ROSCOSMOS

GONETS
SATELLITE SYSTEM

SATELLITE SYSTEM “GONETS”

gonets.ru

ABOUT COMPANY

Joint-stock company “Satellite System “GONETS” — the sole operator of the State Space Corporation ROSCOSMOS for satellite communication and relay systems.

“Gonets” system is a low-orbit satellite system designed to transmit data and provide communication services to mobile and stationary subscribers, exchange messages, monitor infrastructure, and facilities, primarily in areas not covered with ground-based communication networks (GSM, 3G, LTE).

“Gonets” system designations:

- data transmission
- transmission of GPS/GLONASS positioning data
- personal messaging
- M2M satellite channels

GSM world coverage map

World coverage map with “Gonets” system services

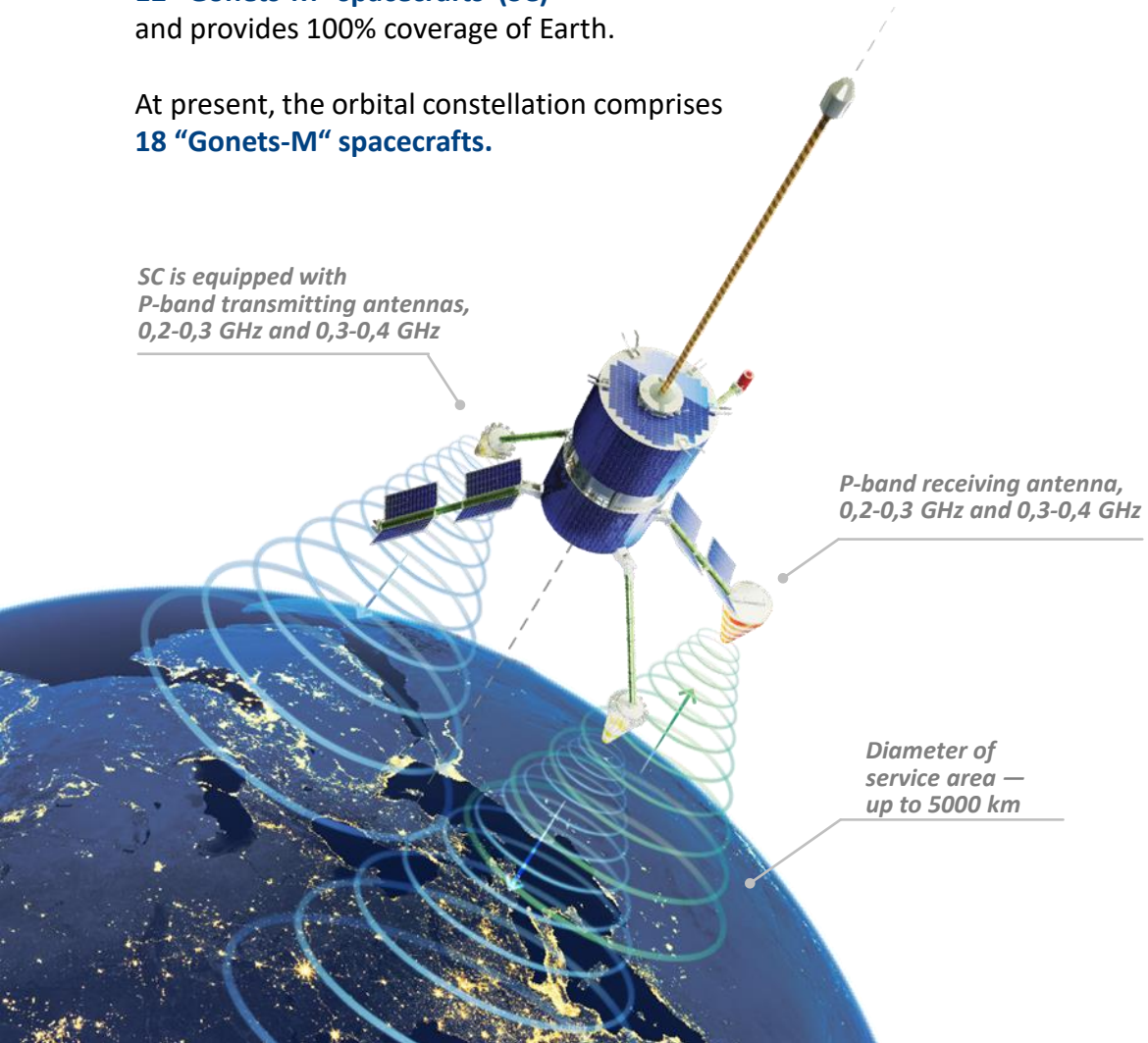
The system provides satellite communications at any location on Earth

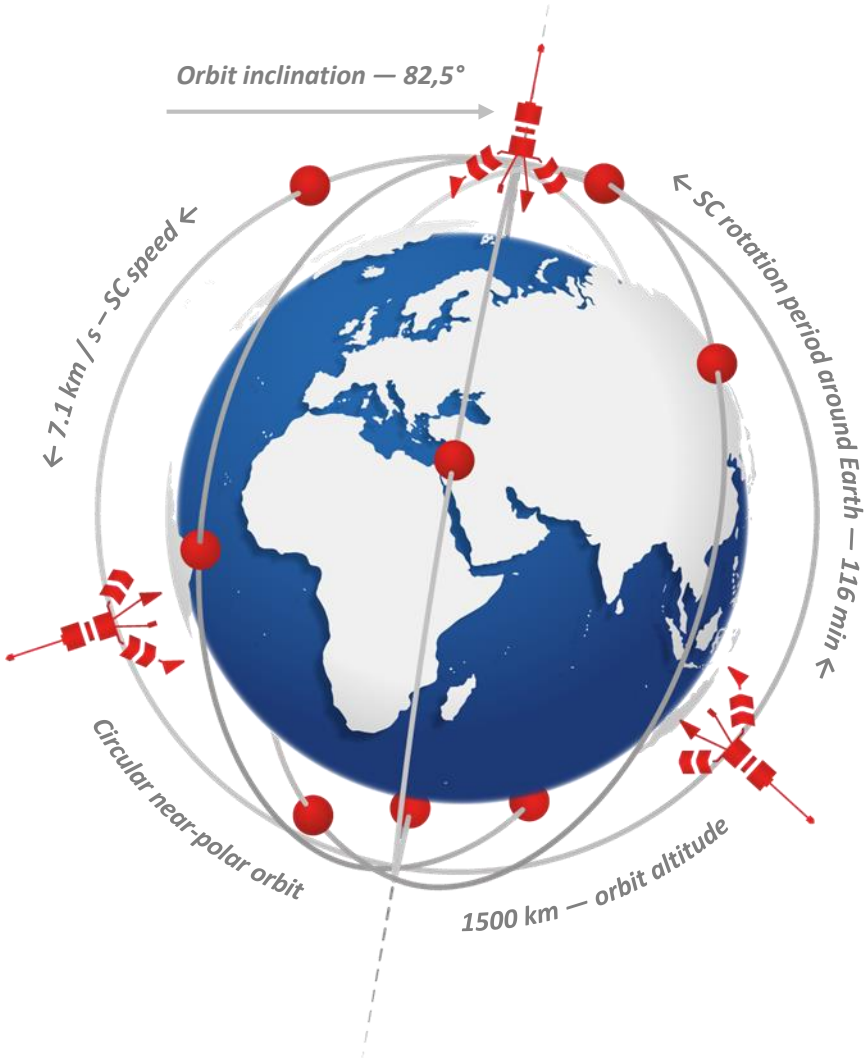
The information provided is current for 2022

ORBIT CONSTELLATION
of “Gonets” system

The regular orbit constellation comprises
12 “Gonets-M“ spacecrafts (SC)
and provides 100% coverage of Earth.

