

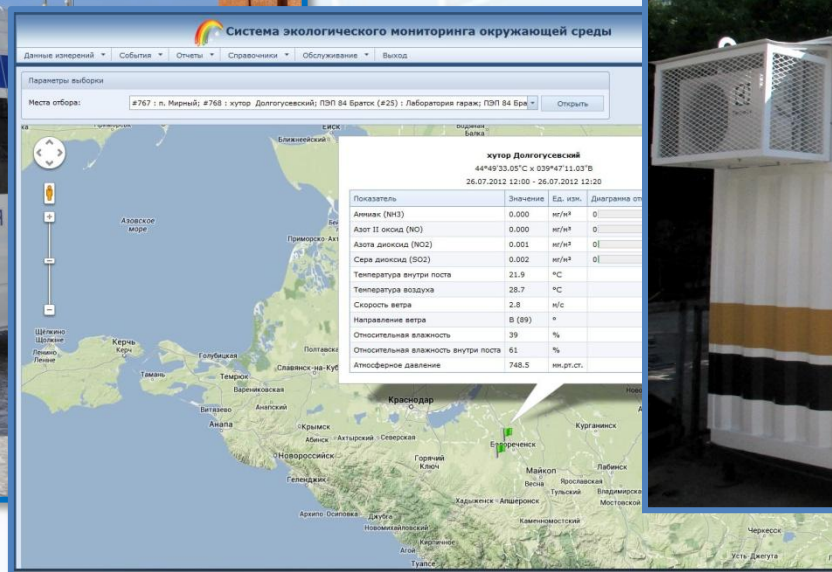
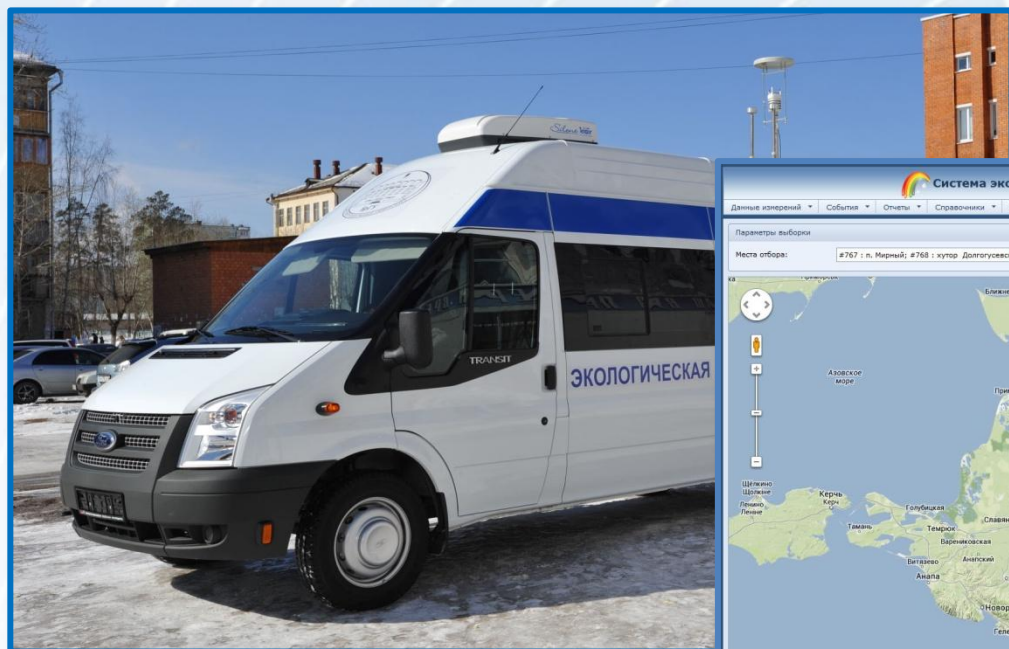


SYSTEM OF THE ECOLOGICAL ENVIRONMENT MONITORING

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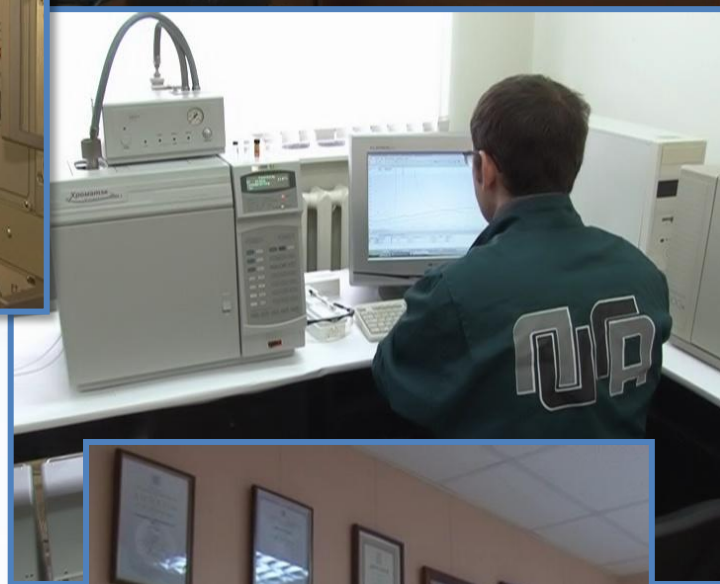
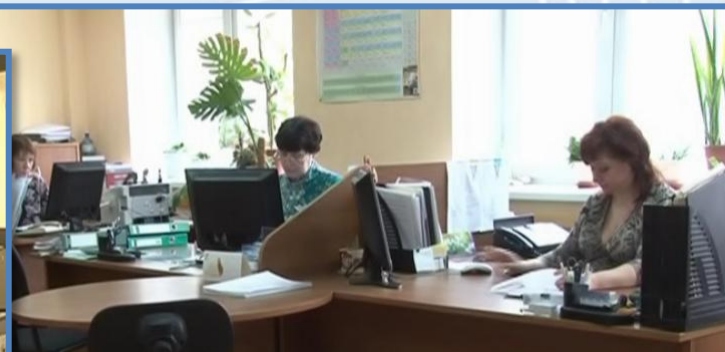
About the OJSC «Liga» enterprise



