NaftaSCADA

NaftaSCADA is a universal supervisory control and data acquisition software designed to collect, organize and analyze data coming from remote Rod Pump controllers and any other oilfield objects like pump stations. The system provides full well control, contains modern software for analysis of all parameters for each well, as well as remote control and flexible tuning.

NaftaSCADA provides full well control (startup, shutdown, parameter downloads, etc.), and remote access to RPC functions, such as swithing control modes, changing work parameters, analising dynagraph cards etc.

Software automaticaly signals when critical parameter goes outside set limits and provides automatic alarm/shutdown sorting. Data history graphs with trends of efficiency, runtime, production or daily reports are provides by NaftaSCADA in graphical form in real-time. Valuable part of system is card viewer screen which collects, displays and analyses dynagraph cards.

NaftaSCADA contains modern algorithms for analysis of production data, cards and all other parameters for every well. Number of wells controlled by NaftaSCADA is scalable – it can be used to automate oil fields with few wells or with thousands of wells (up to 10000 wells). Wells can be grouped according to different parameters, or according to geographical groups like operators or fields.

NaftaSCADA has user-friendly and easy to use user interface for personnel with any level of experience. Interface, that can be accessed without installation of auxiliary programs.

NaftaSCADA multilevel access allows staff to monitor and control oil production process including change and adjustment of automatic modes and browse collected statistical data.

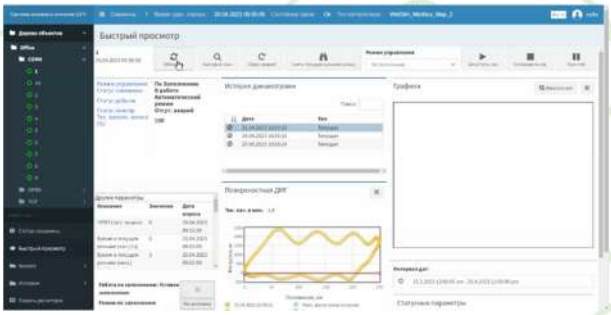
NaftaSCADA is using web-based GUI allowing access from remote computer without specific software, using only internet browser. That technology is also allowing to use mobile devices to gain access to full spectrum of functions and historical data (surface cards, downhole cards, wattmetrograms etc.). With switching from one well to another in objects tree selected information will refresh automatically.

NaftaSCADA provides set of technologist tools such as 3D analysis of well rods and counterweight balancing assistant. Also, there is possibility to set register map to processing of data from other objects and auxiliary wellhead equipment (echo sounder, pressure gauge etc.) can be configured to send collected data to controller and then to NaftaSCADA. This feature allows to use registers other that default ones, that makes connection of third-party systems available.

NaftaSCADA

Features

- Production effectiveness increase
- Full spectrum of controlled oilfield objects
- Up to 10000 simultaneously connected controllers and 5000 clients
- User-friendly interface
- Personalized secure access to data and controls
- Flexible remote SRP adjustment
- Dynagraph cards analysis
- Data history
- Efficiency, runtime, production graphs
- Detailed automated reports
- Simultaneous viewing the status of many objects and comparing their parameters
- Multilanguage web-interface
- Web-based GUI, that doesn't require additional software, except web-browser
- Clients can use PC and mobile devices for access
- Configurable GUI windows for convenient presentation of required technical data and working parameters
- Trend analyzing
- Issuing suggestions for operators and preventing harmful actions
- Simplification and acceleration of change, update and modification procedures
- Detailed reference material
- Polling of peripheral devices of managed object controllers
- Data export to Microsoft Excel and Adobe Reader
- Openness and compliance with standards provide the interaction with other programs by means of OPC, OLE DB, ODBC technologies
- DNP3 protocol support
- Context help
- Graphical indication on well statuses in object tree
- Tasks scheduler (polling, report generation, etc.)
- Remote control and direct access to configuration of controlled objects
- Pattern recognition AI malfunction prevention system
- Data retrieval for 20 parameters from 3600 units during an hour
- Unlimited data life-span
- Configurable registers maps
- Data storage in case of alarms and systems failures
- Parameters backup
- Wells tree organizes wells by group
- Multiple trends display over each other as graphs or tables
- Compatibility with third-party software and devices



