

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

ORBIT CONSTELLATION of “Gonets” system

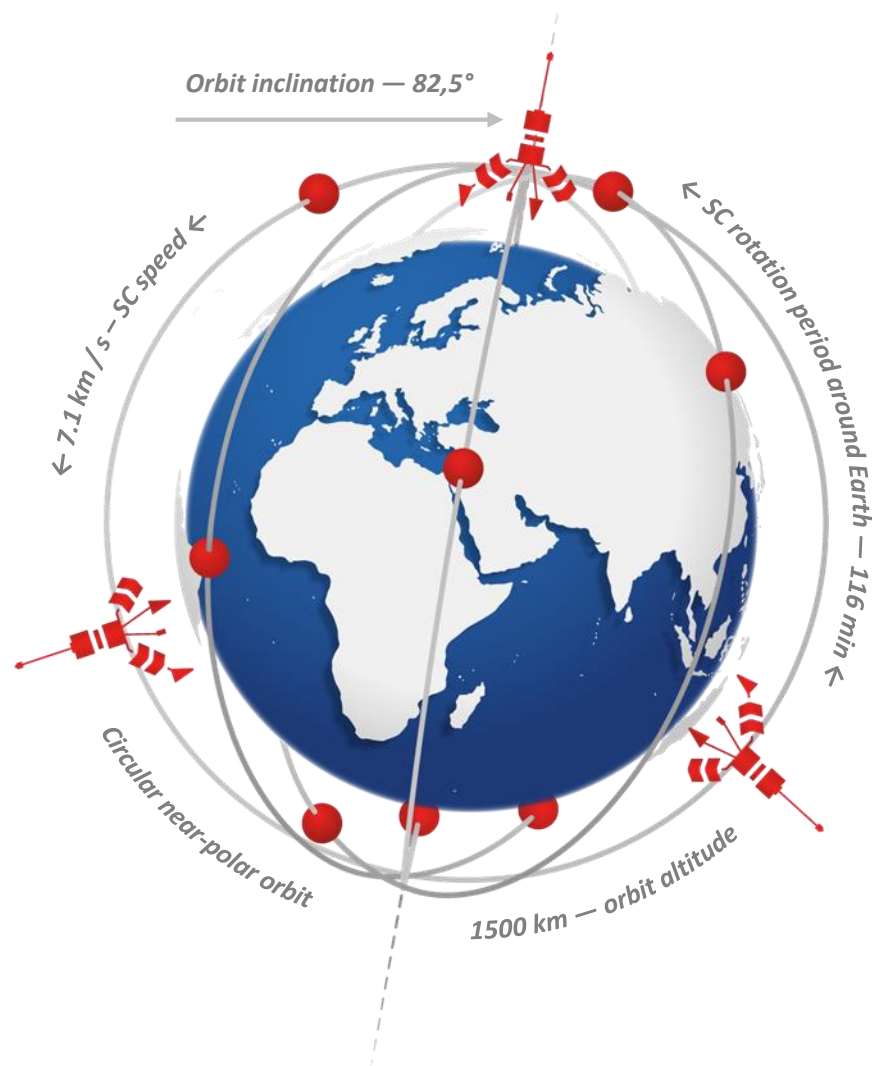
The regular orbit constellation comprises **12 “Gonets-M” spacecrafts (SC)** and provides 100% coverage of Earth.

At present, the orbital constellation comprises **15 “Gonets-M” spacecrafts.**

SC is equipped with P-band transmitting antennas

P-band receiving antenna

Diameter of service area — up to 5000 km



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



SUBSCRIBER EQUIPMENT

of “Gonets” system

Total kit weight **0,7– 4,2 kg**
(depending on the type and configuration)

Interfaces for user devices **RS-485 or 100 Base-T Ethernet**

The volume of message **Up to 20 Kbyte**
(packet data transmission)

