ДОНСКОЙ ГОСУДАРСТВЕННЫЙ ТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ

УПРАВЛЕНИЕ ДИСТАНЦИОННОГО ОБУЧЕНИЯ И ПОВЫШЕНИЯ КВАЛИФИКАЦИИ

Кафедра «Иностранных языков»

Методические указания

по профессионально-ориентированному чтению по дисциплине

«Английский язык»

(Часть 2)

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Аннотация

Методические указания предназначены для студентов Дорожно-транспортного факультета.

Методические указания включают 3 раздела, состоящих из нескольких тем и разнообразных типов заданий, направленных на развитие навыков профессионально-ориентированной устной и письменной речи. Рассчитаны на аудиторную работу студентов, продолжающих изучать английский язык, рекомендуются для практических занятий в неязыковом вузе.

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UNIT 1
THE INTELLIGENT TRANSPORT SYSTEMS (ITS)

Topic 1: The notion of the ITS

1. Read and translate the text:

A quick search on the Internet reveals more than 50 different meanings for ITS – everything from Inventory Tracking system to Interferometer Thermal Sounder. Most people, though, probably think it is something related to Informational Technology, and in some cases it is. But in the world of transport, one definition clearly comes out on top: Intelligent Transport Systems and Services.

ITS is the marriage of information and communication technologies with the vehicles and networks that move people and goods. Under development for the past 20 years, these systems and services have been implemented at various levels around the world. In Japan, for example, vehicle navigation systems are widely used, whereas in the United States they are less common.

In Europe, Intelligent Transport Systems and Services are helping to improve virtually every section of the transport chain as well as reduce their environmental impact. Commercial vehicle operators, individual drivers and public transport users alike are already benefiting from ITS, not to mention the infrastructure operators and public authorities reaping ITS's many regards. Most of these people, though, don't know what type of technology is helping to smooth their journey. ITS covers such a broad range of systems and services that users may not identify with the benefits ITS has to offer.

In the end, ITS will likely be transparent to the end user. Intelligent Transport Systems and Services will simply improve safety, efficiency, comfort and the environment with the general public having limited knowledge that ITS technology is at work. Already today, no one speaks of the ITS tracking system used by the local delivery service, but they do talk about the fact they can locate their parcels online and that on time.

Unfortunately, ITS technologies are not yet completely transparent and may be quite confusing to the casual user or newcomer to the ITS community. A basic understanding of ITS could in fact aid in the further implementation of the systems and services currently being developed. If public authorities, for example, know about the basic functions and benefits of an Intelligent Transport System, they will be more likely to pursue its development. Similarly, if end users understand the principles behind ITS and how they can improve their daily lives, then they are more likely to buy and use those products.

So what is Intelligent Transport Systems and Services? It can be divided into four main categories of ITS development, namely, ITS for

- Private Vehicles
- Public transport
- Commercial Vehicles
- The Infrastructure

Each category is subdivided into smaller sections discussing the various systems and services involved. Some of what is described is already on the market and widely deployed, whereas other items are still on the drawing board or in the development and testing phrases. Thus you will see how ITS is today and where it is headed in the near future. This should provide a better understanding of these new technologies and allow you to take advantage of their many potential benefits in your own daily life.

2. Find Russian equivalents for:

- Intelligent Transport Systems and Services
- To be implemented
- Environmental impact
- Road network
- Public vehicles

3. Say whether the given sentences true or false. Correct if necessary:

- ITS is the marriage of information and communication technologies with the vehicles and networks that move people and goods.
- In Japan, for example, vehicle navigation systems are widely used, whereas in the United States they are less common.
- ITS technologies are not yet completely transparent and may be quite confusing to the casual user or newcomer to the ITS community.
- ITS covers such a broad range of systems and services that users may not identify with the benefits ITS has to offer.
- In Russia, Intelligent Transport Systems and Services are helping to improve virtually every section of the transport chain as well as reduce their environmental impact.

4. **Make up a plan and retell the text according to it.**

Topic 2: National Transportation Communications for Intelligent Transport System Protocol

1. **Read and translate the text:**

The **National Transportation Communications for Intelligent Transport System Protocol** (NTCIP) is a family of standards designed to achieve interoperability and interchangeability between computers and electronic traffic control equipment from different manufacturers.

The protocol is the product of a joint standardization project guided by the Joint Committee on the NTCIP, which is composed of six representatives each from the National Electrical Manufacturers Association (NEMA), the American Association of State Highway and Transportation Officials (AASHTO), and the Institute of Transportation Engineers (ITE).

The project receives funding under a contract with the United States Department of Transportation (USDOT) and is part of a wider effort to develop a comprehensive family of Intelligent Transport System (ITS) standards.