System requirements

Server:

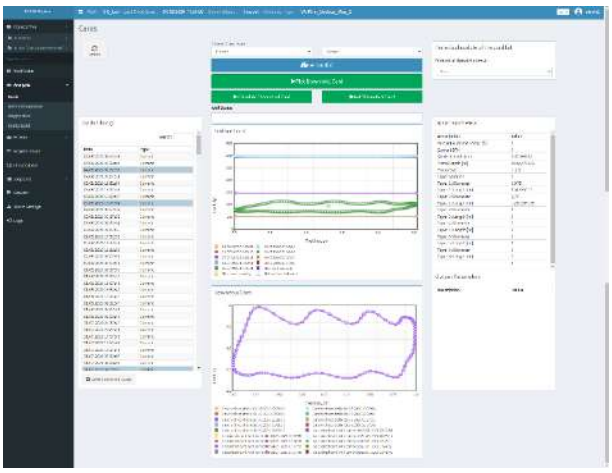
- CPU – Quad Core+;
- RAM – 16+GB;
- HDD – 2+TB, RAID 1;
- Uninterruptible power source.

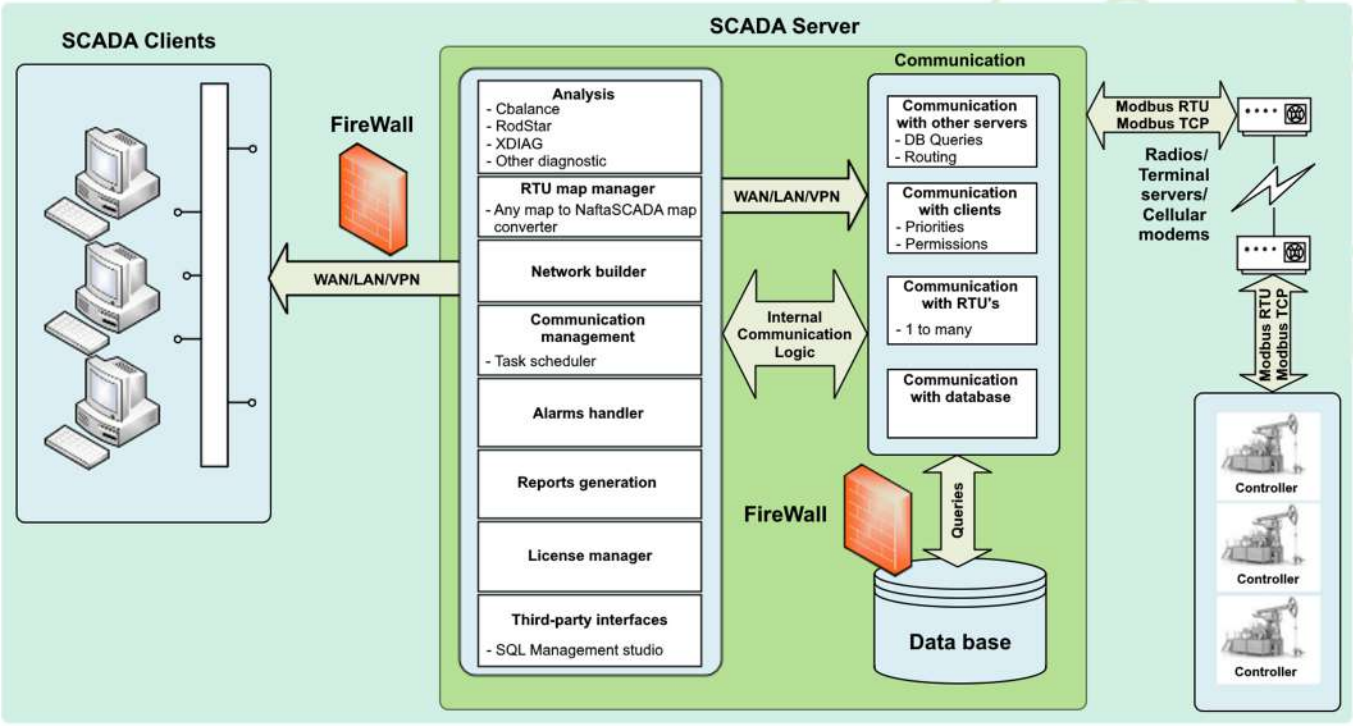
Client:

- CPU – Dual Core+;
- RAM – 2+GB.

