РОСМОРПОРТ

ФЕДЕРАЛЬНОЕ ГОСУДАРСТВЕННОЕ
УНИТАРНОЕ ПРЕДПРИЯТИЕ

Navigation and Information Support of Voyage Planning in the Northern Sea Route: the Case of a Conventional Icebreaker of FSUE “Rosmorport”

Icebreakers of FSUE “Rosmorport”

Icebreaker “Admiral Makarov”

The main characteristics of the icebreaker:

- year of production: 1975 г.;
- total installed power:36000 BHP;
- displacement: 20,247 tons;
- length: 134,84 m (442.4 ft);
- beam: 25.97 m (85.2 ft) (moulded), 26.05 m (85.5 ft) (max)
- crew: 58 people;
- ice break thickness: 1,8 m.

Maritime Satellite Communication Station VSAT

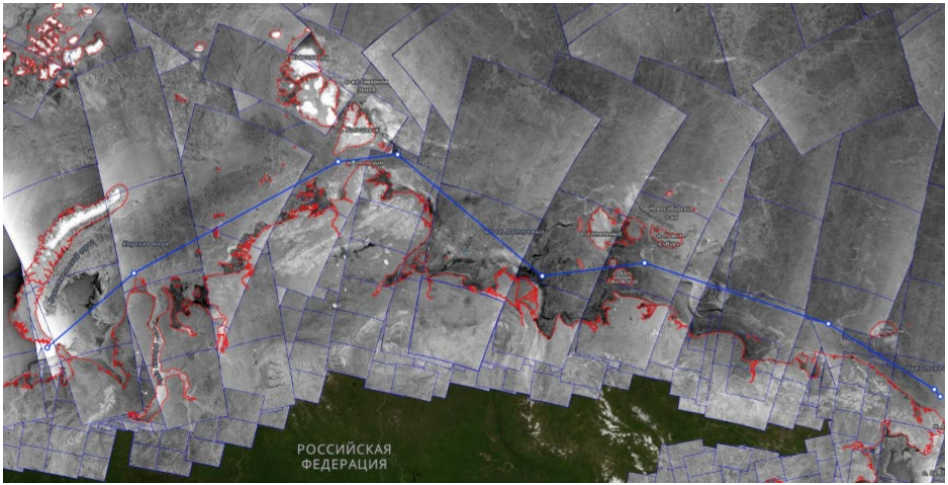
Advantages of using VSAT MSSS:

- permanent monitoring of ships;
- high reliability of the network;
- cost optimization;
- ability to select operational speed;
- easy installation and maintenance of equipment;
- marine type of equipment: ensuring stability of satellite signal at heavy seas up to force 5;
- the crew is provided by ship-to-shore communications;
- ensuring stable communication in case of emergency.

Maritime Satellite Communication Station VSAT

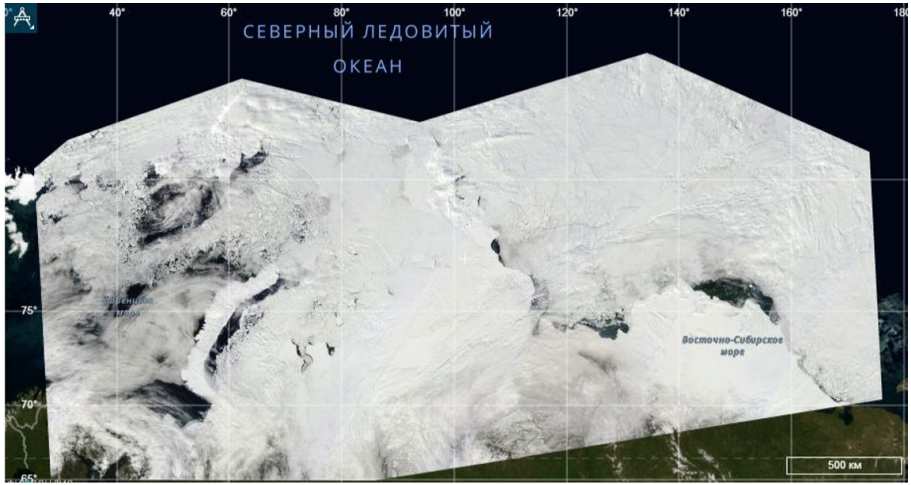
Services based on VSAT MSSS:

- access to the public telephone network through the ship owner's telephone line;
- administration of network access by ship's users;
- service access to the Internet;
- support of video monitoring systems onboard the ships;
- on-line ship's tracking on the maps;
- remote monitoring of the shipboard equipment operation;
- collection, transmission and storage of telemetric, cartographic and navigational information;
- telemedicine.



