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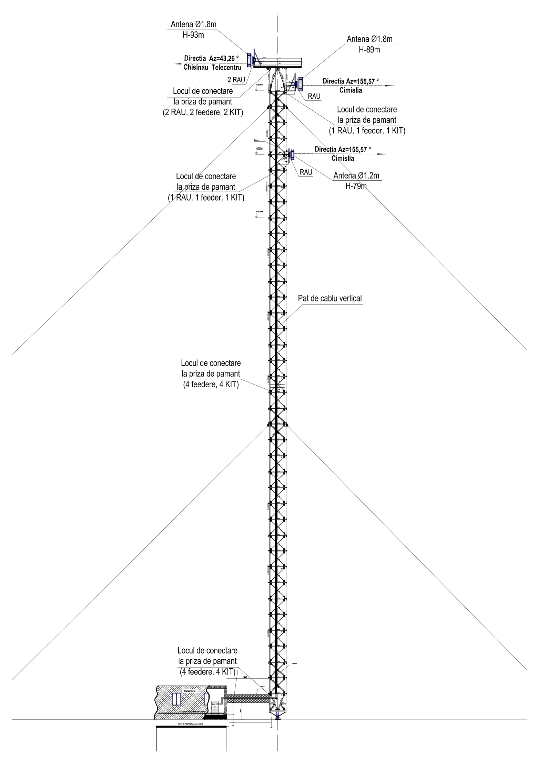
**SOFTCOM S.A.**

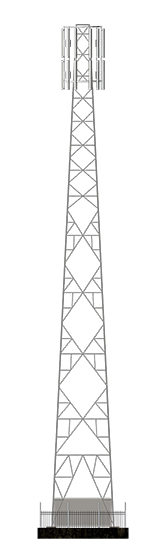
**Republica Moldova, Chişinău MD-2038, bd. Decebal, 76**

**Tel/Fax (+37322)563306;** [**www.syscom.md**](http://www.syscom.md)

**AUTOMATED MONITORING SYSTEM OF VERTICALITY AND DYNAMIC PARAMETERS OF MASTS / TOWER**

**ASVD**





**2021 г.**

**Purpose and main functions**

ASVD is intended for automated control of verticality and dynamic parameters of real time masts / towers of TV-radio antenna devices etc.

**The main functions of ASVD:**

* Comprehensive real-time (on-line) remote monitoring of masts / towers.
* Automatic real time acquisition of verticality diagrams of masts / towers.
* Real-time monitoring of vibrations of masts / towers under the influence of external conditions (wind, hurricane, earthquakes, passage of heavy equipment, etc.)
* Obtaining data and reports for previous time periods (up to a year or more) and comparing them with current ones in order to determine the temporary degradation.
* Displaying information about the location of masts / towers on the geographic information map and their status**.**
* Convenient graphic and reporting forms for the Dispatcher and Administrator.
* Providing engineering and technical personnel with real-time information about the condition of masts / towers during work to restore verticality and eliminate excess vibrations.

**Composition and architecture**

The general architecture of ASVD is shown in Fig. 1.

On the left, a mast is shown, on which sensors / inclinometers (SENSOR 1… N) are rigidly mounted at the levels of the mast guy-wires.