For NaftaSCADA functioning also requiring following software:

- .NET framework > 4.0;
- IIS 8.0;
- .NET OPC API;
- MS SQL 2008 R2 64 bit;





Access

NaftaSCADA provides several access levels for users:

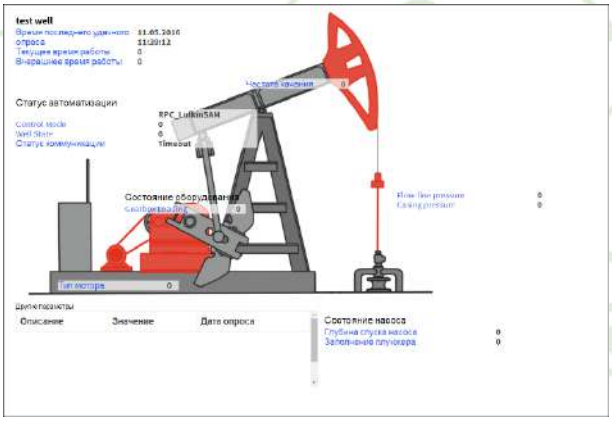
- **Spectator** – only historical data and current state browsing;
- **Supervisor** – all data browsing, starting/stopping wells, dynagraphs cards;
- **Technologist** – applying configuration parameters in database and pump controllers, full control of wells;
- **Service engineer** – applying configuration parameters in database and pump controllers, full control of wells, ability to add new wells;
- **Administrator** – full access.

Administrator also has task scheduler service, that allows to plan events and cyclic polling by setting time of event, its type and delay. That allows flexible automation of SCADA maintenance and report generation.

Every user action is logged as well as all actions as system itself and all events on controlled objects.

Event logs and technical data are stored indefinitely as long as data storage is available, and can be scheduled for cleanup to save space via scheduler.

