

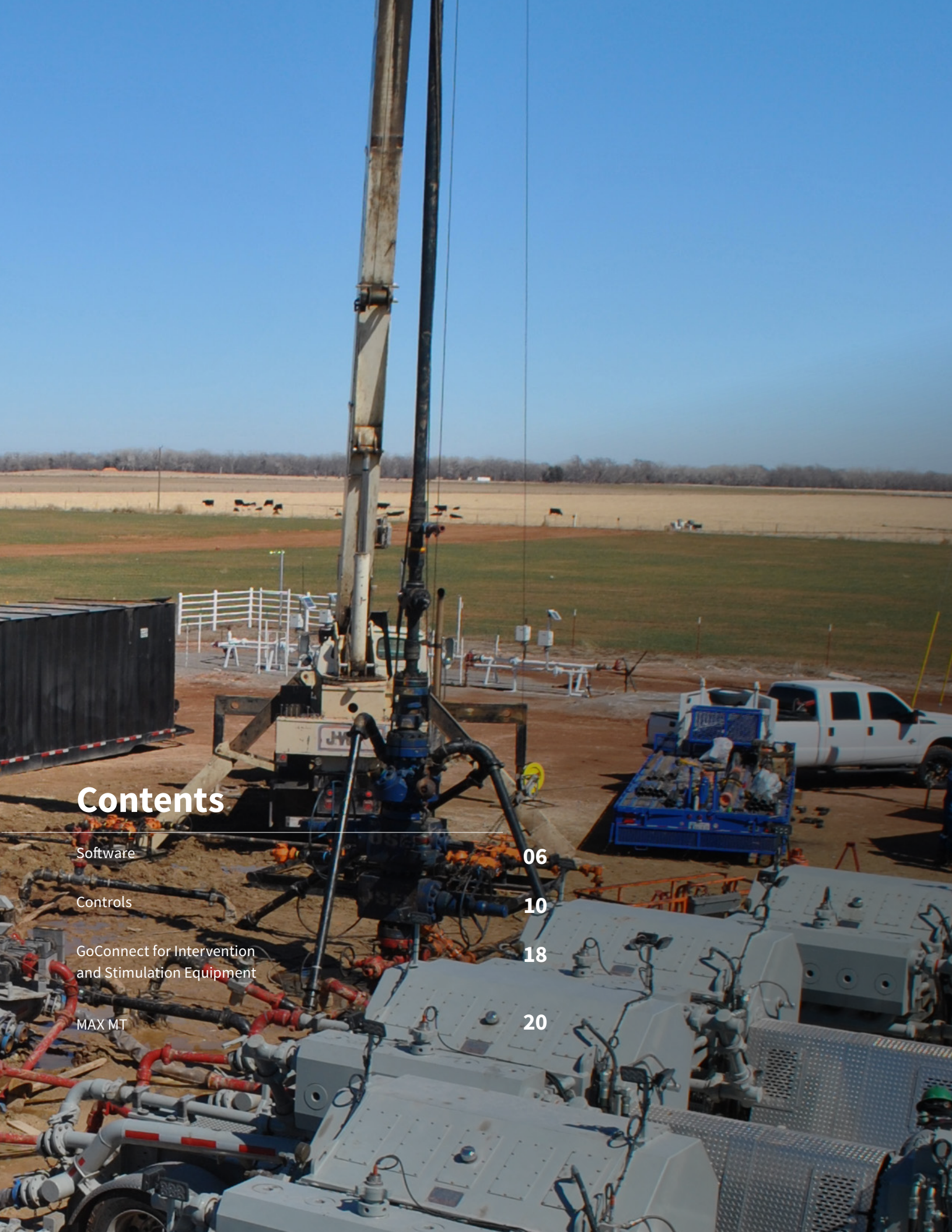
Max™ Ready

Rolligon Software and Controls Solutions



NOV Completion & Production Solutions





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Rolligon



**Completion &
Production Solutions**



We have set ourselves apart in the industry as a premier equipment manufacturer and as an innovator in software and equipment control.

