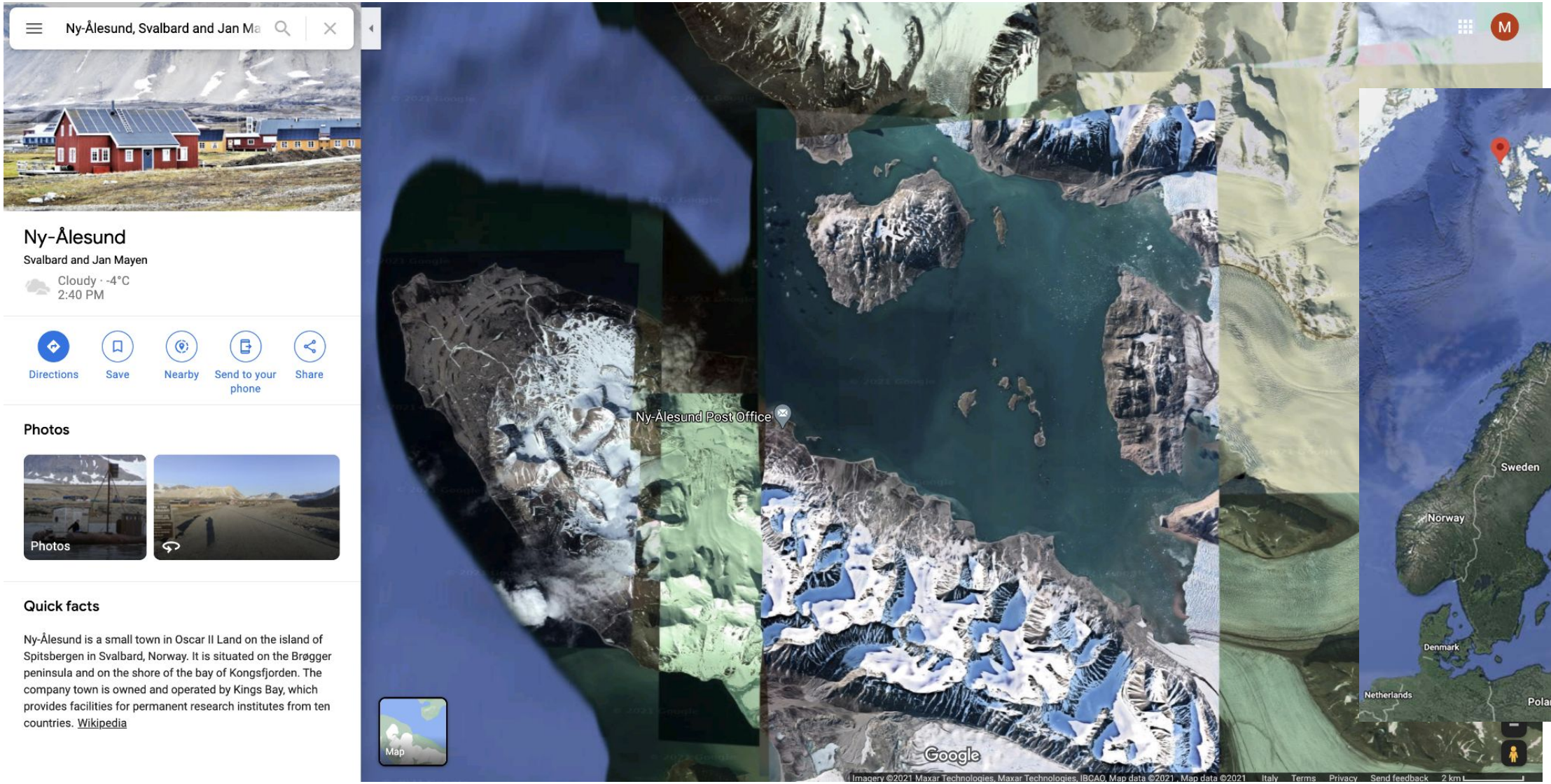
Arctic Research Icebreaker Cons.
ARICE

APECS
Association of Polar Early Career Scientists

Marine robotics campaign to Ny Alesund

- **It's July 2021. Covid-19 pandemic is going to be solved**
- **You are asked by a group of research in marine science to organise an expedition to Svalbard Islands, Ny Alesund, with the goal of monitoring the air-ice-water interface in front of tidal glaciers in 2022**
- **Your team and you are members of the Italian National Research Council**
- **Your *customers* require to participate to the campaign with 2 people, they are not CNR members**

Marine robotics campaign to Ny Alesund



source: P.King. AUVs Under Ice: Past Milestones, Promising Future; Marine Technology News, 2016

Marine robotics campaign to Ny Alesund

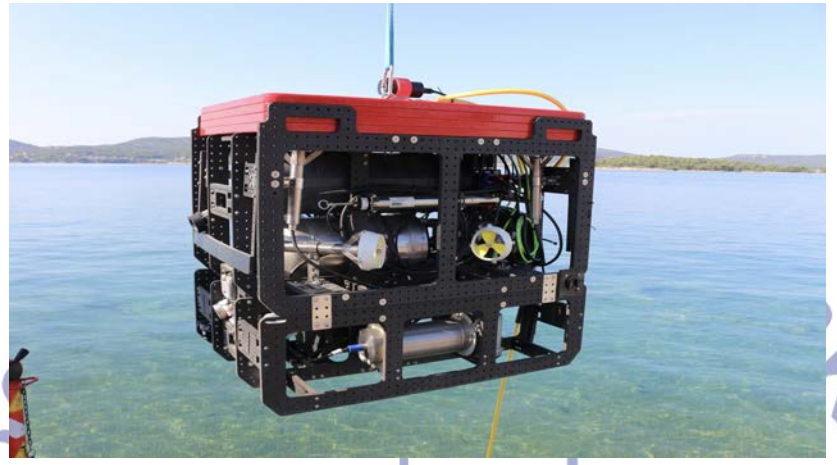
Station	Institution	Nationality	Est.	Research
Amundsen–Nobile	National Research Council of Italy	Italy	2009	Atmospheric
Arctic	University of Groningen	Netherlands	1995	Ecology and others
Arctic Yellow River	Chinese Arctic and Antarctic Administration	China	2004	Environment, glaciology, meteorology, marine ecosystems, meteorology, space–Earth measurements
British	British Antarctic Survey	United Kingdom	1991	Earth and life sciences
Corbel ‡	French Polar Institute Paul-Émile Victor	France	1963	Atmospheric sciences, hydrology, glaciology
Dasan	Korea Polar Research Institute	South Korea	2002	Atmospheric chemistry glacial and periglacial geomorphology and hydrology
Dirigibile Italia	National Research Council of Italy	Italy	1997	Environment and climate
Himadri	National Centre for Polar and Ocean Research	India	2008	Atmospheric sciences, marine ecosystems and pollution
Japanese	National Institute of Polar Research	Japan	1990	Atmospheric physics, glaciology, meteorology, oceanography and terrestrial biology
Koldewey ‡	Alfred Wegener Institute	Germany	1991	Atmospheric physics, biology, chemistry and geology. Part of the Total Carbon Column Observing Network.[67]
Marine Laboratory	Kings Bay	Norway	2005	Marine biology
Rabot ‡	French Polar Institute Paul-Émile Victor	France	1999	Atmospheric and life sciences
Rocket Range	Andøya Rocket Range	Norway	1997	Sounding rockets
Sverdrup	Norwegian Polar Institute	Norway	1999	Various
VLBI	Norwegian Mapping Authority	Norway	1992	Very-long-baseline interferometry
Zeppelin	Norwegian Polar Institute	Norway	1988	Atmospheric

source: Wikipedia

Dirigibile Italia Arctic Station is a 330 square meter permanent research station, managed by CNR, with offices and laboratories which can host up to 7 people.

