

AUTOMATED MOBILE FACILITY FOR QUANTITY ESTIMATION OF RAW OIL AND OIL GAS, PROSPECTED FROM SUBSOIL

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In this article some aspects of the development of automated mobile control facility (MCF), aimed for estimation of raw oil and oil gas quantity that are retrieved from subsoil and transferring data on the estimation results and their indication on central dispatcher's point.

Keywords: automated mobile facility, raw oil, oil gas, subsoil

The development of informative technologies in automobile transport that are based on usage of controllers, computer technics, microelectronics, satellite navigation, geo-information science, provide for a possibility of creation of operative control and auto-transport management that is involved in transportation process. An implementation of informative technologies and telematics tool facilities is a complex of apparatus and program means, including satellite navigation means that allow us to significantly improve our process of planning, control, regulation, and also significantly improve a service quality within transportation process.

The developed procedure complex within a distributed monitoring system is studied as a measure of organizational, technological, and technical character of the introduction of means and methods for an objective instrumental control of transportation process, founded on usage of management means of satellite navigation, GSM, GPRS, EDGE, 3G, metric waves – radio communication, and also of implementation of specialized equipment (controllers, sensors).

The technology of dispatcher maintainability and transportation process management is realized in their full value, while automatization needs the following functions and realization components [1]:

- Automated current planning that corresponds to a consideration of peculiarities and specificity of transportation process;

- Information maintenance and instrumental accounting of transport work regardless of transportation mean and object;

- Automatic analysis and movement control by instrumental means of transport units localization, communication utilities and program-apparatus means of MCF location visualization on a region map, displayed on a screen;

- Operative communication with drivers, voice and with short text messages;

- Simplified technical assistance call via communication means, placed in the most accessible way for a driver;

- Operative analysis, automated by calculative and program means. This analysis

reflects the information on the transportation work completion level (including a movement time schedule elements control) and provides for an operative movement regulation (as a result, report data on a transportation work completion allows us to reflect a transportation process as real, as possible);

- Convenient and affordable visualization means, as well as other mechanisms of obtaining an actual information of transport movement;

- Automated characteristics transfer that are read by telematic equipment, placed on board of an MCF in order to provide a maximum tracking level of a transported objects parameters.

The main objectives of the creation of automated satellite navigation system of following an MCF, involved into transportation processes on oil prospecting enterprises services are [1, 2]:

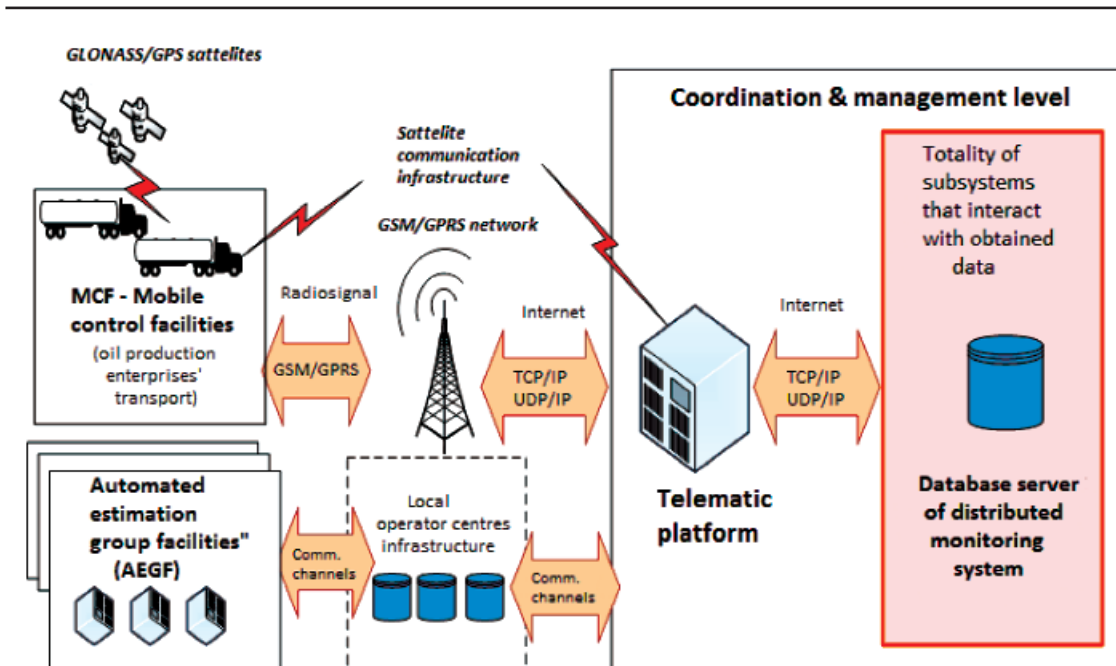
- An increase in a planned MCF movement plan completion quality, an improvement of transport provision for oil prospecting objects, construction sites of oil prospecting objects, and a complex of infrastructure provision (a control of such indexes, as security, accuracy, etc);

