European Polar Consortium

The landscape of European Polar Research

VOLUME II: European polar capacity - an overview of research infrastructures in the Arctic and Antarctic

The European Polar Consortium (EPC) is a Coordination Action financed by the European Commission under framework RTD programme 6 EUROPOLAR ERA-NET ERAC 517842.

The European Polar Consortium is a composed of 27 government ministries, national funding agencies and national polar RTD authorities from 19 European countries and of the European Science Foundation/European Polar Board.

With the combined European critical mass of national programmes reaching approximatively € 300 million per annum it is the most significant initiative to coordinate European polar RTD programmes ever attempted. The European Polar Consortium will exert a massive and positive impact on this domain and lead to long-term durable partnerships within Europe and internationally and will also deepen and strengthen the interactions between countries with large polar RTD programmes and nations with evolving polar programmes in central and south-eastern Europe, encouraging exchange of experiences and the best practice on management and financing of programmes and infrastructures.

The long-term goal of the European Polar Consortium is the development of a «European Polar Entity» that will be established through dialogue on a political level beyond the EPC and will enable Europe to maximize and direct its critical mass at the global level.

The EUROPOLAR project partners are:

- Institut Polaire Français Paul Emile Victor (IPEV) – France
- European Polar Board – European Science Foundation (ESF)
- Fonds zur Förderung der Wissenschaftlichen Forschung (FWF) – Austria
- Fonds de la Recherche Scientifique (FNRS) – Belgium
- Research Foundation - Flanders (FWO) – Belgium
- Belgian Science Policy (BELSPO) – Belgium
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- The Research Council of Norway (RCN) – Norway
- Norwegian Polar Institute (NPI) – Norway
- Ministry of Science and Higher Education (MSHE) – Poland
- Institute of Geophysics - Polish Academy of Sciences (IGF-PAN) – Poland
- Arctic and Antarctic Research Institute (AARI) – Russian Federation
- Ministry of Education and Science (MEDC) – Romania
- Ministry of Education and Science (MEC) – Spain
- Swedish Research Council (VR) – Sweden
- Natural Environment Research Council (NERC) – United Kingdom

For further information on the European Polar Consortium please see: http://europolar.esf.org/

Introduction

This document provides a strategic overview and portfolio of European polar research infrastructures in the Arctic and Antarctic controlled and owned by European countries inclusive of the Russian Federation and Greenland Home Rule. It is the most extensive database to be compiled of European research assets and was assembled in the context of the work-programme of the European Polar Consortium composed of 27 government agencies from 19 countries and financed by the European Commission in Framework Programme 6.

The operators and managing agencies of all the national polar research programmes in Europe have completed an extensive survey of their research stations, research vessels and research aircraft deployed in servicing science programmes in the Polar Regions. A survey of this magnitude requires significant input from the operational managers of all of the programmes and polar institutes; it is therefore a groundbreaking exercise and enables both European countries and their international partners to gain an overview into the scientific support capacities that can be combined in a powerful way. This overview provides a valuable insight into the investment of European countries in operating infrastructures in remote and critical areas for scientific research. The development of future initiatives to coordinate and network research assets at the European level will rely on fully utilising the capacity in a modularised way-designing 'European Scientific Platforms' on the basis of scientific needs and demands of the research community. The information contained within this overview report will also be available in electronic format on the internet as part of a European Polar Portal of the European Polar Consortium.

In order to better and more efficiently serve the multi-disciplinary demands of the research community we have to know the strengths and weaknesses of the assets that we have available. This compilation enables the full exposition of capacity and enables managers to plan their deployment in the most suitable way, the public to understand how investments are utilised and the scientists to design major investigative efforts to solve important questions which effect the functioning of the planet. A compilation of this nature obviously involves periodic updating taking into account new facilities and capacities of the European countries and so the information contained in this report is essentially a snapshot of the current capacity and can be used as a baseline for planning new investment and coordinating existing facilities.

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Chairman
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European polar research stations

The vast network of research stations operated by European countries in the Arctic and Antarctic are a powerful set of assets for supporting interdisciplinary science. These facilities provide policy makers and the public with information on the functioning of the earth system and early warning of changes effecting our daily lives.

Antarctic stations

Antarctic stations

The major Antarctic and Arctic research stations operated by European countries are summarised:

Station name	Princess Elisabeth	St. Kliment Ohridski	ABOA	Dumont d'Urville	Dallmann Laboratory	GARS	Kohnen	Neumayer
Nations	Belgium	Bulgaria	Finland	France	Germany - Argentina	Germany - Chile	Germany	Germany
Latitude	71°57'1"S	62°38'29"S	73°3'0"S	66°40'0"S	62°14'14"S	63°19'S	75°0'2"S	70°39'8"S
Longitude	23°20'48"E	60°21'53"W	13°25'0"W	140°1'0"E	58°40'40"W	57°54'W	0°4'1"E	8°15'16"W
Altitude (m)	-	20	400	30	5	8	2882	40
Opening year	2008	1988	1989	1959	1994	1991	2001	1992
Physical setting	mountain, snow	coastal	mountain	coastal	coastal	coastal	inland ice plateau	iceshelf
Min. annual air temperature (°C)	-	-35.0	-41.0	-	-25.0	-20.0	-75.0	-47.0
Max. annual air temperature (°C)	-	9.0	9.0	-	10.0	8.0	-15.0	4.0
Mean annual air temperature (°C)	-	-5.0	-14.0	-15.0	-2.0	-2.3	-46.0	-16.0
Operational	summer station	summer station	summer station	all year round	summer station	all year round	summer station	all year round
Size (m^2)	-	140	374	-	195	250	375	450
Total accommodation Capacity (n. of pers./day)	-	16	22	100	20	12	25	10 (winter) 40 (summer)
Science	-	multi disciplinary	atmosphere, earth sciences	multi disciplinary	multi disciplinary	climate, geophysics	multi disciplinary	multi disciplinary
Approach	-	sledges	airstrip	anchorage, seasonal airstrip, helipad	via other station	airstrip, helipad	airstrip	airstrip, helipad

Antarctic stations

Station name	Concordia	Mario Zucchelli	Troll	Arctowski	Law-Racovita	Gabriel de Castilla	Juan Carlos I	Svea
Nations	France-Italy	Italy	Norway	Poland	Romania-Australia	Spain	Spain	Sweden
Latitude	75°6'0"S	74°42'0"S	72°1'S	62°9'41"S	69°23'16"S	62°58'40"S	62°39'46"S	74°34'0"S
Longitude	123°21'0"E	164°7'0"E	2°23'E	58°28'10"W	76°23'47"E	60°40'30"W	60°23'20"W	11°13'0"W
Altitude (m)	3233	15	1270	3	150	10	12	1130
Opening year	2005	1987	1990	1977	1988	1990	1988	1987
Physical setting	ice cap, snow	coastal	nunatak	coastal, ice-free oasis	coastal, hills	coastal, mountain	coastal, mountain snow	nunatakk
Min. annual air temperature (°C)	-84.6	-37.0	-	-32.0	-	-	-22.4	-44.0
Max. annual air temperature (°C)	-5.0	9.2	-	10.0	-	-	15.5	-1.0
Mean annual air temperature (°C)	-50.8	-14.5	-20.0	-2.0	-9.0	-	-	-20.0
Operational	all year round	summer station	all year round	all year round	summer station	summer station	summer station	summer station
Size (m^2)	1720	7430	250	5256	91	383	346	12
Total accommodation Capacity (n. of pers./day)	60	90	14	40	8	18	16	4
Science	multi disciplinary	multi disciplinary	multi disciplinary	multi disciplinary	multi disciplinary	multi disciplinary	multi disciplinary	climatology, earth science
Approach	airstrip, traverse	seasonal airstrip helipads, pontoon, sledges	traverse	helipads, anchorage	airstrip	helipad, pontoon sledges	helipad, pontoon, sledges	airstrip