Operating temperature **–50...+50 °C**

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-WHALE

terminals for sea and river vessels

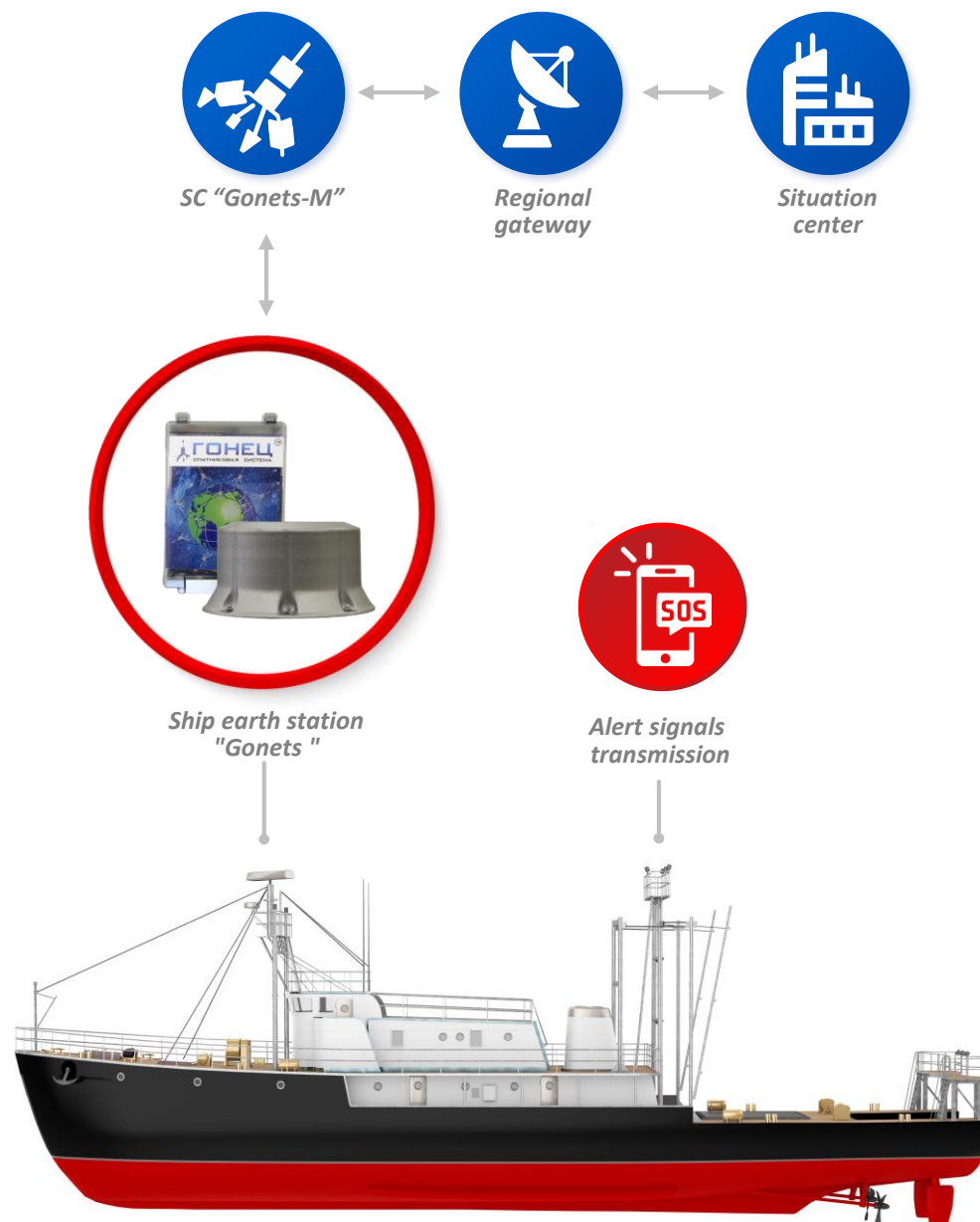
A ship earth station is a subscriber device designed for installation on **sea and river vessels** of various displacement and purpose in order to improve the safety of ships and the control of fisheries.

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
- Collection and **sending various telematics parameters**

The new modification combines a mobile antenna and transmission and reception unit in a plastic case with **IP66 protection**.



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.

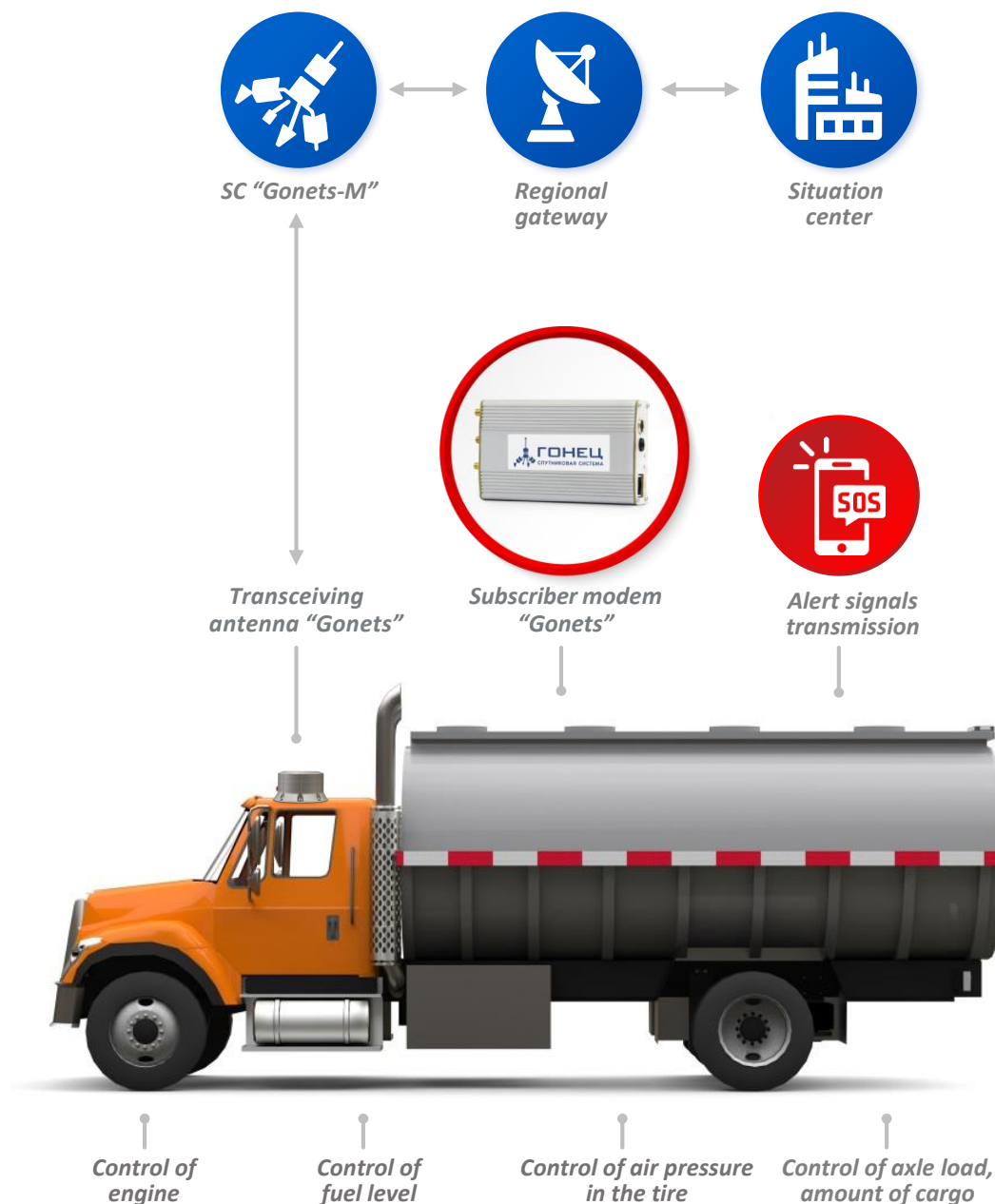
JSC "Gonets" satellite system" provides such services to a large number of consumers in the private and public sectors of the economy.