At present, the orbital constellation comprises
18 “Gonets-M“ spacecrafts.





The Russian Space Program includes
the renewal of the orbital constellation
with 6 new SCs in 2022-2025

GROUND INFRASTRUCTURE
of “Gonets” system

The radiovisibility areas of regional gateways (RG**)** **embrace the whole Russia’s territory and adjacent areas**, thus facilitating efficient data exchange with the SCs of orbit constellation.

RGs for receiving satellite traffic

Radiovisibility areas of RGs

In 2020, four new regional stations were put into operation (Rostov-on-Don, Anadyr, Norilsk, Murmansk)

The information provided is current for 2022

SUBSCRIBER EQUIPMENT
of “Gonets” system

Total kit weight, kg	**0,7– 4,2 (depending on the type and configuration)**
Frequency band, MHz	**312 – 390**
Interfaces for user devices	**RS-485 or 100 Base-T Ethernet**
The volume of message, Kbyte	**Up to 500 (packet data transmission)**
Operating temp, °C	**from -50 to + 50**

The subscriber equipment of “Gonets” system facilitates stable operation at various stationary and mobile assets

► Subscriber terminals

Standard subscriber modem

Ship station in a water-proof housing (IP 67) with a battery for autonomous power supply

Small ship station in a water-proof housing (IP 67) with a battery for autonomous power supply

► Satellite antennas

Mobile

Stationary

GONETS-TRACK*

vehicle monitoring

A significant number of highways **are not covered with ground-based communication networks**. The use of satellite communications on such roads for transmission of alert messages and other telematics data dramatically increases the safety of both freight and passenger traffic.

JSC "Gonets" satellite system" participates in development of “Gonets-track” service, which is intended for a large number of consumers in the private and public sectors of the economy.

One of the ways to remotely control the movement of cargos is **the subscriber modem “Gonets”** designed to receive, store and transmit information via satellite channels.

The device has been successfully tested on **different types of vehicles** and is used for monitoring of cargos that **requires special attention.**

Service provided:

- Transmission of **vehicle positions**
- **SOS signal transmission** from any location of the vehicle

* - concept name of the industry solution project

GONETS-WHALE*

terminals for sea and river vessels

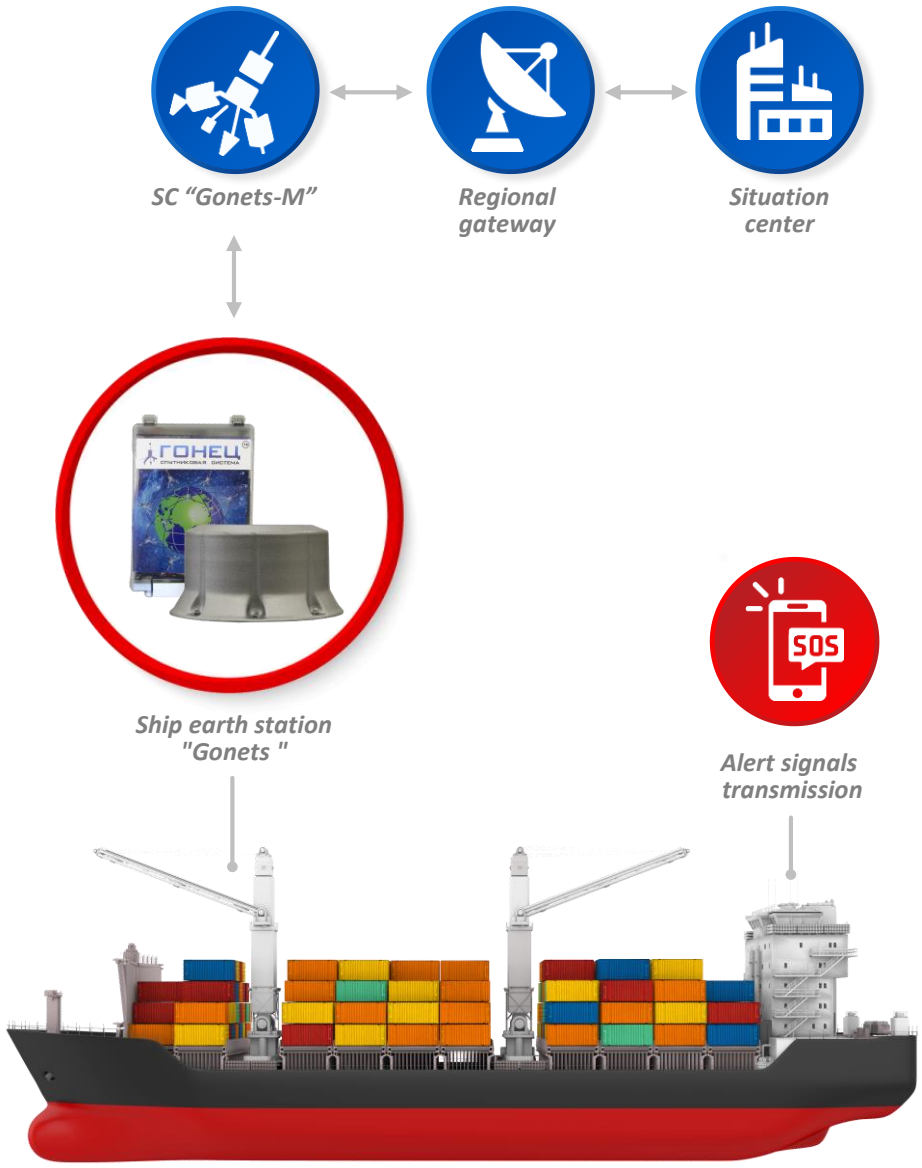
A ship earth station is a subscriber device, which is installed on **sea and river vessels** of various displacement and purpose.

When fishing in areas **above 75 degrees north latitude**, data on the location of the vessel must be transmitted to the regional centers of the fisheries monitoring system exclusively through the “Gonets” station.

Service provided:

- **Online vessel tracking** along the entire route
- **Data transmission** to monitoring centers

The new modification will combine a mobile antenna and transmission and reception unit in a plastic case.



* - concept name of the industry solution project

GONETS-ERA-GLONASS*

prospective car accident messaging service

The ERA-GLONASS emergency response system is used for rapid transmission of information about **road and other accidents** on highways to fast-response services. In the event of a collision, the shock sensor is triggered and the signal is automatically transmitted to the emergency services' situation center via ground communication networks. It is possible for the driver to call by pressing the button.

If an accident occurs outside the coverage area of cellular networks, it is impossible to transmit the alarm signal by ground means. In such zones, it is possible **to use the channels of "Gonets" satellite system**, which provides **100% coverage of the territory of Russia** and is able to transmit an emergency message about an accident from places with no ground communication networks or insufficient coverage.

