



## **The Eira Expedition 2008-2010 Part of Franz Josef Land Iceberg Patrol Programme**

A programme of

**Arctic Marine Research Expeditions of St. Petersburg Scientific Centre of the Russian Academy of Sciences** developed in collaboration with the Shyrshov Institute of Oceanology, Arctic and Antarctic Research Institute and other leading scientific institutions.

Voyage objective: a comprehensive research expedition into the northeastern Barents Sea and the Franz Josef Land Archipelago.

### **The expedition's main tasks are as follows:**

- Oceanographic research in the northeastern Barents Sea
- Iceberg monitoring along the route
- Reconnaissance investigation of outlet glacier berg-producing fronts at the Franz Josef Land Archipelago
- Search for the remains of the sunken "Eira" yacht in 1881 of Benjamin Leigh Smith
- Checking on the condition of the historical sites related to discovery and exploration of the Franz Josef Land Archipelago
- Biological research into the insular flora and fauna

#### **ACARSA SCIENTIFIC EXPEDITIONS**

Vignolants 6, 2000 Neuchâtel, Switzerland, Mob.: ++41 (0)79 354.75.56, [info@acarsa.com](mailto:info@acarsa.com) [www.acarsa.com](http://www.acarsa.com)

## Justification of the Expedition's Scope

The Franz Josef Land Archipelago is the northernmost Arctic Archipelago on the planet. Over the years the geographical location made its islands a stepping-stone for many Arctic explorers in their intrepid attempts to reach the North Pole. Numerous archipelago islands still preserve many traces of famous pioneers who once stayed there, like Weyprecht, Payer, Leigh Smith, Jackson, Nansen, Wellman, and Sedov among many others. These traces are subjected to the destructive impact of time and therefore will be periodically audited to register their current condition as part of the history of Arctic exploration. Yet, even nowadays, there can be unique findings of historical importance. Just one example: so far, no remains of the legendary "Eira" yacht have been found. This was the yacht which carried the expedition of an English explorer, Benjamin Leigh Smith, to Franz Josef Land in 1880 - 1882. We know that the "Eira" sunk about 17 meters deep at the banks of Northbrook Island. However, any attempts to find its hull so far have failed. Possibly, it has either been moved over the years or even broken by the numerous icebergs plowing the bottom under the shallow waters. One of the expedition's main tasks will be to search for the "Eira" or her artifacts using an underwater side-scan sonar device and divers.



Iceberg monitoring is an element of paramount safety in the navigation, construction and operation of off-shore structures. It is regrettable that the dissolution of the Soviet Union made history of the formerly regular airborne prospecting of the Barents Sea. There have also been sad episodes when ship masters have refused to accommodate scientific researchers and to register the icebergs they met. 'Almighty' space crafts - which lately were handed over all major tasks in monitoring sea surface - are not able to picture the whole water area with a resolution sufficient to detect icebergs. As a result, only sporadic iceberg monitoring by research expeditions serves now as the main data source on iceberg spread. In the meantime, contemporary climatic changes so widely discussed in society and media do impact the production pattern of calving glaciers. In 2003 an expedition by the Arctic and Antarctic Research Institute identified an abnormally big aggregation of icebergs in the East Barents Sea, which consisted of over 100 described bergs of various sizes and shapes. So far, the origin of this anomaly has not been established. One of the most probable candidate areas for producing that iceberg abnormality of 2003 is the Franz Josef Land Archipelago, whose annual berg discharge amounts to 2.3 cubic kilometers.

The Arctic and Antarctic Research Institute proposed a program of a comprehensive survey of Barents Sea icebergs as part of the scientific agenda for the International Polar Year (IPY 2007/2008). The program will unite efforts of oceanologists who study icebergs in sea waters and of glaciologists who study iceberg producers, i.e. glaciers at arctic archipelagoes and islands. The expedition will include reconnaissance surveys of major iceberg producing glaciers of Franz Josef Land.

