Russian Academy of Sciences
Program Systems Institute

Russian Research Institute for Regional Problems the Ministry of Science and Education

THE BOTIK TELECOMMUNICATION LABORATORY

Solutions for Building Regional Networks

- **The BOTIK Lab.: Telecommunication System of Pereslavl-Zalessky**
- **The BOTIK Technologies: Cost Effective Technologies for Building Regional Computer Networks**
- **Technology Transfer to Other Regions of Russia and CIS**

The BOTIK Telecommunication System, Pereslavl-Zalessky

BOTIK provides enterprises, organizations, and private persons with permanent high-speed network connections (100 Mbps backbone, 10–100 Mbps at subscibers) 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 6×12 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).

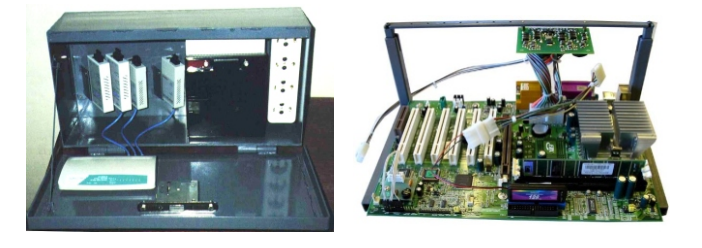
BOTIK technical solutions for building cost-effective urban networks have been implemented in several regions of Russia and CIS countries; specifically, Almaty, Kazakhstan (*www.samal.kz*); Moscow, Russia (*www.urbannet.ru*); Ramenskoye district, Moscow, Russia (*www.aviel.ru*), and others.

The BOTIK Technologies

Software suite for urban computer networks: NAdmin (administration and billing), BMS (monitoring), BotikMap (specialized GIS), BotikTools (subscribers' software package), IP-telephony support, and other services.

Solutions for copper backbone cables: up to 0.6 miles, 10–100 Mbps, $0.18–0.25/m.

Fiber-optic switch modu-le (100 Mbps) endures the poor quality of power sup-ply in Russian regions (fluc-tuation in voltage and irre-gular power supply).



Hardware for new generation PC Routers: low elect-ricity consumption (about 10–15 W); absence of mechani-cal moving elements — processor and power unit fans; classic HDD is replaced by 128 MB FLASH memory; the use of power supply unit (with accumulator) pro-duced by the Botik Lab. which supports PC Rou-ter operation when ex-ternal power supply is lacking; microcontrol-ler-based watchdog tim-ers designed by the Bo-tik Lab.

EtherBox: unmanaged switch control module. In order to cut down on network exploitation expenses, it is neces-sary to automate the monitoring of components' operation to the maximum no matter whether or not the initial device had a control interface. We solved this problem by desig-ning and putting into production a space saving (25×28×10 mm) EtherBox device based on the Atmel chip with an Ethernet port. The device supports TCP/IP and a multicast-based control protocol protected with symmetric cryptography. Attaching this device to a free port of an un-managed switch makes possible the monitoring of the net-work node by means of a ping-test.

EtherBox may also be used to connect external devices, sensors, or actuating mechanisms to the network, which makes it possible to monitor and control switches.

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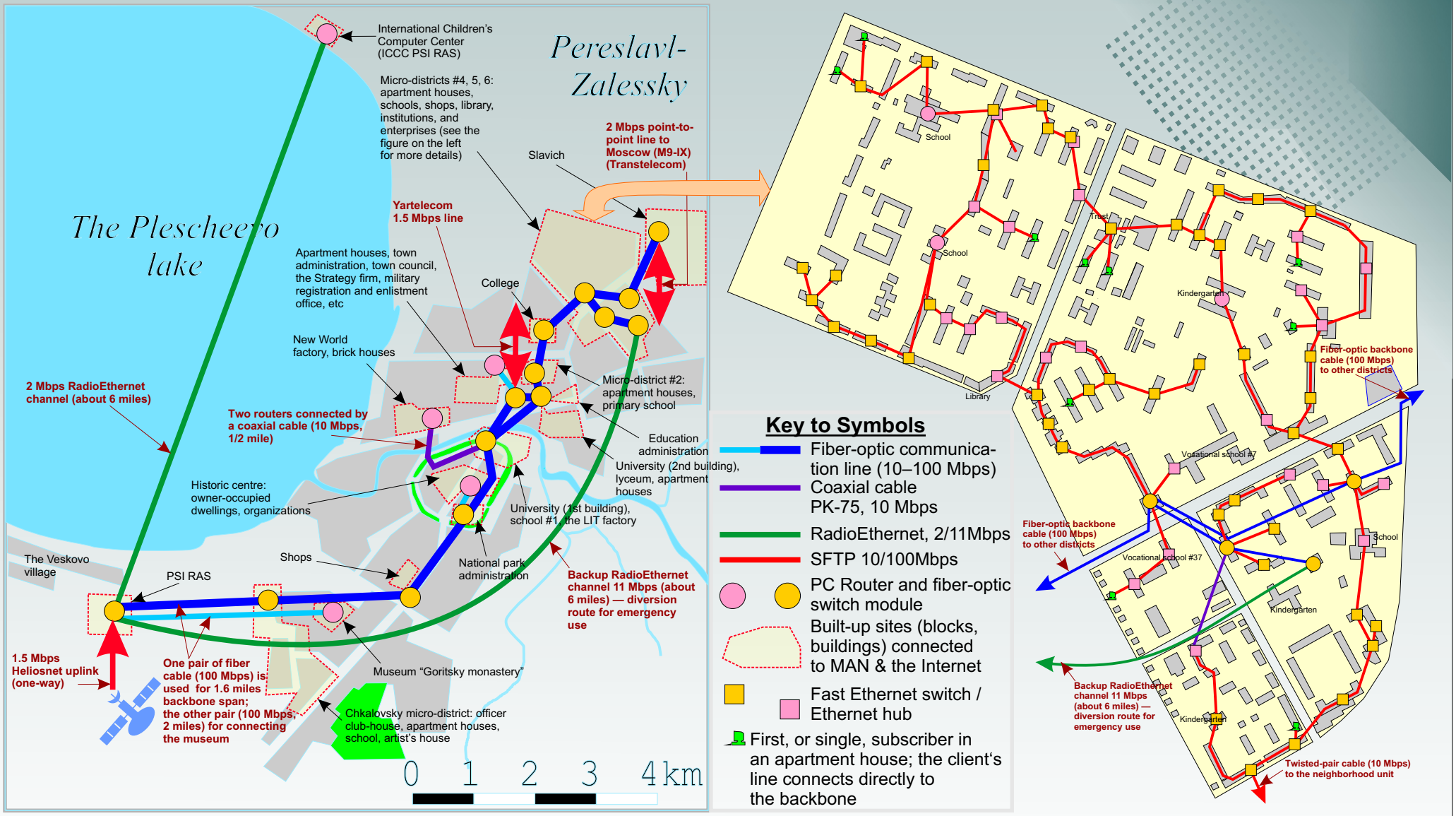

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