Improvement of safety and economic efficiency of shipping (radar satellite imagery)

Coverage of the Russian Arctic and NSR sector with Sentinel-1 images from 01.01.2021 to 30.09.2021



Improvement of safety and economic efficiency of shipping (optical satellite imagery)

Coverage of the Russian Arctic and NSR sector with Terra/Aqua MODIS images in one day (15.01.2021)

Tasks to be solved with the help of SCANEX LLC services

Arctic ice monitoring	Monitoring of dangerous phenomena	Vessel monitoring
determination of ice edge locations	detection of dangerous ice formations and assessment of their specifics	monitoring of vessels in area via satellite data (AIS)
evaluation of ice concentration	detection and identification of icebergs and iceberg waters, and assessment of their specifics	history of any vessel movement
determination of the development (age) of ice forms	icebergs drift modeling	ships traffic assessment
detection of large ice formations		meteorological support of ships
detecting ice under pressure and open pack ice areas		
determination of ice-free water areas		

Ice monitoring services (ice edge contour – “water-ice” boundary)

This service can provide the following information about ice:

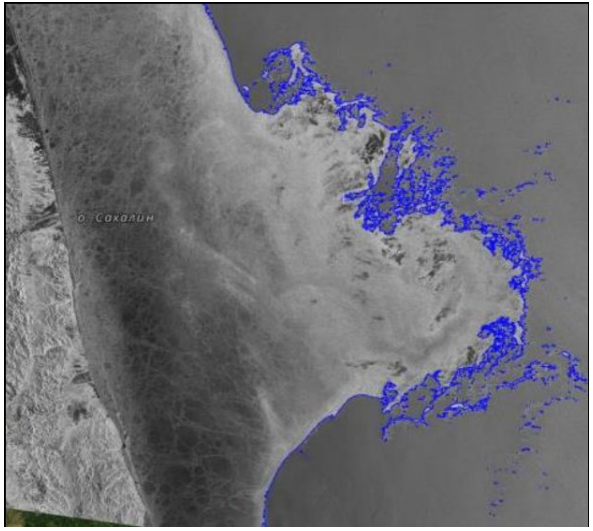
- edges of stationary (fast ice) and pack ice;

- ice concentration;

- concentration boundaries;

- availability and location of large channels, fractures, ice openings and open pack ice;

- shapes and sizes of separate giant floes and vast floes.



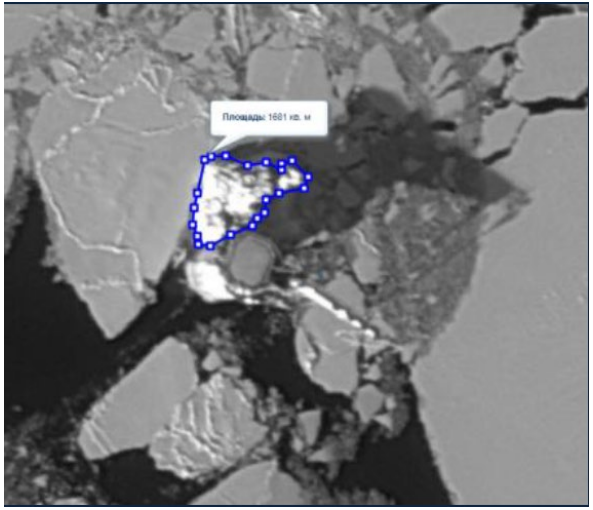
Ice monitoring services (coordinates of dangerous ice phenomena)

This service can display coordinates of dangerous ice phenomenas such as:

- early ice formation;

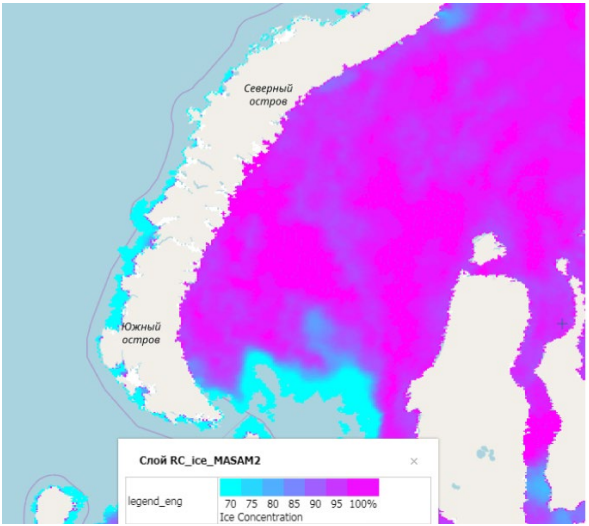
- intensive ice drifting;

- formation of ice, blocking the transit for ships and icebreakers during the period of navigation via common sea routes.