## ACARSA SCIENTIFIC EXPEDITIONS

Vignolants 6, 2000 Neuchâtel, Switzerland, Mob.: ++41 (0)79 354.75.56, info@acarsa.com www.acarsa.com

Due consideration shall be given to the dynamics of currents in upper sea layers that determine berg-drift and are crucial in understanding the laws of iceberg spread. Therefore, the expedition's plans include oceanographic works in the section that connects the northern end of Novaya Zemlya and Wilczek Island of Franz Josef Land. The section is one of the "secular" Barents Sea sections where surveys have been conducted by research vessels over the last 100 years. A specific feature of this section, labeled section XXVI, is that it serves as a gate for the water exchange between the Kara and Barents Seas. The data obtained by the expedition about local currents will allow determining the most likely directions of bergs' drift from Franz Josef Land for this time of the year.

A range of biological studies is to be conducted on the islands of Franz Josef Land. The austere and yet majestic northern landscape of the archipelago provides a backdrop against which the beauty of all live creatures inhabiting the land stands out. The expedition plans to observe and count polar bears, sea animals (walruses, seals, whales and white whales) and various bird colonies. Possible underwater biological research carried out by expedition divers looks particularly promising.

All in all, the expedition covers a broad spectrum of issues and surveys that will be of interest to both professionals and all enthusiasts of Arctic wild life.

### **Oceanographic Surveys**

Oceanographic surveys will include measurements of sea water temperature and salinity, taken at the surface and down to the bottom (TS-sounding), and recording speed and direction of sea currents. The main bulk of the work is to be conducted at 9 oceanographic stations positioned along the axe of section XXVI. Additional TS-sounding in the vicinity of big icebergs and the fronts of some outlet glaciers is also possible. A 3"MicroCTD sounder by FSI (USA) will be used for sounding. It operates on a range from 0 to 2000 meters that exceeds by far the maximal sea depth in the area, approximately 400 meters. TS-sounding could be conducted from the vessel, from a ship's boat or from an inflatable rubber boat. Researchers also plan to use an opto-hydrographic sounder.

An acoustic doppler current meter (ADCP) by SonTeck (USA) has been suggested as the main device for measuring currents. The instrument's one metering cycle provides complete information on currents within a 100 meter thick layer. A compact Russian spinning current meter Vector-2, designed by the Arctic and Antarctic Research Institute, can also be employed. Its advantage is that it can be used from the ship's boat or inflatable boat while the acoustic profiler can only be used from the vessel.

### **Iceberg Monitoring**

Icebergs will be monitored throughout the entire voyage. The area of Franz Josef Land is known for its variety of icebergs. Meeting an iceberg further south into the Barents Sea is not very likely. The lower the latitude of an iceberg spotted in the Barents Sea, the higher is the scientific value of the information. Upon meeting with an iceberg, the expedition will record its coordinates and its above-water size and shape. As a rule, icebergs will be photographed. Subject to the specialized equipment it is carrying (e.g., side-scan sonar device), the expedition will try to determine the dimensions of the iceberg's submerged part. Drafts of small icebergs could be measured by divers with a depth gage. For big icebergs - i.e., 10-20 meters high and several dozens or even hundreds of meters long - draft measuring is somewhat problematic because the draft could be over 100 meters deep.

### **ACARSA SCIENTIFIC EXPEDITIONS**

Vignolants 6, 2000 Neuchâtel, Switzerland, Mob.: ++41 (0)79 354.75.56, info@acarsa.com www.acarsa.com

## **Reconnaissance Surveys of Glacier Fronts**

The expedition plans to conduct reconnaissance surveys of the fronts of outlet glaciers at islands of Wilczek Land (bays of Elena Guld and Perseus), of Gallya (bays of Hidrografo and Surovaya) and of McClintock (southeastern and southern shores). Besides being naturally beautiful, these glaciers are of huge scientific importance as producers of big icebergs. The reconnaissance studies are designed to determine the height and width of a glaciers' front, to describe any icebergs in its proximity and to conduct off-shore oceanographic measurements along its front.

