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ANALYSIS OF SCIENTIFIC ASPECTS OF HYBRID REMOTE CONTROL OF DIFFERENT LEVELS OF TRANSPORTS CONTROL USING FMB-920 GPS/GLONASS/GSM DEVICES

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Abstract: The functionality of the compact and intelligent unit FMB920 with built-in GNSS (global navigation satellite systems - global satellite navigation system) and GSM (global systems of Mobile) with support for microSD (micro secure disk) cards, up to 32 GB in size and with an improved anti-theft system that prevents unauthorized control of vehicles funds at various levels. Considered all aspects of security of connection and using of hardware and software combination.

Keywords: microSD, navigation, satellite, bluetooth, Wi-Fi, configuration, reconstruction, communication, service, automobile, bus.

Introduction

In the modern world, very different technologies are being developed for the management and remote control and protection of mobile objects such as vehicles, aircraft, water-floating and underground and above-ground mobile objects. In this study, a method of installation and operation of a compact and intelligent block of mobile objects with Bluetooth support and built-in GNSS and GSM is developed [1,13]. GNSS (global navigation satellite systems) and GSM (global mobile communication system) with microSD (micro secure disk) support Built-in Bluetooth interface in this system provides wireless connection of headsets and other Bluetooth sensors. It is possible to send a call to a wireless network using Bluetooth devices. The analysis showed that the support for microSD card, up to 32 GB, ensures and prevents data loss. In areas where there is no GSM connection in other places, FMB920 will save all data [2, 11].

And the cars with the improved anti-theft system are compatible with Auto Geofencing with the new Towing Detection function. Such a system completely prevents you from detonation.

Methodology

When installed and operated by our specialists, this terminal works in real time with GNSS, GSM FMB920 with Bluetooth connection, which allows you to determine the coordinates and other necessary data from the device and transmit them via the GSM system. Such Bluetooth peripheral devices significantly expand the possibilities of the project. Software management of mobile objects over a wireless network is one of the priority innovative approaches of this project [3]. The device is ideal for applications that use data on the location of remote objects and can be used in areas such as fleet control and management, car rental companies, taxi services, public transport, logistics, personal vehicles (cars, scooters, snowmobiles, minibuses, buses, boats and catamarans). Listed below are the parameters and capabilities of the FMB920 device [4,13].

According to the GSM system, it combines and registers the following characteristics:

- Frequency band Quad-band 900/1800 MHz; 850/1900 MHz

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- GPRS connection with Multi-Slot class 12 (up to 240 kbt/s)
- GPRS connection with a class B mobile station
- sending texts and data by SMS

It is compatible with the GNSS system (navigation) and has the following characteristics:

- Tracking: collection of 33/99 channels
- Sensitivity -165 dBM
- Hot start < 1 second
- Warm start < 25 seconds
- Cold start < 35 seconds
- NMEA-183 transmission protocol
- GPS, GLONASS, GALILEO, BEIDOU, SBAS, QZSS, DGPS, AGPS
- Accuracy < 3m

Checked interface systems, such as digital, analog and digital output (external relay control, indication, siren, etc.), Bluetooth V3.0 specification, built-in accelerometer,
power source (+10...+30V DC) with overvoltage protection, internal GNSS antenna with high gain level, internal GSM antenna with high gain level
Bluetooth V3.0 specification verification test with Bluetooth transceiver verification is fully compatible with Bluetooth V3.0 specification for external peripheral devices and Bluetooth calling. Check configuration via Bluetooth [5,6].

Results and analysis

After the installation of the system, complete inspection of the power supply chain. The experimental and measuring parameters and characteristics of the following are translated as well as data. Investigated possibilities and operations of hardware parts are carried out by each point (below).

• The functionality of the Bluetooth transceiver is fully compatible with the Bluetooth V3.0 specification for external peripheral devices.
• Micro SD card recording volume, up to 32 GB, up to 275 million records
• Checking and full control of digital outputs via SMS and configurator
• Slots and spaces in the mounting and hard-to-reach places of the body
• GPS communication fix
• Track in real-time mode
• Sending collected data via GPRS (TCP/IP and UPD/IP protocols)
• Check the intellectual algorithm of GPRS communication, to save traffic
• Work in roaming networks according to the list of preferred GSM operators
• Notification of events of I/O elements of their transmission by GPRS or SMS
• Auto Geofencing and Towing Detection to prevent car theft
• Deep Sleep mode (less than 5 mA power consumption)
• Firmware and configuration update via GPRS
• Intelligent data collection mode
• The track is of high quality, even in strongly constructed ones urban areas
• installation
• Internal GNSS and GSM antenna with high gain
• Device configuration via Bluetooth
• Emergency definition
• Towing detection using an accelerometer
• Data collection mode (time, distance)

Проверени держки на переперажний и недонепанзении по песни пени. The translated experimental data confirmed the experimental data of the manufacturer of the company (table 1).