More than 20 years of OJSC «Liga» realizes projects on creation of systems of environmental monitoring on the basis of the latest developments of a science and equipment and is the producer of key links of such systems – mobile and stationary ecological posts of control of atmospheric air, and also the developer of accompanying program and information decisions for monitoring and the analysis of a state of environment



About the OJSC «Liga» enterprise



The enterprise has own production base, office building, the staff of highly skilled experts from which 7 possess scientific degrees. At the enterprise it is introduced and the quality management system of ISO 9000 operates.





Geography of deliveries of OJSC «Liga»

The geography of presence of production of our company covers practically all regions of the Russian Federation





Implementation of large projects

- JSC Taneko, The Republic Of Tatarstan;
- JSC Nizhnekamskneftekhim, The Republic Of Tatarstan;
- TGC-16 branch of JSC - «Nizhnekamsk combined heat and power plant (PTK-1)», The Republic Of Tatarstan;
- Ministry of ecology and natural resources of The Republic Of Tatarstan;
- JSC LUKOIL-Nizhegorodnefteorgsintez, of Kstovo;
- JSC Evrokhim-Belorechenskiye mineralnye udobreniya;
- State Budgetary Institution KK "KIATSEM", Krasnodar;
- RGAU-MSH, Moscow;
- JSC Diall Alyans, Saratov;
- JSC Saratov Refinery TNK-BP, Saratov;
- "RNPК" TNK-BP, Ryazan;
- JSC Lukoil-Volgogradneftepererabotka, Volgograd;
- NK "Rosneft";
- JSC Syzran Refinery, Syzran;
- JSC Saratovorgsintez, Saratov;
- JSC GAZ, Nizhny Novgorod;
- GU «State inspectorate for protection of the surrounding environment of the Orenburg Region»;
- JSC Khimprom, Novocheboksarsk;
- JSC Lebedinsky GOK, Belgorod Region.;
- JSC Kuznetsk Analit Komplekt, Novokuznetsk;
- JSC Orenburggazprom, Orenburg;
- JSC Acron, Veliky Novgorod and many other.





System of environmental monitoring of environment («SEMOS»)

Creation «SEMOS» demands application of a system approach to the solution of problems of environmental protection and **ALLOWS:**



1. In real time to estimate level of influence of the enterprise on environment by means of tool methods, having corrected results of settlement methods which in some cases do not correspond to the valid ecological situation.



2. Define location of true sources of pollution which can be not only in the territory of the enterprises, but also beyond their limits.



3. To reveal adverse weather conditions (NMU) at which for a certain time increases concentration of polluting substances and beforehand to take measures for decrease in emissions during this period, without carrying out expensive reorganization of production.



4. In real time to carry out control of emergencies which are accompanied by considerable emissions of polluting substances.



5. To provide a certain access of the public to information on an ecological situation.



System of environmental monitoring of environment («SEMOS»)

The main **REQUIREMENTS** to construction «SEMOS» are:



1. Automation of process of receiving, transfer and information processing

Automatic data transmission from analytical devices in stationary and mobile laboratories, data of a "human" factor to a minimum at all stages of receiving and information processing.



2. Control of reliability of received data of measurement

Use of the special equipment allowing at any moment to check reliability of received results that plays important role in recognition of laboratory researches competent and independent.



3. The use of Internet technologies for presentation and data transfer

The system is based on open platformo-independent technologies which allow to be connected to it with use of a wide range of various devices, and also to make its integration with other information systems.



System of environmental monitoring of environment («SEMOS»)

Main components «SEMOS»:

1. Measurement systems:

Mobile ecological posts – the operative analysis in any place of selection.

Stationary ecological posts – local continuous round-the-clock monitoring.

Stationary analytical laboratories.