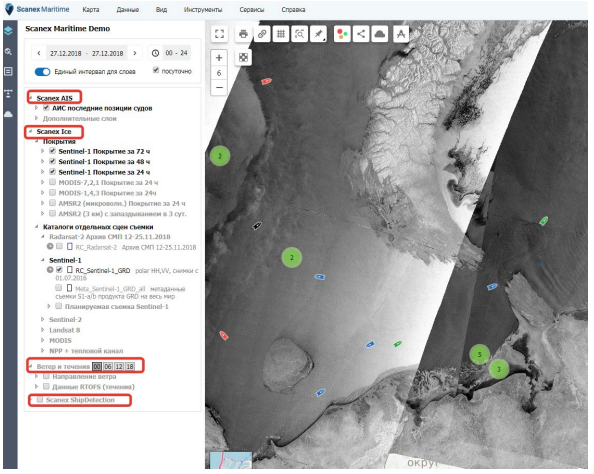
Ice monitoring services (ice cohesion)

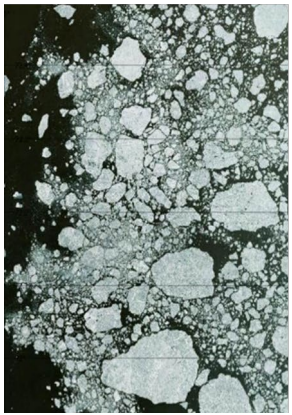
Graphical analysis of ice concentration allows to evaluate the coverage of sea surface by pack ice; its numeric value is estimated through the ratio of the total area of ice to the total area of visible sea surface.

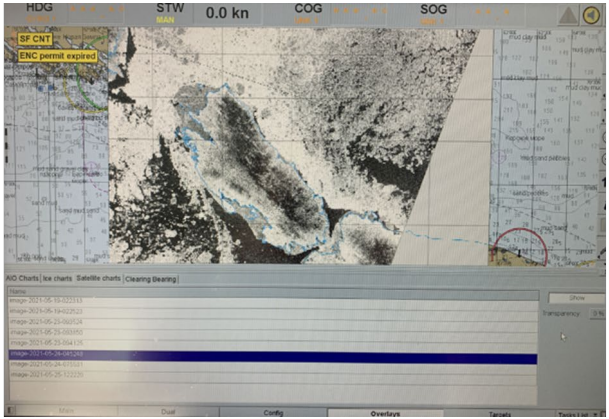


Ice monitoring services (ice cohesion)

Shipmasters on the icebreaker via Internet have access to GeoMixer geoportal, where they can analyze the current ice situation visually in real time, based on images of different time intervals (24, 48 and 72 hours) depending on the ship sailing area.

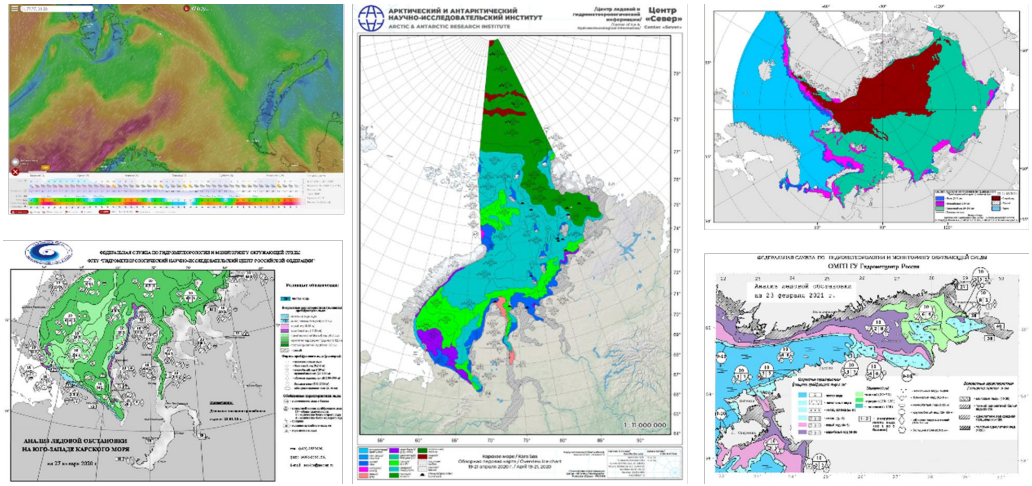






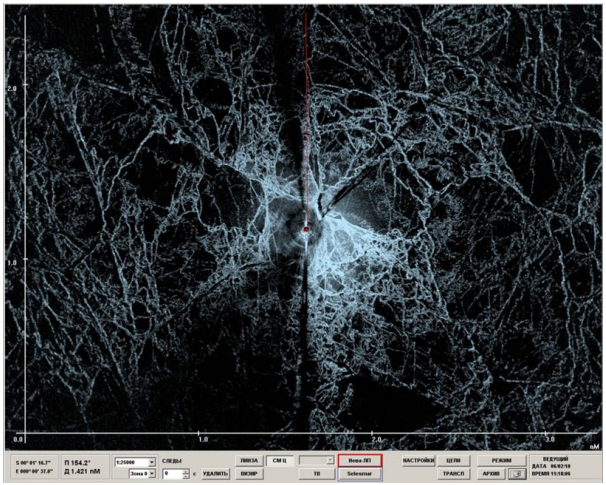
Integration of ScanMagic software and ECDIS