Antarctic stations

Station name	Wasa	Halley	Rothera	Signy	Bellingshausen	Mirny	Novolazarevskaya	Progress	Vostok
Nations	Sweden-Finland	UK	UK	UK	Russia	Russia	Russia	Russia	Russia
Latitude	73°3'0"S	75°35'90"S	68°34'17"S	60°42'5"S	62°12'S	66°33'S	70°46'26"S	69°22'44"S	78°28'0"S
Longitude	13°25'0"W	26°39'47"W	68°8'20"W	45°35'5"W	58°58'W	93°01'E	11°51'54"E	76°23'13"E	106°48'0"E
Altitude (m)	450	30	3	5	15.4	39.9	118	64	3488
Opening year	1988	1956	1975	1947	1968	1956	1961	1988	1957
Physical setting	nunatakk	coastal, ice shelf	coastal	coastal	ice-free terrain surface	ice rock outcrops surface	ice-free terrain surface	ice-free terrain surface	snow covered ice plateau
Min. annual air temperature (°C)	-41.0	-55.3	-39.5	-39.3	-13.8	-24.4	-22.6	-20.2	-75.4
Max. annual air temperature (°C)	5.0	6.3	12.0	19.8	4.9	0.0	1.5	2.5	1.5
Mean annual air temperature (°C)	-15.0	-19.0	-4.3	-3.1	-2.3	-13.1	-10.3	-8.8	-55.3
Operational	summer station	all year round	all year round	summer station	all year round	all year round	all year round	all year round	all year round
Size (m^2)	300	1095	7472	291	784	8000	800	2000	1000
Total accommodation Capacity (n. of pers./day)	24	70	136	8	38	169	70	77	25
Science	multi disciplinary	multi disciplinary	multi disciplinary	-	multi disciplinary	multi disciplinary	multi disciplinary	multi disciplinary	multi disciplinary
Approach	airstrip, helipad	airstrip, anchorage	airstrip, wharf	wharf	anchorage	anchorage	airstrip, helipad, anchorage	airstrip, helipad anchorage	airstrip

Arctic stations

Station name	Arctic Station	Sermilik	Zackenberg	AWIPEV (Charles Rabot)	AWIPEV (Jean Corbel)	AWIPEV (Koldewey)	Samoylov
Nations	Denmark	Denmark	Denmark	France-Germany	France-Germany	France-Germany	Germany-Russia
Latitude	69°15'0"N	65°40'0"N	74°28'15"N	78°55'0"N	78°54'0"N	78°55'24"N	72°22'12"N
Longitude	53°34'0"W	38°10'0"W	20°33'55"W	11°56'0"E	12°7'0"E	11°55'15"E	126°28'51"E
Altitude (m)	5	5	35	10	10	11	12
Opening year	1906	1970	1997	1997	1997	1991	1998
Physical setting	very diverse	coastal, near town	coastal, valley, tundra, mountain	coastal, near town	coastal, near town	coastal, near town	coastal, tundra, river delta
Min. annual air temperature (°C)	-32.9	-17.9	-37.0	-14.0	-14.0	-14.0	-
Max. annual air temperature (°C)	21.9	10.8	16.0	5.0	5.0	5.0	-
Mean annual air temperature (°C)	-4.1	-1.4	-10.0	-6.3	-6.3	-6.3	-13.5
Operational	all year round	summer station	summer station	summer station	summer station	all year round	summer station
Size (m^2)	975	110	117	-	-	660	80
Total accommodation Capacity (n. of pers./day)	26	6	25	-	-	14	16
Science	multidisciplinary	-	multidisciplinary	multidisciplinary	multidisciplinary	multidisciplinary	atm. pollution, permafrost, GIS, biology
Approach	port, helipad, road	-	airstrip	airstrip, port	airstrip, port	airstrip, port	helipad, road

Note: some meteorological Arctic stations are not included in these tables

Arctic stations

Station name	KISS	Dirigibile Italia	Sverdrup	Hornsund	Abisko	Poolstation Spitsbergen	EISCAT Sodankyla	EISCAT Svalbard
Nations	Greenland	Italy	Norway	Poland	Sweden	Netherlands	Sweden	Sweden
Latitude	67°1'5"N	78°55'0"N	78°55'20"N	77°0'8"N	68°21'0"	78°55'0"N	67°21'49"N	78°9'11"N
Longitude	50°41'39"W	11°56'0"E	11°55'1"E	15°32'36"E	18°49'0"E	11°56'0"E	26°37'37"E	16°1'44"E
Altitude (m)	50	5	10	7	365	4	197	445
Opening year	1993	1997	2000	1957	1912	1990	1981	1996
Physical setting	coastal, ice cap, near town, valley	coastal, near town	coastal, near town	fjord, rocky walls	mountain, tundra	coastal, near town	near town	mountain, near town
Min. annual air temperature (°C)	-0.0	-25.0	-14.0	-34.0	-35.0	-	-15.0	-30.0
Max. annual air temperature (°C)	15.0	12.0	5.0	13.0	27.0	-	14.0	15.0
Mean annual air temperature (°C)	-4.0	-5.0	-4.0	-4.0	-1.0	-	-1.0	-7.0
Operational	all year round	all year round	all year round	all year round	all year round	summer station	all year round	all year round
Size (m^2)	900	540	700	1269	1800	-	200	80
Total accommodation Capacity (n. of pers./day)	56	7	-	48	-	-	21	-
Science	multidisciplinary	multidisciplinary	multidisciplinary	multidisciplinary	multidisciplinary	-	atmosphere, high atmosph., geophysiscs	atmosphere, high atmosph., geophysiscs
Approach	airstrip, port	airstrip, port	airstrip, port	helipad, pontoon	road, railway, near airport	airstrip, port	airstrip, helipad, road	road, near airport