Your fleet of marine robots

- **E-URoPe ROV**
  - 200m depth, 170 Kg
- **Proteus ASSV**
  - 60 Kg
- **SWAMP ASV**
  - 40 Kg
- **Splash UAV**



Additional constraint: Antarctic campaign 2022-'23 with **Proteus** AMV foreseen in the Antarctic second and third leg: December-February of the following year

Sensors & tools available in your lab

- 1 multi-parametric gauge (water)
- 1 multi-parametric gauge (atmosphere)
- 8 mini water samplers
- 1 winch (air, adapted to Proteus ASSV)
- 1 winch (Underwater, adapted to Proteus ASSV)

Your team

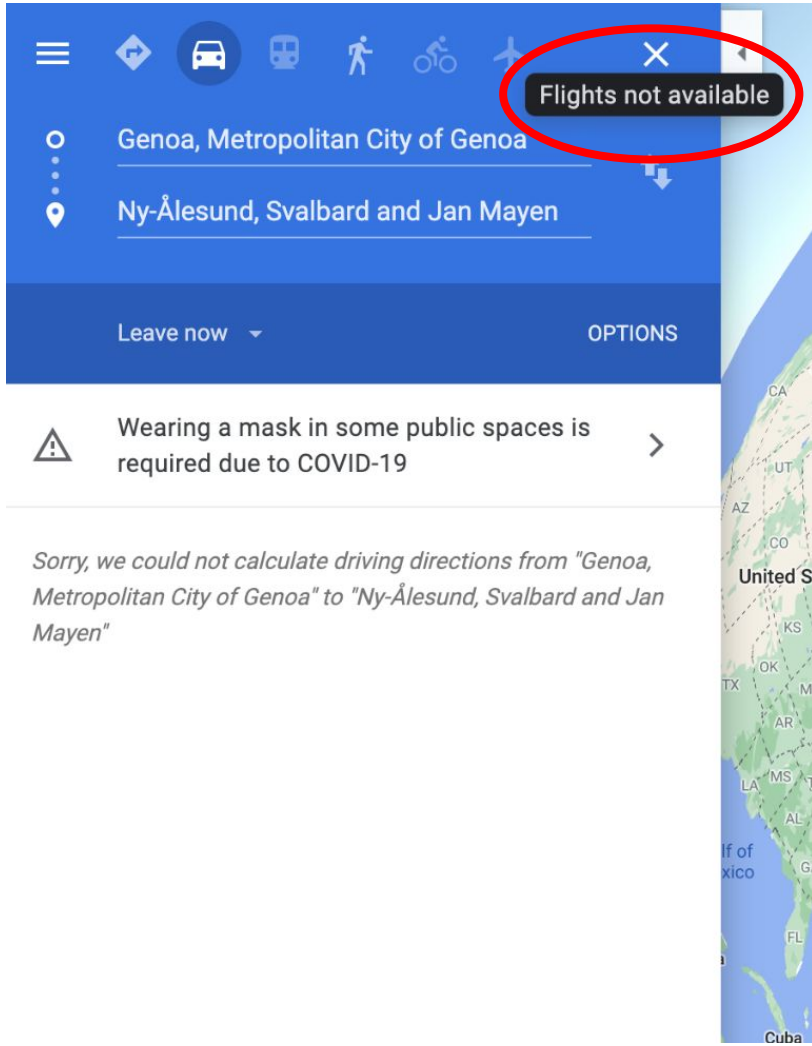
- Michele, senior researcher, NGC sw & project management
- Giovanni, senior researcher, hw/sw design & development/implementation
- Luigi, researcher, NGC sw architecture
- Andrea, researcher, naval-mechanical design & construction
- Maria, researcher, control sw & architecture
- Filippo, technician, mechanical and electrical design & assembly
- Stefano, technician, electrical & mechanical design & assembly
- Fabio, Technician, mechanical and electrical design & assembly
- Stefania, administration & project management
- Elena, administration & accounting
  - Filippo, Stefano : Arctic & Antarctic experience
  - Giovanni, Andrea: Arctic experience
  - Michele: Antarctic experience
  - Luigi, Stefano: enabled UAV pilots

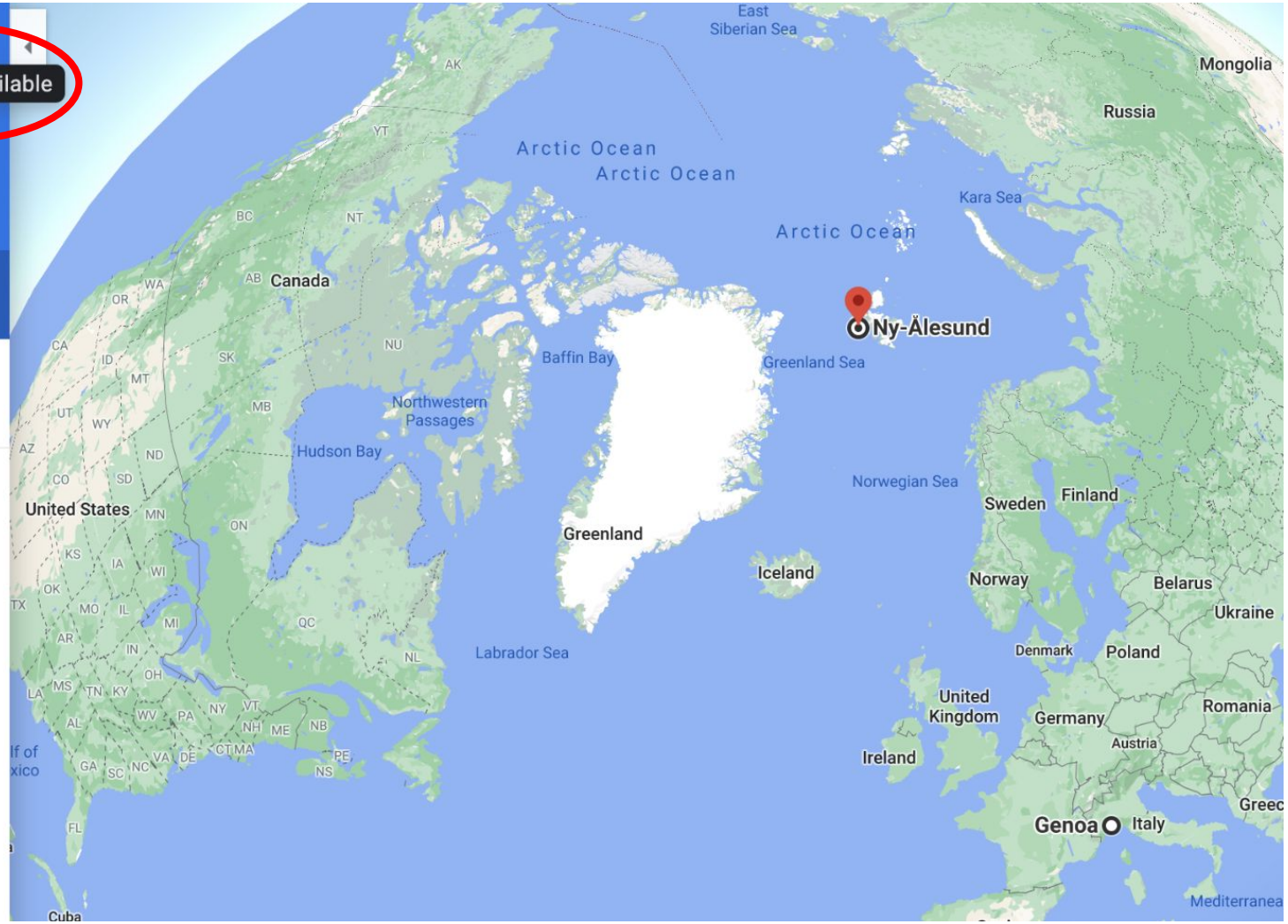
Let’s start!