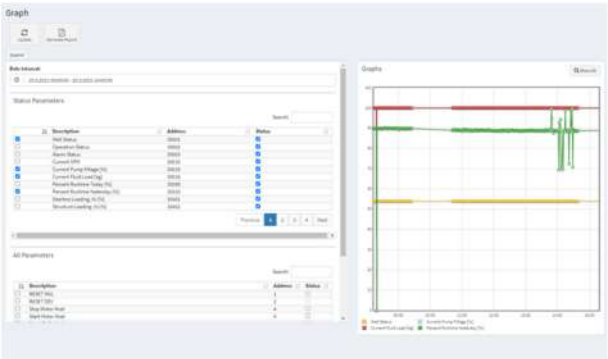
Analysis Module

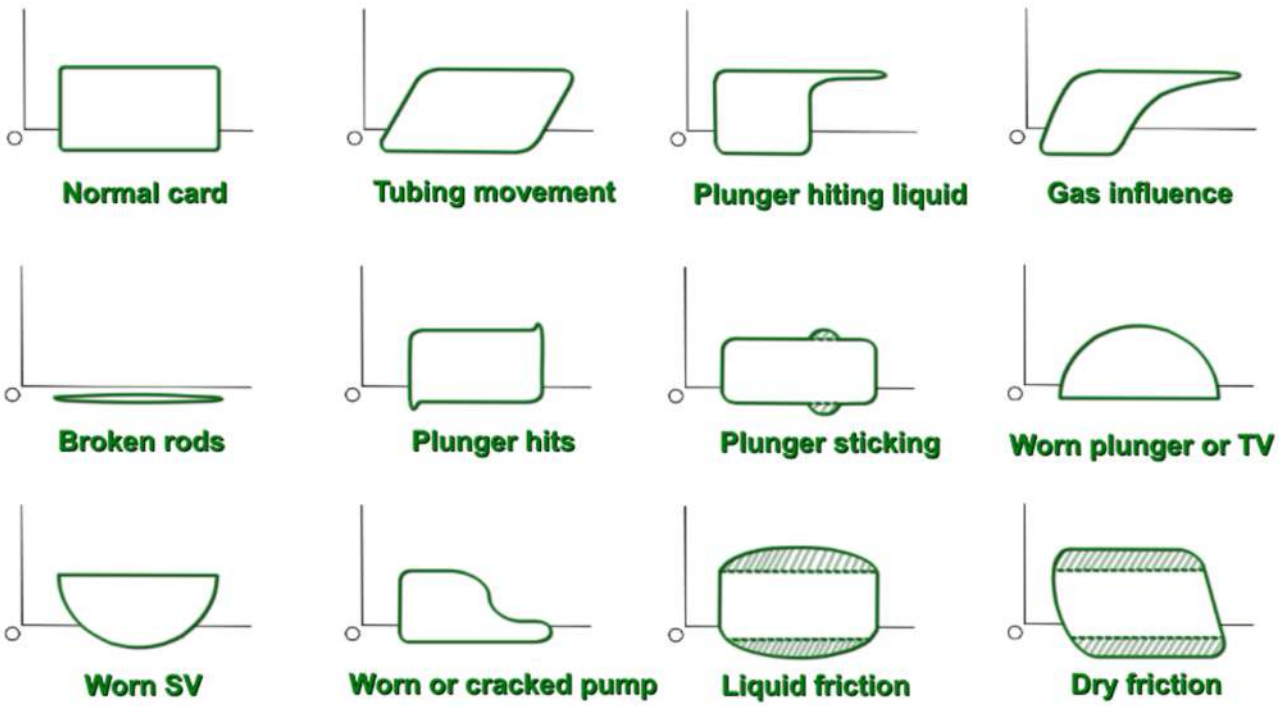


NaftaSCADA is equipped with powerful Naftamatika WellSim mathematical apparatus, which allowing to not only collect raw data from objects but also process it.

AI malfunction prevention system and key technological parameters calculation can expand functionality of controllers, which lacks these features.

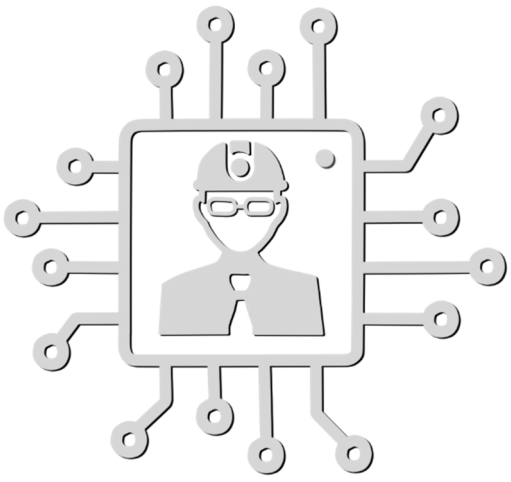
- Dynagraph cards analysis
- Wattmetrogram calculation
- Typical cards comparison
- Malfunction prediction
- Rods 3D analysis
- Well operation diagnosis
- Theoretical card calculations
- Production
- Equipment load:
  - Gearbox loading
  - Structure loading
  - Rod tapers loading
- Leakages
- Energy consumption
- Pump efficiency
- Pump intake pressure calculation
- Liquid level calculation
- Surface and downhole cards formation
- Position calculation from the geometry of the equipment
- Getting information about the balancing of equipment
- Downhole pumping equipment diagnose
- Power consumption calculation
- Electric equipment status
- Friction force calculation from well deviation survey
- Graphical representation
- Scaling and processing raw data from peripheral devices of managed object controllers
- Visual displaying of alarms
- Trends analytics
- Reports generation
- Recalculation data from other formats to Naftamatika standards, allowing to use data from third-party controllers in WellSim mathematical apparatus and AI system