NEMA initiated the development of the NTCIP in 1992. In early 1993, the US Federal Highway Administration (FHWA) brought together transportation industry representatives to discuss obstacles to installing field equipment for new Intelligent Transport Systems (ITS). The key objectives of the new NTCIP protocol were the interchangeability of similar roadside devices, and the interoperability of different types of devices on the same communications channel.

NTCIP standards offer increased flexibility and choices for agencies operating transportation management systems. According to the NTCIP Guide, use and application of the NTCIP provides the following benefits to Intelligent Transport System (ITS) deplores:

- Avoiding Early Obsolescence;
- Providing a Choice of Vendor;
- Phased Procurement and Deployment;
- Enabling Interagency Coordination;
- Use One Communications Network for All Purposes.

NTCIP allows agencies to exchange information and (with authorization) basic commands that enable any agency to monitor conditions in other agencies' systems, and to implement coordinated responses to incidents and other changes in field conditions when needed. Such data exchange and coordinated response can be implemented either manually or automatically. One agency can monitor, and issue basic commands, if authorized, to field devices operated by another agency, even though those devices may be from a different vendor than those used by the monitoring agency. Potential applications of interagency coordination include:

- Coordinating timed transfers at a shared transit center,
- Coordinating traffic signals across jurisdictional boundaries,
- Providing traffic signal priority for selected, e.g., behind schedule, transit vehicles,
- Providing real-time information to a shared traveler information center,
- Monitoring traffic volumes on another agency's roadway,
- Coordinating the operation of a freeway ramp meter with an adjacent traffic signal, or posting a warning message on another agency's dynamic message sign.

NTCIP allows a management system to communicate with a mixture of device types on the same communications channel. The NTCIP Framework is based primarily on the open standards of the Internet Engineering Task Force (IETF), World Wide Web Consortium (W3C), and ISO, plus NTCIP data dictionary standards specific for the task of ITS device communications. A layered, or modular, approach to communications standards, is used to represent data communications between two computers or other electronic devices.

To ensure a working system, deplorers should select and specify at least one NTCIP protocol or profile at each level. A discussion of each level, and NTCIP standards that apply at that level, follows:

- **NTCIP Information Level** — Information standards define the meaning of data and messages and generally deal with ITS information (rather than information about the communications network). Information level standards represent the functionality of the system to be implemented.
- **NTCIP Application Level** — Application standards define the rules and procedures for exchanging information data.
- **NTCIP Transport Level** — Transport standards define the rules and procedures for exchanging the Application data between point 'A' and point 'X' on a network, including any necessary routing, message disassembly/re-assembly and network management functions.
- **NTCIP Subnetwork Level** — Subnetwork standards define the rules and procedures for exchanging data between two 'adjacent' devices over some communications media.
- **NTCIP Plant Level** — The Plant Level is shown in the

NTCIP Framework only as a means of providing a point of reference to those learning about NTCIP.

2. Find Russian equivalents for:

– Key objectives
– Choice of Vendor
– Early Obsolescence
– Traffic volumes
– Real-time information

3. Say whether the given sentences true or false. Correct if necessary:

- **NTCIP Information Level** — Information standards define the meaning of wrong data and messages and generally deal with ITS information (rather than information about the communications network). Information level standards represent the functionality of the system to be implemented.
- **NTCIP Application Level** — Application standards define the rules and procedures for exchanging information data.
- **NTCIP Transport Level** — Transport standards define the absence of rules and procedures for exchanging the Application data between point 'A' and point 'X' on a network, including any necessary routing, message disassembly/re-assembly and network management functions.
- **NTCIP Subnetwork Level** — Subnetwork standards define the rules and procedures for exchanging data between two 'adjacent' devices over some communications media.
- **NTCIP Plant Level** — The Plant Level is shown in the NTCIP Framework not only as a means of providing a point of reference to those learning about NTCIP but as a way of solving a lot of problems.

4. Make up a plan and retell the text according to it.

UNIT 2
GLOBAL POSITIONING SYSTEMS – GLOBAL POSITIONING RESEARCH SYSTEM

Topic 1: The notion of GPS and GPRS

1. Read and translate the text:

The Global Positioning System (GPS) is a U.S. space-based global navigation satellite system. It provides reliable positioning, navigation, and timing services to worldwide users on a continuous basis in all weather, day and night, anywhere on or near the Earth.

GPS is made up of three parts: between 24 and 32 satellites orbiting the Earth, four control and monitoring stations on Earth, and the GPS receivers owned by users. GPS satellites broadcast signals from space that are used by GPS receivers to provide three-dimensional location (latitude, longitude, and altitude) plus the time.

Navigation systems may (or may not) use a combination of any of the following:

- top view for the map
- top view for the map with the map rotating with the automobile (so that "up" on the map always corresponds to "forward" in the vehicle)
- bird's-eye view for the map or the next curve
- linear gauge for distance, which is redundant if a rotating map is used
- numbers for distance
- schematic pictograms
- voice prompts

GPS has become a widely used aid to navigation worldwide, and a useful tool for map-making, land surveying, commerce, scientific uses, tracking and surveillance, and hobbies such as geocaching and waymarking. Also, the precise time reference is used in many applications including the scientific study of earthquakes and as a time synchronization source for cellular network protocols.