The list of defined polluting substances:

- automatic measurement of mass concentration: nitric oxide (NO), nitrogen dioxide (NO₂), ammonia (NH₃), sulfur dioxide (SO₂), hydrogen sulfide (H₂S), carbon oxide (CO), carbon dioxide (CO₂), ozone (O₃);
- automatic measurement of mass concentration of aromatic hydrocarbons (benzene, toluene, chlorobenzene, ethylbenzene, xylenes, isopropylbenzene, phenol, alpha-methylstyrene, styrene, naphthalene), acetone and methanol, propanols, n-butanola, methyl ethyl ketone in atmospheric air;
- automatic measurement of mass concentration of limiting hydrocarbons C₁-C₅, of unsaturated hydrocarbons (ethene, propene, butene and pentene) and individual paraffin hydrocarbons C₆-C₁₀ in atmospheric air; automatic measurement of mass concentration of the sum of limiting hydrocarbons C₁₂-C₁₉;
- automatic measurement of mass concentration of the weighed substances of PM_{2,5} PM₁₀ in atmospheric air;
- meteorological parameters of atmospheric air (temperature, absolute value of atmospheric pressure, relative humidity, speed and wind direction).



System of environmental monitoring of environment («SEMOS»)

Mobile ecological post of «PEP - 1-1M»

«PEP - 1-1» is intended for monitoring of a condition of a sanitary and protective zone of the enterprises, residential areas of the city, area, and also for use in regions of oil and gas fields, metallurgical, chemical and other productions. It is equipped with the automatic devices, allowing to measure the maintenance of the main pollutants in atmospheric air



Mobile ecological post of «PEP - 1-1M» is registered in the State register of measuring instruments for No. 28903-09 and allowed to application in the Russian Federation.

«PEP - 1-1» is made on the basis of various chassis: A gazelle 2705 both with standard, and with a high roof, Ford Transit Van, UAZ 3962, «Sadko» GAZ, Fiat Ducato, Volkswagen Crafter, Mercedes Sprinter and other. There is an approval such as a vehicle



System of environmental monitoring of environment («SEMOS»)



The structure of the standard equipment of «PEP - 1-1» includes the following components:

- stand for gas detection equipment;
- kit air-intake devices;
- autonomous power system;
- life support system;
- meteorological complex;
- system of check of reliability of measurement;
- the automated system of collecting and information processing;

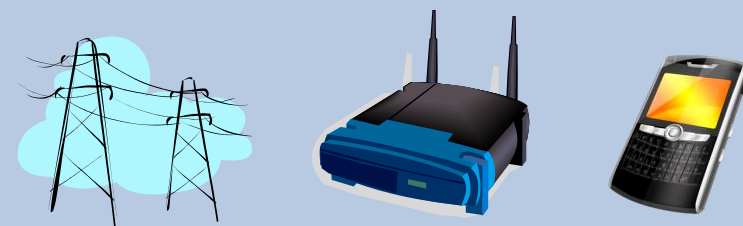


System of environmental monitoring of environment («SEMOS»)

Main components «SEMOS»:

Means of communication

Data transmission is carried out according to the protocol of the Internet of TCP/IP and can be constructed on the basis of copper wire lines, fiber-optical lines, with use of a radio channel, networks of cellular communication, etc.