Service will provide:

- Transmission of the **exact positioning of accident scene**
- **Automatic assessment of the direction and force of impact** in the event of an accident, speed before impact, overload values, number of passengers fastened
- **SOS signal transmission** from any location of the vehicle
- **Prevention of false calls**, which today are more than 90%

* - concept name of the industry solution project

The information provided is current for 2022

GONETS-SHC “CEDAR”*

monitoring of mobile machinery, stationary equipment and industrial facilities

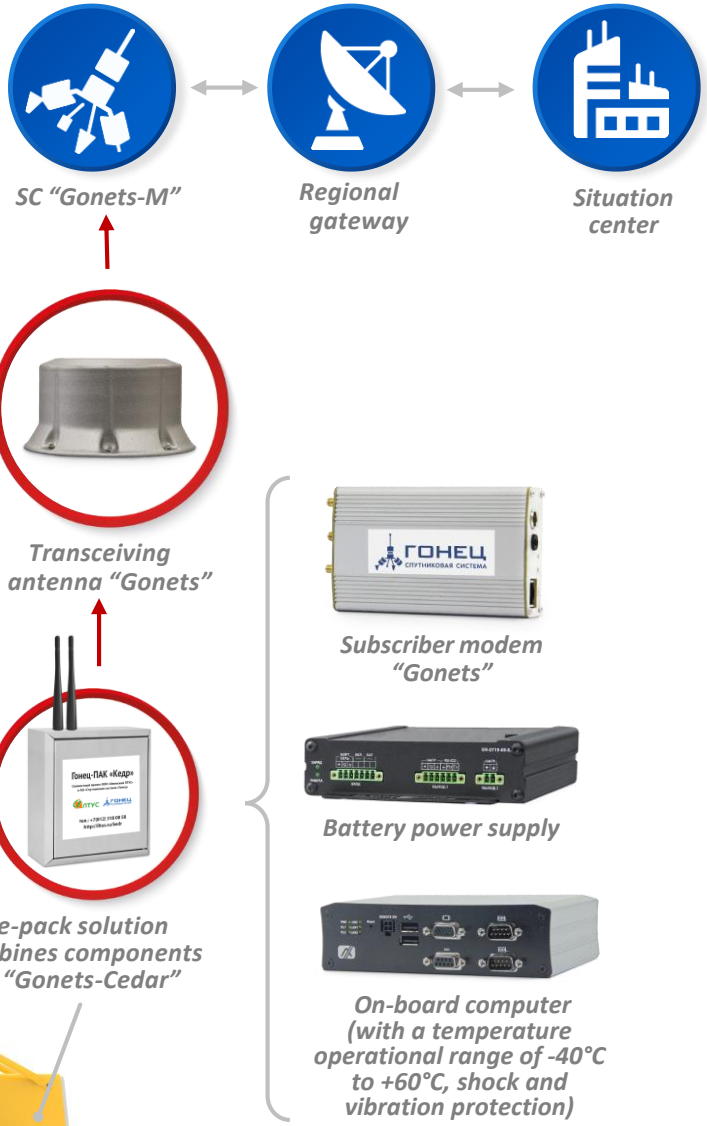
LLC "Ilim LTUS" (telecom operator providing services to the leader of the pulp and paper industry of Russia JSC "Ilim Group") has developed a software and hardware complex “Gonets-SHC "Cedar" using subscriber terminals of the satellite system “Gonets". “Gonets-SHC "Cedar" is a modular system that provides flexible integration with equipment installed on forestry equipment and customer data systems. Complex intended for monitoring of condition of equipment, transport, and facilities.

Service provided:

- Transmission of logging equipment and transport **location positions**
- **Control and transmission of any telematics data** (engine pressure, oil pressure and temperature, speed, etc.)
- **Automation of data collection and transmission** from different sources
- Transmission of **personal messages or SOS signals**

Application:

- **Industrial facilities**, equipment and transport
- **Mining infrastructure** and equipment
- **Gas and oil pipelines**
- **Forestry machinery**



* - concept name of the industry solution project

GONETS-TSK*

digital monitoring of oil and gas extraction and transportation

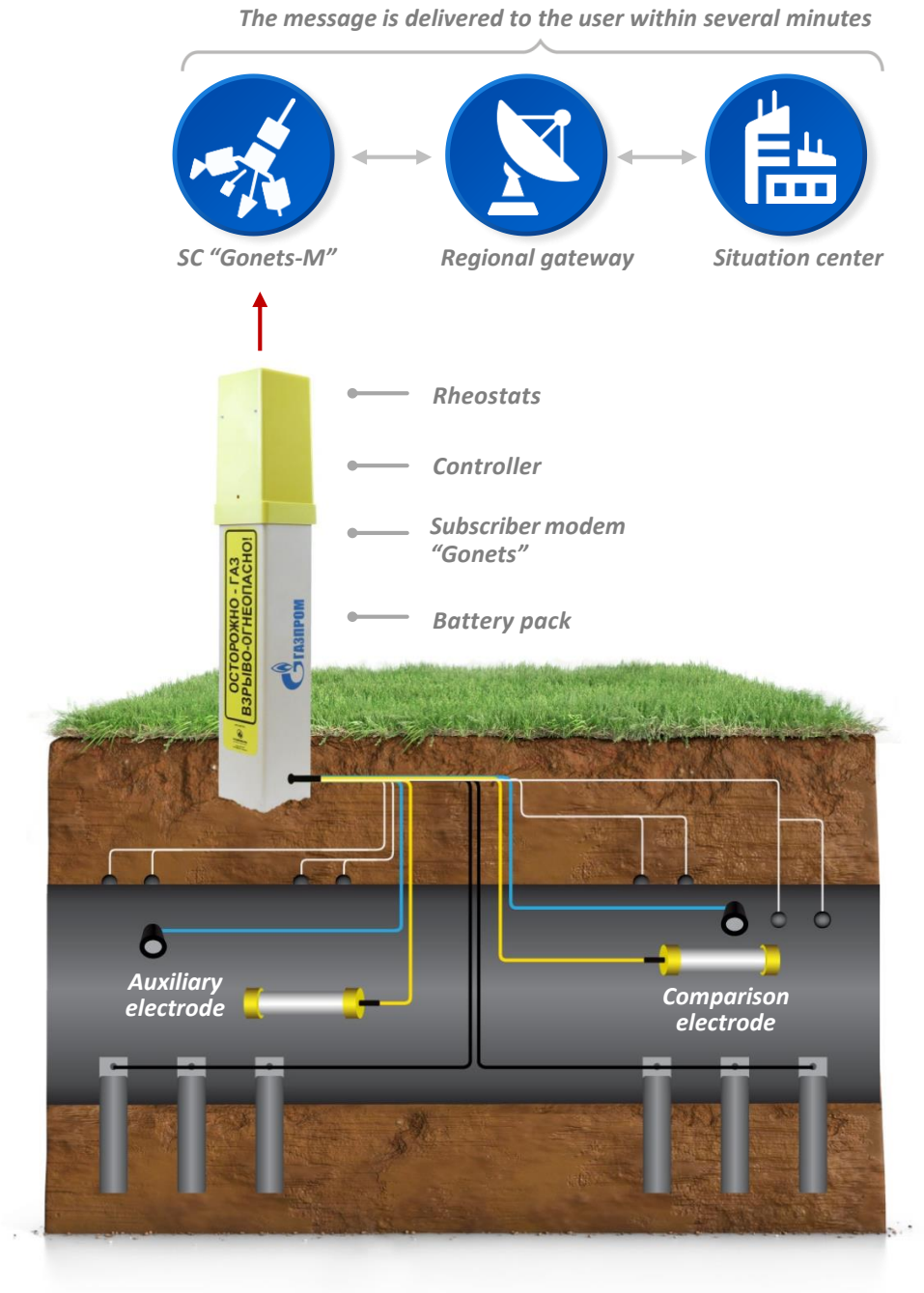
90% of accidents associated with oil spills from oil pipeline breaks occur **due to corrosion of pipe metal.**