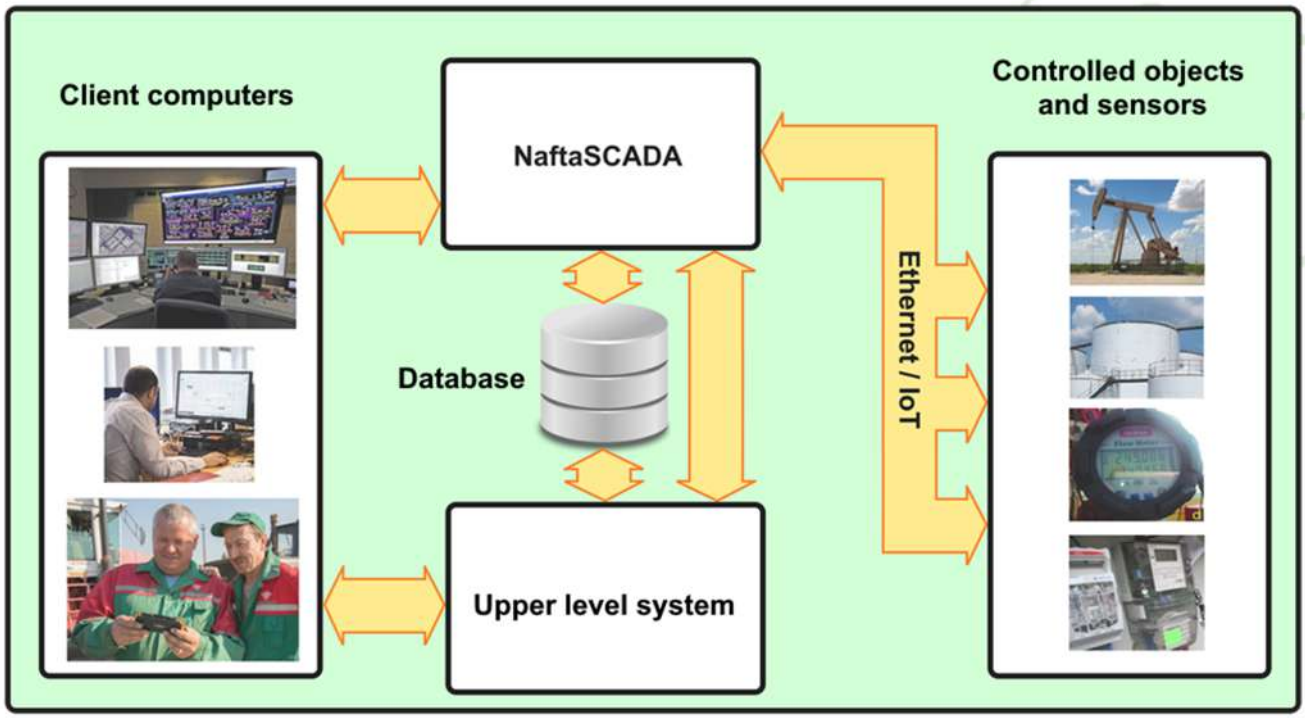
AI Analytics

The "digital technologist" artificial intelligence system is built on the principles of pattern recognition and allows for early recognition of emerging malfunctions and correction of calculations using a mathematical model.



The "Digital Technologist" has been trained on more than 20,000 dynacard and the accuracy of its forecasts has been confirmed by readings from external sensors, the conclusion of technologists and inspection with the lifting of downhole equipment to the surface.

The "Digital Technologist" is able to recognize both individual undesirable conditions and cases with emerging faults. The AI system also considers the progression of fault trends over a long period of time, allowing for planning maintenance and major repairs of facilities.



Integration with third-party software and hardware

Support for numerous standard interfaces, databases and fully customizable register maps allows NaftaSCADA to seamlessly exchange data with both objects and upper-level systems.

NaftaSCADA can act as a dispatch control and data collection level for oil field facilities, as well as an intermediate level system, collecting, sorting and analyzing data for another software package that provides a decision-making level.

NaftaSCADA allows communication with connected controllers both as objects via the communication protocol and directly to their user interface. Sensors connected to object controllers can also be polled using standard methods or directly in the transparency mode.

NaftaSCADA allows to manage full spectrum of oilfield objects like rod pumps, electric submersible pump, group metering stations and injection stations, creating control center and makes oilfield “smart”.

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