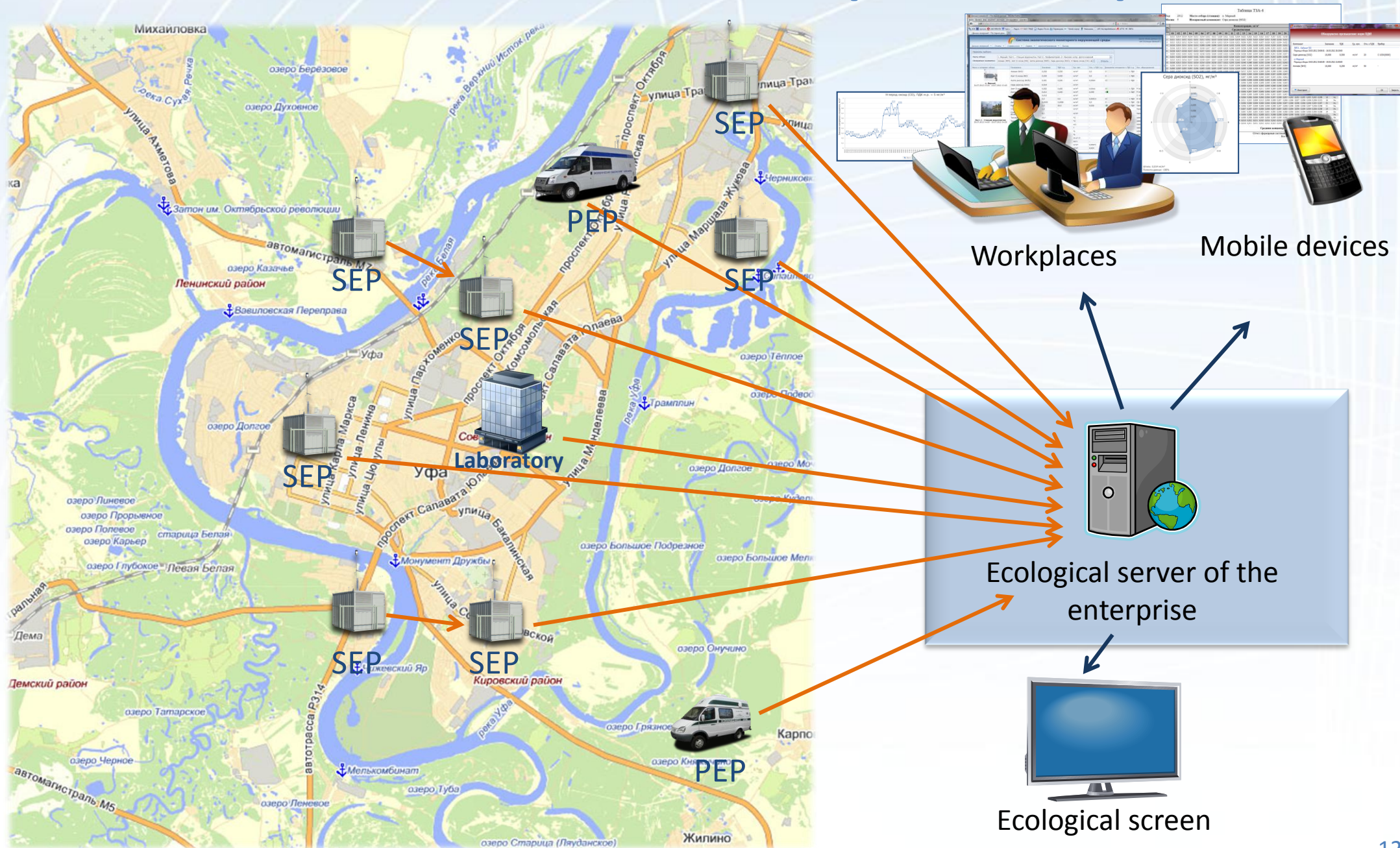
Software

The software carries out data collection of measurements from analytical devices, carries out their preprocessing and control, carries out their transfer on communication lines to the server where the analysis of results of measurements and their storage is carried out.

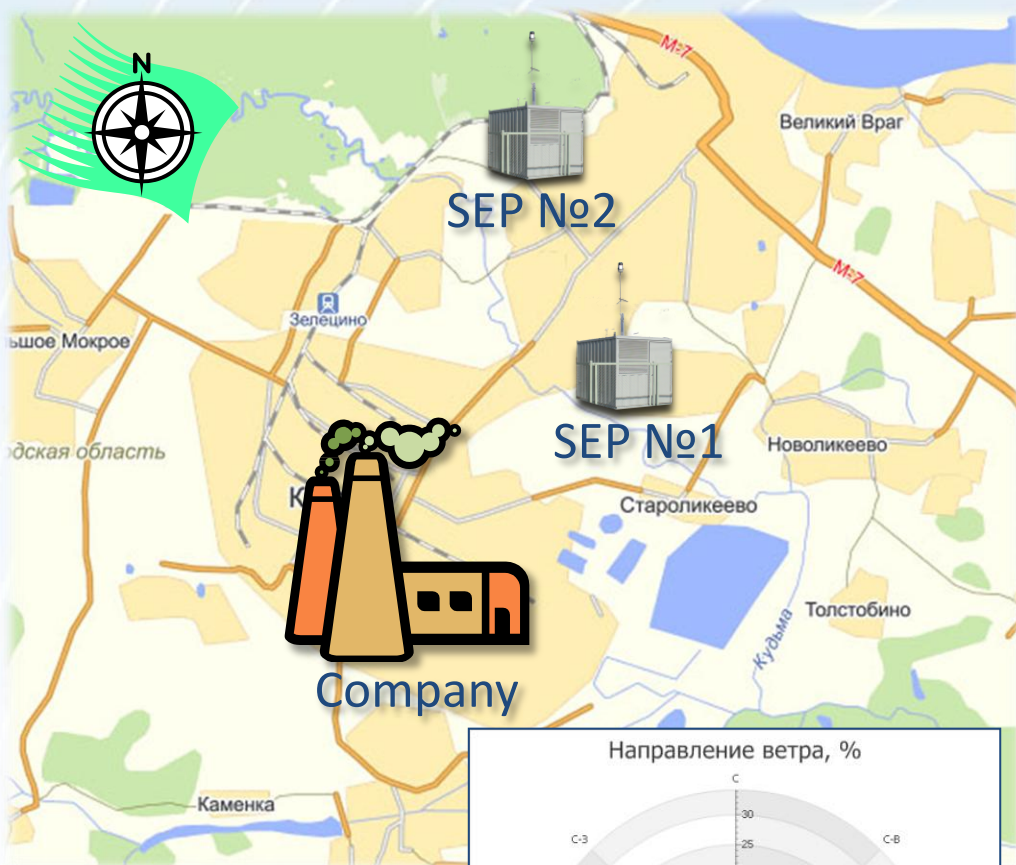




System of environmental monitoring of environment («SEMOS»)

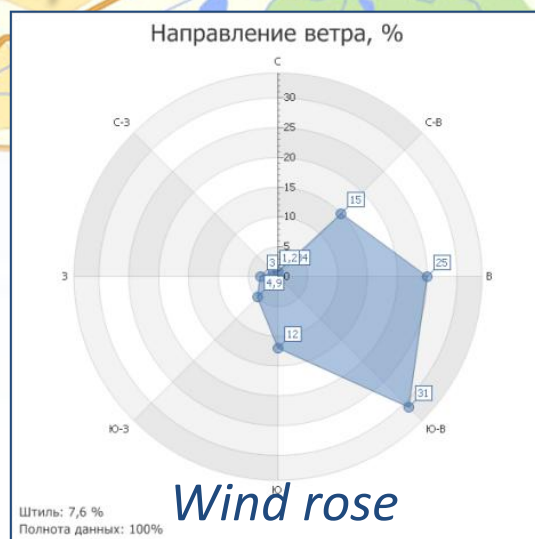


Example of existing system «SEMOS»



Let's consider the existing system «SEMOS» which consists of two stationary posts. The location of posts shown on the map, they are located to the North of enterprise. "SEP № 1" is located in the two kilometers from the border of the plant, "SEP № 2" is located in the city, about four kilometers.