GPS has become a mainstay of transportation systems worldwide, providing navigation for aviation, ground, and maritime operations. Disaster relief and emergency services depend upon GPS for location and timing capabilities in their life-saving missions. Everyday activities such as banking, mobile phone operations, and even the control of power grids, are facilitated by the accurate timing provided by GPS. Farmers, surveyors, geologists and countless others perform their work more efficiently, safely, economically, and accurately using the free and open GPS signals.

Various options exist for obtaining a vehicle's position. Some rely on ground-based transmitters that offer precise information within a given area. More common, though, are satellite-based positioning systems such as the US Global Positioning System (GPS). The foundation of GPS is a constellation of satellites that enable location calculation using their broadcast signals and a properly equipped receiver. The accuracy of standard GPS ranges from 100 metres down to the meter level, depending on the type of system used.

2. *Find Russian equivalents for:*

- The Global Positioning System
- Satellites
- map-making
- land surveying
- to broadcast signals

3. Give your own definition for "GPRS"

4. Say whether the given sentences true or false. Correct if necessary:

- GPS has become a mainstay of transportation systems worldwide, providing navigation for aviation, ground, and maritime operations.
- The accuracy of standard GPS ranges from 100 metres down to the kilometer level, depending on the type of system used.
- GPS is made up of three parts: between 24 and 32 satellites orbiting the Earth, four control and monitoring stations on Earth, and the GPS receivers owned by users.
- The Global Positioning System (GPS) is a U.S. space-based global navigation satellite system.
- GPS could be used only for fun.

5. Make up a plan and retell the text according to it.

Topic 2: GPS: the history of the question

1. Read and translate the text:

Automotive Navigation Systems or, more commonly, Global Positioning Systems were the subject of extensive experimentation, including some efforts to reach mass markets, prior to the availability of commercial GPS.

The most major technologies required for modern automobile navigation were already established when the microprocessor emerged in the 1970s to support their integration and enhancement by computer software. These technologies subsequently underwent extensive refinement, and a variety of system architectures had been explored by the time practical systems reached the market in the late 1980s. Among the other enhancements of the 1980s was the development of color displays for digital maps and of CD-ROMs for digital map storage.

However, there is a question about who made the first *commercially available* automotive navigation system. There seems to be little room for doubt that Etak was first to make available a digital system that used map-matching to improve on dead reckoning instrumentation, which arguably made car navigation systems practical for the first time. However, Japanese efforts on both digital and analog systems predate Etak's founding.

Honda claims to have created the first navigation system starting in 1983, and culminating with general availability in the 1990 Acura Legend. However, it appears from Honda's concessions in their own account of the Electro Gyrocator project that Etak actually trumped Honda's analog effort with a truly practical digital system.

Both Mitsubishi Electric and Pioneer claim to be the first with a GPS-based auto navigation system, in 1990. Also in 1990, a draft patent application was filed within Digital Equipment Co. Ltd. for a multi-function device called PageLink that had real-time maps for use in a car listed as one of its functions.

Magellan, a GPS navigation system manufacturer, claims to have created the first GPS-based vehicle navigation system in the U.S. in 1995.

In 1995, Oldsmobile introduced the first GPS navigation system available in a production car, called GuideStar.

However it was not until 2000 that the United States made a more accurate GPS signal available for civilian use.

2. Find Russian equivalents for:

- The Global Positioning System
- Digital map storage.
- Dead reckoning instrumentation
- Draft patent application
- To trump

3. Say whether the given sentences true or false. Correct if necessary:

- The most major technologies required for modern automobile navigation were already established when the microprocessor emerged in the 1970s to support their integration and enhancement by computer software.

– Among the other enhancements of the 1990s was the development of color displays for digital maps and of CD-ROMs for digital map storage.

– Honda claims to have created the first navigation system starting in 1983, and culminating with general availability in the 1999 Acura Legend.

– Both Mitsubishi Electric and Pioneer claim to be the first with a GPS-based auto navigation system, in 1990.

– However it was not until 2000 that the United Kingdom made a more accurate GPS signal available for civilian use.

4. Make up a plan and retell the text according to it.

Topic 3: The principles of GPS functioning

1. Read and translate the text:

A GPS receiver calculates an automobile's position by precisely timing the signals sent by the GPS satellites high above the Earth. Each satellite continually transmits messages which include:

- the time the message was sent
- precise orbital information (the ephemeris)
- the general system health and rough orbits of all GPS satellites (the almanac).