- **We’re looking for 4 to 8 volunteers to plan the campaign**

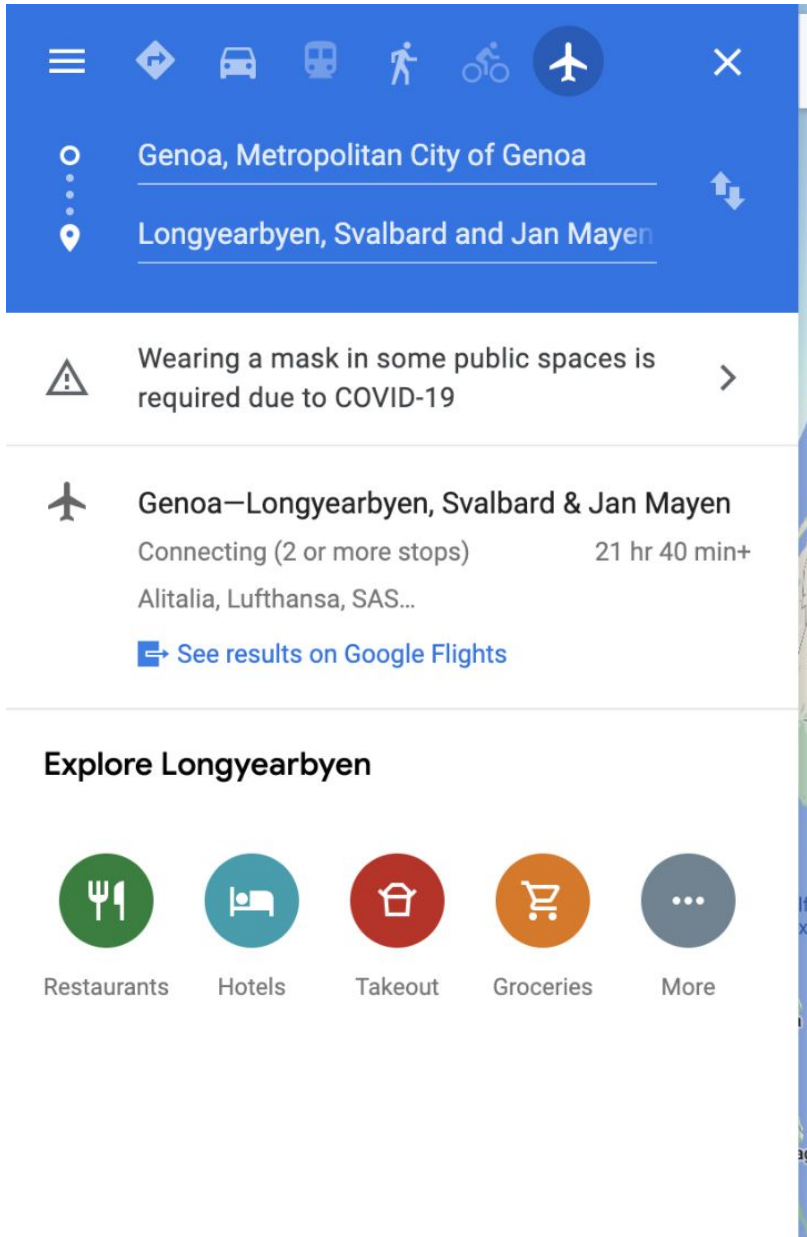
- **Once completed each step, it will be reviewed by the other training participants**