Arctic stations

Arctic stations

Station name	EISCAT Tromso	ESRANGE Keops observ.	Tarfala	Barentsburg	Ostrov Dikson	Tiksi	Amderma	Pevek
Nations	Sweden	Sweden	Sweden	Russia	Russia	Russia	Russia	Russia
Latitude	69°35'11"N	67°52'19"N	67°54'40"N	78° 3'36"N	73°30'00"N	71°34'48"N	69°45'00"N	69°42'20"N
Longitude	19°13'38"E	20°1'50"E	18°37'1"E	14°12'36"E	80°24'00"E	128°54'36"E	61°40'48»E	170°22'28"E
Altitude (m)	86	560	1130	73	42	7	52	3
Opening year	1981	2000	1948	1934	1916	1932	1933	1935
Physical setting	near town	mountain	mountain, high alpine	valley, near town	-	-	near town	near town
Min. annual air temperature (°C)	-30.0	-35.0	-30.0	-49.0	-51.0	-54.0	-48.0	-48.0
Max. annual air temperature (°C)	30.0	28.0	20.0	21.0	27.0	33.0	31.0	30.0
Mean annual air temperature (°C)	2.00	-5.0	-3.9	-5.5	-11.5	-13.4	-7.0	-10.6
Operational	all year round	all year round	all year round	all year round	all year round	all year round	all year round	all year round
Size (m^2)	0	1200	422	2100	2500	220	-	1200
Total accommodation Capacity (n. of pers./day)	-	-	30	-	-	-	-	-
Science	atmosphere, high atmosph., geophysiscs	atmosphere, high atmosph., geophysiscs	multidisciplinary	climate, atmosphere, geophysiscs, oceanogr.	multidisciplinary	multidisciplinary	climate, geophysiscs	multidisciplinary
Approach	helipad, near road, airport	helipad	helipad	helipad, road	airstrip. helipad	airstrip. helipad, anchorage	airstrip, road	airstrip

European polar research vessels

Europe has a world class range of assets and capacity to launch major marine scientific investigations in the Arctic and Southern Oceans. Marine polar vessels also have a vital role in supply and logistical support to research stations. The investment in marine polar capacity encourages international cooperation and exchange of scientists from many countries.

Planning of new capacities and enhanced coordination of existing European polar vessels in the context of multinational research programmes will ensure effective utilisation, added value and critical mass in the European research area.

The main ice-strengthened and conventional research vessels that are utilised in support of Antarctic and Arctic research are summarised:

Polar vessels

Polar vessels

Vessel name	Astrolabe	Aranda	Polarstern	Paamiut	Italica	OGS Explora	Lance
Nations	France	Finland	Germany	Greenland	Italy	Italy	Norway
Ice class	A Super	1ASuper	German. Lloyd 100 A 5 ARC 3	-	1 A Super	1B	ICE 1A
Build year	1985	1989	1982	1971	1981	1973	1978
Vessel length (metres)	65	59	118	36	130	73	61
Vessel beam (metres)	12.80	14.00	25.00	-	17.00	11.80	12.6
Vessel displacement (tons)	200	1734	17	721	6000	2044	2370
Cruise speed (knots))	11	11	11	-	13	12	11
Total accommodation capacity	-	25	98	-	120	42	30
Cargo capacity (tons)	-	100	5457	-	4000	150	300
Science	-	multi disciplinary	multi disciplinary	marine biology, oceanography, fishery	multi disciplinary	multi disciplinary	marine biology, oceanography, fishery

Vessel name	Horyzont II	Oceania	Hespérides	Las Palmas	Oden	James Clark Ross	Ernest Shackleton
Nations	Poland	Poland	Spain	Spain	Sweden	UK	UK
Ice class	I	0	100 A1 Ice Class 1C	N	1A1	A1 A1A Super	A1 ICE05
Build year	2000	1985	1990	1978	1988	1990	1995
Vessel length (metres)	56	48	82	41	108	99	72
Vessel beam (metres)	11.36	9.00	14.30	11.60	31.00	11.85	17.00
Vessel displacement (tons)	1321	370	2700	1500	13	7439	5455
Cruise speed (knots))	12	7	14	13	16	12	11
Total accommodation capacity	57	30	35	56	80	58	80
Cargo capacity (tons)	288	1	20	24	40	608	573
Science	multi disciplinary	multi disciplinary	multi disciplinary	-	climate, geology, mapping, marine	-	-

Polar vessels

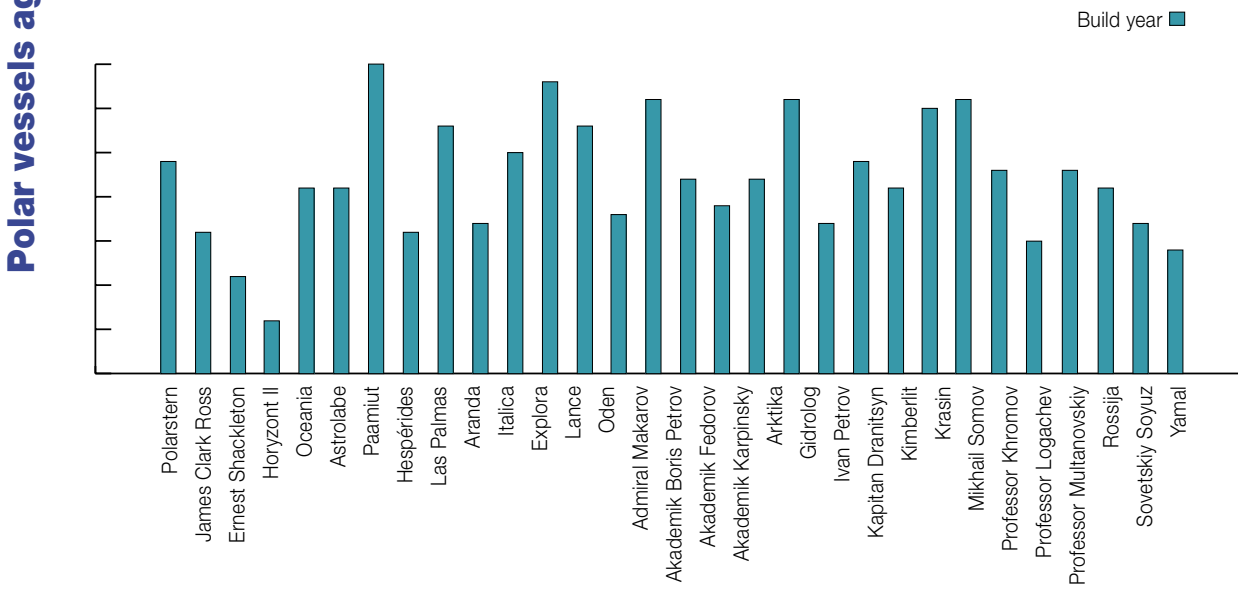
Vessel name	Akademik Fedorov	Mikhail Somov	Professor Multanovskiy	Arktika	Kapitan Dranitsyn	Professor Khromov	Rossija
Nations	Russia	Russia	Russia	Russia	Russia	Russia	Russia
Ice class	KM * NLA 2 A2	-	-	-	-	-	-
Build year	1987	1975	1983	1975	1982	1983	1985
Vessel length (metres)	141.2	133.13	71.61	148	132	71.6	148
Vessel beam (metres)	23.5	18.85	12.83	30	27	12.8	30
Vessel displacement (tons)	16500	14185	1754	23000	15000	2140	23000
Cruise speed (knots))	16	14	-	20.6	16	13.5	20.6
Total accommodation capacity	252	132	30	250	162	66	250
Cargo capacity (tons)	-	-	-	-	-	-	-
Science	multi disciplinary	multi disciplinary	-	multi disciplinary	multi disciplinary	multi disciplinary	multi disciplinary