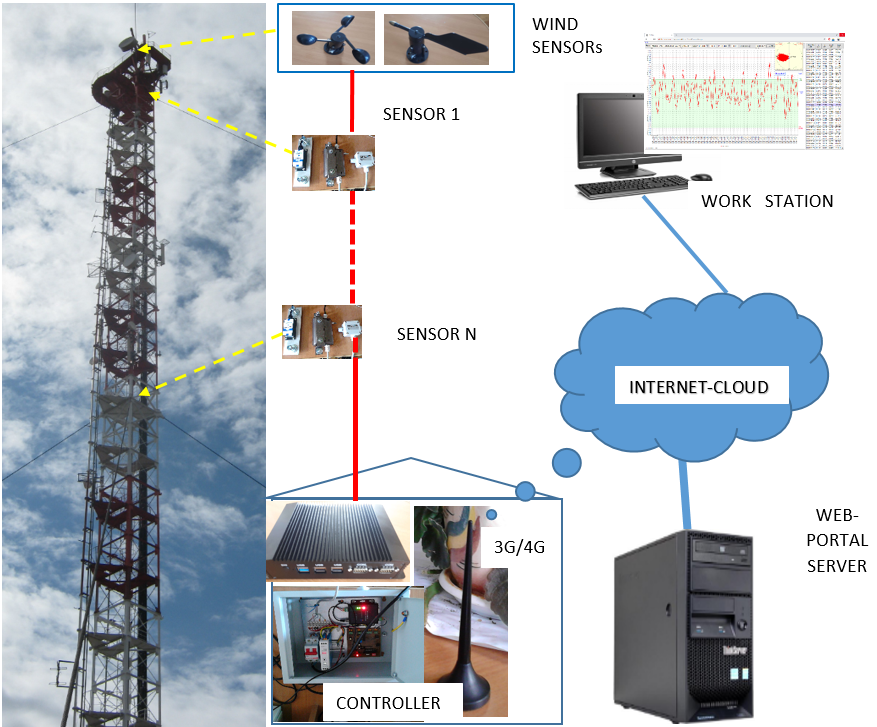
Wind speed and direction sensors (WIND SENSORS) are installed at the top.

The sensors are connected to a common cable via thunderstorm protection modules and transmit information (data) via the RS-485 interface. The lower end of the RS-485 cable is connected to the CONTROLLER, the software of which controls and communicates with the sensors and the 3G / 4G Modem.

3G / 4G Modem implements data exchange with WEB-PORTAL SERVER via mobile Internet.

WEB-PORTAL SERVER stores sensor data received via the Internet from a 3G / 4G Modem. The WEB-PORTAL SERVER software processes the sensor data array and implements the information display user interface.

The user gets authorized access to the WEB-PORTAL SERVER through the WORK STATION using the Internet-Cloud Computing technology.



**Fig. 1**

**User interface**

The main user interface (Work Station) window is shown in Figure 2.

http://syscom.md/tower/images/phones.png http://syscom.md/tower/images/disp.png http://syscom.md/tower/images/tools.png

**DATA DIRECTORIES TRAFFIC SUPERINTENDENT ADMINISTRATION**

Data directory editing Alarms Configurations

Track Viewer

http://syscom.md/tower/images/statistics.png http://syscom.md/tower/images/web.png