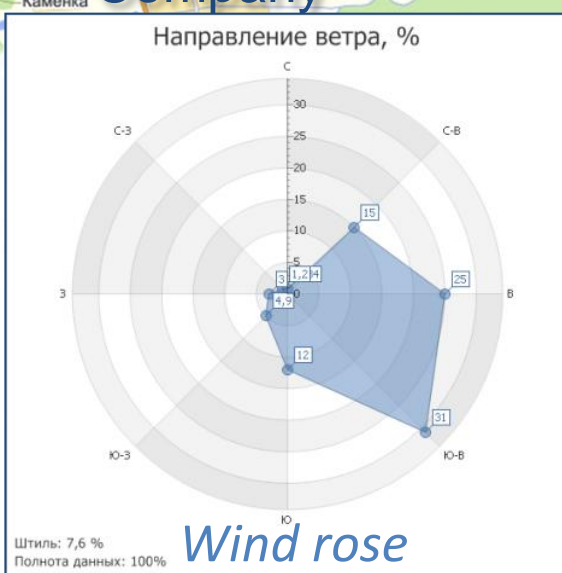
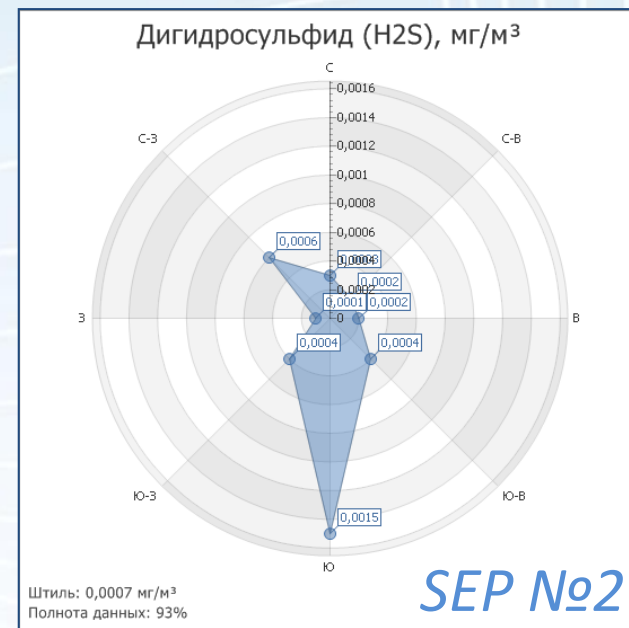
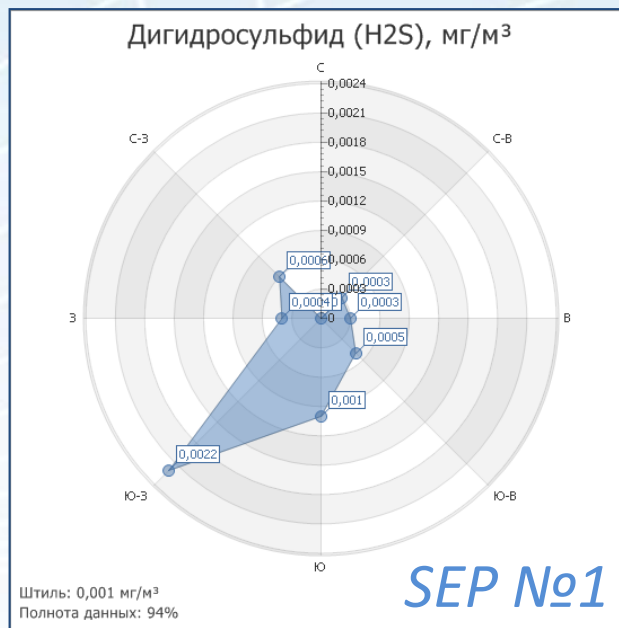
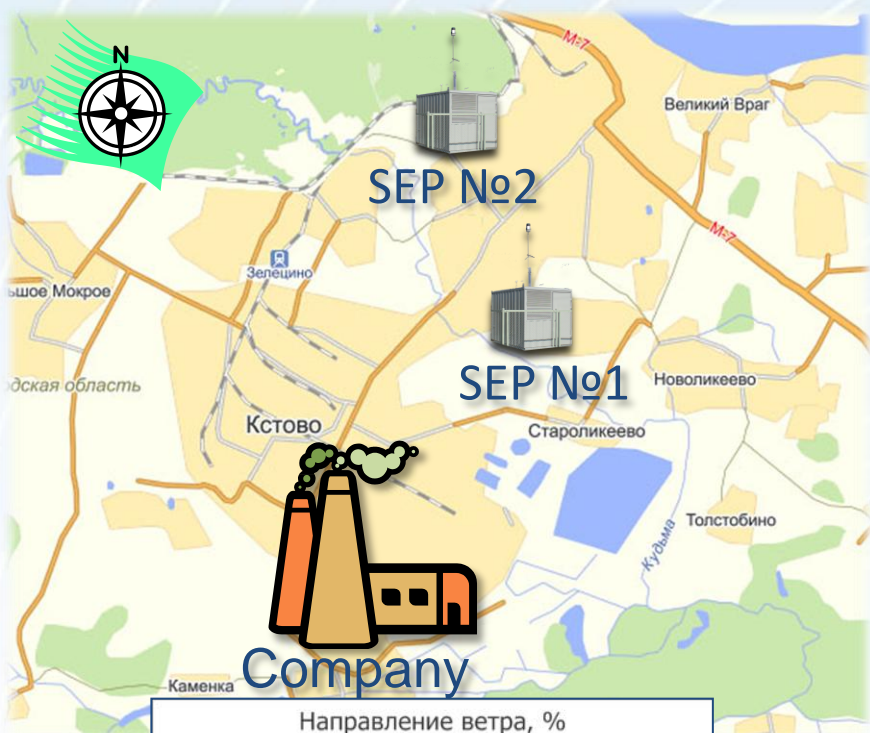
Let's consider the winter period from December to February. The figure shows the wind rose (the predominant direction of the wind) created using software, at the location of the posts. The wind rose shows the predominant direction South Eastern, southern and Eastern winds at two observation points. The company is also located in the South relative to the observation points.