Vessel name	Sovetskiy Soyuz	Yamal	Ivan Petrov	Krasin	Kimberlit	Akademik Karpinsky	Akademik Boris Petrov
Nations	Russia	Russia	Russia	Russia	Russia	Russia	Russia
Ice class	-	-	-	KM*LL2 [2]	CLASS KM* LIA2	KM-ILA2	30% floating ice
Build year	1989	1992	1989	1976	1985	1984	1984
Vessel length (metres)	148	148	50	134.9	53.7	104.5	75.5
Vessel beam (metres)	30	30	10	26	10.5	16	17.7
Vessel displacement (tons)	23000	23000	929	20190	1185	5715	2600
Cruise speed (knots))	20.6	20.6	12	15.6	11.6	15	10
Total accommodation capacity	250	250	38	-	29	87	74
Cargo capacity (tons)	-	-	-	7554	-	-	-
Science	multi disciplinary	multi disciplinary	-	-	-	geology, sedimentology, geophysics	-

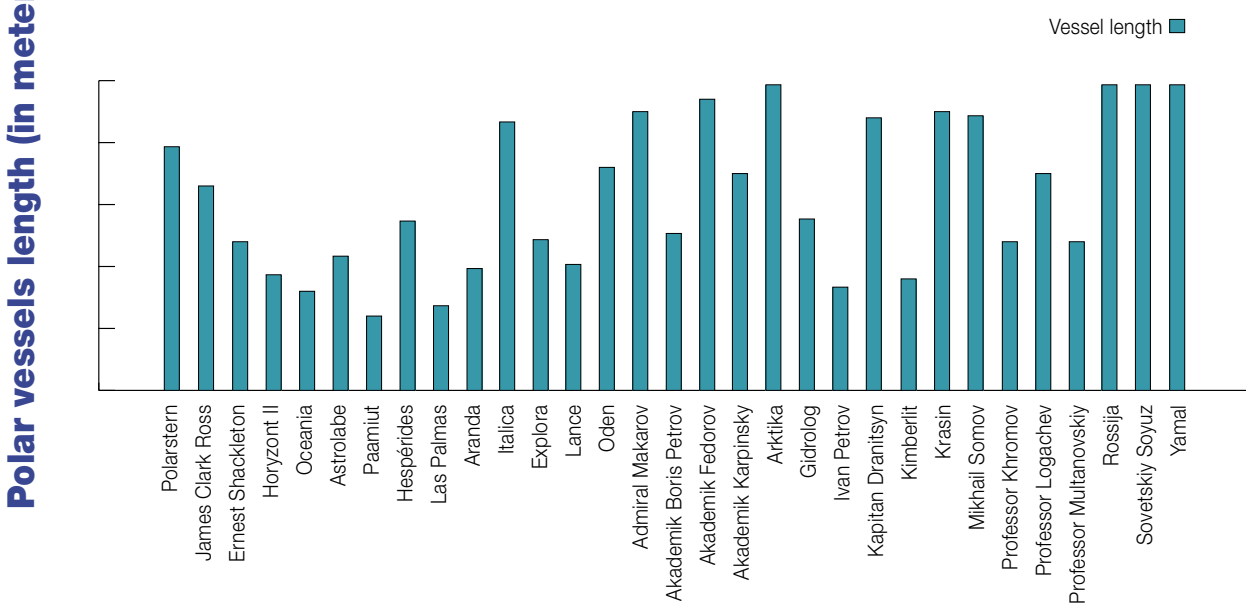
Polar vessels

Vessel name	Gidrolog	Professor Logachev	Admiral Makarov
Nations	Russia	Russia	Russia
Ice class	-	-	KM*LL2 [2]
Build year	-	1991	1975
Vessel length (metres)	82.3	104.5	134.9
Vessel beam (metres)	13.5	16	26
Vessel displacement (tons)	2455	5620	20190
Cruise speed (knots))	-	14.5	15.6
Total accommodation capacity	51	90	-
Cargo capacity (tons)	-	-	7554
Science	oceanography, geodesy, marine biology, fishery	geology, sedimentology, geophysics	-

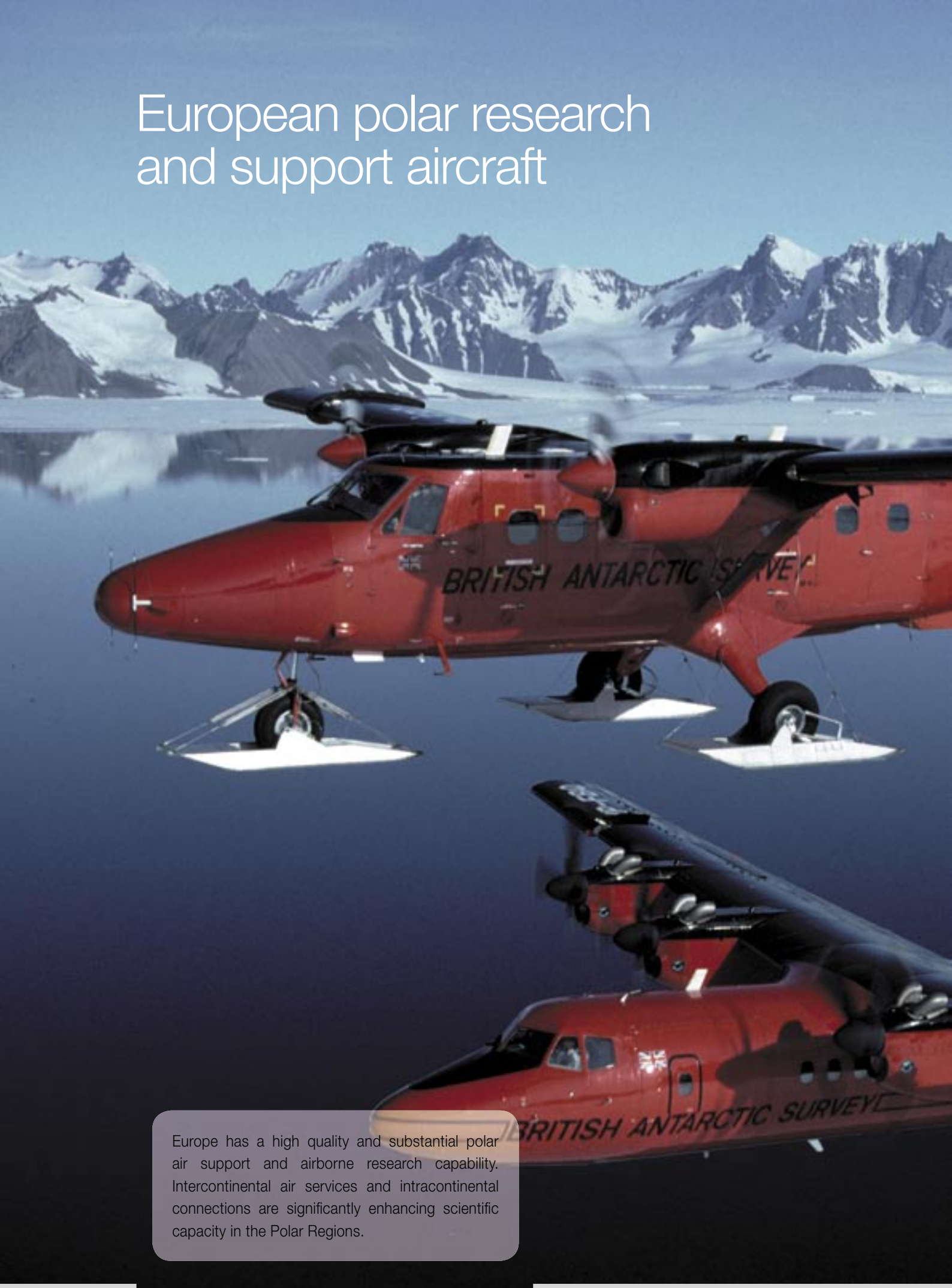
Polar vessels age



Polar vessels length (in meters)



European polar research and support aircraft



Europe has a high quality and substantial polar air support and airborne research capability. Intercontinental air services and intracontinental connections are significantly enhancing scientific capacity in the Polar Regions.

