



Russian Academy of Sciences Program Systems Institute

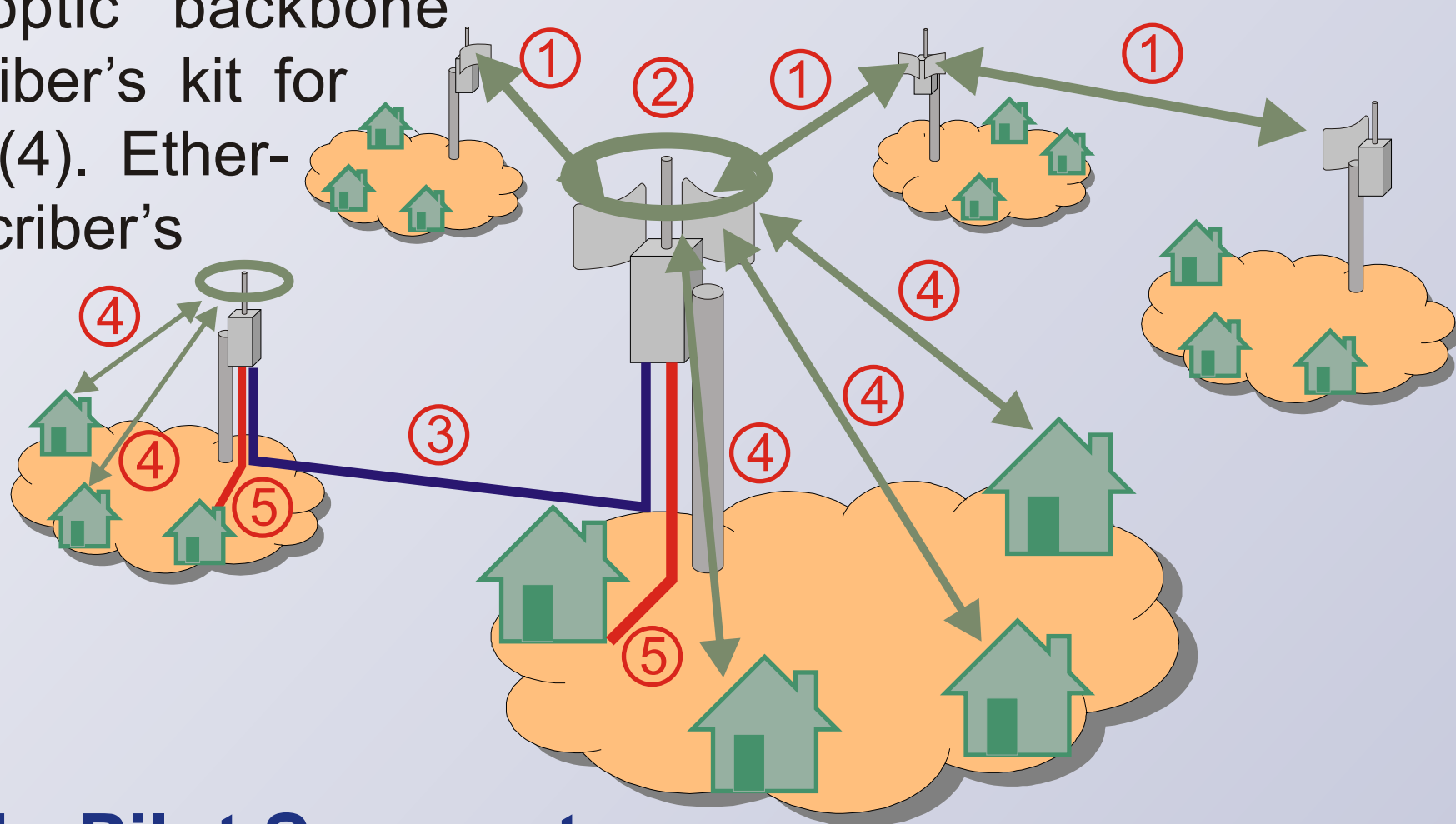
Network Solutions for Russia: MAN, Wireless and Sensor Nets

Peculiarities of Building Rural Networks in Russia

- Low population density in rural areas, large distances between buildings and settlements.
- Lack of heated places of general use for installing network equipment.
- Poor reliability of power supply: fluctuation in voltage from 150 V to 500 V and frequent outages.

Computer Network for Rural Areas of Russia

Backbone lines and system nodes based on wireless technologies (1). Radio cells (2), backbone nodes permitting wireless access to the network. Fiber-optic backbone lines (3). Subscriber's kit for wireless access (4). Ethernet access subscriber's kit (5).