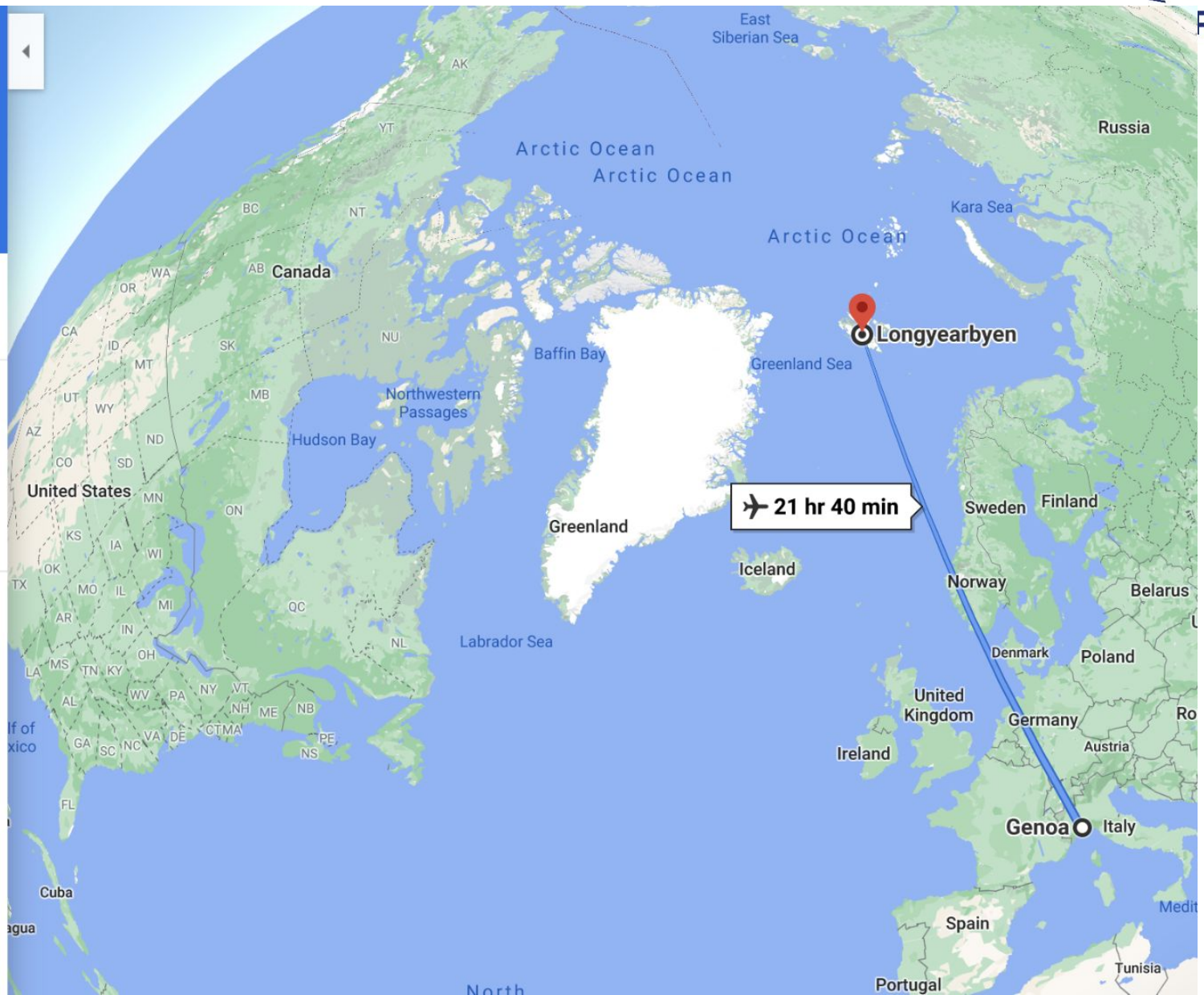
Genova - Ny Alesund flights



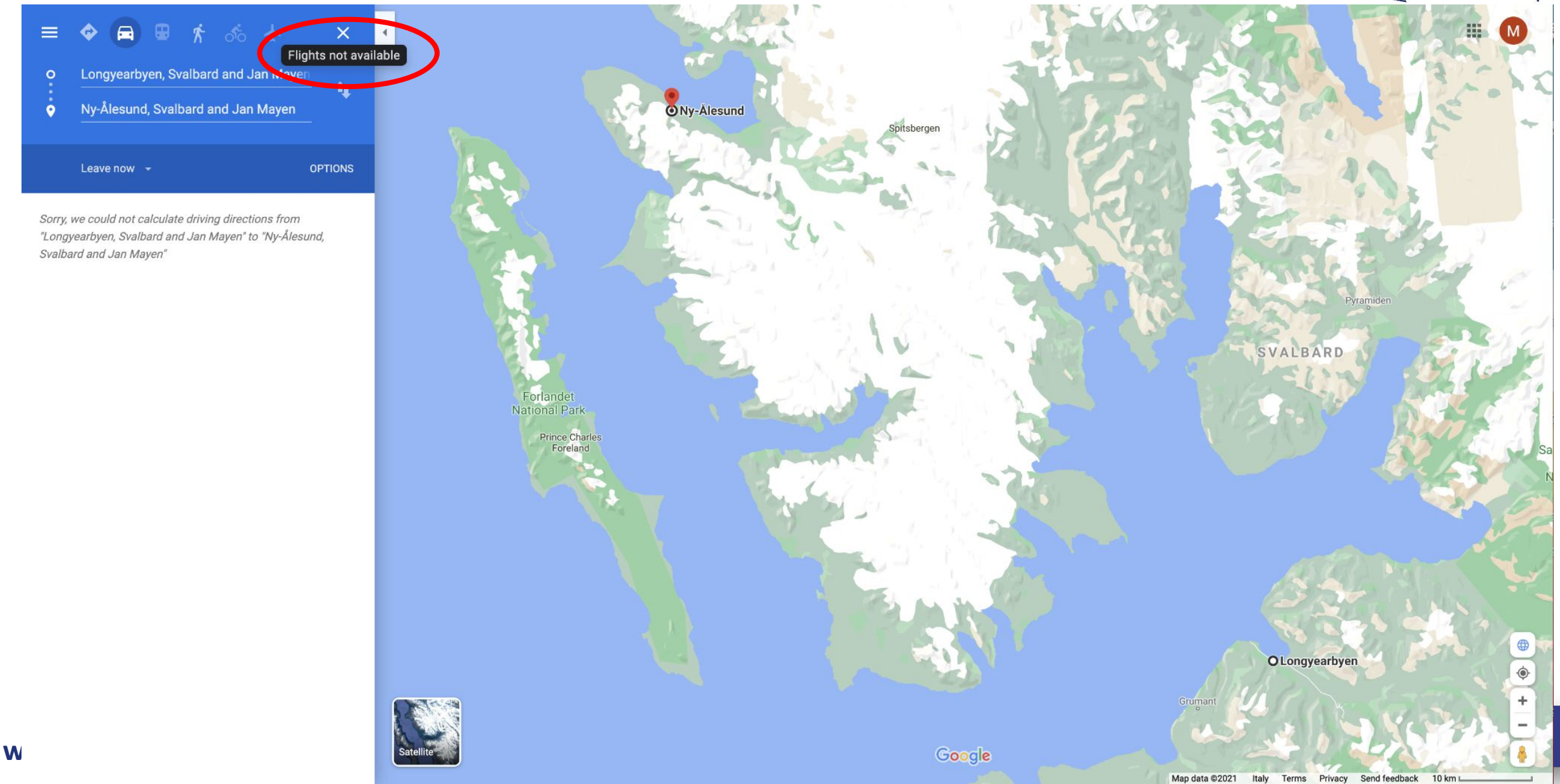


Genova - Longyearbyen flights





Longyearbyen - Ny Alesund flights



Longyearbyen - Ny Alesund flights

Flight schedule

All bookings and reservations to and from Ny-Ålesund are issued by Kings Bay, not Lufttransport.

- All reservations must be registered through RiS or directly with Kings Bay
- Departure times are given in the overview below
- Time refers to take-off in Longyearbyen. Departure from Ny-Ålesund is approximately 45 minutes later
- Check-in in Longyearbyen is 45 minutes prior to departure time
- Check-in in Ny-Ålesund is one hour prior to departure time (departure time from LYR)
- Heavy and large capacity cargo should be sent by boat. We cannot guarantee delivery on time by airplanes
- Maximum luggage, including hand luggage, is 20 kilos per passenger. More luggage require aproval from Kings Bay.
- Flight times may change due to weather or other unforeseen events
- To see the flight schedule and available seats on our flights click here
- Choose the appropriate month/year and click Change Month if needed.
- Please note that this is only an indication on the availability as there might be bookings that are yet to be processed. Seats are only guaranteed when you receive a confirmation directly from Kings Bay
- Flights that are marked Charter or Cargo are not available outside the dedicated group unless stated otherwise in the flight calendar.

Longyearbyen - Ny Alesund flights

Mai 2021 Change Month

2021-05-03 production

Departure time	Route #	Origin	Destination	Remaining Seats
1015	751	LYR	NYA	14
1100	752	NYA	LYR	8
1530	753	LYR	NYA	13
1615	754	NYA	LYR	14

2021-05-06 production

Departure time	Route #	Origin	Destination	Remaining Seats
0930	751	LYR	NYA	14
1015	752	NYA	LYR	7
1530	753	LYR	NYA	13
1615	754	NYA	LYR	14

2021-05-10 production

Departure time	Route #	Origin	Destination	Remaining Seats
1015	751	LYR	NYA	10
1100	752	NYA	LYR	1
1530	753	LYR	NYA	10
1615	754	NYA	LYR	8

2021-05-14 production

Departure time	Route #	Origin	Destination	Remaining Seats
0930	751	LYR	NYA	14
1015	752	NYA	LYR	13
1530	753	LYR	NYA	7
1615	754	NYA	LYR	14

2021-05-20 production

Departure time	Route #	Origin	Destination	Remaining Seats
0930	751	LYR	NYA	13
1015	752	NYA	LYR	4
1530	753	LYR	NYA	9
1615	754	NYA	LYR	14