Satellite services for monitoring trunk pipelines will allow real-time monitoring of the state of infrastructure facilities and prompt response to the accidents. The complex measures the rates of external and internal corrosion, erosion and electrical parameters of objects. Data from the sensors are sent to the monitoring center for processing via Gonets satellite channels.

Service capabilities:

- **Corrosion rate detection and control** (frequency of data collection and transmission is determined by the user)
- **Collection and transmission of telematics data** from the object:
  - AC/DC voltage on the pipeline
  - Electrochemical polarization
  - Density of alternating and direct currents
  - Current directly in the pipeline (insulation quality assessment)
  - AC flow resistance, etc.
- **Integration with various sensors and analyzers provides:**
  - monitoring and management of network infrastructure
  - monitoring of the condition of nearby natural objects

* - concept name of the industry solution project



The information provided is current for 2022

GONETS-ECOLOGIST*

remote monitoring of energy resources and other liquids

A prospective software and hardware complex for **monitoring of fuel and other liquids levels** with Gonets equipment.

The service is intended for independent constant control with high measurement accuracy in both open and closed tanks. The service provides continuous monitoring at remote energy storage facilities, **allowing to prevent man-made accidents and illegal actions**.

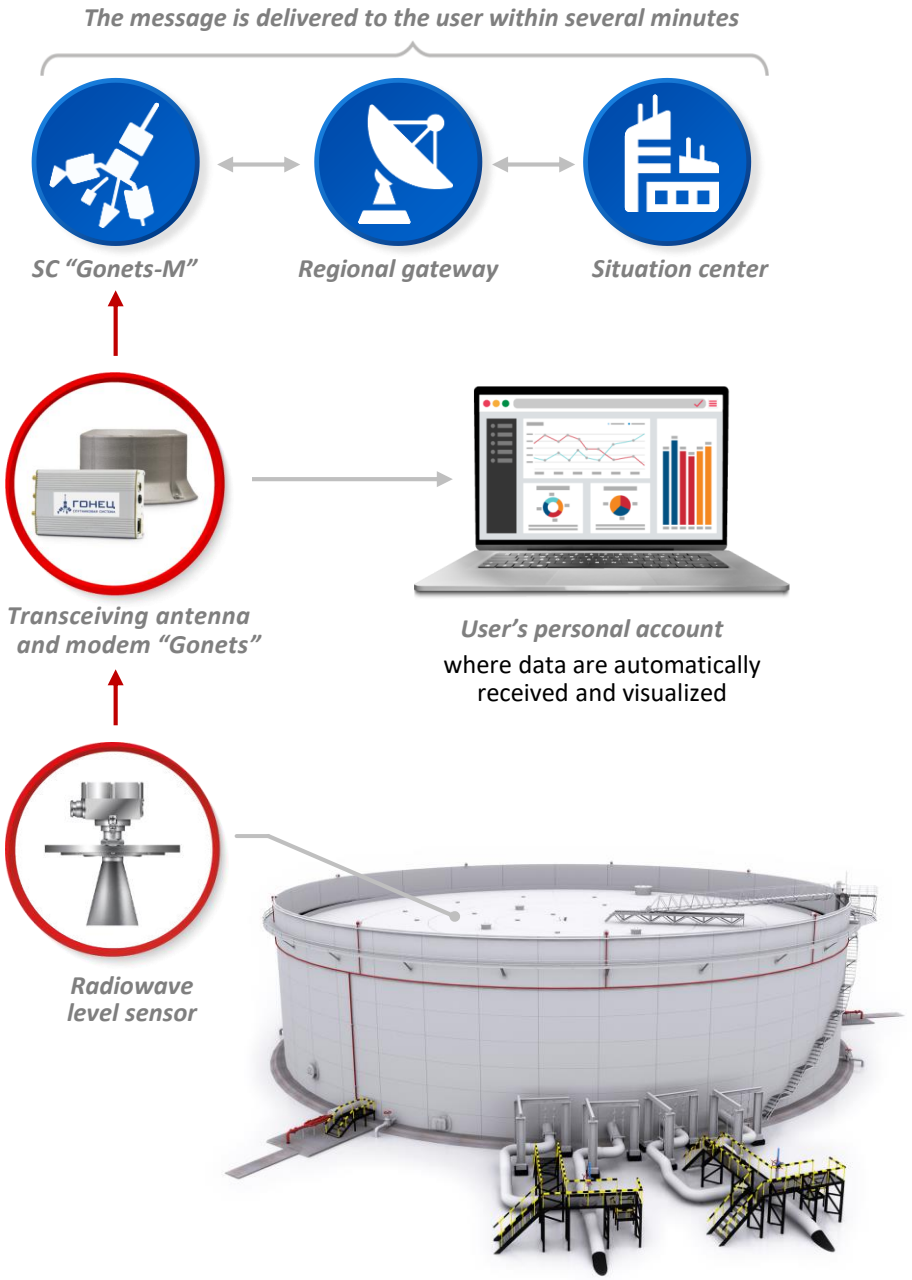
Service capabilities:

- **Period of data collection** is set by the user (from 1 sec)
- **Fuel consumption profile** on a diagram and signaling declines from the working profile
- **Transmission of accumulated data** via “Gonets” satellite system to email, a site account or FTP-server for analysis and visualization
- Options to **integrate additional devices and sensors**
- **Control** in both remote way (via “Gonets” system) and locally, in manual mode

Application fields:

- **Oil & chemistry industry** for storing and transportation of fuels and other products
- **Dwelling facility** assets including sewage plants
- **Hydrodynamic objects** and dams
- **In agriculture**

* - concept name of the industry solution project



GONETS-METEOROLOGIST*

meteorological and hydrological monitoring

The Russian meteorological observation network **has 3,563 points**, 348 meteorological stations of them operate **without staff**.

Together with the Federal Hydrometeorology Agency of Russia (Roshydromet), a network of **automated hydrological complexes** equipped with "Gonets" satellite equipment has been created. Data collection and control of the operation of hydrological sensors at autonomous observation point has been implemented.

The station records meteorological parameters and transmits them via satellite communication channel to the monitoring system. A frequency of transmission is configured by users. Therefore, specialists **can observe weather conditions** and analyze the situation online.