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**
- Obtaining and transmission of **any telematics data**, including the force and direction in case of an accident, the speed before the collision, the data of overloads, the number of fastened passengers
- **SOS signal transmission** from any location of the vehicle
- Prevention of false calls, which today are more than 90%



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 provided:

- 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%



GONETS-CEDAR

monitoring of mobile machinery, stationary equipment and industrial facilities

Hardware and software complex “Cedar” is a comprehensive solution for monitoring of the location and condition of equipment, transport, and facilities. The service is a modular system that provides flexible integration with equipment installed on forestry equipment and customer data systems.

The equipment has successfully passed field tests at logging sites in Siberia. Work is currently on track to further development of the project and replication of the solution.

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



GONETS-TSK

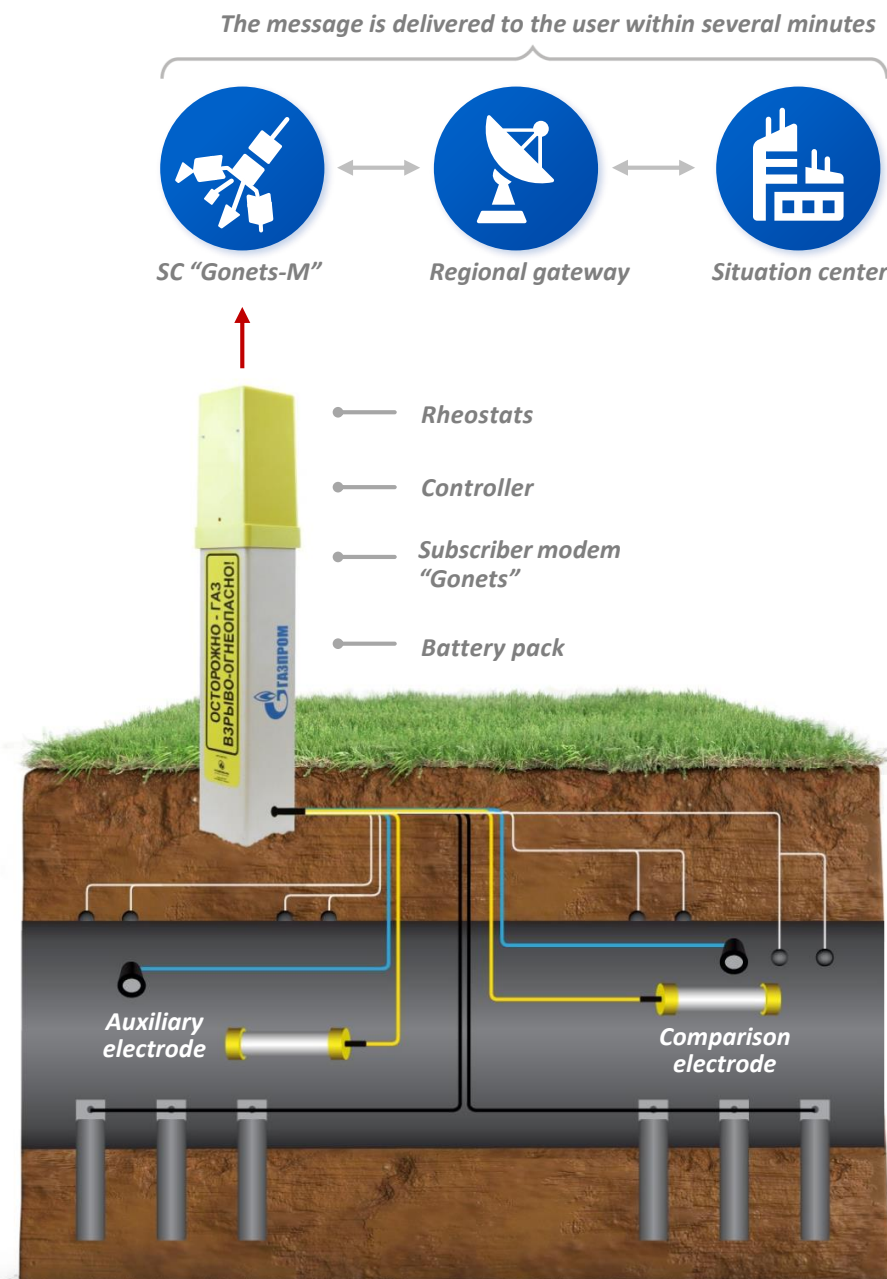
digital monitoring of oil and gas extraction and transportation