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Table 1. Power supply voltage of the FMB920 device

Description	Voltage	Duration
Normal operating modes	10-30 Volt	Unlimited
Enable protection, off. Terminal	34 Volt	Unlimited
Maximum voltage	<70 Volt	Unlimited
Maximum impulse voltage	90 Volt	5 мс

Устройства и аксессуары для подключении к системе контроля должно находится в температурном режиме. Устройства оказывающим являющиеся элементом переоснащения обработать или не допустить к монтирование к объекту [7, 8].

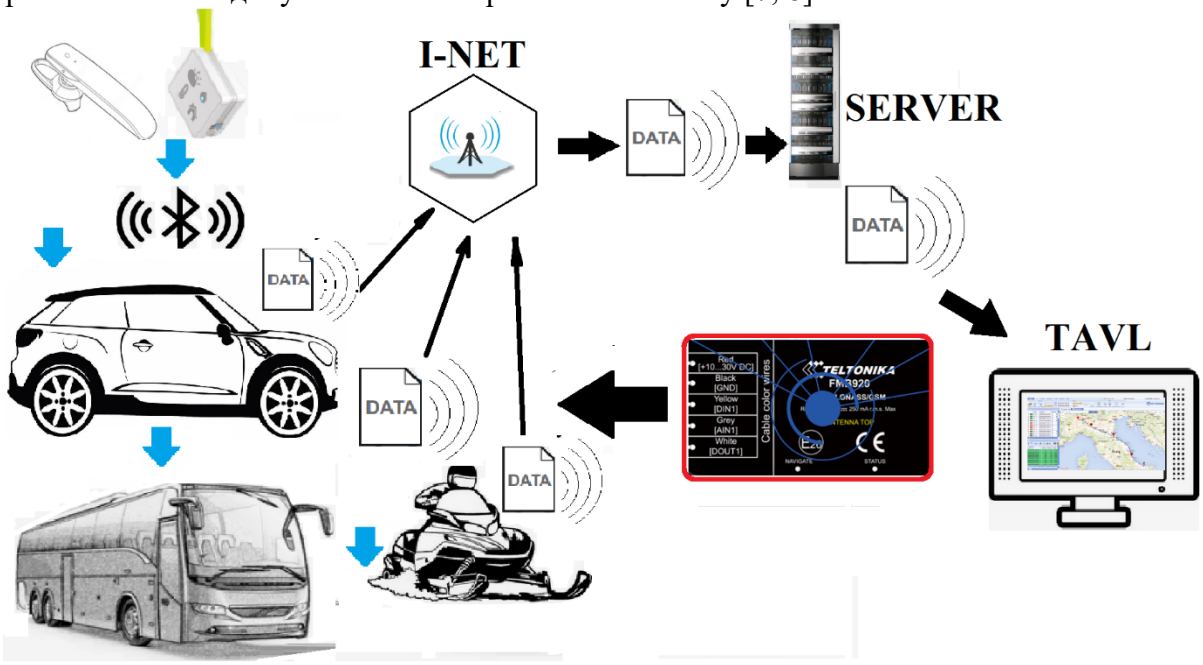

Fig. 1. Connection and service through FMB920 mobile objects.

Devices and accessories for connecting the control system bluetooth headset, bluetooth humidity and temperature sensor, analog sensor, opening/closing sensor, fuel door, 12V/24V relay, alarm button, LED, siren and signal and other accessories are installed according to standard requirements, which should be an element of re-equipment of this type of moving object [9,10].

Conclusion

In the conclusion of the work, it is possible to state that the researched functional possibilities and operation of this class of devices with configuration of SMS (protected) command and configurator through a computer have yielded fruitful results. Installation and testing showed that this system turned out to be a more suitable system in modern conditions of operation in regions and areas with more severe climatic conditions. It also meets all the requirements of the modern high-tech hybrid information world in the country. This project was carried out with the installation and verification with a test drive of the "Chevrolet Tracker" car [12,13].

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