Consider the concentrations pollutants using diagrams, which contain data about average concentration of the pollutant for each of the cardinal directions.



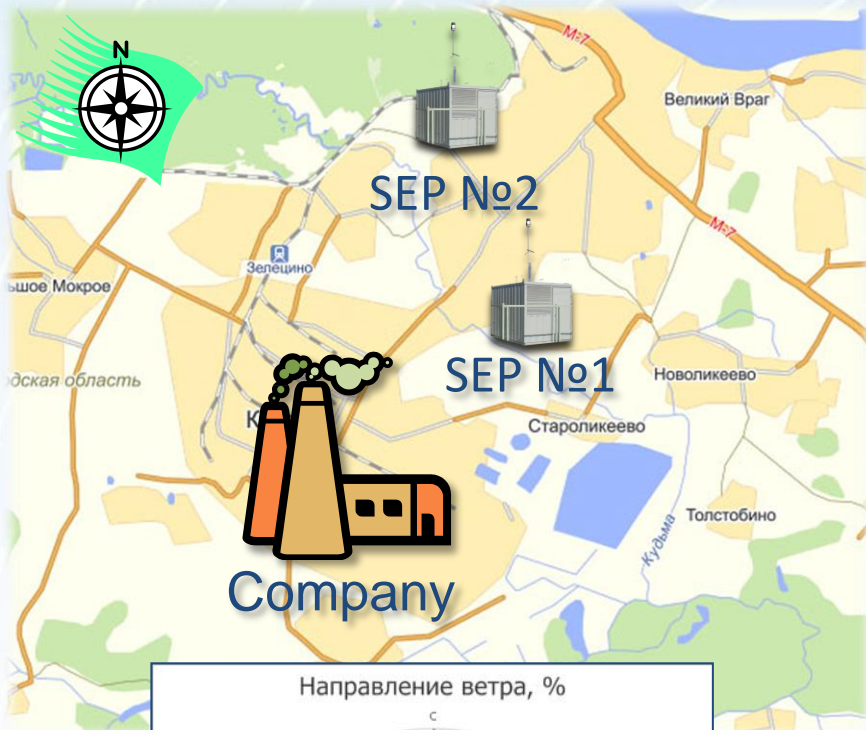
Example of existing system «SEMOS»