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

Satellite services for monitoring trunk pipelines 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



GONETS-ECOLOGIST

remote monitoring of energy resources and other liquids

An excellent solution for systems that need a **reliable and autonomous monitoring of fuel and other liquids levels** is a radio wave level sensor.

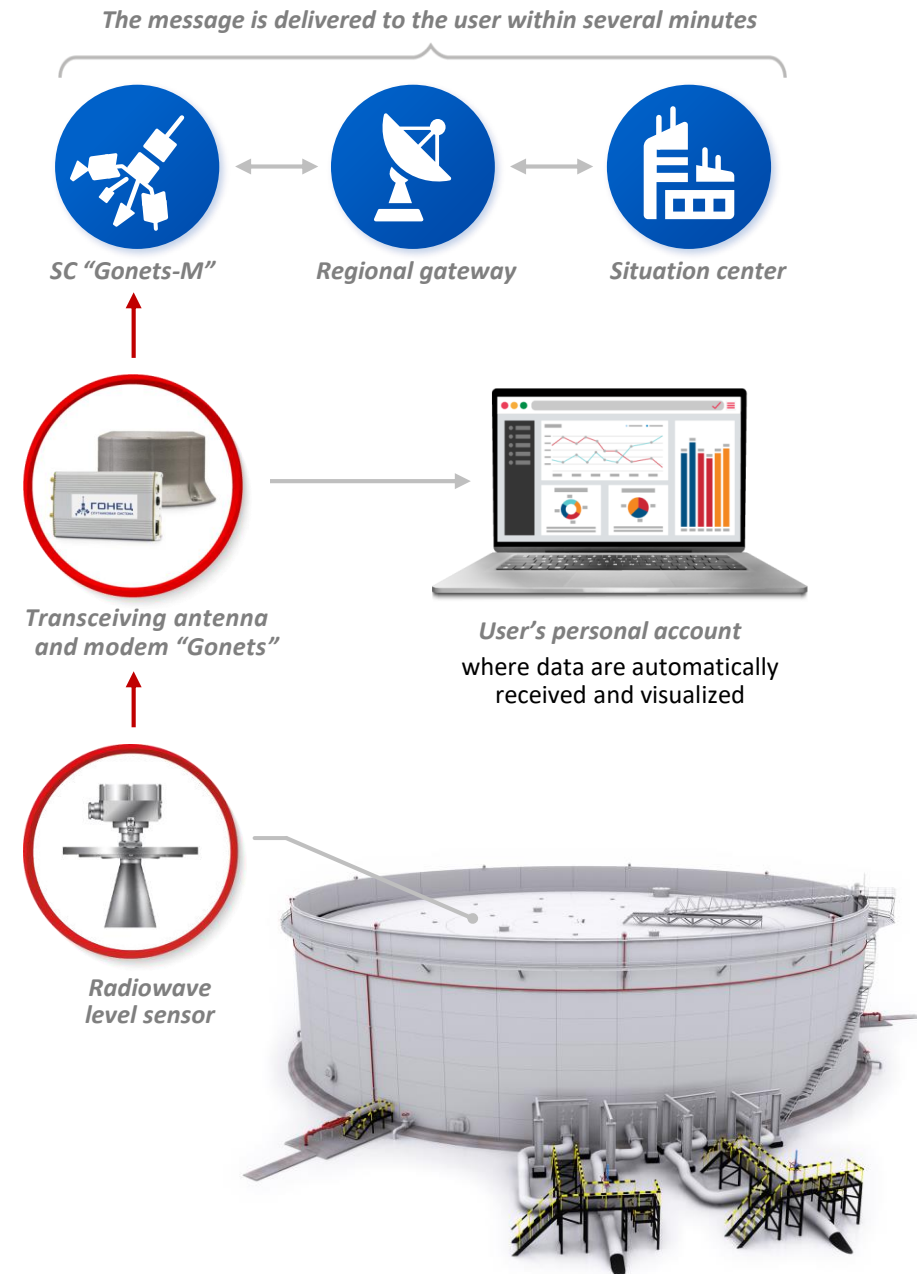
The device demonstrates high measurement accuracy in both open and closed tanks. The service provides continuous monitoring at remote energy storage facilities, **allowing to prevent man-made accidents and illegal actions.**

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**



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.