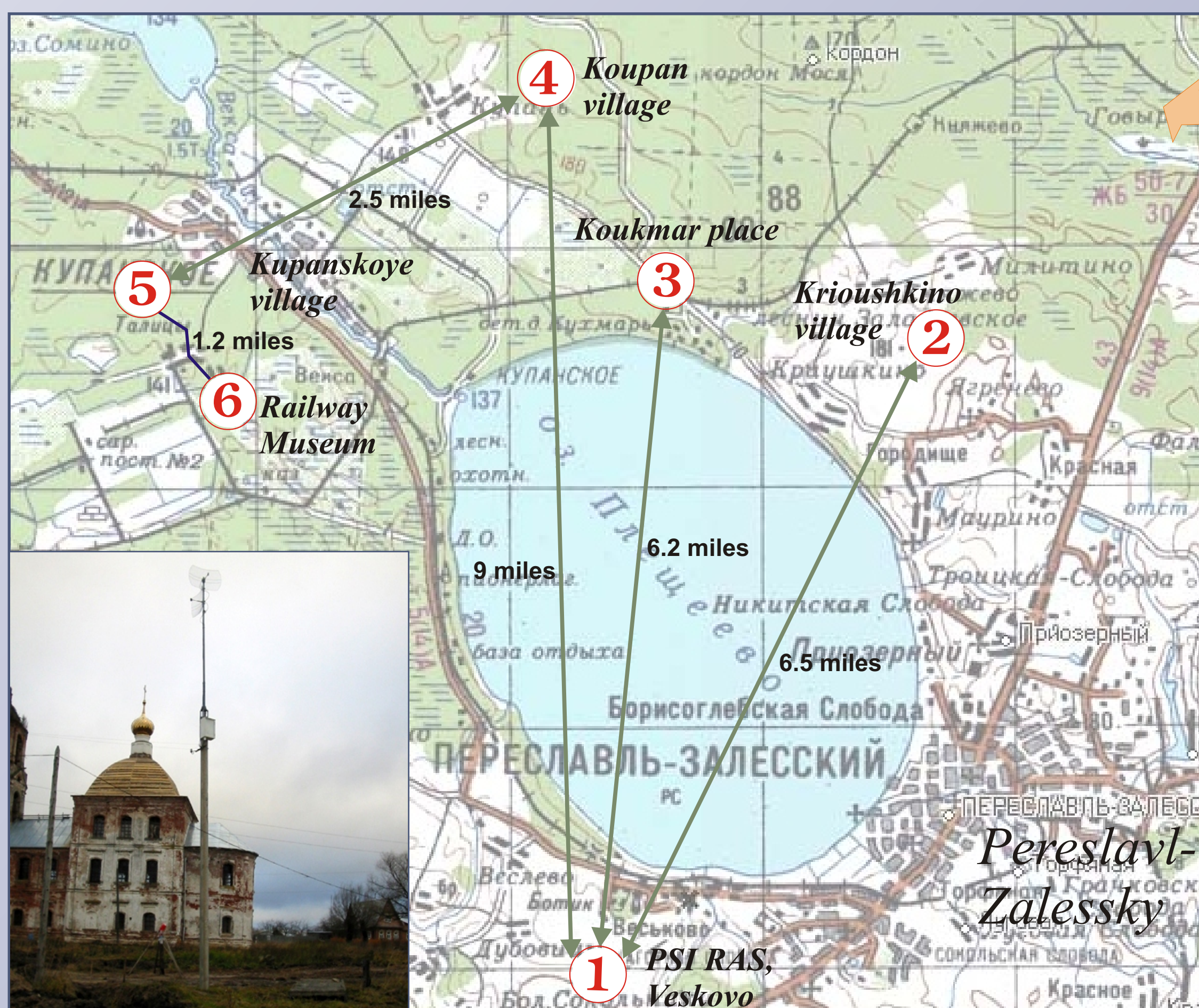


Rural Network: Pilot Segment

In 2004, BOTIK conducted a survey and developed technological solutions for building rural networks. A pilot segment of 6 villages in the Pereslavl region was networked. The maximum backbone line span amounts to 9 miles. Among the first subscribers was a village school, the Railway Museum, the International Children's Computer Center, one commercial organization, and private persons.