- An increase in the effectiveness of mobile structure of different MCF types, labor productivity and production culture, a decrease in direct production costs;

- A transportation process safety increase via informative provision of accidents' consequences liquidation measures, including: momentary reading of a station situation and accident location data transmission to competent reaction bodies, provision of radio communication between drivers and rescue team representatives; operative broadcast of accidents on a route for MCF drivers.

- Operative informing of exploitation object representatives, local oil prospecting objects' control bodies, and also transportation process controlling bodies and structures;

- An increase in dispatcher services' work efficiency via hand operations automatization and implementation of modern telecommunication technologies;



The scheme of information exchange between the navigation systems of AEGF and MCF

- An increase in safety of MCF drivers, transported objects, and MCF within a transportation process;

- Complex informing and diagnostics of all controlled parameters' condition, that are read from an MCF board;

- Operative interaction with road-construction enterprises and data transmission in case of discovering obstacles that make impossible MCF movement on a road;

- A process of technical assistance summoning for automobiles, involved in a transportation process is made as short as possible via automated means of malfunctions on an MCF board location and occurrence.

An automated navigation system of accounting and control of oil production enterprises automobile transport realizes a complex of structure platforms of mutual objectives and functions fulfillment, the most important of which are:

- 1) An automated monitoring and control of a transportation process with minimal personnel involvement.

The system means provide for an effective fulfillment of the major technological transport control functions:

- Automated control of planned and accidental auto transport means movement on a road network and automated discharge of a plan deviation information;

- Realization of a system dispatcher' management functions that carry out a control and management of automobile transport of oil

production enterprises in a dialog mode with a computer system.

- A formation and display of operative information on various MCF, subdivisions', enterprises' work.

- 2) Dispatcher control and oil products' transportation products regulation;

- 3) A securing of information exchange between MCFs and oil prospecting enterprises within an objective accomplishment process, and also under an emergency situation, in order to secure drivers' safety, transportation object and MCF integrity.

The function of selection and transmission of information is carried out via telematic means that are installed on oil production enterprises MCFs. While moving along a route, onboard navigation-communication equipment carries out the process of the MCF location data transmission. Operative reports are formed on basis of information exchange between the global navigation satellite system means (GLONASS/GPS) and onboard navigation-communication equipment. The obtained MCF coordinates are automatically saved in an energy-dependent transmitter memory and are transferred to local operator centres of regional departments via various communication channels (satellite communication, GSM, GPRS, EDGE, 3G, RFID, metric waves radio communication, etc).

Within the process of the obtained information massive formation by local operator centres initial processing procedures are car-

ried out in accordance with the defined system processes. Information exchange between local operator centres and oil production enterprises happens via modern communication means that provide high data transfer speed. These conditions are formed because of the usage of telematic platform as a necessary element of the whole automated control system structure functioning and oil production enterprises MCF operation check-up. The main telematic platform element within the process of information collection and transmission is the telematic server and it is an apparatus system block with an installed server software complex, connected to the internet, and provided with a static IP address. Universal architecture together with simple work algorithms and high throughput ability of a telematic server allows companies to connect up to several thousand user terminals without

any noticeable system performance decrease. To improve a system reliability data flows can be duplicated on another similar reserve server.

For the clearness of information exchange function, an information exchange scheme is provided in picture.

Thus, on basis of Russian system «GLONASS» usage a distributed corporate automated system can be constructed, in which managers have an operative access to a transport work results, regardless of oil production enterprises transport units remoteness.

References

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