## **Checking the Condition of Historic Sites**

The Franz Josef Land islands have many sites associated with the legendary Arctic explorers of the 18th and 19th centuries. The expedition intends to visit the following locations:

The initial landing spot of the Franz Josef Land discoverers who arrived at Wilczek Land Island on November 1, 1873. There is also the grave of Otto Krisch, an engineman of the Austro-Hungarian expedition.

Cape Heller, at Wilczek Land Island, with a food depot preserved since the Wellman expedition of 1898 - 1899, where two Norwegian members of the expedition, Bentsen and Bjervig, spent the winter.

Ruins of an American camp set up by the Baldwin expedition of 1901 - 1902 and the Fiala expedition of 1903 - 1905.

Remains of Fiala's camp at Cape Dillon, McClintock Island;

An abandoned Soviet polar station in the Tikhaya Bay of Hooker Island. There is also a memorial cross of Sedov's expedition at the site of their astronomical station.

Leigh Smith's cabin (1880) (the so-called Eira house) at Bell Island;

Famous Cape Flora of Northbrook Island with the ruins of a base of the English Jackson's expedition and a meeting point of Jackson and Nansen. In 1914, navigator Albanov and sailor Conrad stayed there. There is also a monument to the missing members of the first party of the Duke of Abruzzi's Italian expedition.

Cape Tegetthoff of Gallya Island, equally famous and related to the discovery of Franz Josef Land by Weyprecht and Payer on August 30, 1873. Nowadays, there are remains of the American camp set up by the Wellman expedition.

## **Search for the Sunken Eira Yacht**

An English expedition headed by Benjamin Leigh Smith visited Franz Josef Land twice - in 1880 and 1881 - aboard the "Eira" steam yacht. After many but unsuccessful attempts to sail through the ice fields, the "Eira" was blocked by ice at Cape Flora, Northbrook Island on August 21, 1881. She sunk the same day at a depth of about 17 meters. The Leigh Smith expedition spent the winter at Cape Flora and then rowed their pulling boats to Novaya Zemlya summer 1882.

So far all recent attempts to find the sunken "Eira" have failed. The expedition is planning to search a small field of seabed near Cape Flora with a side-scan sonar device. This can be done from the ship or from a service boat (similar to the ship's boat, a motor boat or inflatable boat). Should we identify any items resembling the hull or its pieces, it is planned for divers to make more detailed investigations. If our sonar search brings no positive results, we may attempt to investigate a limited seabed area at the approximate coordinates of the Eira's wreck. There we will try to find any smaller items, which could have survived if the hull was destroyed by an iceberg plowing the bottom.

## **ACARSA SCIENTIFIC EXPEDITIONS**

Vignolants 6, 2000 Neuchâtel, Switzerland, Mob.: ++41 (0)79 354.75.56, info@acarsa.com www.acarsa.com

## Biological Studies

The Program of Biological Studies proceeds from the fact that, in general, scientists have poor knowledge of the Franz Josef Land Archipelago and that industrial exploitation of the Barents Sea is increasing. Therefore the Program intends to:

observe birds and mammals around the islands of Franz Josef Land;

determine quantities and the spread of birds and mammals in the Barents Sea waters en route;

gather data on sea bird colonies at Franz Josef Land to improve the database of bird nestling colonies in the Barents Sea;

collect biomaterial to identify micro arthropods associated with arctic birds;

collect flora samples at the islands of Franz Josef Land (i.e., vascular plants, lichens);

gather ichthyic fauna in the zone near the shore.

## Expedition Ship's Parameters

The "Viktor Buynitskiy" is a modern and comfortable research vessel belonging to the Hydro-Meteorological Institute in Murmansk. She was built in 1986 in Finland, and was designed as an ice-strengthened vessel. It is now under long term contract with the Northern Shipping Company. She was converted in the Netherlands for passenger use and is ideally suited for scientific expeditions and excursion cruising. She has been certified according to the ISM (International Safety Management) code.