Service capabilities:

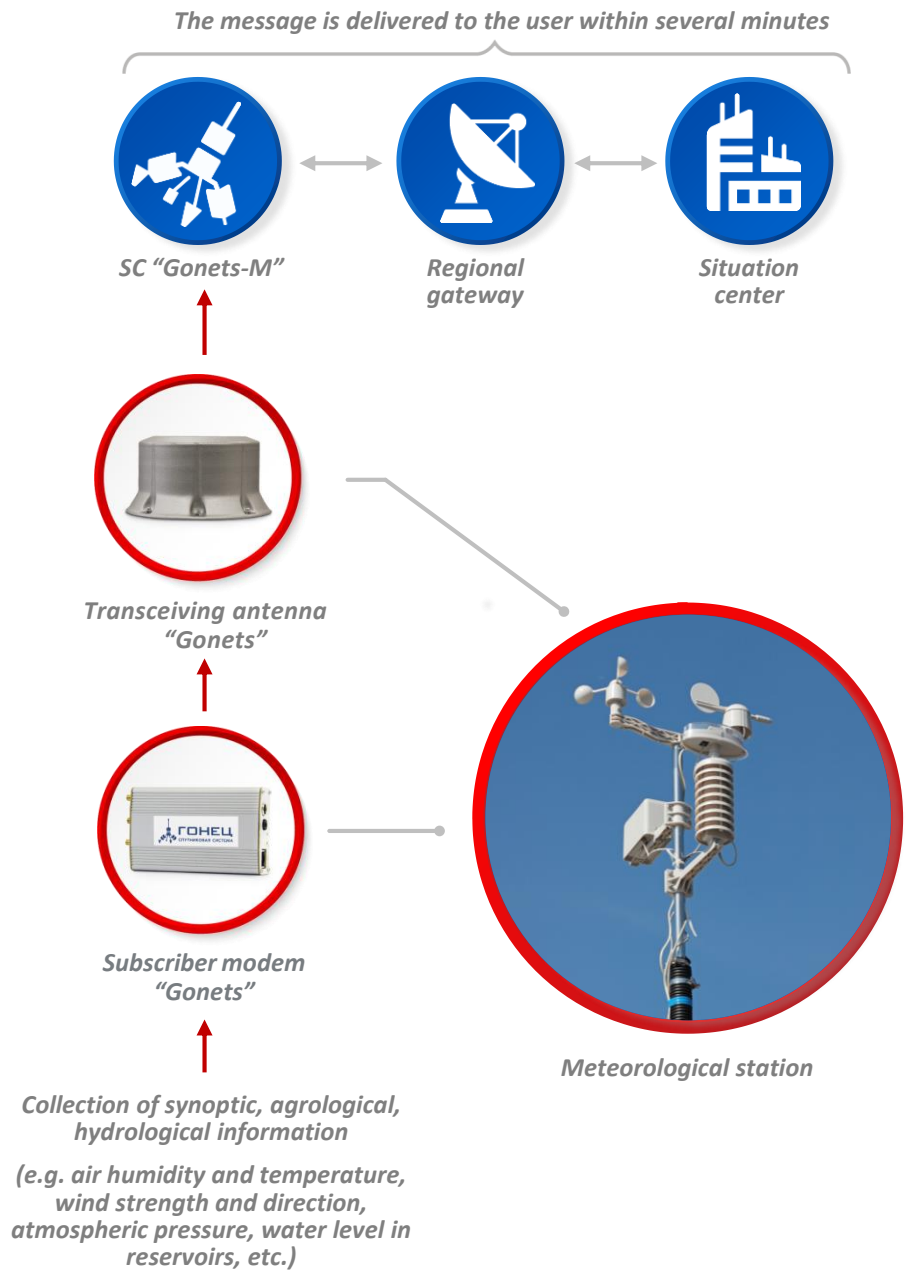
- **Real-time data transmission**
- **Connection of additional devices**, including wireless sensors
- **Autonomous operation**
- Resistance to **extreme climatic conditions** (operating temperature from -50 to +50°C)

With "Gonets" satellite system data is transmitted from several autonomous meteorological stations and hydrological complexes in the interests of **several federal state institutes of Russia**.

The equipment is used **for life support at the stations, e-mail communication and backup of the main communication channels**.

At some stations, when the main equipment is out of order, it is used to transmit meteorological information.

* - concept name of the industry solution project



The information provided is current for 2022

GONETS-IMPULSE*

remote monitoring of electricity networks

The total electrical transmission network in Russia is about 2 mln km. About 50% of the lines are in areas not covered with ground-based networks. Financial losses from undersupply of electricity and accidents in Russia are estimated at $30 mln a year.

To solve a problem the prospective platform **"Gonets-Impulse"** can be used as a universal solution for monitoring of the network infrastructure with Gonets satellite equipment. The complex is intended for rapid collection and transmission of data on the state of electrical transmission network and pipelines from various sensors and analyzers.

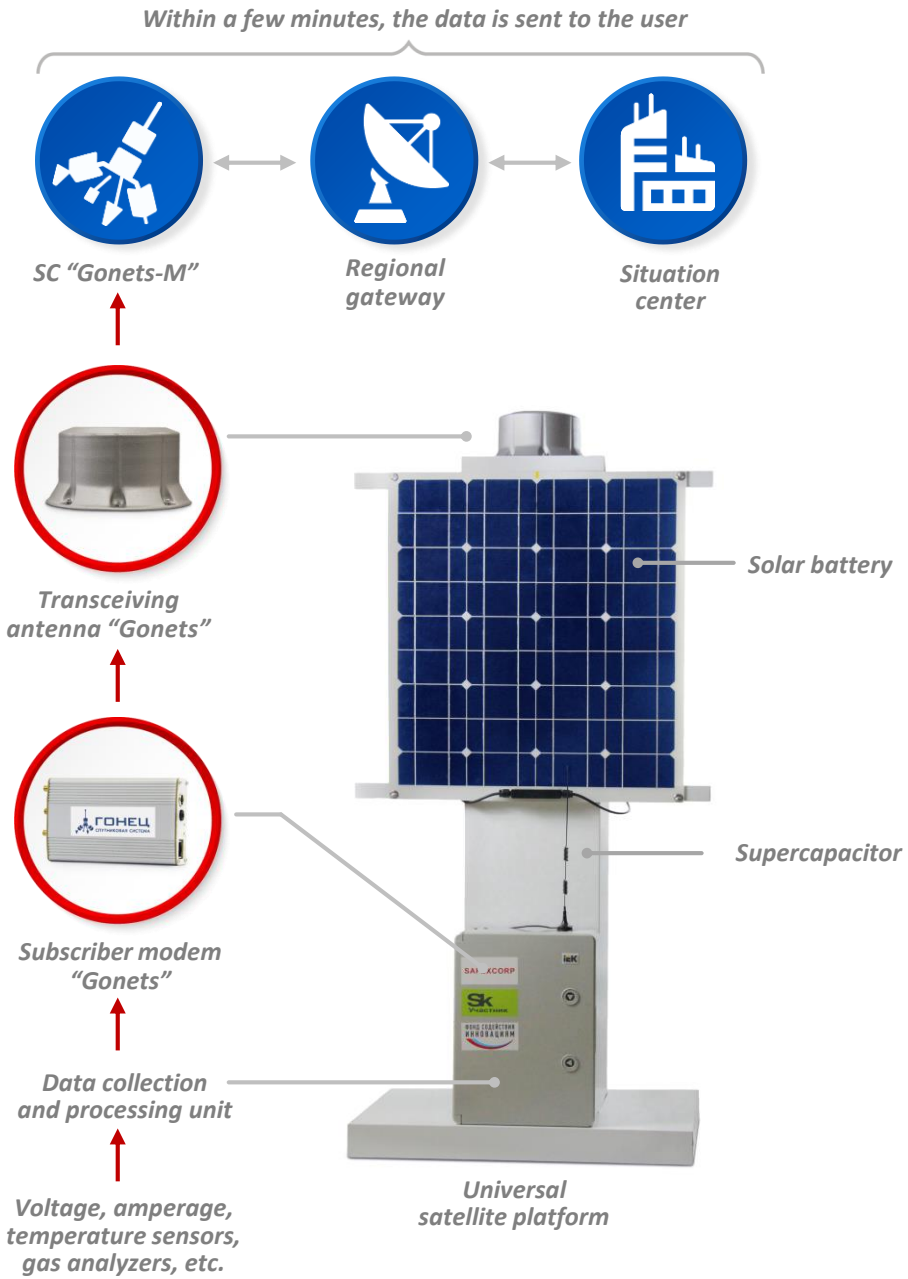
The solution is especially relevant for monitoring network infrastructure facilities located in areas not covered with ground-based communication networks.

