

COMMUNICATION NETWORKS



ROSTELECOM PROVIDES INTERNATIONAL AND LONG-DISTANCE COMMUNICATION SERVICES USING CABLE RADIORELAY TRANSMISSION LINES AND SATELLITE LINKS. THE BACKBONE TRANSPORT NETWORK RESOURCES ENSURE TRANSMISSION OF ANY TYPE OF INFORMATION. THE DIGITAL NETWORK BASED ON DENSE WAVELENGTH DIVISION MULTIPLEXING COVER VIRTUALLY THE ENTIRE TERRITORY OF THE RUSSIAN FEDERATION.

BACKBONE NETWORK OF

500

THOUSAND KILOMETERS
IN LENGTH

TRANSPORT COMMUNICATION NETWORK

The main components of the backbone network are powerful fiber-optic communication lines connecting Moscow and Novorossiysk, Moscow and St. Petersburg, and Moscow and Khabarovsk.

Communication links connecting large settlements of a region with access to the backbone network make the basis of a transport regional network.

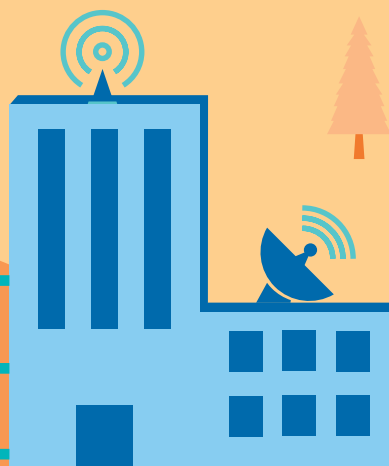
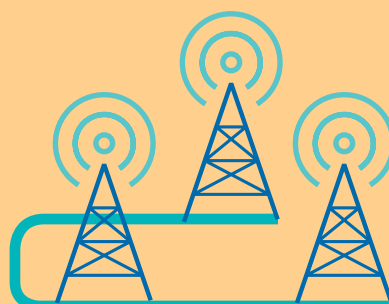
In order to lease out Nx64 Kbps digital circuits to customers and clients, the Company deployed networks of flexible access multiplexers.

With deployment of new digital communication links during the period from 2001 to the end of 2015 the Company put out of operation 207,037 kilometers of used-up and obsolete transmission lines, subscriber -and distribution networks.

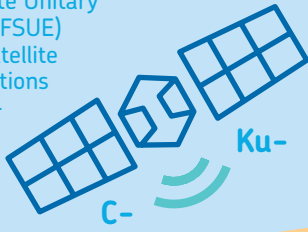
MOSCOW – NOVOROSSIYSK

MOSCOW – ST. PETERSBURG

MOSCOW – KHABAROVSK



Federal State Unitary Enterprise (FSUE) "Russian Satellite Communications Company" – 'Express' Satellite



INTERNATIONAL

● STOCKHOLM

● FRANKFURT

COOPERATION WITH MOBILE NETWORK OPERATORS

Cooperation of Rostelecom with Russian operators of ground-based mobile networks aims at extension of the range of high-quality network services, including national and international roaming. The Company ensures international roaming routing for 716 mobile networks in 201 countries of the world.



INTERNATIONAL

The Company provides communication services in Sweden, Lithuania, International Amsterdam also offers services to Asia via

SCPC



5 SATELLITE COMMUNICATIONS GROUND STATIONS

SATELLITE COMMUNICATIONS

The united satellite communications network of Rostelecom is based on two technologies: SCPC and VSAT. Own and leased circuits are used. The leased circuits are purchased on a turnkey basis from OJSC 'RTComm.RU'.

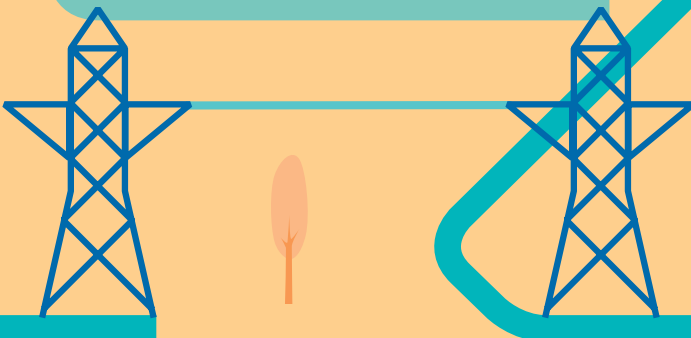
Company owned VSAT-networks are provisioned on the basis of leased capacity with the use of central VSAT-stations located in Siberia, Ural, Far East macroregional branches. Leased VSAT-networks (or individual channels) are purchased as a general redistributed pool resource from such providers as OJSC 'RTComm.RU' and OJSC CB 'Iskra'.