The principle research and support aircraft utilised in the Antarctic and Arctic regions are summarised:

Polar research aircraft

Polar research aircraft

Name and model	Polar2 Do228-101	M55 Geophysica	DHC-6/300 Twin Otter	Ecureuil AS-350/B2	Hercules L-100/30
Nations	Germany	Italy	Italy	Italy	Italy
Aircraft type	dornier	dual turbofan	commuter ski equipped	helicopter	cargo
Build year	1983	1988	1990	1990	1985
Length (m)	15.00	22.0	15.8	13.0	35.0
Wingspan (m)	16.97	37.0	19.8	10.7	40.0
Cruise speed (knots)	200	450	130	120	300
Max cargo payload (kg)	1000	2250	900	1000	11000
Number of engines	2	2	2	1	4
Type of engines	garret TPE 331-5	turbofan D_30V12	0	0	turbo prop
Number of seats	14	1	12	5	60
Scientific activities	geophysics, meteorology, atmospheric sciences (meteorology, air chemistry)	polar stratospheric clouds, ozone «hole», gravitation waves; troposphere-stratosphere air mass exchange, Tropical cyclones, «hot towers», satellite validation.	radio echo sounding, geomagnetism	radio echo sounding, geomagnetism	none

Polar research aircraft

Polar research aircraft

Name and model	Dash 7	Twin Otter (1)	Twin Otter (2)	Twin Otter (3)	Twin Otter (4)
Nations	UK	UK	UK	UK	UK
Aircraft type	de Havilland	de Havilland	de Havilland	de Havilland	de Havilland
Build year	1988	1981	1982	1982	1988
Length (m)	24.0	15.0	15.0	15.0	15.0
Wingspan (m)	28.0	19.0	19.0	19.0	19.0
Cruise speed (knots)	200	130	130	130	130
Max cargo payload (kg)	1818	900	900	900	900
Number of engines	4	2	2	2	2
Type of engines	6-50	60-27	60-27	60-27	60-27
Number of seats	16	5	5	5	5
Scientific activities	geo survey	meteorological survey	none	none	geo survey

Polar research aircraft

Polar research aircraft

Name and model	Antonov-2	Antonov-3	Antonov-12	Antonov-24	Antonov-26
Nations	Russia	Russia	Russia	Russia	Russia
Aircraft type	Antonov	Antonov	Antonov	Antonov	Antonov
Build year	year of introduction 1947	-	year of introduction 1958	year of introduction 1962	year of introduction 1968
Length (m)	12.74	13.965	33.10	23.53	23.80
Wingspan (m)	18.18	18.176	38.0	29.20	29.20
Cruise speed (knots)	100	118	361	250-270	233
Max cargo payload (kg)	1500	1800	20000	4700	5500
Number of engines	1	1	4	2	2
Type of engines	Shvetsov ASh-62IR	TVD-20	TVD Progress (Ivcenko) AI-20K	TVD Progress (Ivcenko) AI-24A	Ivchenko AI-24T turboprops
Number of seats	12	9-12	90	48	38-40
Scientific activities	-	-	-	-	-

Polar research aircraft

Polar research aircraft

Name and model	Antonov-30	Antonov-32	Antonov-74	Ilyushin-76	Kamov-26
Nations	Russia	Russia	Russia	Russia	Russia
Aircraft type	Antonov	Antonov	Antonov	Ilyushin	Helicopter
Build year	year of introduction 1974	year of introduction 1977	year of introduction 1984	year of introduction 1975	year of introduction 1968
Length (m)	24.26	23.68	28.10	46.59	7.75
Wingspan (m)	29.20	29.20	31.89	50.50	main rotor diam. - 13.0
Cruise speed (knots)	230	245-283	295-325	405-430	70
Max cargo payload (kg)	-	6700	7500	40000	800
Number of engines	2	2	2	4	2
Type of engines	Ivchenko AI-24VT	TVD Progress AI-20D Seriy 5 (AI-20M)	Lotarev D-36	Aviadvigatel (Soloviev) D30KP	Vedeneev M-14v-26 Radial Piston Engines
Number of seats	-	50	52	90	6-7
Scientific activities	-	-	-	-	-

Polar research aircraft

Polar research aircraft

Name and model	Let-410	Mil-2	Mil-8	Mil-10K	Mil-17	Mil-26
Nations	Russia	Russia	Russia	Russia	Russia	Russia
Aircraft type	let (Czech Republic)	helicopter	helicopter	helicopter	helicopter	helicopter
Build year	year of introduction 1970	year of introduction 1961	year of introduction 1961	year of introduction 1965	year of introduction 1981	year of introduction 1977
Length (m)	14.424	17.4 (rotors turning), 11.9 (fuselage)	25.2 (rotors turning), 18.2 (fuselage)	41.89	25.2 (rotors turning), 18.2 (fuselage)	40 (rotors turning), 33.5 (fuselage)
Wingspan (m)	19.978	rotor diameter 14.6	rotor diameter 21.3	main rotor diam. - 35.0	rotor diameter 21.3	rotor diameter 32
Cruise speed (knots)	197	105	122	107	119-130	138
Max cargo payload (kg)	1615	800	4000	3000	4000	20000
Number of engines	2	2	2	2	2	2
Type of engines	L 410 UVPE	PZL GTD-350/Isotov GTD-350-4 turbines	TV2-117	D-25V turbo shafts	TV3-117VMA turbines	Lotarev D-136 turbines
Number of seats	9	6-8	24	28	26	70
Scientific activities	-	-	-	-	-	-

European polar and sub-polar aircraft landing strips

Europe has also developed significant airstrip support for facilitating scientific and logistical operations.