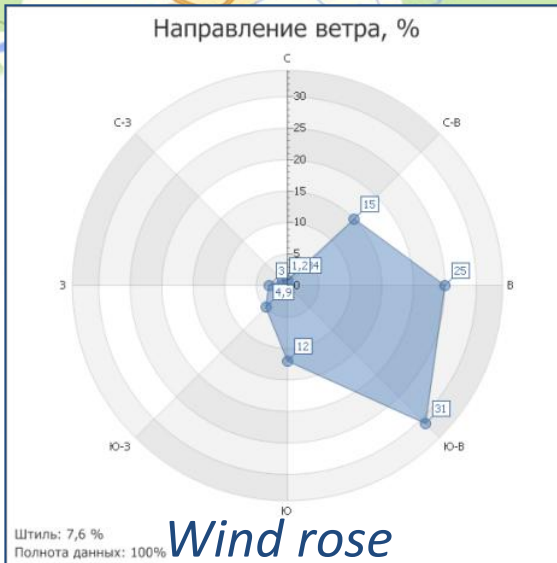
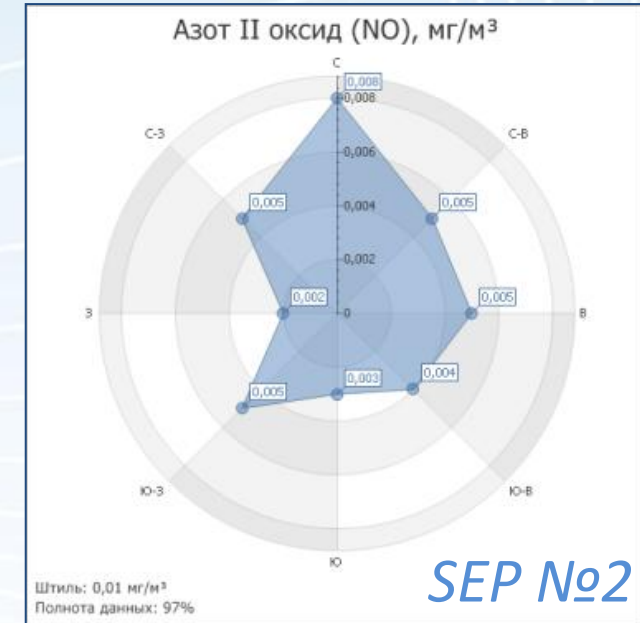
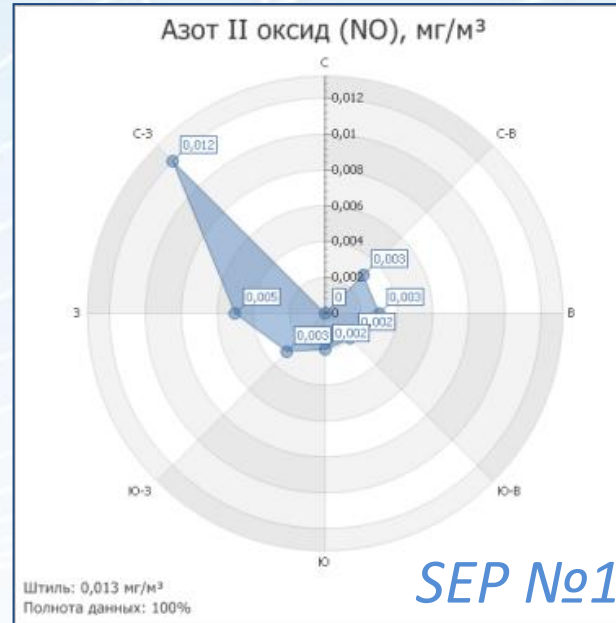
Roses of concentration show presence hydrogen sulfide from the southern direction on both points – but within admissible concentration. Average concentration is higher on a post which is located closer to a source. It shows that a source of emissions of hydrogen sulfide is the investigated enterprise.



Example of existing system «SEMOS»



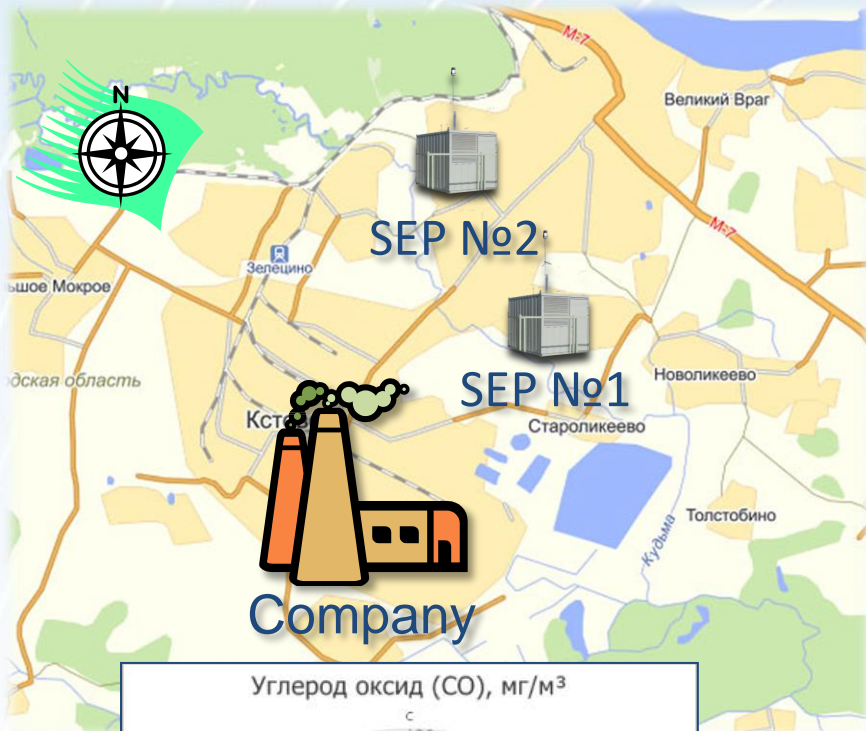
Company



Other picture is observed at creation of a rose of concentration for nitrogen dioxide. The increase in average concentration occurs at the western and northwest direction of a wind – in other party from the enterprise. It means that a source these pollutants the company is not, the source of these pollutants is another object in the West.