The receiver measures the transit time of each message and computes the distance to each satellite. Geometric trilateration is used to combine these distances with the satellites' locations to obtain the position of the receiver. This position is then displayed, perhaps with a moving map display or latitude and longitude; elevation information may be included. Many GPS units also show derived information such as direction and speed, calculated from position changes.

Three satellites might seem enough to solve for position, since space has three dimensions. However, even a very small clock error multiplied by the very large speed of light—the speed at which satellite signals propagate—results in a large positional error. Therefore receivers use four or more satellites to solve for the receiver's location and time. The very accurately computed time is effectively hidden by most GPS applications, which use only the location. A few specialized GPS applications do however use the time; these include time transfer, traffic signal timing, and synchronization of cell phone base stations.

Although four satellites are required for normal operation, fewer apply in special cases. If one variable is already known, a receiver can determine its position using only three satellites. (For example, a ship or plane may have known elevation.) Some GPS receivers may use additional clues or assumptions (such as reusing the last known altitude, dead reckoning, inertial navigation, or including information from the vehicle computer) to give a degraded position when fewer than four satellites are visible.

2. Make up a plan and retell the text according to it.

Topic 4: Floating car data

1. Read and translate the text:

Floating car data (FCD) (also known as Floating Cellular Data) is a method to determine the traffic speed on the road network. It is based on the collection of localization data, speed, direction of travel and time information from driving vehicles. These data are the essential source for traffic information and for most intelligent transportation systems (ITS). This means that every appropriately equipped vehicle acts as a sensor for the road network. Based on these data, traffic jams can be identified, travel times can be calculated, and traffic reports can be instantly generated.

In contrast to traffic cameras, number plate recognition systems, and sensor loops embedded in the roadway, no additional hardware on the road network is necessary. Different types are possible:

Floating Cellular Data = cellular network data-based (CDMA, GSM, UMTS, GPRS): No special devices/hardware are necessary: every switched-on mobile phone becomes a traffic probe and is as such an anonymous source of information. The location of the mobile phone is determined using triangulation or the hand-over data stored by the network operator. As the GSM localization is less accurate than GPS based systems, lots of devices have to be tracked and complex algorithms need to be used to extract high-quality data (Care must be taken, for instance, not to misinterpret cellular phones on a high speed railway track parallel to the road as incredibly fast journeys along the road). However, the more congestion, the more cars, the more phones and thus more probes. In metropolitan areas where traffic data are most needed the distance between antennas is lower and thus the accuracy increases. FCD based on mobile phones believe to have significant advantages over GPS-based or conventional methods such as cameras or street embedded sensors: no infrastructure or hardware is needed to be built in cars or along the road. It is much less expensive, offers more coverage of more streets, it is faster to set up (no work zones) and needs less maintenance.

Wireless signal extraction is a new term in the ITS industry. Wireless signal extraction (WiSE) is a technology that pulls or extracts data from a wireless carrier's network, after the data have been anonymized. The data are then used to provide traffic information. The resultant information can be used to provide drivers with real-time traffic conditions, to build historical databases of traffic information for planning purposes, and to give emergency response agencies both historical snapshots and real-time conditions to aid in their evacuation and emergency response management. WiSE technology provides traffic information on highways and arterials, which is an advantage over other technologies. Another advantage of WiSE technology is that it does not rely on equipment that has to be installed and maintained, such as sensors. This term was initially used by AirSage to describe its technology.

Electronic toll collection device data: ETC transponders, which are uniquely identifiable, may be read not only at toll collection points (e.g. toll bridges) but also at many non-toll locations.

GPS-based: A small number of cars (typically cars driving in a fleet, such as courier services and taxi drivers) are equipped with a box that contains a GPS receiver. The data are then communicated with the service provider using the regular on-board radio unit or via cellular network data (more expensive).

It is possible that FCD could be used as a surveillance method, although the companies deploying FCD systems give assurances that all data are anonymized in their systems, or kept sufficiently secure to prevent abuses.

Extended FCD (XFCD)

Additionally, efforts are underway to enable the use of Extended Floating Car Data (XFCD). Today's cars are equipped with a range of sensors, some of which can be used to provide extended data. If the majority of the vehicles in a given area have activated their windscreen wipers, for example, then it is reasonable to assume it is raining (or snowing) in that area. Vehicle navigation systems could provide location and speed information (indicating traffic jams, etc.), while in-vehicle emergency response systems offer an important link for incident detection and management.

Some of the key issues that need to be addressed to make the use of XFCD possible are the communications options, sensor interfaces and interoperability. ERTICO is working with its partners and other key players to determine how best to go about implementing XFCD on a large scale. The communications question is significant, as the availability of packet-oriented mobile communications will have a huge impact on both the possible technical solutions of retrieving data from probe vehicles and the operational costs for running the service.

In addition, an on-board standard sensor interface will allow an economic use, independent of the specific floating car data implementation. Plus, the design of on-board logic, a transmission protocol, remote configuration of vehicle communication behavior and control centre operational procedures that are interoperable Europe-wide will greatly advance the use of XFCD.