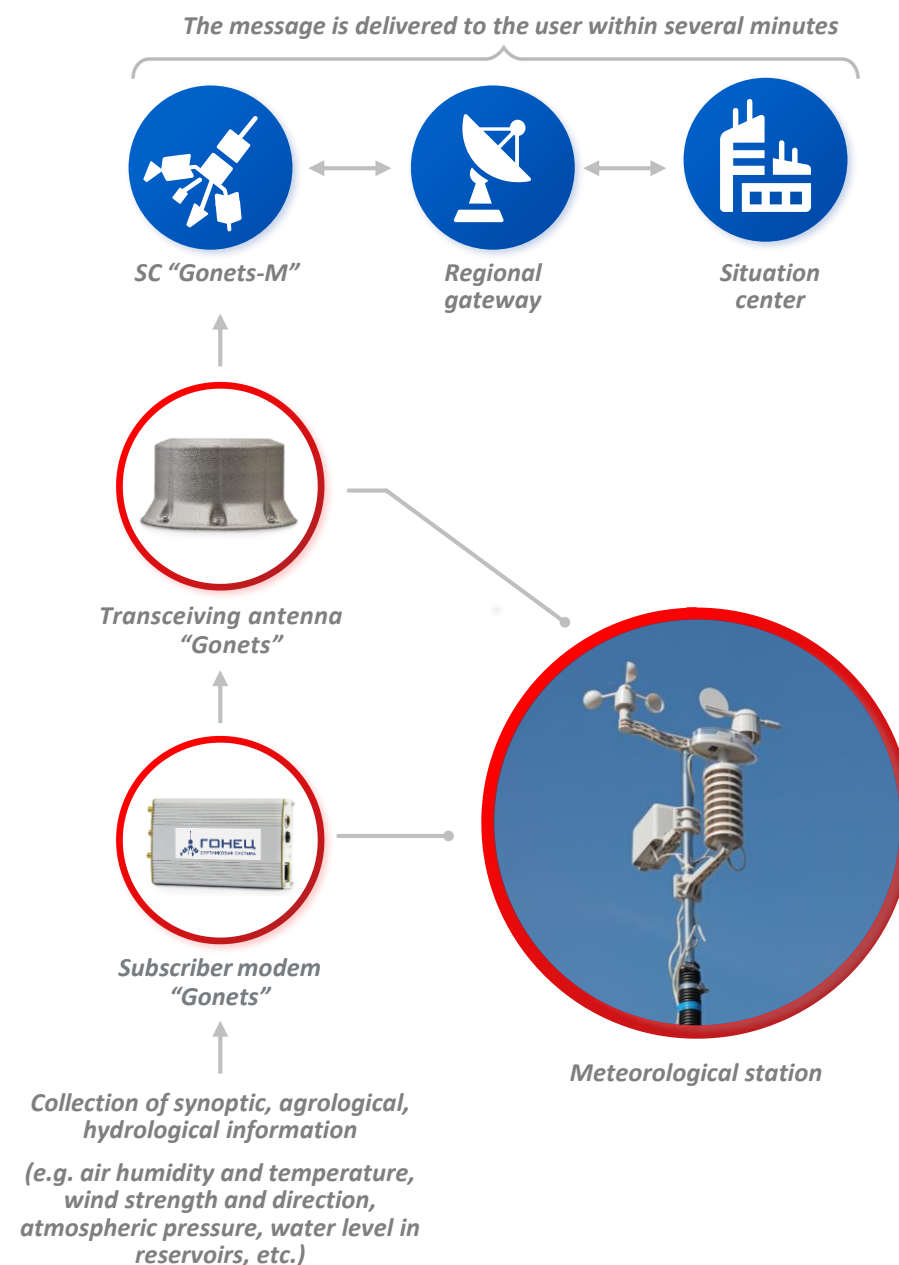
Service capabilities:

- **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)

"Gonets" satellite system transmits data 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.



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.

In this regard, the **universal satellite platform** is a universal solution for monitoring of the network infrastructure. The device is designed for rapid collection and transmission of data on the state of electrical transmission network and pipelines from various sensors and analyzers.