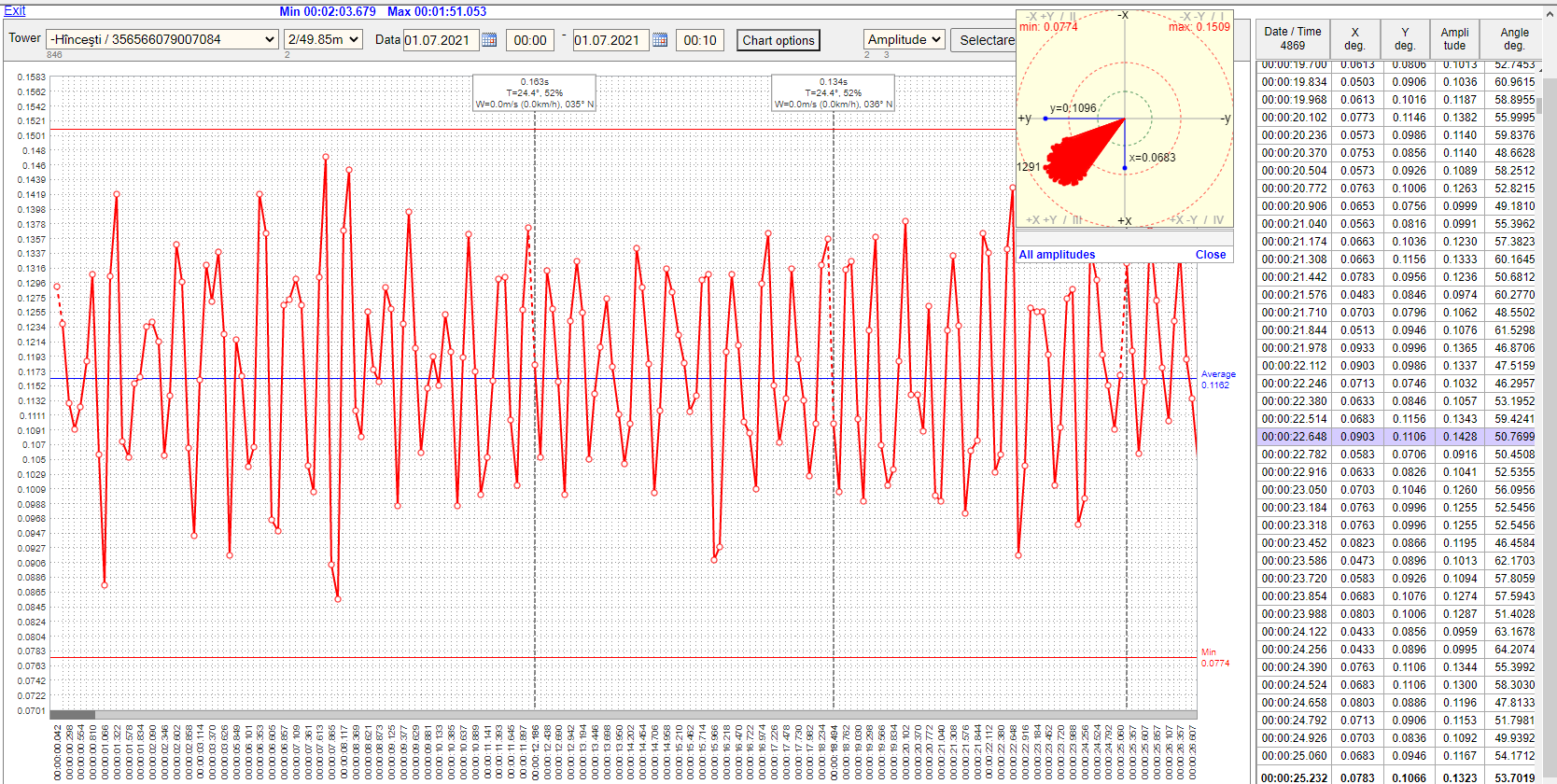
**STATISTICS USER INTERFACE LANGUAGES**

Chart English Русский Romană

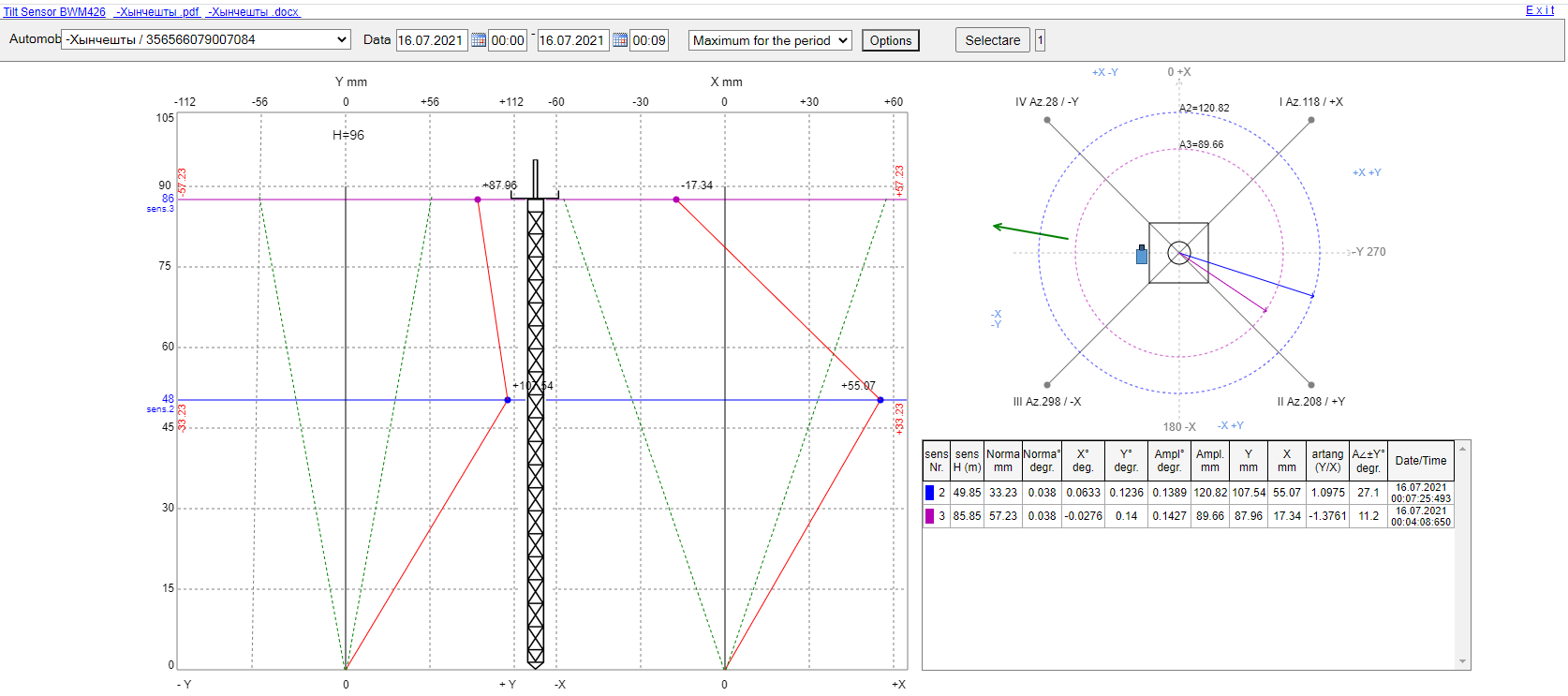
Verticalit*y*

**Fig. 2**

The main functions of the System are STATISTICS-Chart and STATISTICS-Verticality, Fig. 3,4.