Implementations in Russia and CIS

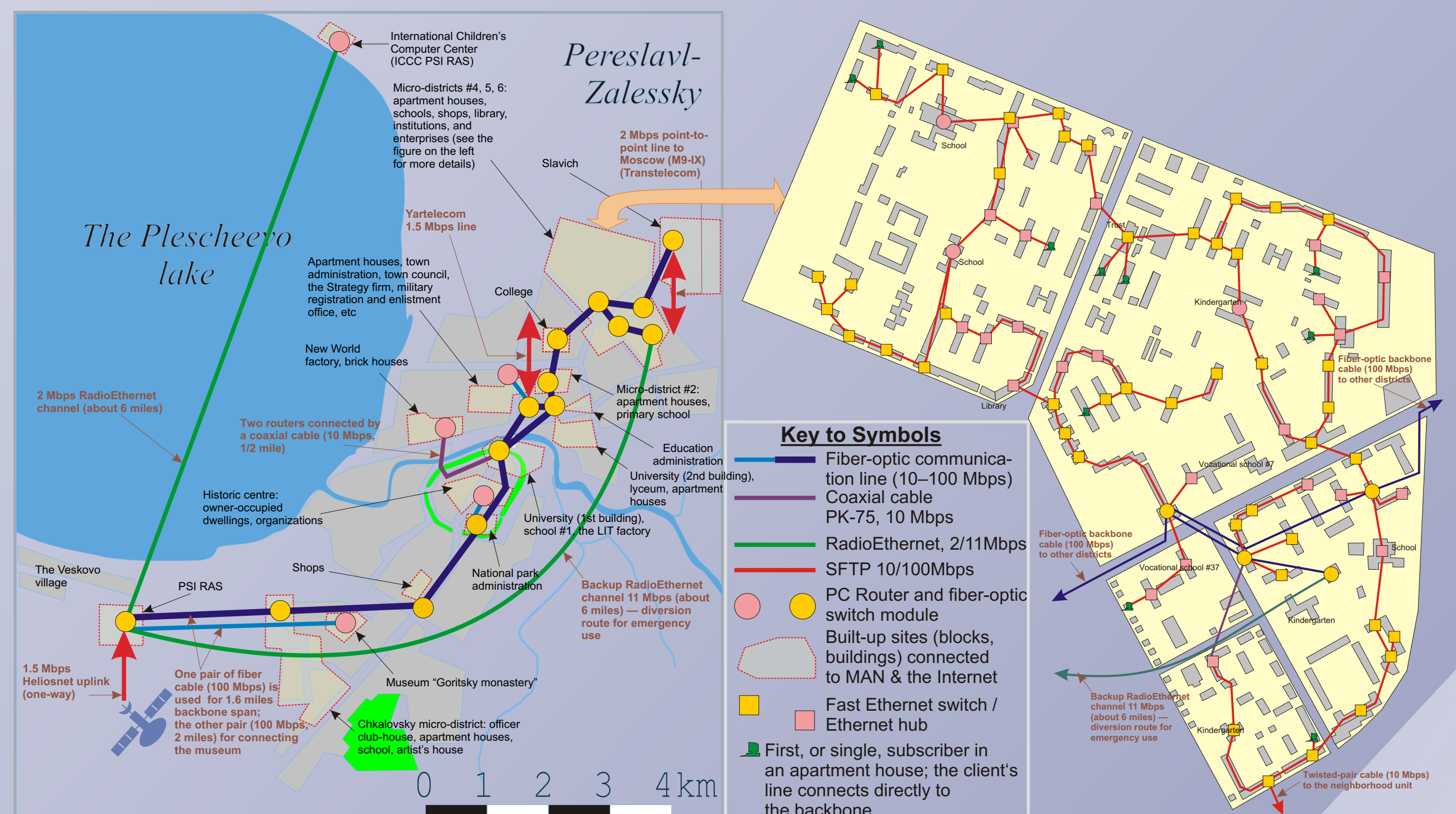
BOTIK technical solutions for building cost-effective urban networks have been implemented in several regions of Russia and CIS; specifically, Ramenskoye district, Moscow, Russia (www.aviel.ru); Moscow, Russia (www.urbannet.ru); Almaty, Kazakhstan (www.samal.kz), and others.



The Botik Telecommunication System, Pereslavl-Zalesky

BOTIK provides enterprises, organizations, and private persons with permanent high-speed network connections (100 Mbps backbone, 10–100 Mbps at subscribers) at a reasonable price. Since 2000, the BOTIK telecommunication system has been developing at an exponential rate: all major quantitative indices — number of connections, volume of data transferred, etc — have increased by 1.5 times every year.

BOTIK has more than 800 subscribers — more than 100 organizations and 700 private persons — and over 2,500 networked computers in a town of 45,000 inhabitants. The system covers an area of 6x12 miles. BOTIK provides practically all the town's educational and research institutions, libraries, some medical institutions, town administration, most enterprises, and hundreds of inhabitants with LAN connection: 85% of the subscribers have permanent high-speed connections: Ethernet, 10–100 Mbps.



PC Router — the Kernel of the Botik Technology

Active network nodes — routers, bridges, terminal servers — take a central part in any network. The idea of using IBM PC with a free Unix clone for implementation of such devices is well known. The Botik laboratory has started production of a universal network node called PC Router which costs \$400–1000 and has the following characteristics:

- tolerance to unexpected shutdown;
- absence of mechanical moving elements — fans and conventional HDDs — that are the most liable to failures;
- low electricity consumption (about 10–15 W), low emission of heat;
- the use of power supply (with accumulator) designed by the Botik Lab. which remains active with an input voltage in the range of 100 to 300 V and is immune to fluctuation at input voltages up to 500V;
- autonomous operation up to 10 hours;
- functionality: IP-routing, IP-filtering, Ethernet-bridging, caching nameserver, etc.



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