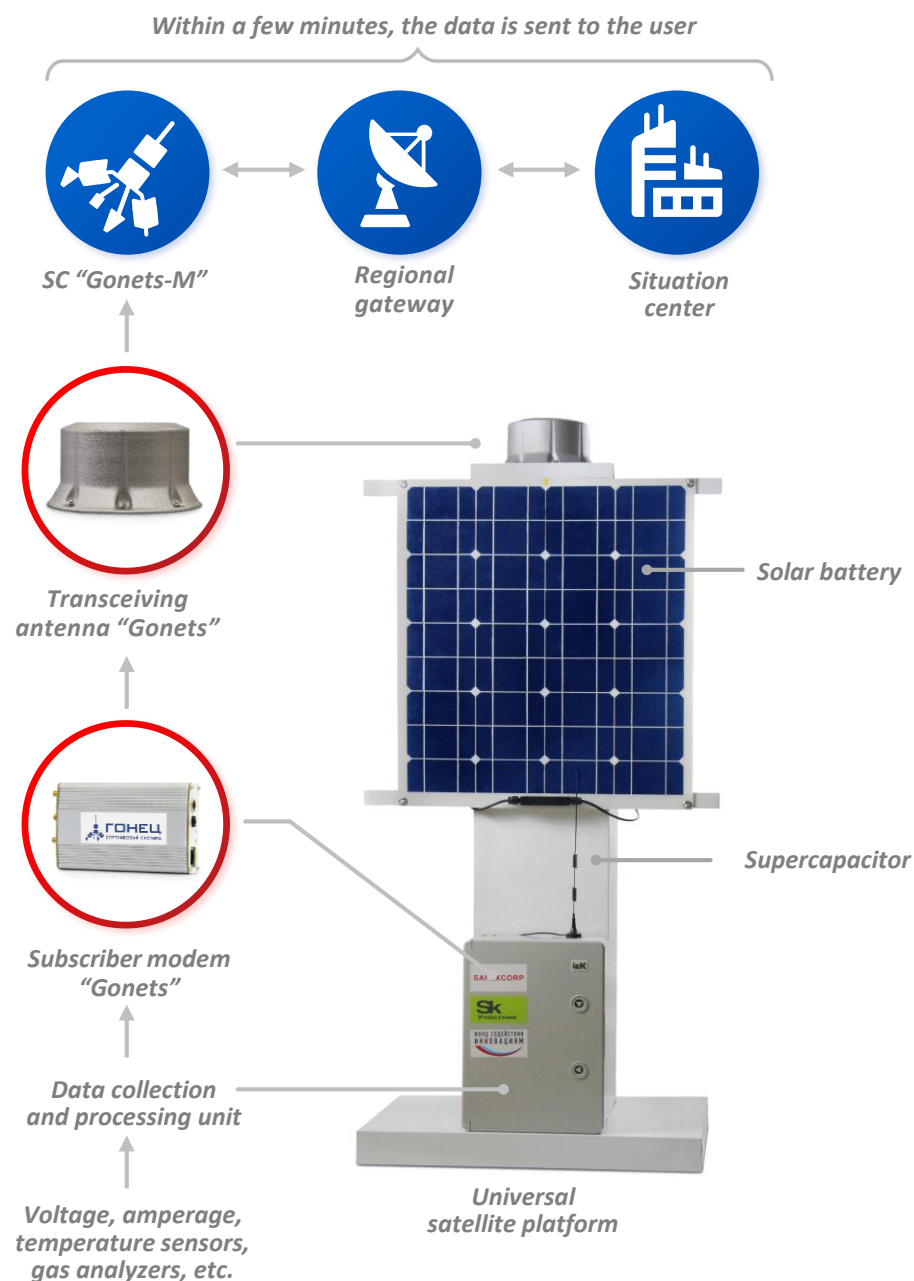
The solution is especially relevant for monitoring network infrastructure facilities located in areas not covered with ground-based communication networks.

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**

The device has undergone field testing, patented in Russia, and has been introduced to the Russian market. Currently, the work on international patents registration is in process, which will bring the product to the international market.

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



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 temperature	-40...+60 °C
Dimensions	56 x 22 x 4 mm



"Module Gonets" is a radio modem (transceiver) designed for **wireless integration for integration with stand-alone devices of clients** (mobile and stationary objects) and provides 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.

PROSPECTIVE PRODUCT LINE

satellite terminals and modems “Gonets”

► TERMINALS



Mobile Kit

Allows you to carry out personal communications at any point. The terminal has a local Wi-Fi network for connecting mobile devices. The terminal has been successfully tested.



Terminal in a single case

Combines the transceiving unit with the antenna. This allows the terminal to be used in a limited space and does not require cable laying.

► MODEMS



«Gonets-module»

The prospective device “Gonets-module” is a radio modem (transceiver) designed for integration into user devices (mobile and stationary objects), which will provide data transmission over a satellite communication channel.

PROSPECTIVE PRODUCT LINE

transceiving antennas “Gonets”



Mobile antenna

Desktop antenna
(length 15 cm)



Flat antenna

Low-profile antenna for extreme
conditions (length 22 cm)



Rod antenna

(length 15 cm)



Vertical antenna

for stationary use in alarm
systems (length 22 cm)