2. Find Russian equivalents for:

- Floating Cellular Data
- hand-over data
- Wireless signal extraction
- In-vehicle emergency response systems
- Retrieving data

3. Say whether the given sentences true or false. Correct if necessary:

- A small number of cars (typically cars driving in a fleet, such as courier services and taxi drivers) are equipped with a box that contains a GPS receiver.
- Wireless signal extraction is not a new term in the ITS industry.
- Vehicle navigation systems could provide location and speed information (indicating traffic jams, etc.), while in-vehicle emergency response systems offer an important link for incident detection and management.
- The location of the mobile phone is determined using triangulation or the hand-over data stored by the driver himself.
- The resultant information can be used to provide drivers with real-time traffic conditions, to build historical databases of traffic information for planning purposes, and to give emergency response agencies both historical snapshots and real-time conditions to aid in their evacuation and emergency response management.

4. Make up a plan and retell the text according to it.

UNIT 3
MOBILE DEVICES

Topic 1: Mobile data terminal

1. Read and translate the text:

A **mobile data terminal** (MDT) is a computerized device used in public transit vehicles, taxicabs, courier vehicles, service trucks, commercial trucking fleets, military logistics, fishing fleets, warehouse inventory control, and emergency vehicles to communicate with a central dispatch office.

Mobile data terminals feature a screen on which to view information and a keyboard or keypad for entering information, and may be connected to various peripheral devices. Standard peripherals include two-way radios and taximeters, both of which predate computer assisted dispatching. MDTs may be simple display and keypad units, intended to be connected to a separate black-box or AVL (see below) computer. While MDTs were originally dumb terminals most have been replaced with fully functional PC hardware, known as MDCs (Mobile Digital Computers). While the MDC term is more correct, MDT is still widely used. Other common terms include MVC (Motor Vehicle Computer) and names of manufacturers such as Mobile or KDT.

In the earlier days of computer-aided dispatching (CAD), many MDT's were custom devices, used with specialized point to point radios, particularly in applications such as police dispatching. While applications like taxi and package delivery often still use custom designed terminals, many CAD systems are switching to common (or ruggedized) laptops and Wide-Area Wireless IP communications, utilizing the Internet or private IP networks connected to and over it.

For many industrial applications, such as commercial trucking, GIS, agriculture, mobile asset management, and other industries, custom electronic hardware is still preferred. Custom terminals use I/O interfaces that connect directly to industry-specific equipment. They are usually environmentally hardened packages with power supply protection and robust memory file systems that greatly improve reliability and task efficiency. MDT solutions that are based on ruggedized consumer products or consumer available software will typically not have the life cycle duration expected in industrial applications, over 5 years.

A related device classification, specific to the transportation industry, is called automatic vehicle location (AVL). Mobile data terminals are often used in conjunction with a ¨black box¨ that contains GPS receiver, cell phone transceiver, other radio devices, or interfaces to industry-specific equipment. AVL devices may be simple stand-alone modems or may include operating systems with application space for the system integrator.

MDTs are most commonly associated with in-vehicle use. This requires the MDT to be anchored to the vehicle for driver safety, device security, and user ***ergonomics****. Mounts are designed for attaching MDTs to mobile workspaces into most notably automobiles, forklifts, boats, and planes.*

MDTs generally require specific installation protocols to be followed for proper ergonomics, power and communications functionality. MDT installation companies such as USAT Corp. and TouchStar Pacific specialize in designing the mount design, assembling the proper parts, and installing them in a safe and consistent manner away from airbags, vehicle HVAC controls, and driver controls. Frequently installations will include a WAN modem, power conditioning equipment, and a WAN, WLAN, and GPS antenna mounted external to the vehicle.

2. Match the following notions with their definitions:

1) device	a) any kind of carriage or conveyance on land, e.g. a cart, a lorry, a motorcar, a bicycle
2) taxicab	b) an invention; something made for a special purpose
3) taximeter	c) freedom from danger
4) vehicle	d) a car for hire. It is usually provided with a device which shows the amount to be paid
5) safety	e) an instrument fixed to a taxi. It shows the distance travelled and the amount to be paid

3. Say whether the given sentences true or false. Correct if necessary:

– Mobile data terminals feature a screen on which to view information and a keyboard or keypad for entering information, and may be connected to various peripheral devices.

– A related device classification, specific to the transportation industry, is called automatic vehicle location (AVL).

– A mobile data terminal (MDT) is a non-computerized device used in public transit vehicles, taxicabs, courier vehicles, service trucks, commercial trucking fleets, military logistics, fishing fleets, warehouse inventory control, and emergency vehicles to communicate with a central dispatch office.

– MDTs may be simple display and keypad units.
– MDTs generally require specific installation protocols to be followed for proper ergonomics.