The ship is built with strong materials: it is made of steel and is equipped with an ice-strengthened hull, perfect for the polar seas. The "Viktor Buynitskiy" is manned by a Russian crew of about 15, all highly experienced in ice navigation. Russian captains are recognised experts in polar navigation.



## ACARSA SCIENTIFIC EXPEDITIONS

Vignolants 6, 2000 Neuchâtel, Switzerland, Mob.: ++41 (0)79 354.75.56, [info@acarsa.com](mailto:info@acarsa.com) [www.acarsa.com](http://www.acarsa.com)

## Ship's Major Properties

Maximal Length: .....50 metres (164 feet)  
 Maximal Width: .....10 metres (33 feet)  
 Draught: .....3.6 metres (12 feet)  
 Tonnage: .....929 tonnes  
 Hold Capacity: .....12 knots  
 Speed: .....1340 horsepower diesel engine  
 Cruising Range: .....35 days independent operation  
 Ship Capacity (including the crew): .....45 people

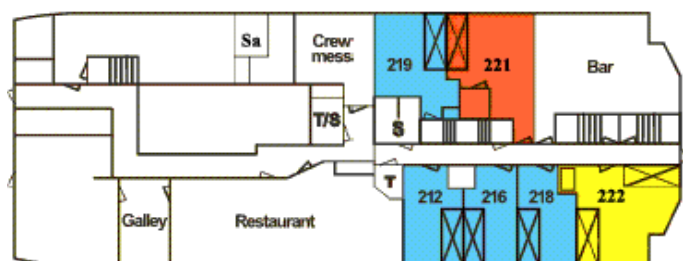
Inflatable rubber Zodiac boats of 800 kg carrying capacity outfitted with 10 and 30 hp outboard motors will be used in addition to the ship's standard crafts.

- The "Viktor Buynitskiy" provides accommodation for 30 travellers in comfortable triple, twin and superior cabins.

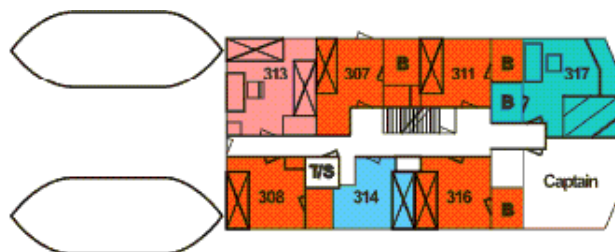
- All cabins are facing outwards, with a desk and ample storage space. Cabins on Deck 2 have portholes and cabins on Deck 3 have windows.

- 6 twin and 2 triple cabins without bath have upper and lower berths and washbasins (triple cabins have an additional upper berth and one cabin has no washbasin). Shared shower and toilet facilities are conveniently located on Decks 2 and 3.

- 5 cabins with private facilities are located on Decks 2 and 3 and have upper and lower berths. 1 superior cabin, with private facilities, on Deck 3, has a separate bedroom with a double bed.










Deck 2



Deck 3

### Symbols :

- |                                                                                    |                                                |              |
|------------------------------------------------------------------------------------|------------------------------------------------|--------------|
|  | - superior                                     | Sa - sauna   |
|  | - twin with private facilities                 | B - bathroom |
|  | - twin without facilities                      | T - toilet   |
|  | - four-berth without facilities                | S - shower   |
|  | - four-berth without facilities (no washbasin) |              |
|  | - upper and lower berths                       |              |
|  | - double bed                                   |              |

## ACARSA SCIENTIFIC EXPEDITIONS

Vignolants 6, 2000 Neuchâtel, Switzerland, Mob.: ++41 (0)79 354.75.56, info@acarsa.com www.acarsa.com

## **Voyage Itinerary**

The exact departure date and time will be agreed among all the expedition stakeholders.