Platform components:

- **Subscriber modem "Gonets"** for data transmission
- **Data collection and processing unit** (with connectors for voltage, amperage, temperature sensors, gas analyzers, etc.)
- **Supercapacitor** – modern energy accumulator and current source with a lifetime of up to 10,000 charge cycles without degradation
- **Solar battery**
- **Waterproof case**

In January 2022, the "Gonets-Impulse" service represented **first successful results** of pilot operation in different Russian regions.

* - concept name of the industry solution project



The information provided is current for 2022

GONETS-CASE

emergency communication module

Personal stand-alone module for **two-way transmission of information** from anywhere in the world. In tests the device confirmed **100% delivering of information to the recipient.**

The module's omnidirectional antenna allows you **to receive and send information in any, including tough conditions** (urban agglomeration, forest, mountainous terrain, water surface).

The mobile phone in the module kit is used for managing and accessing your personal account, sending and receiving messages and other data.

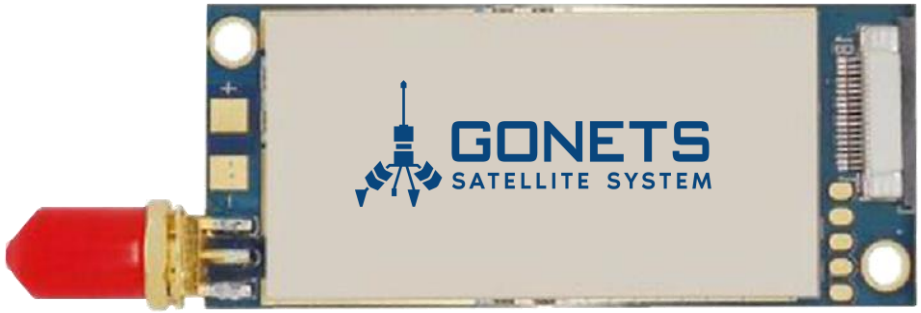
The device is demanded in the work of users for whom ubiquitous signal availability is crucial.

Battery life in the "sleep mode until the event" is **up to one year.**

MODULE GONETS

embedded OEM module

Operating range of System “Gonets”	**P-band**
Transmitter power	**5W with 5V supply 3W with 3,6V supply**
Receiver sensitivity	**117 dBm**
Data transmission speed	**Direct: 2.4, 4.8, 9.6 Reverse: 9.6, 19.2, 38.4, 76.8 kbps**
Satellite antenna “Gonets”	**external**
Navigation system receiver	**no**
Interface	**UART**
Supply voltage	**3,3-5 V**
Operating temp, °C	**from -40 to +60℃**
Dimensions	**56 x 22 x 4 mm**



Prospective device “Gonets Module" is a radio modem (transceiver) intended for **wireless integration with devices of clients** (mobile and stationary objects) and will provide data transmission via a satellite communication channel.

The versatility and small size of the device facilitate **flexible capabilities of the modem integration** with specific customers' needs.

The use of the UART interface in the device provides an effective information exchange with external components and makes it possible to create complex solutions in a single design with the inclusion of the Gonets satellite data transmission channel.

The information provided is current for 2022

PROSPECTIVE PRODUCT LINE

subscriber equipment of “Gonets” system

Frequency band, MHz	312 – 315; 387 – 390
Interfaces for user devices	RS-485; Bluetooth
Standard data packet, byte	1280 (the number of packets is not limited)
Operating temp, °C	from -40 to + 60
Transmitter power, W	10
Ingress protection class	IP66

The new line of equipment can be used in **the current “Gonets” system and the next generation system — “Gonets 2.0”**

► Terminal “Gonets” in a one-pack unit

«Gonets -Track» for land transport

«Gonets-Whale» for water transport

The subscriber equipment of the new line is used to automatically **transmit coordinate and telematics data** and provide **personal communication** (text and alarm messages, file exchange).

Unlike the previous modification, the new device combines a **transceiving unit and a mobile antenna** in a single plastic case.

In order to improve the convenience of configuration and use, the terminal uses a wired Ethernet interface and wireless Bluetooth for control from a **mobile phone, tablet or laptop.**

► Personal communication complex “Gonets-Mobile”

Equipment for transmitting **coordinates, alarm, and short voice messages via "Gonets" system.**

It is possible to communicate with the modem and transfer information from a **mobile phone, tablet or laptop via a Bluetooth channel** using various text messengers. An audio recording function is implemented.

The device has two buttons:

- **red** - SOS (to send an alarm signal)
- **green** - OK (to confirm the current state of the user)

DIGITAL SERVICES

for IoT solutions

The limitation of terrestrial network service areas leads **to difficulties with scaling distributed IoT systems**.