In order to ensure operation of satellite communications network Rostelecom engages FSUE Satellite Communications and Gazprom Space Systems JSC for provision of services to the Company aimed at leasing capacities for 'Express' and 'Yamal' satellites, respectively.



67%
ROSTELECOM SHARE

OTN – OPTICAL TRANSPORT NETWORK





AMSTERDAM LONDON

INTERNATIONAL COMMUNICATION LINKS

The Company has laid international fiber-optic communication links providing access to Finland, Mongolia, Japan, China, Estonia, Latvia, Kazakhstan, Ukraine, Georgia, and Belarus. Operational points of presence in Stockholm, Frankfurt, Moscow, and London have been made. The Company provides high-speed transit services from Europe to the territory of the Russian Federation.

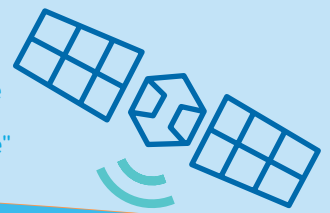
SUBMARINE CABLES

As part of its program to expand and upgrade its international telecommunications capacity Rostelecom uses modern submarine cables to establish communication circuits between Russia and other countries.

To provide access to these systems and lay direct high-quality international communication links to remote areas of the world Rostelecom participates in construction of a number of international cable systems and acquires capacity in them.

As of the end of 2015 Rostelecom held interest or indefeasible right of use in 11 cable systems, including such global cable systems projects as "Fiber Line Around the Globe" (a fiber-optic communication link around the globe; Great Britain – Middle East – Japan; Trans-Pacific Cable System (China-USA), the system South-East Asia – Middle East – Western Europe and Trans-Atlantic system.

Gazprom Space Systems JSC – 'Yamal' Satellite"



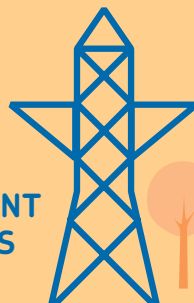
50%
ROSTELECOM SHARE

LINE AND CIRCUITS OF OTHER OPERATORS USED BY THE COMPANY

Rostelecom engages other telecom operators for delivering line and circuits for use thereof, mainly for the purposes of providing protection and back-up for the Company's existing technological network infrastructure and provision of services to end users in the event of shortage of Rostelecom's own resources.

716

MOBILE NETWORKS IN 201 COUNTRIES



100%
BACK-UP OF EQUIPMENT AND COMMUNICATIONS LINKS



VOICE INFOCOMMUNICATION NETWORK

A voice infocommunication network ensures provision of telephone and traffic transmission services at the local, intra-zone, national, and international levels; signaling traffic transmission; audio and video conferencing; Integrated Services Digital Network (ISDN) and intelligent communication network (ICN) services, virtual PBX services, and includes the following segments.

THE INTERNATIONAL TELEPHONE NETWORK

Is based on 10 international Transit Nodes (ITN). The total installed capacity of the network amounts to 212.1 thousand circuits where the digitalization level is 100%..

THE LONG-DISTANCE TELEPHONE NETWORK

Is based on 16 Transit Long-Distance Nodes (TLDN) and 6 combined communication nodes TRANSIT AREA NODES (TAN) /TLDN. The total installed capacity of the long-distance telephone network is 639.3 thousand circuits, and the digitalization level amounts to 100%.

THE INTRA-ZONE TELEPHONE NETWORK

functions on the basis of 138 transit area nodes (TAN). The total installed capacity of that network includes 1,396.9 thousand circuits. The digitalization level is 100%.

THE LOCAL TELEPHONE NETWORK

functions on the basis of 39,392 automatic telephone exchanges. The total installed capacity of the local network includes 33,952.4 thousand subscriber lines. The digitalization level is 84%.

DATA NETWORK

The IP/MPLS data network ensures provision of broadband Internet services, digital IPTV and TV content management, connection and Internet traffic transmission, virtual private network (VPN) including L2 VPN, L3 VPN, VPLS, inter-carrier VPN and Data-Center Services, and includes the following components.

BACKBONE DATA NETWORK

Has a transmission capacity of over 12.3 Tbps.

REGIONAL DATA NETWORKS

INTERNATIONAL SEGMENT

Including communication nodes located in Stockholm, Frankfurt and Hong Kong.

RELIABILITY SUPPORT

- geographic diversity of pathways
- Interconnection with networks of several foreign operators on every international route
- 100% protected equipment and communication links
- application of OTN technologies