DIGITAL SERVICES

for IoT solutions

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

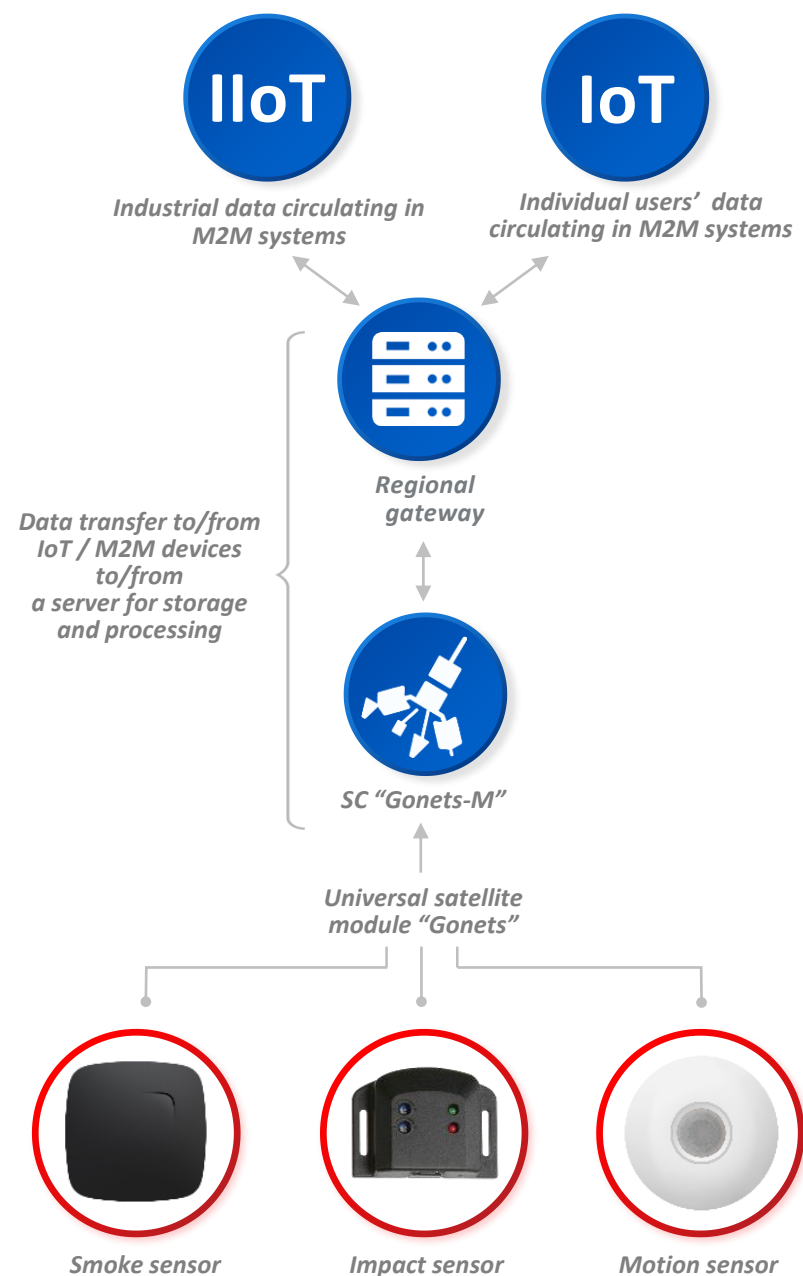
For that reason, satellite network channels remain the only alternative to connect IoT devices in areas with no 2G-5G coverage.

“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



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.

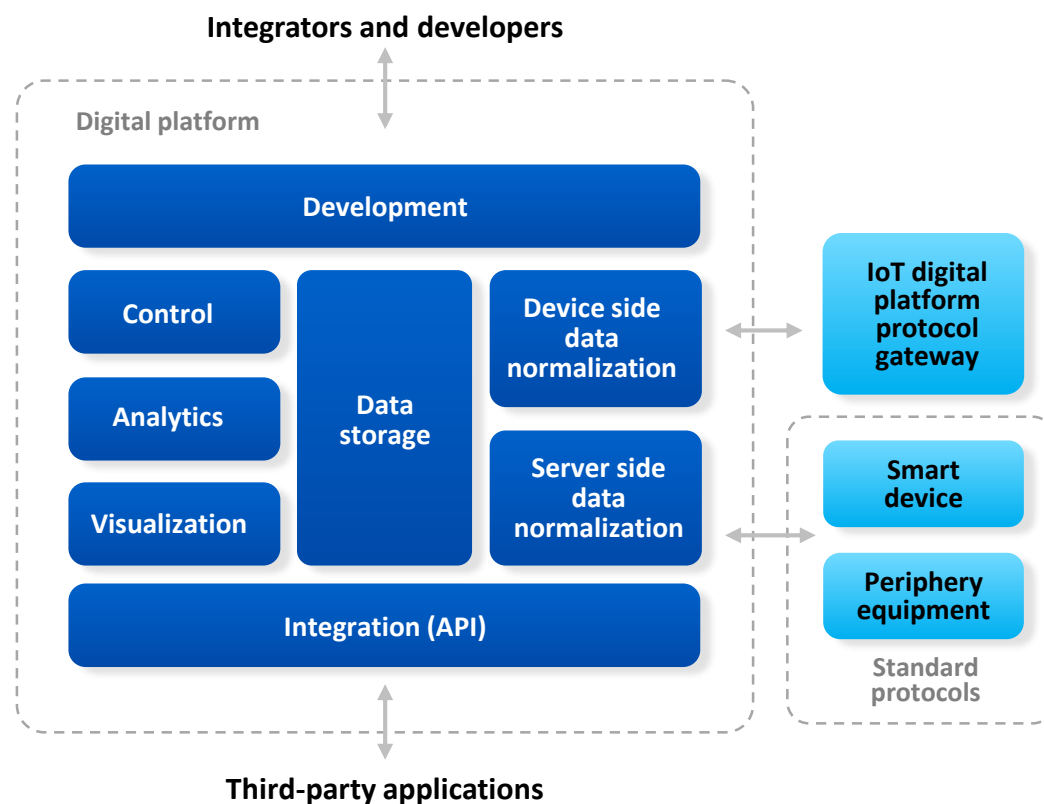
Application:

- **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

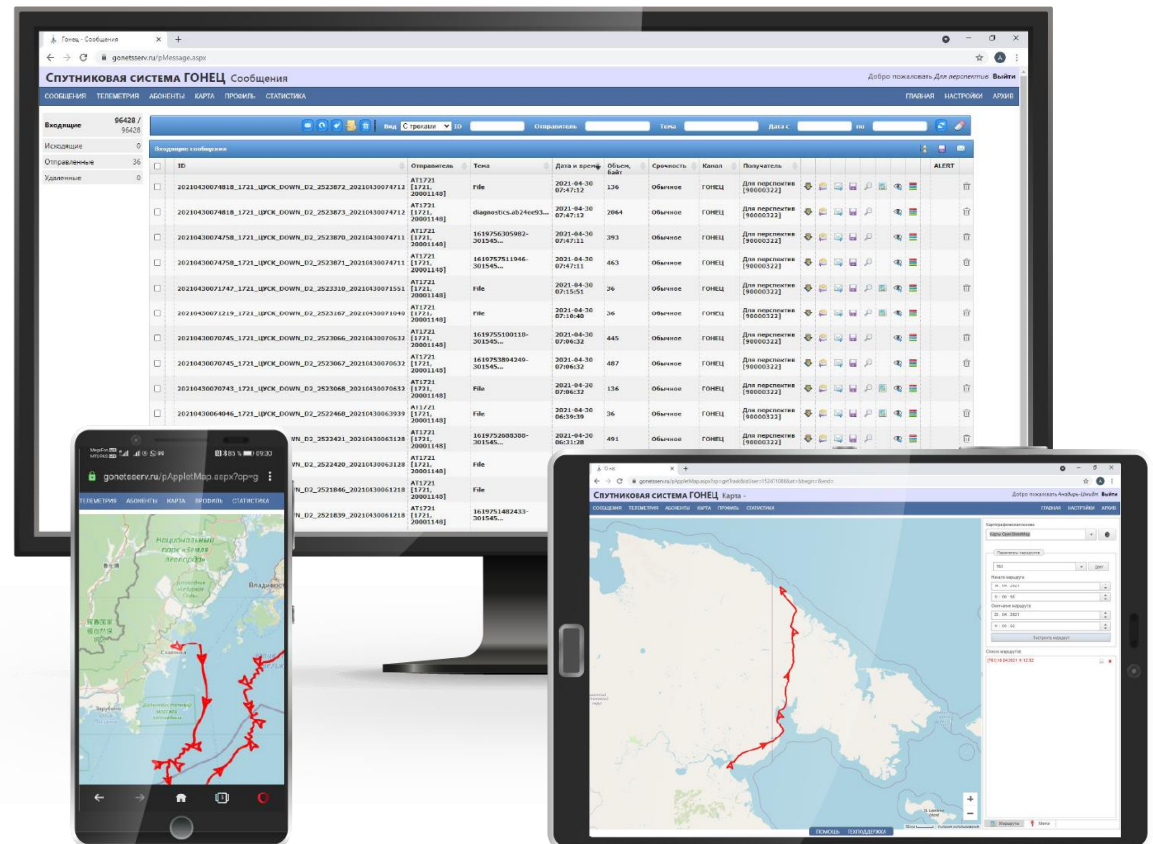
To access the user's account it can be used:

- 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

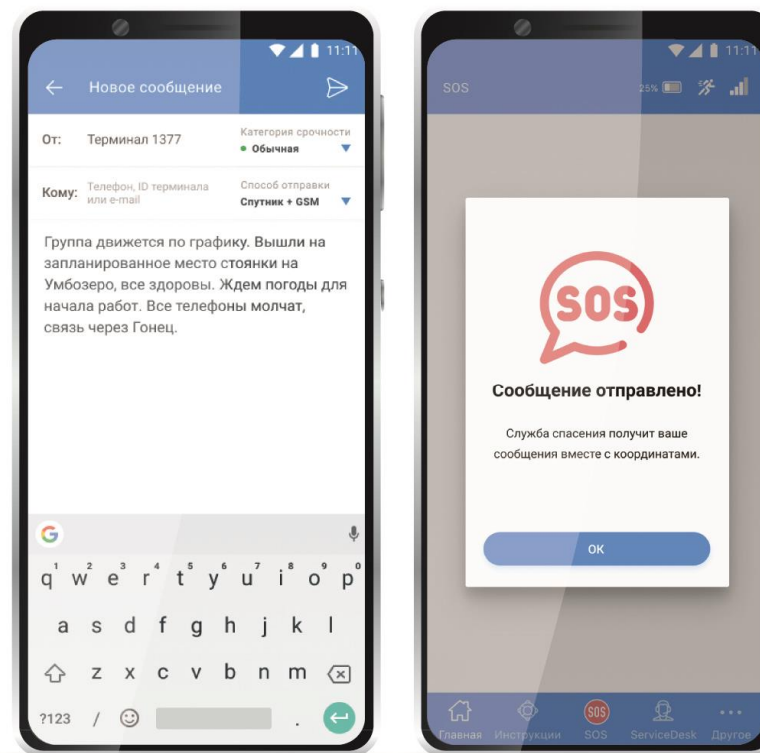
prospective application for Android devices

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.



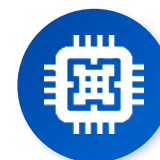
Availability

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.



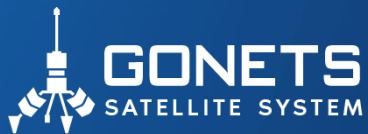
100% Earth coverage

“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.



Thank you for your attention!

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