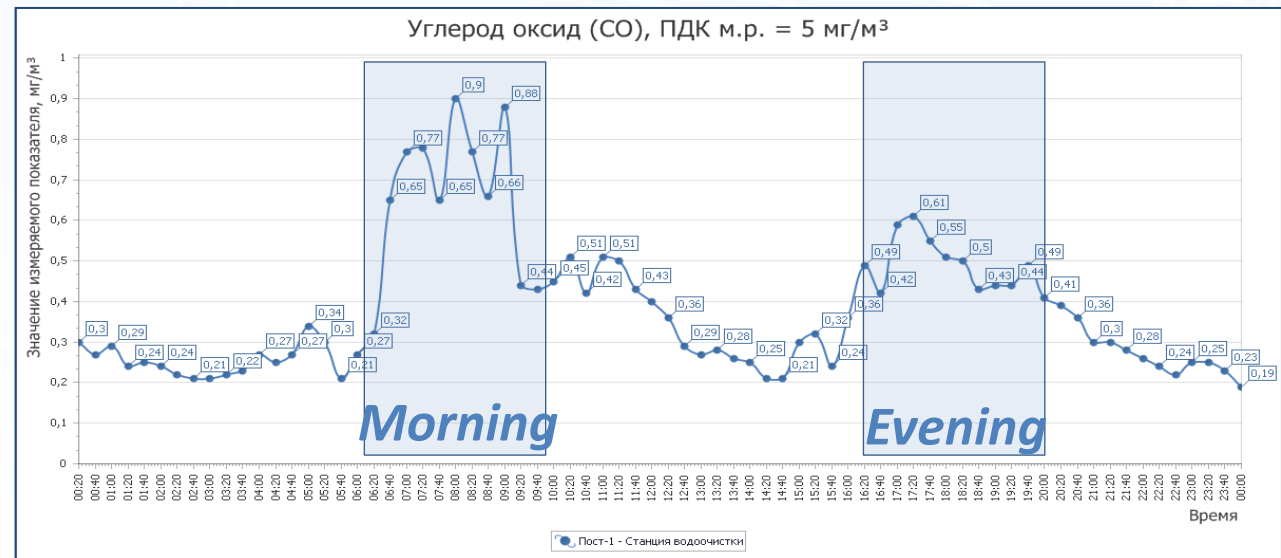
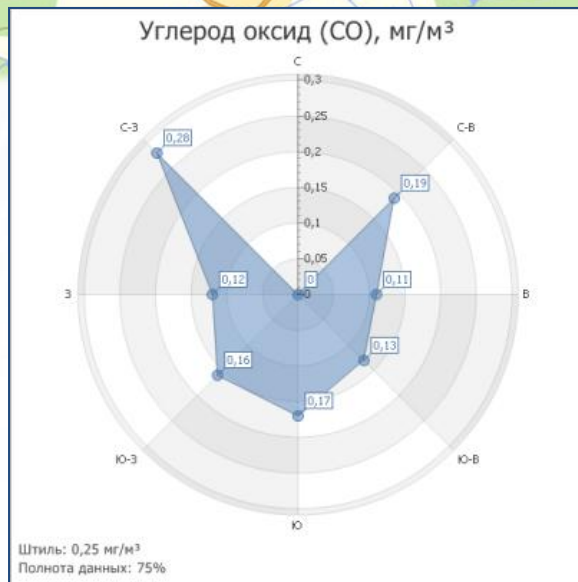
Example of existing system «SEMOS»



In respect Carbon oxides observed uniform distribution of the concentration on all sides, and it does not depend on the wind direction and its speed.

The schedule of change of concentration of dioxide of carbon from time during the working day near the highway is indicative. The maximum values are on rush hours of movement of cars during the beginning and the end of the working day.

Summing up, it is possible to conclude that during the winter period the adverse weather conditions for the city is a southern and southeast wind with speed of 1,5-3 m/s.





Conclusion

The comprehensive environmental monitoring of atmospheric air is not limited to data from stationary posts. And even, in our opinion, a key element of system for clarification of a full picture of distribution of pollutants, and also location of their sources, is the mobile ecological post. Its uniqueness that it carries out the same functions, as the stationary post, but is not adhered to a concrete place of selection.

To obtain data on pollutant of air and meteodata of mobile laboratory needs no more than 40 minutes, process also as well as in case of stationary laboratory is automated. The measuring complex of mobile laboratory is equipped with information system for collecting and data transmission in system of environmental monitoring. The obtained data are compared with the corresponding geographical coordinates from the GPS navigator.

Application area of a mobile ecological post is extensive: with its help can be form ecological card of pollution of atmospheric air for individual components, the mobile ecological post irreplaceable for identification of real sources of pollution, areas and pollution borders, is the effective tool at implementation of the plans of measures at adverse weather conditions.





Conclusion

The concept of creation of System of environmental monitoring is represented to us as realization separate environmental modules, in accordance with the main types of controlled environmental objects. Module – "Atmospheric air" which was considered, Soil environmental modules (control of pollutants of a soil cover) and the Water module (control of pollutants of the water environment). In addition offered to equip "SEMOS" the tools of import of the data received from stationary production laboratory, by implementing a laboratory information management system.

Such laboratory information management system is original development of our company and is completely compatible to system of environmental monitoring. At implementation of such decision a complete set of data about pollutants it is possible, as well as in a case with atmospheric air, to receive in real time and to present in temporary and spatial segment.