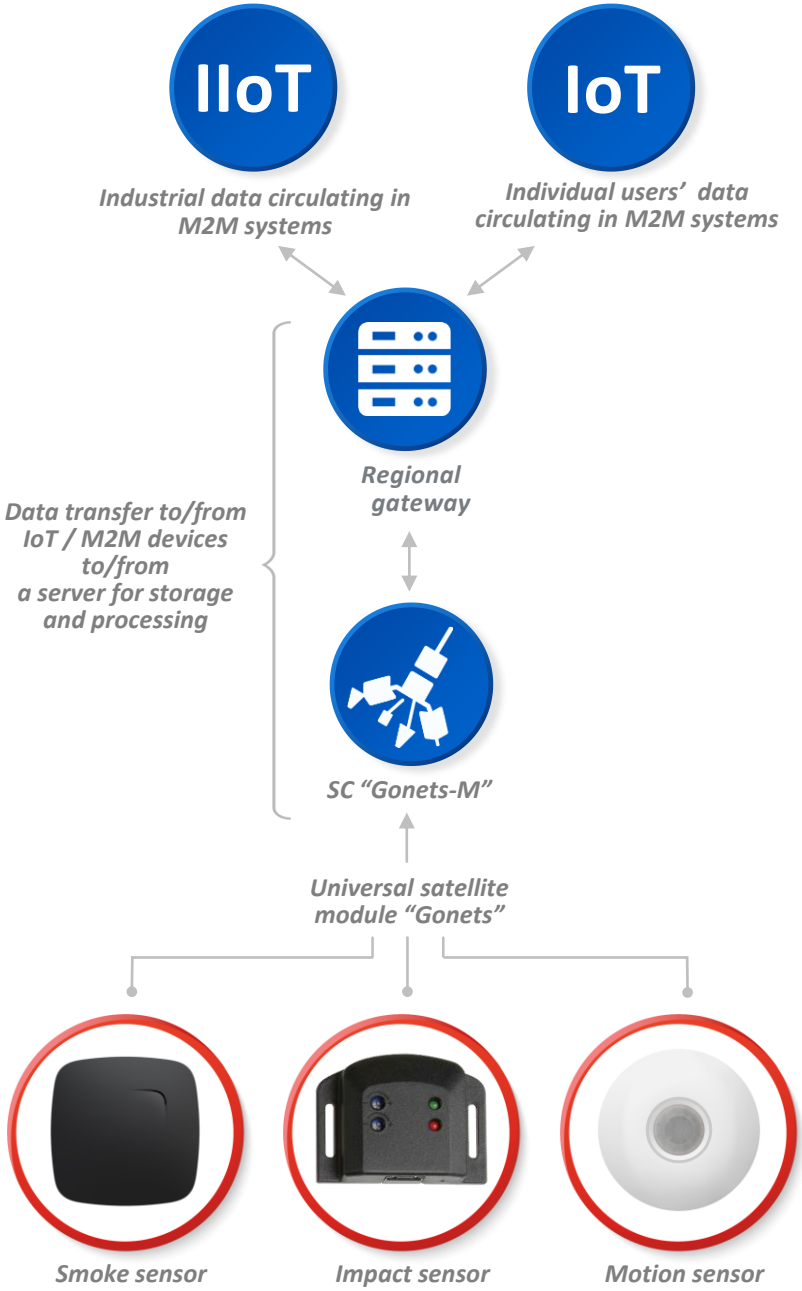
For that reason, satellite network channels remain the only alternative to connect IoT devices in areas with no 2G-5G coverage.

“Gonets” satellite system is a **universal transport medium for IoT solutions** that perform data transmission in a session mode anywhere in the world.

The benefits of “Gonets” system

that are important for its effective use in the field of IoT:

- Servicing of stationary and mobile facilities
- Flexible settings for the frequency of data collection and transmission
- Remote control of IoT devices via a satellite channel
- Portability of subscriber equipment
- Omnidirectional antennas do not need to be tuned to the satellite signal
- High security of transmitted data
- Unlimited scalability
- Long battery life
- Flexible integration and configuration



The information provided is current for 2022

DIGITAL PLATFORM “GONETS”

The digital platform is a **Data Marketplace service.**

It is **designed to collect, store, analyze and visualize information** received from various sources, including the network of “Gonets” satellite system.

The received data can be used in end applications, analytical systems, the corporate infrastructure of the customer, and solutions for automation of the production and business processes.

The modular design of the platform architecture allows **flexible adaptation of the solution to various tasks and user needs**. Standard protocols and API functionality facilitate the work of integrators and developers and maximize efficiency.

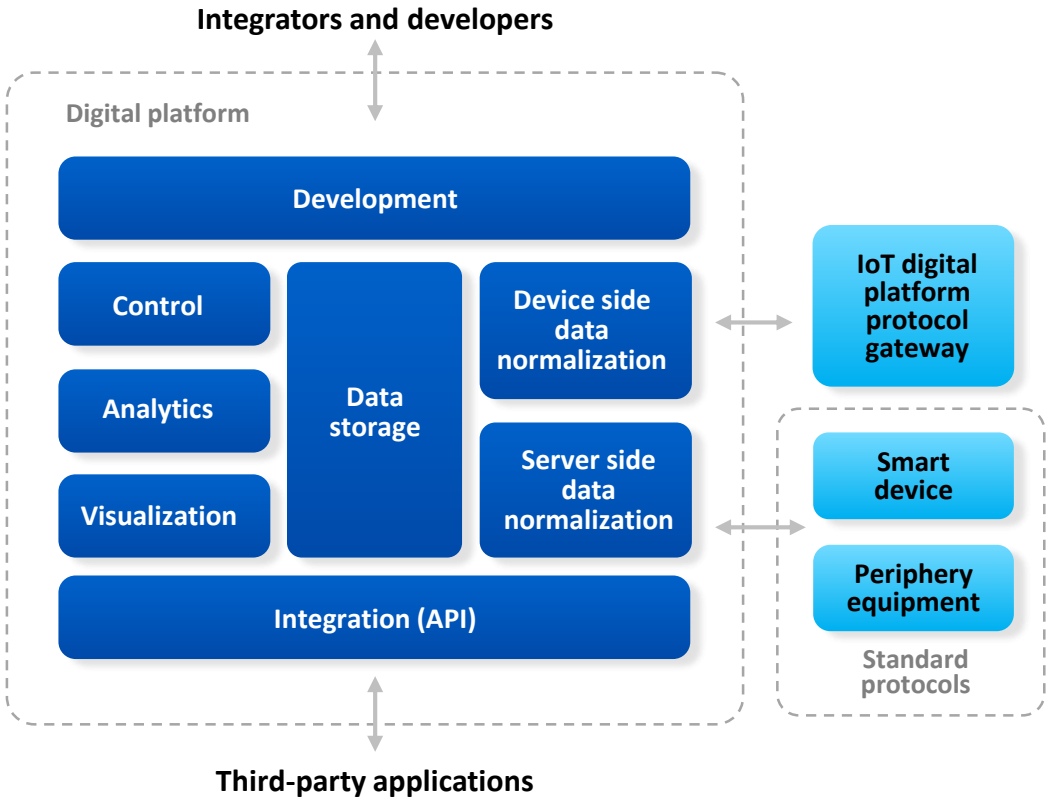
Application:

- Multilevel **access to raw and normalized data**
- A **wide range of IT services** for the flexible solution of customer problems and optimization of business processes
- **Flexible integration** with external information systems

Participants of the service:

Information providers, platform operator, platform developer, IT service developers, IT service consumers

Conceptual scheme of the digital platform:



USER PORTAL
of "Gonets" system

The system provides confirmation on data packets transmission, which ensures guaranteed data delivery