2021-05-25 production

Departure time	Route #	Origin	Destination	Remaining Seats
1015	751	LYR	NYA	14
1100	752	NYA	LYR	10
1530	753	LYR	NYA	14
1615	754	NYA	LYR	14

2021-05-27 production

Departure time	Route #	Origin	Destination	Remaining Seats
0930	751	LYR	NYA	14
1015	752	NYA	LYR	13
1530	753	LYR	NYA	14
1615	754	NYA	LYR	14

2021-05-31 production

Departure time	Route #	Origin	Destination	Remaining Seats
1015	751	LYR	NYA	11
1100	752	NYA	LYR	12
1530	753	LYR	NYA	12
1615	754	NYA	LYR	14

Longyearbyen - Ny Alesund flights

Juni 2021 Change Month

2021-06-03 production

Departure time	Route #	Origin	Destination	Remaining Seats
0930	751	LYR	NYA	14
1015	752	NYA	LYR	11
1530	753	LYR	NYA	8
1615	754	NYA	LYR	14

2021-06-07 production

Departure time	Route #	Origin	Destination	Remaining Seats
1015	751	LYR	NYA	7
1100	752	NYA	LYR	14
1530	753	LYR	NYA	11
1615	754	NYA	LYR	14

2021-06-10 production

Departure time	Route #	Origin	Destination	Remaining Seats
0930	751	LYR	NYA	11
1015	752	NYA	LYR	11
1530	753	LYR	NYA	11
1615	754	NYA	LYR	14

2021-06-14 production

Departure time	Route #	Origin	Destination	Remaining Seats
1015	751	LYR	NYA	12
1100	752	NYA	LYR	12
1530	753	LYR	NYA	3
1615	754	NYA	LYR	14

2021-06-17 production

Departure time	Route #	Origin	Destination	Remaining Seats
0930	751	LYR	NYA	12
1015	752	NYA	LYR	12
1530	753	LYR	NYA	12
1615	754	NYA	LYR	14

2021-06-21 production

Departure time	Route #	Origin	Destination	Remaining Seats
1015	751	LYR	NYA	13
1100	752	NYA	LYR	2
1530	753	LYR	NYA	11
1615	754	NYA	LYR	14

2021-06-24 production

Departure time	Route #	Origin	Destination	Remaining Seats
0930	751	LYR	NYA	10
1015	752	NYA	LYR	14
1530	753	LYR	NYA	11
1615	754	NYA	LYR	14

2021-06-28 production

Departure time	Route #	Origin	Destination	Remaining Seats
1015	751	LYR	NYA	10
1100	752	NYA	LYR	9
1530	753	LYR	NYA	11
1615	754	NYA	LYR	13

Longyearbyen - Ny Alesund flights

July 2021 Change Month

2021-07-01 production

Departure time	Route #	Origin	Destination	Remaining Seats
0930	751	LYR	NYA	12
1015	752	NYA	LYR	12
1530	753	LYR	NYA	9
1615	754	NYA	LYR	14

2021-07-05 production

Departure time	Route #	Origin	Destination	Remaining Seats
1015	751	LYR	NYA	8
1100	752	NYA	LYR	12
1530	753	LYR	NYA	10
1615	754	NYA	LYR	14

2021-07-08 production

Departure time	Route #	Origin	Destination	Remaining Seats
0930	751	LYR	NYA	11
1015	752	NYA	LYR	13
1530	753	LYR	NYA	13
1615	754	NYA	LYR	14

2021-07-12 production

Departure time	Route #	Origin	Destination	Remaining Seats
1015	751	LYR	NYA	14
1100	752	NYA	LYR	8
1530	753	LYR	NYA	14
1615	754	NYA	LYR	5

2021-07-15 production

Departure time	Route #	Origin	Destination	Remaining Seats
0930	751	LYR	NYA	14
1015	752	NYA	LYR	12
1530	753	LYR	NYA	14
1615	754	NYA	LYR	14

2021-07-19 production

Departure time	Route #	Origin	Destination	Remaining Seats
1015	751	LYR	NYA	14
1100	752	NYA	LYR	11
1530	753	LYR	NYA	12
1615	754	NYA	LYR	14

2021-07-22 production

Departure time	Route #	Origin	Destination	Remaining Seats
0930	751	LYR	NYA	14
1015	752	NYA	LYR	11
1530	753	LYR	NYA	14
1615	754	NYA	LYR	7

2021-07-26 production

Departure time	Route #	Origin	Destination	Remaining Seats
1015	751	LYR	NYA	10
1100	752	NYA	LYR	12
1530	753	LYR	NYA	12
1615	754	NYA	LYR	14

2021-07-29 production

Departure time	Route #	Origin	Destination	Remaining Seats
0930	751	LYR	NYA	12
1015	752	NYA	LYR	6
1530	753	LYR	NYA	14
1615	754	NYA	LYR	14

Longyearbyen - Ny Alesund flights

AIRFARE one way	
Airfare one way, with 20 kg luggage incl. hand luggage	3 500
Master students, with 20kg luggage (incl. hand luggage)	2 605
Children under 15 years, with 20kg luggage (incl. hand luggage)	855
Children under two years of age	-
Special price (bet.); KB visitors, board members	1 670
Overweight (> 20 kg, price per kg)	75

Tromso - Svalbard sailing

Sailing schedule Tromsø – Svalbard 2020

WEEK	DEPARTURE TROMSØ	ARRIVAL	
2	Tuesday 07.01.	Longyearbyen 10.01.	
5	Tuesday 28.01.	Longyearbyen 31.01.	
6	Friday 07.02.	Longyearbyen 10.02.	Ny-Ålesund
8	Tuesday 18.02.	Longyearbyen 21.02.	
9	Friday 28.02.	Longyearbyen 02.03.	
11	Tuesday 10.03.	Longyearbyen 13.03.	
12	Friday 20.03.	Longyearbyen 23.03.	Ny-Ålesund
14	Tuesday 31.03.	Longyearbyen 03.04.	
16	Friday 17.04	Longyearbyen 20.04.	
18	Tuesday 28.04.	Longyearbyen 01.05.	
19	Friday 08.05.	Longyearbyen 11.05.	
21	Tuesday 19.05.	Longyearbyen 22.05.	
22	Friday 29.05.	Longyearbyen 01.06.	Ny-Ålesund
24	Tuesday 09.06.	Longyearbyen 12.06.	
25	Friday 19.06.	Longyearbyen 22.06.	
27	Tuesday 30.06.	Longyearbyen 03.07.	
28	Friday 10.07.	Longyearbyen 13.07.	Ny-Ålesund
30	Tuesday 21.07.	Longyearbyen 24.07.	
31	Friday 31.07.	Longyearbyen 03.08.	
33	Tuesday 11.08.	Longyearbyen 14.08.	
34	Friday 21.08.	Longyearbyen 24.08.	Ny-Ålesund
36	Tuesday 01.09.	Longyearbyen 04.09.	
37	Friday 11.09.	Longyearbyen 14.09.	
39	Tuesday 22.09.	Longyearbyen 25.09.	
40	Friday 02.10.	Longyearbyen 05.10.	Ny-Ålesund
42	Tuesday 13.10.	Longyearbyen 16.10.	
43	Friday 23.10.	Longyearbyen 26.10.	