- electronic cartographic navigation and information system (ECDIS on the icebreaker "Admiral Makarov") (left);
- prepared ice map for the icebreaker navigation area (center);
- -ice map installed in ECDIS on top of the electronic navigation map)(right).



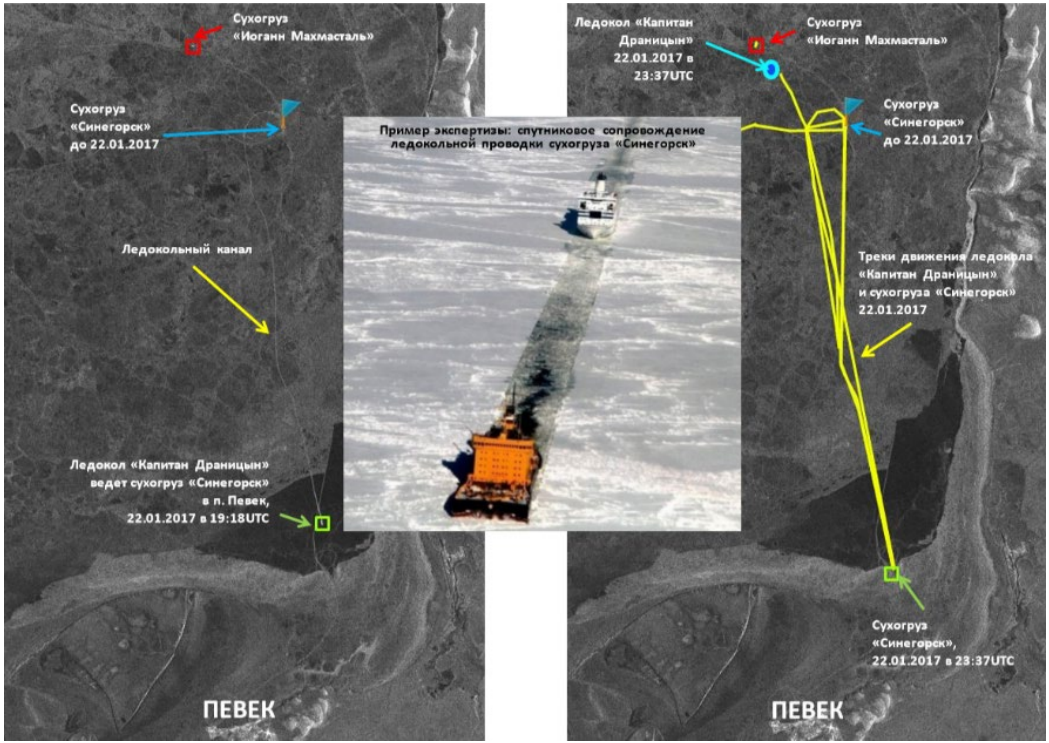
Additional services for Ice situation monitoring

Additionally to information obtained from the Internet, the Murmansk branch of Rosmorport sends the following data to the icebreaker at regular intervals via corporate e-mail: satellite images of ice conditions obtained from free Internet sources, as well as analysis of ice conditions in the icebreaker navigation area with weekly forecast provided by "Hydrometeorological Research Center of the Russian Federation".



Maritime satellite communication station VSAT

- radar indicator of ice conditions on the icebreaker Admiral Makarov (left);
- image of the ice field on the screen of the ice radar indicator (right).


Сухогруз
«Иоганн Махмасталь»
Сухогруз
«Синегорск»
до 22.01.2017
Ледокольный канал
Ледокол «Капитан Драницын»
ведет сухогруз «Синегорск»
в п. Певек,
22.01.2017 в 19:18UTC
ПЕВЕК
Пример экспертизы: спутниковое сопровождение ледокольной проводки сухогруза «Синегорск»
Ледокол «Капитан Драницын»
22.01.2017 в
23:37UTC
Сухогруз
«Иоганн Махмасталь»
Сухогруз
«Синегорск»
до 22.01.2017
Треки движения ледокола
«Капитан Драницын»
и сухогруза «Синегорск»
22.01.2017
Сухогруз
«Синегорск»,
22.01.2017 в 23:37UTC
ПЕВЕК

Ice wiring

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Thank you for your attention!

Zelenkov N.K.