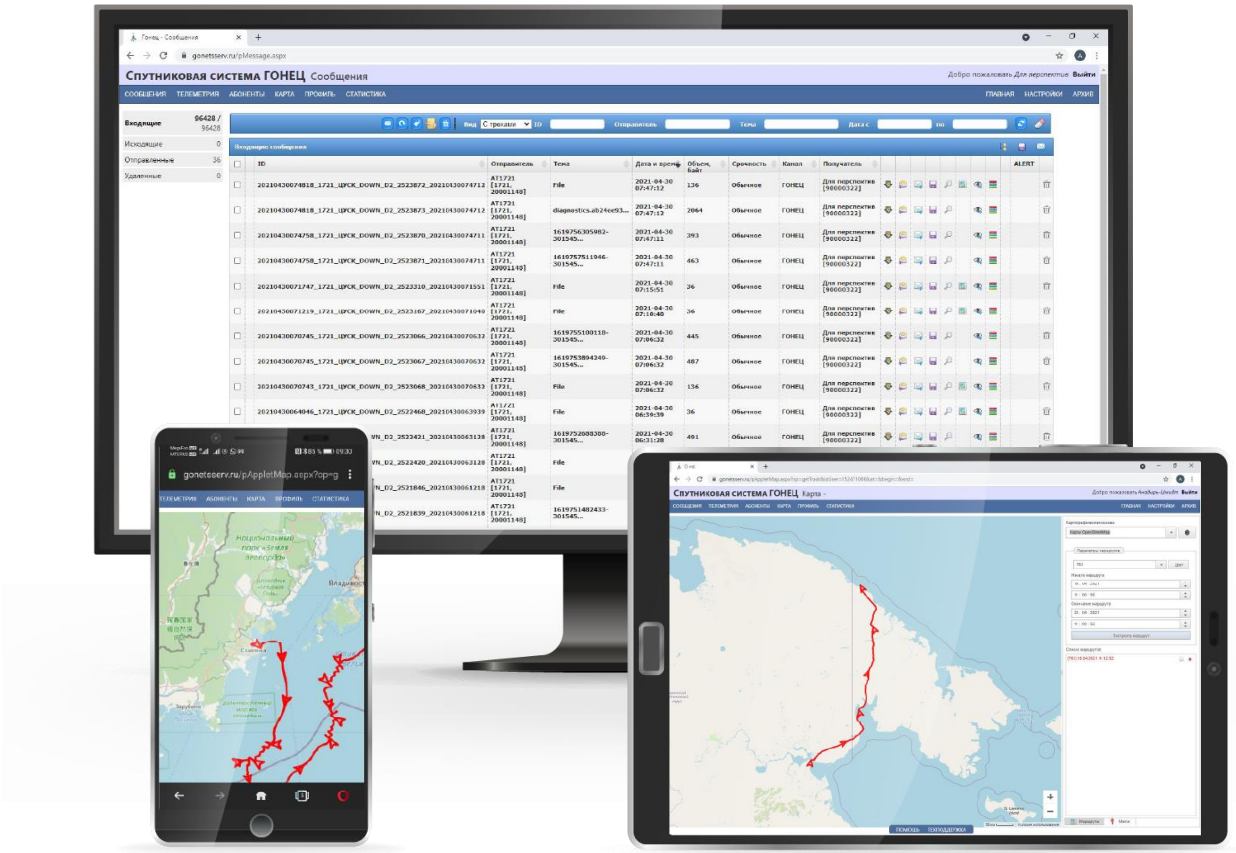
To **access the user's account** it can be used:

- Personal computer
- Mobile communication devices

The personal account is provided along with subscriber equipment and has the **following functionality:**

- **Viewing messages sent** to your personal account
- **Sending messages** to subscriber devices
- **Mapping service** (in case of transmission of coordinate information generated by subscriber equipment "Gonets")
- **Ability to connect an FTP server** to automate receiving/ sending messages

Information services of the "Gonets" system provide **priorities of users and transmission of messages.**



GONETS.CONNECT

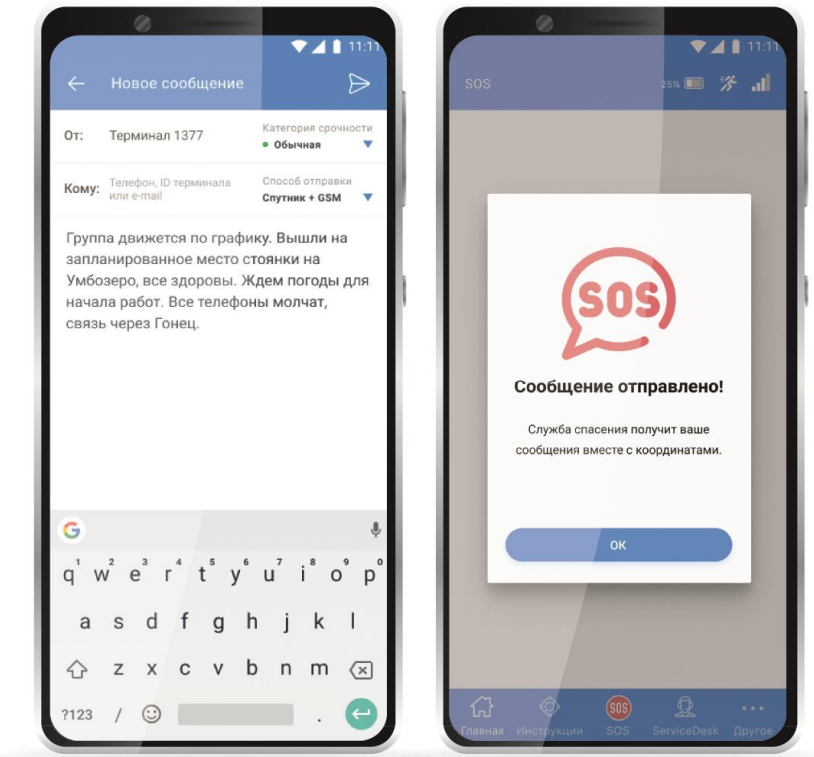
application for Android devices

The application allows **exchanging data between mobile devices** and significantly expands the scope of “Gonets” satellite subscriber equipment.

Service capabilities:

- **Text messaging** between mobile devices of users
- **Sending messages to any users** from a contact list of the mobile device
- Manage message **delivery prioritization**
- **SOS button to send an emergency message** with the user's location coordinates
- Interactive **chat with the technical support** department
- Information and reference section with **manuals for operation** and settings of the subscriber equipment

The interface of the “Gonets.Connect” application is **similar to popular messengers and is intuitive to use**.



“Gonets.Connect”
mobile application interface

COMPETITIVE ADVANTAGES

of “Gonets” system

Flexible integration

The subscriber equipment of “Gonets” satellite system allows easy integration into various customers’ digital systems.

Availability

The cost of traffic is significantly lower in comparison with other satellite operators.

Digital economy

Digital services of the “Gonets” system facilitate implementation of fast emergency response to environmental and man-made disasters, communication with mobile users (emergency services) and reserve communication channels at critical infrastructure facilities anywhere in the world.

IoT / M2M

“Gonets” satellite system provides various sectors of the world economy with satellite communication channels for IoT / M2M systems in areas not served by terrestrial communication networks.

100% Earth coverage

“Gonets” satellite system provides communication services anywhere in the world, including the poles of Earth. Its capabilities are competitive to similar satellite systems.

Data security

“Gonets” satellite system transmits data through secure channels, which assures its confidentiality.

ROSCOSMOS

GONETS
SATELLITE SYSTEM

Thank you for your attention!

Post and office address:
53/2, str. 5, Baumanskaya str.,
Moscow, 105005 Russia

Contacts:
Tel./fax: +7 (495) 745-50-60
E-mail: info@gonets.ru

Commercial service:
E-mail: Comm_dep@gonets.ru
Tel.: +7 (495) 745-76-90