Longyearbyen - Ny Alesund accommodation

MEALS prices for day visitors (by boat, scooter etc.)	
Breakfast	150
Breakfast incl. Packed lunch	165
Lunch	305
Brunch (Saturday and Sunday)	355
Dinner	370
Evening meal (self serve)	180
Coffee and cake (Saturday and Sunday)	105
Food for field trips - price depending on order	

Accommodation: All prices per night per person	Board	Room	Total
Scientists			
Single room, BR-SH (shared facilities)	665	735	1 400
Twin room SH, per pers. (shared facilities)	665	520	1 185
Single room Sykehuset (private bath)	665	1 065	1 730
Single room EVEN (private bath)	665	990	1 655
Single room Veksthuset (private bath)	665	990	1 655
Single room, Nordpolhotellet	665	1 285	1 950
Twin room, Nordpolhotellet	665	855	1 520
Scientists board only	665		665
Scientists and students in field			75

Ny Alesund support vessel - MS Teisten

MS Teisten is a small work boat owned and operated by Kings Bay AS. The boat is 31 feet long and equipped to do smaller scientific operations, transportation and survey in Kongsfjorden and Krossfjorden. Safety equipment is available on board (life raft, life belts and survival suits).

The boat, including captain, fuel and sampling equipment, can be rented by all scientists visiting Ny-Ålesund. Five passengers in addition to the skipper onboard is maximum capacity for sightseeing and transport. For scientific work the maximum number of passengers on board is restricted to four. It is also possible to rent a technician to have an field assitant on board.

Ny Alesund support vessel - MS Teisten

Ny-Ålesund Research Station Shared Logistic - rent of boat "MS TEISTEN" (including fuel and driver)	Per hour
Weekdays 08:00-17:00 from 1 May - 30 September	1 475
Other times and weekends	2 020

Outside the main season (1 May-30 Sept), an extra fee may apply for renting an external driver, depending on the number of rental hours, please ask for info.

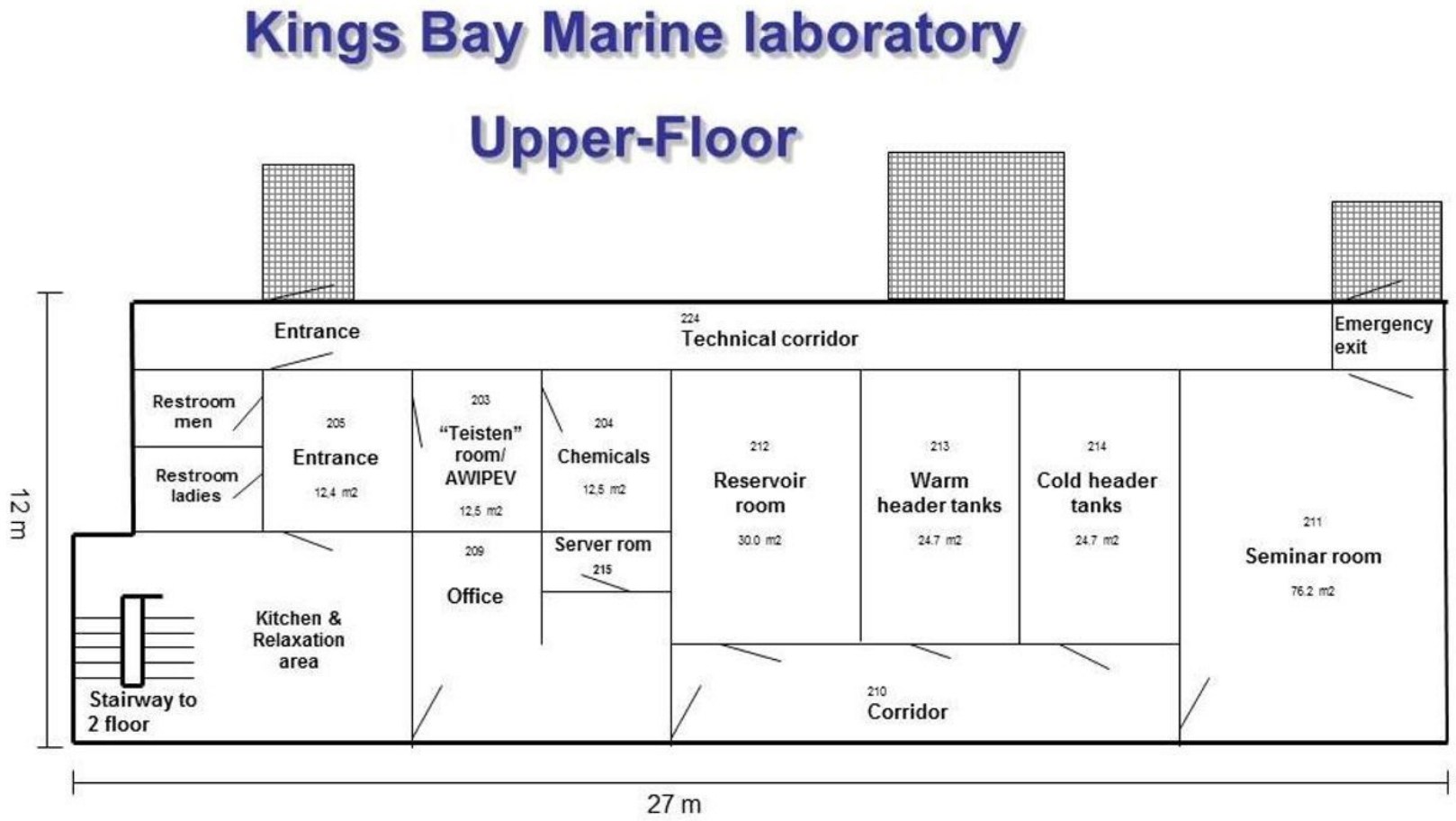
Outside the main season (1 May-30 Sept), ask for price

Ny Alesund support vessel - MS Teisten

Equipment on board and available field sampling equipment:

- 450 m wire (100 kg)
- 1000 m wire (ca 1000 kg)
- Crane with speed and meter counter
- three small hand nets
- Plankton net (40 µ, da 50 cm, l 280 cm)
- WP-2 net (200 µ, 500µ) with choker
- WP-3 net (1000 µ)
- Spare bucket for WP-2 (200µ) and WP-3 (500µ)
- Rectangular dredge
- Triangular dredge
- Nansen release mechanism
- Mechanical flow-meter with back-run
- Van Veen grab (1000 cm2 and 500 cm2)
- Day grab 1000 cm2 (includes rack with funnel and sieves)
- Niskin bottles (6x10 L and 3L)
- drop messengers and lead weights
- STD/CTD (SAIV model SD204) with fluorometer, turbidity meter and software