The Vessel is expected to start from the city of Saint Petersburg.

Short itinerary given below, will start after a stop in Murmansk or Archangelsk.

### **Day 1**

The vessel goes by the White Sea. Meeting the crew. Mandatory drills involving all crew members, the research team and the passengers. While the ship is passing through the narrow exit from the White Sea, she will come close to the western shore of the Kola Peninsula providing an exquisite view onto its austere high banks.

### **Day 2**

The ship enters the Barents Sea and sails north along the banks of Novaya Zemlya. Her course will draw near the shore from time to time and if the weather and the visibility permit, we are bound to capture breath-taking views in pictures and videos. This will be a day of lectures on the history of the Barents Sea and the exploration of the Franz Josef Land Archipelago and its wild life, about Barents Sea's icebergs and arctic oceanography.

### **Day 3**

By the evening the vessel is expected to arrive at the 1st station of section XXVI that is located on the border between the Barents and the Kara Sea, north of Novaya Zemlya. Round-the-clock oceanographic work at the section will begin. Work at each oceanographic station is scheduled to last for 1 hour, and then the vessel moves to another location within the section. The transfer will take several hours, which will be spent on data processing and rest. Altogether there are 9 oceanographic stations planned at section XXVI.

### **Day 4**

Oceanographic work at section XXVI is in progress.

### **Day 5**

Oceanographic work at section XXVI is completed. The last station is located close to Wilczek Island. This was the first island of the Franz Josef Land Archipelago on which discoverers set foot. We are hoping to approach the island and disembark. There is the grave of Otto Krisch, an engineman with the Weyprecht and Payer Austro-Hungarian expedition. He was the first human being to be buried at Franz Josef Land.

### **Day 6 - 7**

Landing at Tegetthoff Cape, Gallya Island, named after the ship "Tegetthoff" of the Austro-Hungarian expedition. The discovery of that previously unknown cape on August 30, 1873 is regarded as the date on which Franz Josef Land was discovered.

En route to the large Wilczek Island, home of several calving glaciers, including the famous Znamenity glacier, which often produces massive tabular icebergs. This day is reserved for various research activities at the glacial fronts and icebergs. If possible, there will be shore landings close to the glaciers and at Cape Heller, where once the now ruined food depot of the Wellman expedition was located.

Day 8

Heiss Island. Visit to Krenkel's Observatory, a Russian hydro meteorological station.

Day 9

Landing at Aldger Island to visit the ruins of the American camp of the Baldwin and Fiala expeditions.

Day 10

Studies of glaciers at big McClintock Island. Landing at Cape Dillon to visit the remains of the camp set by the Fiala expedition.

Day 11

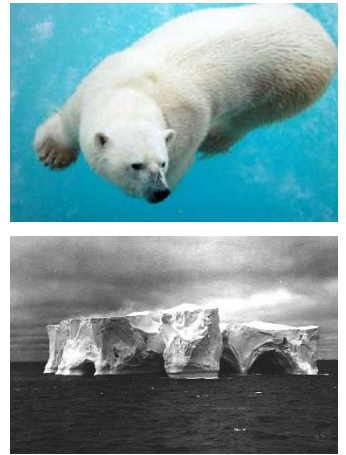
Landing at Tikhaya Bay, Hooker Island, to conduct glacier research and to visit an abandoned Soviet polar station.

Day 12 - 14

The program includes landings at Bell (Eira House) and Northbrook (Cape Flora) Islands, sonar survey of the seabed and diving at Cape Flora. Completion of work on the evening of Day 14 will be celebrated with a festive dinner either aboard the ship or ashore, if we are lucky with the weather.

Etc.

It must be said that this is a tentative itinerary and can be updated subject to the weather, ice conditions, etc., because of the nature of an arctic expedition into scantily explored and uninhabited areas.



**ACARSA SCIENTIFIC EXPEDITIONS**