4. Make up a plan and retell the text according to it.

Topic 2: Bluetooth

1. Read and translate the text:

Bluetooth is an open wireless protocol for exchanging data over short distances (using short radio waves) from fixed and mobile devices, creating personal area networks (PANs). It was originally conceived as a wireless alternative to RS232 data cables. It can connect several devices, overcoming problems of synchronization.

Bluetooth uses a radio technology called frequency-hopping spread spectrum, which chops up the data being sent and transmits chunks of it on up to 79 frequencies. In its basic mode, the modulation is Gaussian frequency-shift keying (GFSK). It can achieve a gross data rate of 1 Mb/s. Bluetooth provides a way to connect and exchange information between devices such as mobile phones, telephones, laptops, personal computers, printers, Global Positioning System (GPS) receivers, digital cameras, and video game consoles through a secure, globally unlicensed Industrial, Scientific and Medical (ISM) 2.4 GHz short-range radio frequency bandwidth. The Bluetooth specifications are developed and licensed by the Bluetooth Special Interest Group (SIG). The Bluetooth SIG consists of companies in the areas of telecommunication, computing, networking, and consumer electronics.

Bluetooth is a standard and a communications protocol primarily designed for low power consumption, with a short range (power-class-dependent: 100m, 10m and 1m, but ranges vary in practice; see table below) based on low-cost transceiver microchips in each device. Bluetooth makes it possible for these devices to communicate with each other when they are in range. Because the devices use a radio (broadcast) communications system, they do not have to be in line of sight of each other.

In most cases the effective range of class 2 devices is extended if they connect to a class 1 transceiver, compared to a pure class 2 network. This is accomplished by the higher sensitivity and transmission power of Class 1 devices.

In order to use Bluetooth, a device must be compatible with certain Bluetooth profiles. These define the possible applications and uses of the technology.

A typical Bluetooth mobile phone headset.

More prevalent applications of Bluetooth include:

- Wireless control of and communication between a mobile phone and a hands-free headset. This was one of the earliest applications to become popular.
- Wireless networking between PCs in a confined space and where little bandwidth is required.
- Wireless communication with PC input and output devices, the most common being the mouse, keyboard and printer.
- Transfer of files, contact details, calendar appointments, and reminders between devices with OBEX.
- Replacement of traditional wired serial communications in test equipment, GPS receivers, medical equipment, bar code scanners, and traffic control devices.
- For controls where infrared was traditionally used.
- For low bandwidth applications where higher [USB] bandwidth is not required and cable-free connection desired.
- Sending small advertisements from Bluetooth-enabled advertising hoardings to other, discoverable, Bluetooth devices.
- Wireless bridge between two Industrial Ethernet (e.g., PROFINET) networks.

The technology is useful when transferring information between two or more devices that are near each other in low-bandwidth situations. Bluetooth is commonly used to transfer sound data with telephones (i.e., with a Bluetooth headset) or byte data with hand-held computers (transferring files).

Bluetooth protocols simplify the discovery and setup of services between devices. Bluetooth devices can advertise all of the services they provide. This makes using services easier because more of the security, network address and permission configuration can be automated than with many other network types.

Standardized communication between the host stack (e.g., a PC or mobile phone OS) and the controller (the Bluetooth IC). This standard allows the host stack or controller IC to be swapped with minimal adaptation.

There are several HCI transport layer standards, each using a different hardware interface to transfer the same command, event and data packets. The most commonly used are USB (in PCs) and UART (in mobile phones and PDAs).

In Bluetooth devices with simple functionality (e.g., headsets) the host stack and controller can be implemented on the same microprocessor. In this case the HCI is optional, although often implemented as an internal software interface.

Radio frequency communications (RFCOMM) is the cable replacement protocol used to create a virtual serial data stream. RFCOMM provides for binary data transport and emulates EIA-232 (formerly RS-232) control signals over the Bluetooth baseband layer.

RFCOMM provides a simple reliable data stream to the user, similar to TCP. It is used directly by many telephony related profiles as a carrier for AT commands, as well as being a transport layer for OBEX over Bluetooth.

Many Bluetooth applications use RFCOMM because of its widespread support and publicly available API on most operating systems. Additionally, applications that used a serial port to communicate can be quickly ported to use RFCOMM.

BNEP (Bluetooth Network Encapsulation Protocol)

BNEP is used to transfer another protocol stack's data via an L2CAP channel. Its main purpose is the transmission of IP packets in the Personal Area Networking Profile. BNEP performs a similar function to SNAP in Wireless LAN.