Polar airstrips (not related to stations)

Airstrip name	Contact	Longitude	Latitude	Altitude (m)	Airstrip surface	Length	Width	Bearing	Other
Fossil Bluff	BAS	71°19'76"S	68°16'2"W	92	snow				
Sky Blue	BAS	74°51'38"S	71°34'15"W	1500	blue ice	1200	50		
Kap Harald Moltke	DPC	82°4'19"N	29°53'34"W	2	clay	1200	60	01/19	unmanned Located in National Park, require via Danish Polar Center Unusable when wet
Mestersvig	DPC	72°14'18"N	23°55'0"W	10	gravel	1500	50	14/32	unmanned Military Post close to site Located in Nat. Park, requires permission via Danish Polar Center
Station Nord	DPC	81°35'36"N	16°40'58"W	30	gravel - compressed snow october-may	1500	60	04/22	owned and maintained by Danish Military requires permission from Danish Military
Longyearbyen	Gov. Svalbard	78°15'0"N	15°30'0"E	20	concrete	2300	45		
Mid Point Charlie	MIUR	75°32'25"S	145°49'7"E	2520	skiway only ice	1000	20	350°/170° grid	airstrip is accessible from Nov. 12 to Feb. 10
Sitry Point	MIUR	71°39'19"S	148°39'9"E	1600	skiway only ice	1000	20	300°/120°	airstrip is accessible from Nov. 12 to Feb. 10
Troll Airfield	NPI	71°58'42"S	2°24'48"E	1250	ice	3000	10	070	intercontinental flights. Wheels provided aircrafts. Used by DROMLAN
Novo Airfield	AARI-ALCI	70°49'31"S	11°37'41"	550	blue ice	2760	60		intercontinental flights. Wheels provided aircrafts. Used by DROMLAN
Amderma	AARI	69°45'47"N	61°33'47"E	4	concrete	2600	50		
Antipayuta	AARI	69°6'0"N	76°52'0"E						
Batagay	AARI	67°39'3"N	134°41'24"E	212	dirt	2000	61		
Belaya Gora	AARI	68°33'0"N	146°13'0"E		dirt	1800	60		
Chersky	AARI	68°44'0"N	161°20'0"E	6	concrete	1700	61		
Chizha	AARI	67°6'0"N	44°25'0"E		dirt	650	50		
Chokurdah	AARI	70°37'0"N	147°53'0"E	46	concrete	2000	50		
Deputatsky	AARI	69°29'0"N	139°55'0"E	241	gravel	2200			
Dikson	AARI	73°3'0"N	80°22'0"E	47	concrete	1500	46		
Dudinka	AARI	69°22'0"N	86°9'0"E	25	concrete	1454	28		
Gyda	AARI	70°54'0"N	78°32'0"E						
Haryaginsky	AARI	67°12'0"N	56°47'0"E		concrete				
Igarka	AARI	67°26'30"N	86°37'23"E	25	concrete	2512	46		
Indiga	AARI	67°38'0"N	49°3'0"E		dirt	550	60		
Izhma	AARI	65°1'0"N	53°59'0"E	70	concrete	1350			
Kameny Cape	AARI	68°29'0"N	73°34'0"E	30	rolled sand	2460	87		
Karatayka	AARI	68°54'0"N	61°24'0"E	12	dirt	550	60		
Keperveen	AARI	67°51'0"N	166°7'0"E	190	dirt	2000	60		
Kharasavey	AARI	71°6'0"N	66°45'0"E						
Kharuta	AARI	66°51'0"N	59°32'0"E		dirt	650	60		
Khatanga	AARI	71°58'41"N	102°29'26"E	30	concrete	2729	48		
Khorey-Ver	AARI	67°25'0"N	58°4'0"E			650	50		
Kirovsk Apatity	AARI	67°27'0"N	33°35'0"E	157	concrete	2500	42		
Krest Bay	AARI	66°21'0"N	179°6'0"E		dirt	1350	60		
Kular	AARI	70°35'0"N	134°30'0"E	310	dirt	1948	67		
Murmansk	AARI	68°46'54"N	32°45'3"E	81	concrete	2500	45		

Polar airstrips (not related to stations)

Airstrip name	Contact	Longitude	Latitude	Altitude (m)	Airstrip surface	Length	Width	Bearing	Other
Naryan-Mar	AARI	67°37'59"N	53°1'59"E	11	concrete	2500	40		
Nes	AARI	66°36'0"N	44°41'0"E		dirt	650	50		
Nizhneyansk	AARI	71°25'0"N	136°8'0"E	6	dirt	1500			
Nizhnyaya Pesha	AARI	66°44'0"N	47°43'0"E		dirt	550	60		
Norilsk Alykel	AARI	69°18'40"N	87°19'56"E	175	concrete	3441	44		
Novy Port	AARI	67°42'0"N	72°54'0"E						
Nyda	AARI	66°38'0"N	72°55'0"E						
Olenek	AARI	68°3'0"N	112°28'0"E	258	dirt	2000	61		
Oma	AARI	66°39'0"N	46°31'0"E		dirt	600	60		
Pevek	AARI	69°46'59"N	170°35'49"E	3	concrete	2500	42		
Polyarny	AARI	66°24'2"N	112°1'49"E	509	concrete	3100	42		
Sabetta	AARI	71°14'0"N	72°3'0"E						
Sakyryr	AARI	67°47'0"N	130°24'0"E						
Salekhard	AARI	66°35'27"N	66°36'40"E	66	concrete	2718	46		
Saskylakh	AARI	71°58'0"N	114°7'0"E						
Seyakha	AARI	70°10'0"N	72°32'0"E						
Shmidt Cape	AARI	68°52'0"N	179°22'0"E	6	concrete	2500	60		
Shoyna	AARI	67°52'0"N	44°8'0"E		dirt	650	50		
Snezhnogorsk	AARI	68°38'0"N	87°38'0"E	31	pebble	1200	60		
Snopa	AARI	66°45'0"N	47°1'0"E		dirt	550	60		
Srednekolymsk	AARI	67°28'0"N	153°43'0"E	100		3000			
Svetlogorsk	AARI	66°50'0"N	88°24'0"E	120	concrete	1650	32		
Tazovsky	AARI	67°28'0"N	78°42'0"E	28	metal				airstrip length: 800m(metal), 2420m(ice). airstrip width: 39m(metal), 61m(ice)
Tiksi	AARI	71°41'52"N	128°54'11"E	9	concrete	3001	59		
Turukhansk	AARI	65°48'20"N	87°55'48"E	32	concrete	1800	28		
Ust-Kuyga	AARI	70°0'0"N	135°40'0"E						
Valek	AARI	69°22'58"N	88°23'55"E						
Varandey	AARI	68°50'0"N	58°9'0"E		dirt	20	20		only for helicopters
Verkhoyansk	AARI	67°33'0"N	123°33'0"E						
Vizhas	AARI	66°38'0"N	43°55'0"E		dirt	550	60		
Volokovaya	AARI	66°30'0"N	48°15'0"E						
Vorkuta	AARI	67°29'27"N	63°59'41"E	184	asphalt	2200	50		
Yamburg	AARI	67°59'0"N	75°6'0"E	33	concrete	2430	42		
Yar-Salye	AARI	66°52'0"N	70°51'0"E	10	dirt	760	70		
Zhygansk	AARI	66°47'0"N	123°22'0"E	89	dirt	1800	62		

Data and information assets

Polar data and information service infrastructure is developing and emerging resource to allow the integration of information from the vast array of terrestrial, marine, aerial and space based observing platforms. Enhancement of this capacity in European polar programmes, especially cyber infrastructure, will enable the growth of interdisciplinary and earth system approaches.