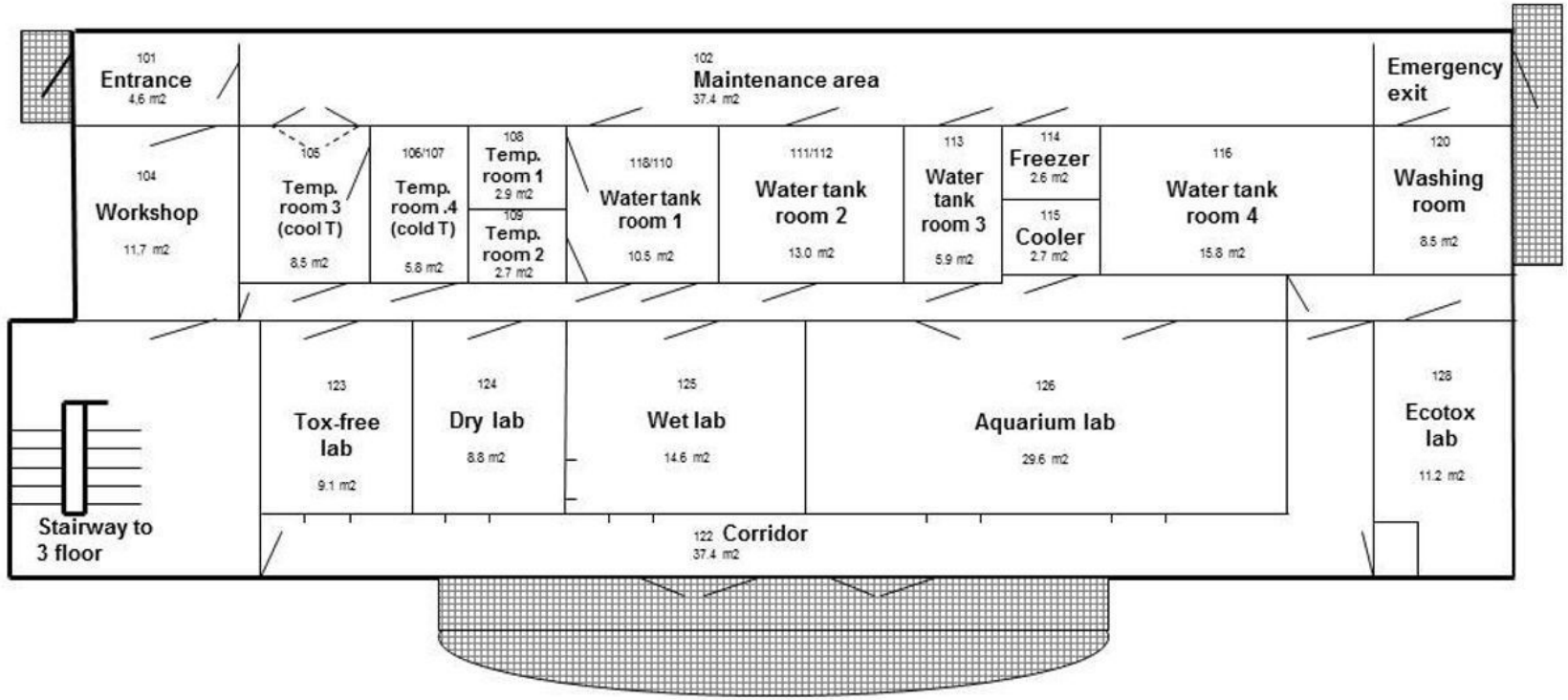
Ny Alesund Marine laboratory



Ny Alesund Marine laboratory

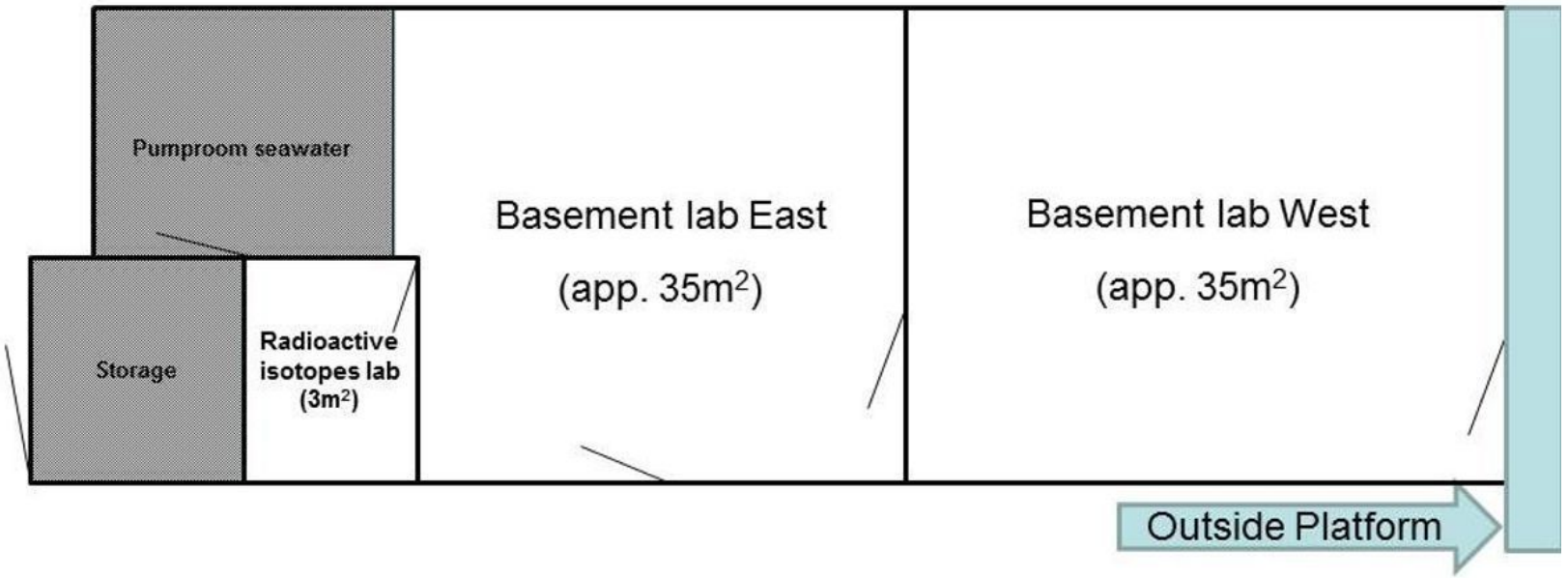
Kings Bay Marine laboratory

Mid-Floor



Ny Alesund Marine laboratory

Kings Bay Marine laboratory Ground-Floor



Ny Alesund Marine laboratory

- Facilities for running sea water in experimental tanks
- Experiment rooms (with water tanks - room temp. depends on the temp. of the water in the tanks)
- Climate/temperature rooms (T Rooms: 106/107, 108 & 109: from 0°C to +15°C and T Room 105: from -3°C to +5°C)
- Regular laboratory rooms
- Dive locker, dive compressor & decompression chamber
- Lounge with kitchenette
- Outdoor platform for work under ambient conditions
- Cooler room & refrigerators
- Freezers (-20°C and -80°C) for experiments and storage
- Seminar room (capacity: 30 persons)

Ny Alesund Marine laboratory

Ny-Ålesund Research Station Shared Laboratories - per 24 hours per person (Discount: Groups of: 3-4 people - 15%, 5-6 people - 25%, 7+ people - 35% off. Per 24 hrs. per person.)			
The Marine Laboratory - Master students half price	**1 May to 31 August**	**All April and September**	**1 October to 31 March**
Access to the facility (standard laboratory + lab equipment)	1 055	840	705
Access to climate/experiments room	655	545	300
Dive locker (with decompression chamber)	545	545	545
Only platform (can be rented if available, cost related to snow removal would be in addition)	255	255	255

Ny Alesund Marine laboratory

Equipment and Chemicals

Updated: 21.12.2019

Chemicals: Please place your order with us via RIS as early as possible! NOTA BENE: Some chemicals cannot travel by air - take this into account and make an order early!

Gas: Gas can not travel by air and all orders need to be made well in advance to reach the cargo boat in time. Always check with us if any leftover gas is available.