Any Bluetooth device will transmit the following information on demand:

- Device name
- Device class
- List of services
- Technical information (for example: device features, manufacturer, Bluetooth specification used, clock offset)

Any device may perform an inquiry to find other devices to connect to, and any device can be configured to respond to such inquiries. However, if the device trying to connect knows the address of the device, it always responds to direct connection requests and transmits the information shown in the list above if requested. Use of a device's services may require pairing or acceptance by its owner, but the connection itself can be initiated by any device and held until it goes out of range. Some devices can be connected to only one device at a time, and connecting to them prevents them from connecting to other devices and appearing in inquiries until they disconnect from the other device.

Every device has a unique 48-bit address. However, these addresses are generally not shown in inquiries. Instead, friendly Bluetooth names are used, which can be set by the user. This name appears when another user scans for devices and in lists of paired devices.

Most phones have the Bluetooth name set to the manufacturer and model of the phone by default. Most phones and laptops show only the Bluetooth names and special programs are required to get additional information about remote devices. This can be confusing as, for example, there could be several phones in range named T610

During the pairing process, the two devices involved establish a relationship by creating a shared secret known as a *link key*. If a link key is stored by both devices they are said to be *bonded*. A device that wants to communicate only with a bonded device can cryptographically authenticate the identity of the other device, and so be sure that it is the same device it previously paired with. Once a link key has been generated, an authenticated ACL link between the devices may be encrypted so that the data that they exchange over the airwaves is protected against eavesdropping.

Link keys can be deleted at any time by either device. If done by either device this will implicitly remove the bonding between the devices; so it is possible one of the device to have a link key stored but not be aware that it is no longer bonded to the device associated with the given link key.

Bluetooth services generally require either encryption or authentication, and as such require pairing before they allow a remote device to use the given service. Some services, such as the Object Push Profile, elect not to explicitly require authentication or encryption so that pairing does not interfere with the user experience associated with the service use-cases.

2. Match the following words to the Russian ones:

data	кодировать, шифровать
headset	запрос, расспрашивание, наведение справок
frequency	соревноваться, соперничать, подражать
encrypt	передача, пересылка
eavesdrop	данные, факты, сведения
inquiry	позволение, разрешение
permission	головной телефон, наушники
transmission	подслушивать
emulate	частотность, частота

3. Make up a plan and retell the text according to it.

Topic 3: Additional mobile devices.

1. Read and translate the text:

OpenStreetMap (**OSM**) is a collaborative project to create a free editable map of the world. The maps are created using data from portable GPS devices, aerial photography, other free sources or simply from local knowledge. Both rendered images and the vector graphics are available for download under a Creative Commons *Attribution-ShareAlike 2.0* licence.

OpenStreetMap (OSM) was founded in July 2004 by Steve Coast. In April 2006, a foundation was established with the aim of encouraging the growth, development and distribution of free geospatial data and providing geospatial data for anybody to use and share. In December 2006 Yahoo confirmed that OpenStreetMap could use their aerial photography as a backdrop for map production.

In April 2007 Automotive Navigation Data (AND) donated a complete road dataset for the Netherlands and trunk road data for India and China to the project and by July 2007, when the first OSM international *The State of the Map* conference was held there were 9,000 registered users. Sponsors of the event included Google, Yahoo and Multimap. In August 2007 an independent project, OpenAerialMap, was launched, to hold a database of aerial photography available on open licensing and in October 2007 OpenStreetMap completed the import of a US Census TIGER road dataset. In December Oxford University became the first major organisation to use OpenStreetMap data on their main website.

By August 2008, shortly after the second *The State of the Map* conference was held, there were over 50,000 registered users with over 5,000 active contributors. In March 2009, 100,000 users were surpassed.

The initial map data was all built from scratch by volunteers performing systematic ground surveys using a handheld GPS unit and a notebook or a voice recorder, data which was then entered into the OpenStreetMap database from a computer. More recently the availability of aerial photography and other data sources from commercial and government sources has greatly increased the speed of this work and has allowed land-use data to be collected more accurately. When large datasets are available a technical team will manage the conversion and import of the data.

Ground surveys are performed by a volunteer (also called 'mapper'), on foot, bicycle or in a car. Map data is usually collected using a GPS unit, although this isn't strictly necessary if an area has already been traced from satellite imagery.

Once the data has been collected, it's entered into the database by uploading it on the project's website. At this point in time, no information about the kind of uploaded track is available - it could be e.g. a motorway, a footpath or a river. Thus, in a second step, editing takes place using one of several purpose-built map editors. This is usually done by the same 'mapper', sometimes by other user(s) registered at openstreetmap. As collecting and uploading data is separated from editing objects, contribution to the project is possible also without using a GPS unit. In particular, placing and editing objects such as schools, hospitals, taxi ranks, bus stops, pubs etc. is done based on editors' local knowledge. Some committed contributors are systematically mapping whole towns and cities over a period of time, or organizing mapping parties to intensively map a particular area over an evening or a weekend. In addition to structured surveys, a large number of smaller edits are made by contributors to correct errors or add features.

Some commercial companies have donated data to the project on suitable licenses. Notably, Automotive Navigation Data (AND) who provided a complete road dataset for Netherlands and details of trunk roads in China and India.