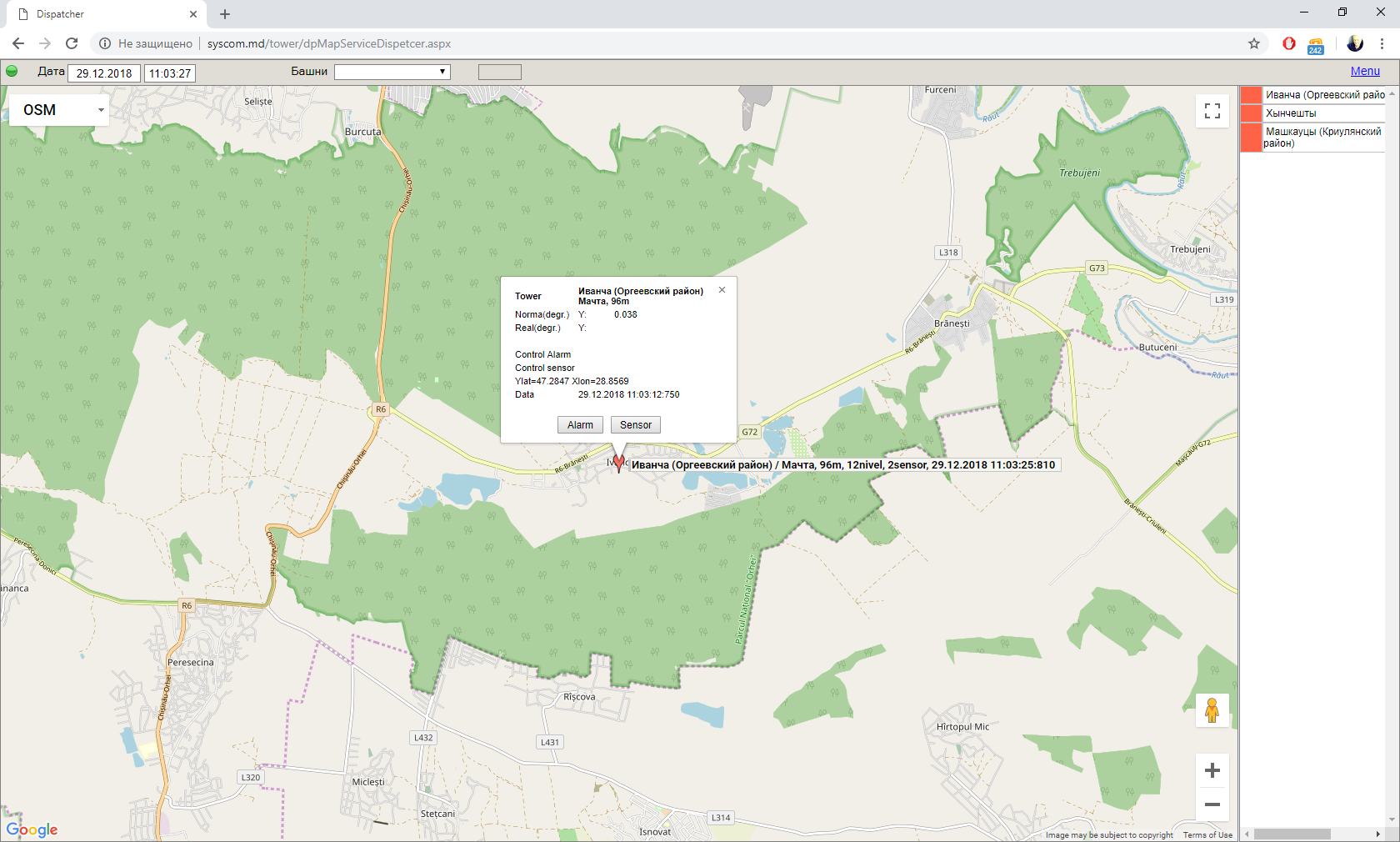
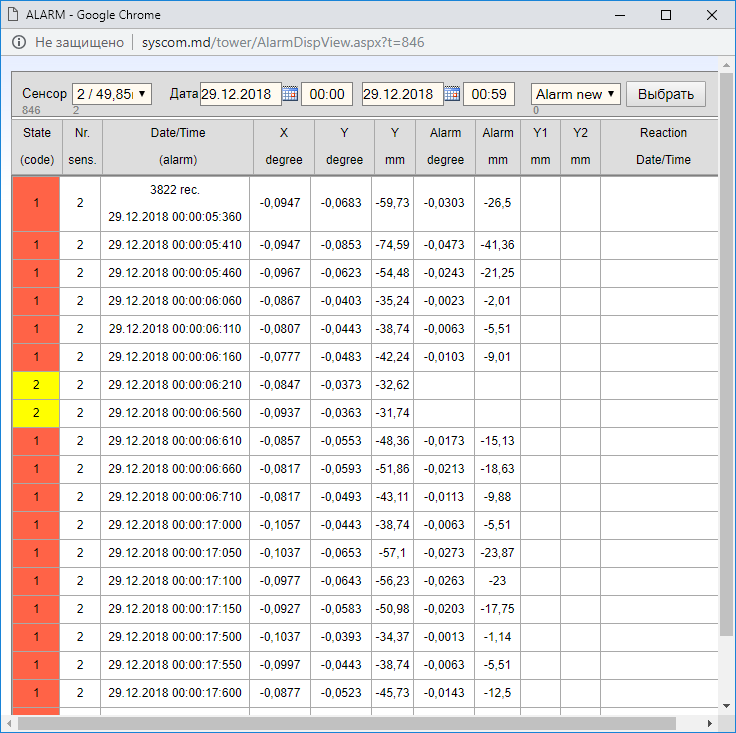


**Fig. 3**



**Fig. 4**

Fig. 5 shows alarms for vertical or vibration violation of the mast / tower.

  
**Fig. 5**

**Basic parameters**

Technical specifications

|  |  |
| --- | --- |
| *Name* | *Specification* |
| Periodicity of displaying information from sensors | 100-200 milliseconds |
| Displaying information on WORKSTATION | - Timeline of fluctuations  - Typical scheme of geodetic measurement of verticality  - Pie chart of deviations |
| Method of transmitting / receiving information | Internet, RS-482 |
| Operating conditions for outdoor components:  - Humidity protection level  - Electromagnetic and lightning protection  - Impact resistance | IP67  GBT17626  2000g, 0.5ms, 3 times |

Measuring accuracy

|  |  |  |  |
| --- | --- | --- | --- |
| *Sensor type* | *Mean time between failures (MTBF), hour* | *Accuracy of ASVD, degrees* | *Operating temperature range* |
| BWM 426 | 30000,0 | 0,02 | -40～85℃ |
| BWS 2000 | 90000,0 | 0,002 | -40～85℃ |

ASVD implemented in the Republic of Moldova at the state-owned enterprise RADIOCOM.