Polar databases on the internet

Institution	AARI	AWI	BAI	BAS	BELSPO	MEC	MITOC	MIUR	NPI	IGF PAN
Do you have databases of polar stations?	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Do you have databases of polar vessels?	Y	Y	N	Y	N	Y		N	N	Y
Do you have databases of aircrafts?	Y	Y	N	Y	N	N		N	N	
Are the station databases accessible?	Y	Y	Y	Y	N	Y	Y	Y	N	Y
Are the vessel databases accessible?	Y	Y	N	Y		Y		N	N	
Are the aircraft databases accessible?	Y	N	N	Y		N		N	N	
Station databases web address	www.europolar.ru/eng/	www.awi-bremerhaven.de/index-e.html	N	www.antarctica.ac.uk		www.utm.csic.es			-	www.ssf.npolar.no
Vessel databases web address	www.europolar.ru/eng/	www.awi-bremerhaven.de/index-e.html	N	www.antarctica.ac.uk		www.utm.csic.es			www.npolar.no/lance/	www.arcus.org/ALIAS/index.html
Aircraft databases web address	www.europolar.ru/eng/	www.awi-bremerhaven.de/index-e.html	N	www.antarctica.ac.uk					-	
Comments		the arctic station AWIPEV Platform is the French-German Research Base in Ny-Alesund at Svalbard: www.ipev.fr/awipev/	N	the above refers to information held on the BAS website (it is not in a data base format)	a website and research database will be available as of the working of the new Belgian Antarctica station in 2008-09 season				NPI does not have any aircrafts	

European polar scientific and logistical networks

European polar scientific and logistical networks

Institution	IB AS CR	DPC	ESTANTEX	MITOC	IPEV	AWI	KIIIP
Is your institution part of a logistic network providing services to polar stations and infrastructures? *(if yes, specify here)*	not yet	Zackenberg Station (FARO, EPICOM)	not yet, but planning a national operation including a summer only station	DROMLAN: Dronning Maud Land Air Network is providing flight transports to scientific expeditions of different nations. COMNAP/SCALOP coordinates all logistic work of all Antarctic nations.	no	1. DROMLAN (Antarctica) AWI provides services to the Dronning Maud Land Air Network (DROMLAN). The aim of the Dronning Maud Land Air Network (DROMLAN) is to provide an intercontinental air-link from Cape Town to destinations within Dronning Maud Land (Antarctica) to European countries and any member country of COMNAP and SCAR in science related activities, including logistics. The regular air-link improves the accessibility and extends the time period for summer season activities. Founding members are the national polar research organizations of Belgium, Finland, Germany, India, Japan, the Netherlands, Norway, Russia, South Africa, Sweden and the United Kingdom. The DROMLAN co-operation includes the following actions: • To maintain, improve and run two airfields close to the stations Novolazarevskaya (Russia) and Troll (Norway) for intercontinental flights from Cape Town into Dronning Maud Land. • To organize intercontinental air transport of personnel and cargo with appropriate aircraft between Cape Town and the airfields Novolazarevskaya (Russia) and Troll (Norway). • To organize connecting flights with small aircraft to all stations and field destinations in Dronning Maud Land including further destinations such as Vostok, South Pole and stations of the East Antarctic shore region as well. • To organize necessary services as weather forecast, fuel provision at DML stations, and accommodation for the flights above. 2. International Marine Laboratory in Ny-Alesund on Svalbard (Arctic). The new International Marine Laboratory in Ny-Aalesund/Svalbard is operated by Kings Bay AS, Ny-Aalesund. An international consortium of eight institutes, including AWI, steers the scientific profile of the laboratory, which follows the most modern standards of a marine biological laboratory. The lab is open to additional projects from non-consortium members. Current research investigates marine biodiversity, ecology, and related oceanographic topics. An extensive long term data set of biological and physical parameters of the Kongsfjord is being established.	No
Is your institution part of a scientific network providing a support platform to polar programmes? *(if yes, specify here)*	not yet	Zackenberg Station (SCANNET, ENVINET, CEON, ITEX, GLORIA, CALM, ACD) Arctic Station (SCANNET)	no		no	the following AWI platforms support polar programmes: Koldewey Station (AWIPEV Base) in Ny-Alesund at Svalbard (Arctic) and Neumayer Station (Antarctic). Arctic - AWIPEV Base (Koldewey Station): Networks: BSRN, GAW, GTS, NDSC, ENVINET. Antarctic – Neumayer Station/Kohnen Station. Networks: BSRN, NDSC, GAW, GTS, seismological networks. Projects: EPICA-MIS, TASTE-IDEA (IPY project)	No
Does your institution share facilities and/or stations with other institutions or countries? *(if yes, specify the name of the stations, or other facilities, and the countries or the institutions you share it with)*	the Czech Republic opens the Antarctic station in 2006	no	no	we share facilities with the Swedish Wasa station	AWI Germany Ny-Alesund PNRA Italy Concordia Station Antarctica	the following stations are shared with other countries: Germany-France: AWIPEV Base in Ny-Alesund on Svalbard(Arctic). Germany – Russia: Samoylov Station in the Lena river delta, Sibiria (Arctic). Germany – Argentina: Dallmann Laboratory at King Arctic. George Island (Antarctica). Germany – Chile: GARS Antarctic Peninsula	No