All data added to the project needs to have a license compatible with the Creative Commons Attribution-Share Alike license. This can include out of copyright information, public domain or other licenses. All contributors must register with the project and agree to provide data on a Creative Commons BY-SA 2.0 license or determine that the licensing of the source data is suitable. Increasingly this involves examining licenses for government data to establish if it they are compatible. Use of unfree data is an especially severe problem for a map, as the only way to prove that no data came from unfree sources would be to revert the whole area in question to before the addition of the questionable data.

TomTom NV is a Dutch manufacturer of automotive navigation systems, including both stand-alone units and software for personal digital assistants and mobile telephones. It is the leading manufacturer of navigation systems in Europe. TomTom's customer service is located in Amsterdam. TomTom offers two types of products: *navigation devices* and *navigation software* for installation on mobile devices. The navigation devices and portable devices with installed software are referred to as *units*.

TomTom units provide a flying interface with an oblique bird's-eye view of the road, as well as a direct-overhead map view. They use a GPS receiver to show the precise location and provide visual and spoken directions on how to drive to the chosen destination. Certain TomTom systems also integrate with mobile phones using Bluetooth, traffic congestion maps or to actually take calls and read aloud SMS messages.

In most cases, the differences between the different models is on a software level. The hardware (at least inside the unit) is relatively similar across the entire range, with the exception of certain functionality such as FM transmission, Bluetooth, handsfree calling (requires microphone) and enhanced positioning technology (done through motion sensors in the device).

The global slogan for TomTom is "the smart choice in personal navigation".

The TomTom GO is an all-in-one GPS navigation device. It has a touch screen, speaker, USB port, internal Lithium ion battery, and comes with TomTom HOME software. It charges, synchronizes, and updates its data by connecting to a Windows or Mac PC running the TomTom HOME software via USB cable.

The TomTom One is the base model for automobile navigation. The difference between the TomTom One XL and the TomTom One is the size of the touch screen (4.3" vs. 3.5"). However, the One is able to receive traffic and weather updates using the TomTom Plus service when paired via Bluetooth with a mobile phone with a DUN data service. The reduced software capability means less demand on the hardware, which allows the One to be sold at a significantly lower price than the Go. The *XL* is also available as a *Live* version with integrated LIVE services.

TomTom Navigator is a GPS navigation software product for personal digital assistants (PDAs), Palm devices, Pocket PCs, and some smartphones. It differs slightly from the previous version by adding a few features like the ability to add frequently used functions to the main screen of the program, in addition to allowing users to report maps corrections and share them with other users.

Map Share is a proprietary map technology launched by TomTom in June 2007. Map Share allows users to make changes to the maps on their navigation devices and share them with others. It allows drivers to make changes to their maps directly on their navigation devices. Drivers can block or unblock streets, change the direction of traffic, edit street names and add, edit or remove points of interest (POIs).

Improvements can be shared with other users. Users who connect their devices to their computers can download and upload map corrections on a daily basis. This is done through TomTom

HOME, TomTom's content management software. Users can select various 'levels of trust', only receiving improvements that have been verified by TomTom or changes that have been submitted by trusted sources, by many , or by some people.

A traffic monitoring service that uses multiple sources to provide traffic information. The service does this by combining data from:

- traditional sources: Governmental/third party data such as induction loops in the roads, cameras and traffic surveillance
- new sources: traffic flow of anonymous mobile phone users

The information is merged by TomTom and algorithms are used to improve the data and filter out anomalous readings. The system sends updates to all HD Traffic users every three minutes. Users can receive the service through a connected navigation device, or through a specially designed antenna. Most current devices receive the updated road congestion conditions automatically. Rerouting can be set to be transparent to the user with the only sign that the route has been changed due to a traffic jam being a sound indication from the device and a changed ETA.

IQ Routes, developed by TomTom, uses anonymous data accumulated by users of TomTom satnav devices. This is fed back into the new devices that use algorithms that take this data into account when calculating the best way to go.

Travel time data is stored in Historical Speed Profiles, one for each road segment, covering large motorways, main roads and also small local roads. Historic Speed Profiles are part of the digital map and are updated with every new map release.

They give a unique insight into real world traffic patterns. This is a fact-based routing system based on measured travel times, whereas most other methods rely on speed limits or 'assumed' speeds.

2. Find Russian equivalents for:

– traffic jam
– road congestion conditions
– rerouting
– traffic flow
– loop
– navigation devices
– touch screen
– destination

– database

3. Match the following notions with their definitions:

1) destination	a) the course taken by a moving object, the point towards which a thing moves
2) launch	b) ability, power of doing things
3) location	c) position or place
4) direction	d) the place to which a thing or person is going or being sent or which a person wants to reach
5) capability	

4. Make up a plan and retell the text according to it.