The cargo boat travelling to Ny-Ålesund is Norbjørn. You find all necessary information under: Visitor Information -> Freight

Ny Alesund Marine laboratory


Scales

Stirrer with heated magnetic …

Spectrophotometer

Autoclave


Milli-Q water system


FlashGel Dock


Stirrer with heated plate

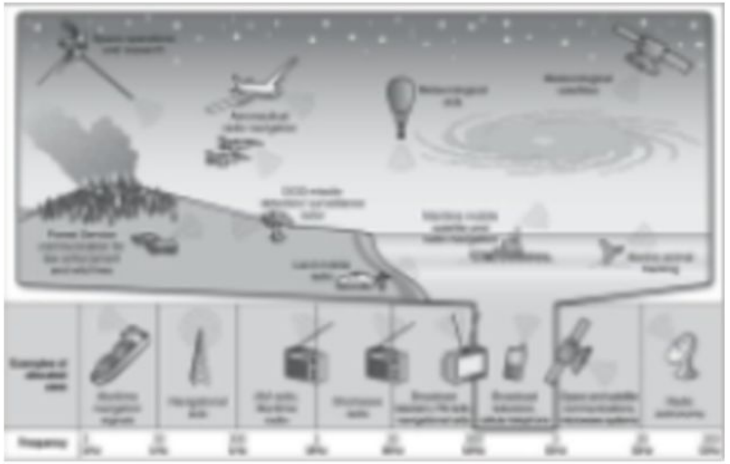

Pallcheck Luminometer


Ohaus scale


Motic BA400 Microscope

Ny Alesund Radio silence

Radio Silence



Ny-Ålesund was meant to be a radio silent research site in Svalbard. However, due to science, technology, safety and historical reasons, there are emitting instruments here today. The long-term goal is to keep the level of electromagnetic pollution as low as possible and to avoid any unnecessary active radio systems.

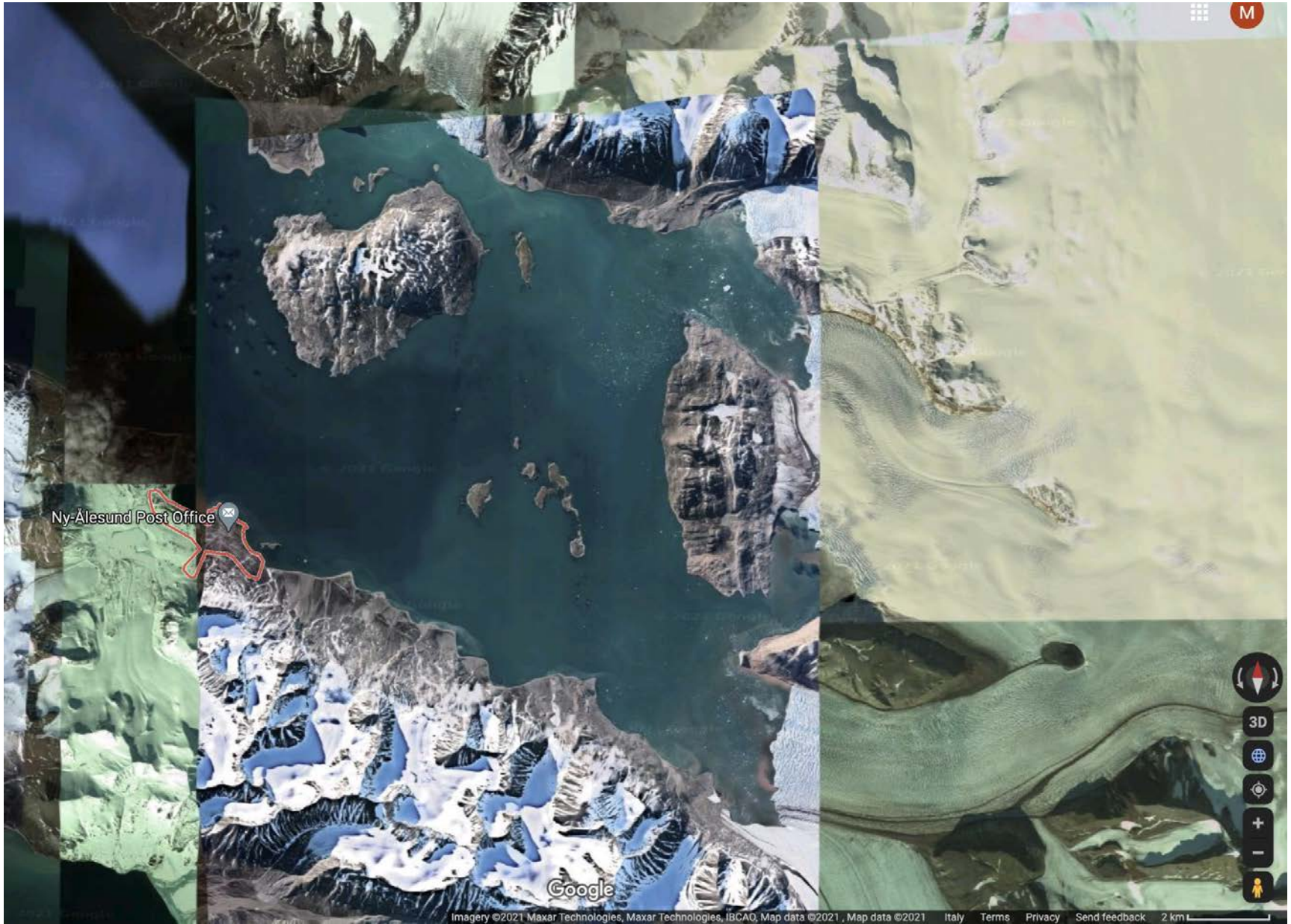
Ny-Ålesund Science Managers Committee (NySMAC) has information on radio silence and regulations on its website as well (under: Practical).

Norwegian Telecommunications Authority (Nkom) has a mandate to administer use of all radio frequencies. The owner might need to apply for a permission to use selected radio frequency, regardless of the length of activity.

The Regulation No. 628 (Nr. 77) describes general regulations for the use of radio frequencies.

However, there is an important exception relevant to Ny-Ålesund:
"The Regulations **do not apply to frequencies in the range of 2 GHz - 32 GHz in the geographic area within a 20 km radius from the centre of Ny-Ålesund**"

Ny Alesund Exit planning



Ny Alesund Exit planning

Costs

- Voli LYR-NYA A/R: 350x2x5 = 3500 €
- Voli LYR A/R: 800x5 = 4000 €
- 3 cnr base: 66x3x5 =990 €
- 2 scientists 140x2x5 = 1400€
- Teisten 5 days x 4 hours/day = 147x5x4 = 2940 €
- Lab 5 days x 5 persons 54 x5x5-15% = 1147 €
- Oslo 120x5x2 = 1200€

About 15 K€ for 5 days

APECS-ARICE Webinar

Polar marine robotics

Questions!?






Arctic Research Icebreaker Cons.
ARICE

An international collaboration strategy for meeting the needs of marine based research in the Arctic

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APECS-ARICE Webinar

Polar marine robotics

Thank you very much!






Arctic Research Icebreaker Cons.
ARICE

An international collaboration strategy for meeting the needs of marine based research in the Arctic

Webinar recording will be available on arice.eu and on the APECS website

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