European polar scientific and logistical networks

Institution	MIUR	RPRI	MEC	BAS	BAI	IGF PAS
Is your institution part of a logistic network providing services to polar stations and infrastructures? *(if yes, specify here)*	on behalf of MIUR, the CNR and the Consortium PNRA SCrl provide the following services: Arctic: The National Research Council is part of the following network: Ny-Alesund international facility, Ny-Alesund Marine Laboratory, FARO, EPICOM. Antarctic: The PNRA Consortium provides support to Mario Zucchelli Station, Concordia Station, operates the Italian Meteo Net and is part of COMNAP	agreement between Romania and Uruguay Governments regarding the permanent cooperation in Antarctica	no. The Spanish Polar Committee, and the Spanish National Polar Program, has a logistic network to support its national scientific necessities in both at sea and in its Antarctic Bases and eventually camps. To support our necessities in the logistic we operate in the Antarctic Summer two Antarctic Bases (Gabriel de Castilla in Deception Island and Juan Carlos I in Livingston Island (South Bay). The logistic support is made by our Ship ' Las Palmas' operating continuously in the South Shetland area during the summer station. The research at sea is made by our oceanographic vessel Hesperides that usually operates in the area of Scotia Arc, South Shetlan, Bellinghousen sea. When possible, and according to our own programs necessities, we could support other national programs as happens with the Bulgarian Antarctic Base located close to our Antarctic Base Juan Carlos I in Livingston Island.	Dronning Maud Land Air Network DROMLAN	agreement with Chile, Uruguay and Spain Governments regarding logistic and scientific cooperation in Antarctica	FARO
Is your institution part of a scientific network providing a support platform to polar programmes? *(if yes, specify here)*	Italy is part of the following scientific networks: Arctic: NDSC (network for detection of stratospheric changes). ENVINET (European network of alpine and arctic stations), ARCFAC V (The European Centre For Arctic Environmental Research) Antarctic: EPICA, GAW (Global Atmospheric Watch), IHB, NDSC, POLAR-AOD, ICESTAR, SUPERDARN and also: ITASE - International Trans-Antarctic Scientific Experiment (ITASE). It performs traverses to collect information on the Antarctic continent. Talos Dome - It's an ice-core drilling project at Talos Dome involving Italy, France, Switzerland and Germany. ANDRILL - Antarctic Drilling BOOMERANG - Balloon Observations Of Millimetric Extragalactic Radiation And Geophysics; Research on the initial stages of the Universe's formation. SALE - Sub-Glacial Lake Exploration at Vostok and Concordia EVOLANTA - The Biological Evolution in the Antarctic. FDSN - Federation of Digital Broadband Seismographic Network, an international network for the collection of seismologic data. BSRN Baseline Surface Radiation Network. WMO-GCOS Global Climate Observing System	Russian Antarctic Expedition, Chinese Antarctic Expedition, Europolar ERA-NET	no. As we tell before in preceding point above, our Institution is aimed to support our research polar program. Our research national polar program is open to other national by agreement with the scientific projects responsibles. Eventually, and according with our national program necessities we support other countries logistic necessities.	BAS has over 140 collaborations and hosts many scientists from other nations and institutes.	logistic and Scientific Support to projects from Germany, Portugal, South Korea, Chile, Luxemburg and Macedonia.	Europolar ERA-NET
Does your institution share facilities and/or stations with other institutions or countries? *(if yes, specify the name of the stations, or other facilities, and the countries or the institutions you share it with)*	Arctic: Ny-Alesund international facility, Ny-Alesund Marine Laboratory. Antarctic: French-Italian Station Concordia	Law-Racovita Base Romanian Antarctic Foundation and Australian Antarctic Division	as we have explained in the first point above, our research installations are open to other countries researchers included in our national projects and also eventually for permission granted according with our logistic possibilities. The name of our Antarctic Summer Bases are Gabriel de Castilla in Deception Island and Juan Carlos I in Livingston Island (South Bay). At sea we have a logistic support vessel ' Las Palmas' and the an oceanographic vessel Hesperides that usually operates in the area of Scotia Arc, South Shetlan, Bellinghousen sea. We usually cooperate and share media directly with the Bulgarian, Argentinian, Germany, USA, Chilenean, Uruguay, Polish Antarctic Program	in the Arctic, BAS manages a rented facility at Ny-Alesund. In the Antarctic, BAS regularly hosts scientist from other nations	no	

Conclusions

The extensive survey of European polar capacity and national assets has pointed to the following strategic observations:

- The requirement for enhanced European coordination and networking of terrestrial research stations and interoperability in the Arctic and Antarctic supporting a range scientific research clusters.

- Polar logistic support networks such as DROMLAN system and access corridors into Antarctic and the Arctic are a vital element supporting the European polar research system. They should be strengthened through increased European investment and expanded partnerships.

- The forecasting of scientific personnel flows and global scheduling between the European countries and key international partners will be essential in the context of building large scale multi-country programmes.

This inventory of European polar infrastructures is the most comprehensive ever assembled and can be linked closely to the surveying of strategic management practices, investment strategies and progamme definition in volume I.

There is a vast range of scientific theme areas supported by the terrestrial stations, marine vessels and aerial platforms in Polar Regions. Through this portfolio the scientific community, policy makers and the public can be made aware of the capacity at the European level and the importance of investment in these vital facilities.

The work of assembling this inventory required significant interaction and discussion between all of the European Polar Consortium members. Bringing together all of the major governmental ministries and agencies who manage and invest in polar programmes it has resulted in accurate assessment of European polar capacity and identified the strengths and opportunities for growth. This assessment is a major contribution to harmonise management approaches and procedures, to adopt best practices and increasingly speak in a common voice with international partners.

The design and implementation of European scientific platforms in the Arctic and Antarctic is a major goal of these efforts. Many of the terrestrial stations are increasingly acting in the capacity of long term earth observatories for baseline monitoring of chemical, atmospheric, geophysical, biologic and astrophysical baseline parameters.

Annex

Chronology and process to compile the capacity data

Throughout a specific questionnaire provides a synthesis of European polar research infrastructure utilisation and the strategic management of national assets. In particular, it will provide a targeted inventory of European polar assets in terms of polar stations, vessels and aircraft.

Chronology

- May 2, 2005 - The first draft of the infrastructure questionnaire was presented to the partners at the European Polar Consortium meeting in Brussels.
- May 2/July 15, 2005 – The work-package partners (Italy, Denmark, Bulgaria, Sweden, Romania, Greenland, Russia) revised and sent their comments/suggestions to the task leader (MIUR – Italy). The questionnaire was modified and updated according to the partners' suggestions.
- July 15, 2005 – The questionnaire was first launched on-line. The original deadline was 31 August 2005.
- September 18-20, 2005 – The first submissions where presented and discussed at the second EPC meeting in Brussels. Since some of the partners did not complete the questionnaire, the deadline was postponed to the end of September. During the EPC Technical Committee meeting in Brussels, it was agreed to add some additional questions to the questionnaire.
- October 12, 2005 – A short additional questionnaire, made of only 3 questions, was sent to all partners on a word document. The additional questions had been decided together with the partners in Brussels.
- November 18, 2005 – The additional facilities questionnaire was sent to all partners along with a reminder for the partners who had not completed the two previous questionnaires.
- December 16, 2005 - A meeting in Strasbourg was organised to establish a workgroup of IT experts with the aim of creating the structure and the rationale of the future European Polar Consortium «Polar Portal», the website of the Europolar project. The website will contain and display, with different levels of access, the information on European polar programmes and infrastructures collected with the questionnaires.
- April 10,11 and 12, 2006 - During the EPC meeting in Brussels all Europolar partners agreed to undertake a process of verification of the data submitted in the questionnaires. This was necessary since during the process of survey data analysis it appeared that some data was missing, incorrect or not coherent with the same information obtainable from other sources, for instance, from the internet. Italy, as country coordinator of work-package, took care of creating excel tables of the programme and infrastructure survey data for each EPC members.

An additional survey was also needed to provide an inventory of the European polar research facilities not included in the polar stations, vessels, aircraft, airstrips and databases' previous survey. As polar facility we intend to include infrastructures such as universities, laboratories, observatories, scientific huts, drift stations, and others, which constitute a fundamental part of the European research potential and capacity. This additional questionnaire was necessary to have a more complete synthesis of European polar infrastructures utilisation and of the strategic management of national assets.

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FNRS

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FWO Vlaanderen
Fonds Wetenschappelijk Onderzoek
Research Foundation – Flanders

NWO
Netherlands Organisation for Scientific Research

The Research Council of Norway

European Science Foundation

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Photos credit : *Concordia station*/Katell Pierre/IPEV - *Landing of Ilyushin Il-76TD aircraft on snow-ice airstrip at Russian Antarctic base Novolazarevskaya*/AARI - *Polarstern icebreaker*/AWI - *Eiscat radar*/EISCAT Scientific Association European Polar Consortium - *BAS Twin Otter flying low over a striking crevasse field on the English Coast, Palmer Land on the Antarctic Peninsula*/British Antarctic Survey - *BAS Twin Otter aircraft*/British Antarctic Survey - Conception : Latitude