Since we understand the ins and outs of your equipment, we are able to provide specialized expertise when it comes to the software and controls.

Whether it is for a complete hydraulic fracturing spread, cementing units, acidizing units, coiled tubing support pumps, or data acquisition systems, we can assist you in upgrading or standardizing your equipments' controls. These custom-engineered controls improve efficiency and curb operational costs.

Each set is designed for simplistic operation, with minimal personnel on site. Our control systems feature ruggedized, field-proven hardware and an operator-friendly interface. With a complete package offering, you can rest assured that all systems will communicate with each other and incorporate similar control logic and appearance, giving your operators familiarity with all systems after being trained on just one. All control packages can be installed at our facility or yours. With 24-hour field and technical support, you can count on our controls.

Features and benefits

- OEM specialized in controls
- Field-proven performance
- User-friendly software
- Custom-engineered designs
- Superior quality and technology
- Continuous in-house development
- Reliable 24/7 remote and field service
- Rugged oilfield hardware
- Over 4,000 control systems worldwide

Equipment monitored and controlled

- Frac pump
 - Multi-pump control
 - Blender
 - Liquid additive system
 - Hydration
 - Data acquisition
 - Coiled tubing support pump
 - Cementer
 - Acid pump
 - Sand handling
-

Software

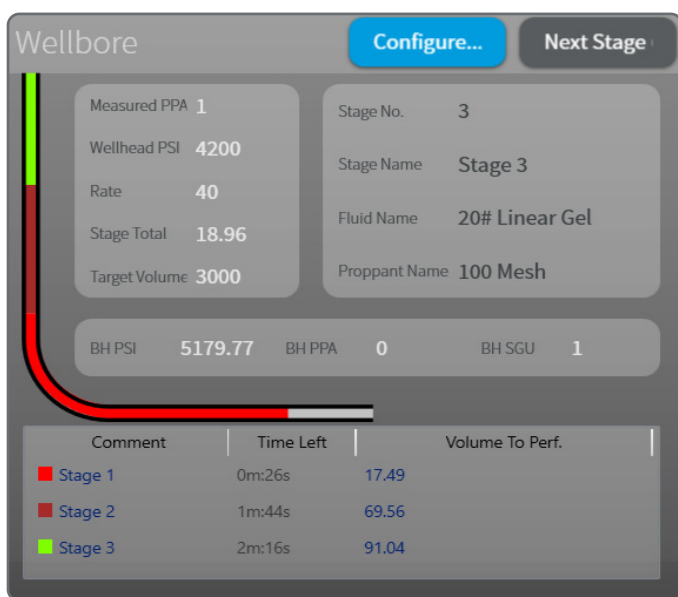


DASTRAC III

Rolligon DASTRAC III is a PC-based data acquisition and control program designed to acquire frac operations data from wellsite process control units and other independent sensors. This program also monitors job performance and creates customer reports.

This software displays acquired data from the data acquisition system and from the CANbus or ethernet network. Acquired data can be displayed in both numeric and graphical form in real-time during the job.

In addition, DASTRAC III allows operators in the data van to access the programming features of Rolligon-controlled blenders, hydration units, and liquid additive systems (LAS) connected to the data van. Using these modules, data van operators can change job profiles, scale parameters, advance stages, change stages, hold stages, and operate as if they were on the process unit.



Features and benefits

- Acquire and log data from multiple devices including ethernet, CAN, and serial
- Flexible data tag setup
- Numeric data display
- Selectable serial output
- Calculated channels using acquired data
- Post job report generation
- Multiple monitor displays
- Backup configuration data
- Review data from previous jobs
- Complete unit control of Rolligon equipment
- Technician tool for changing settings
- Dongle-based license
- Scalable system from full frac sites to single-unit acquisition
- Wellbore diagram, downhole pressure calculations, and Nolte-Smith plot views
- GoConnect™-compatible

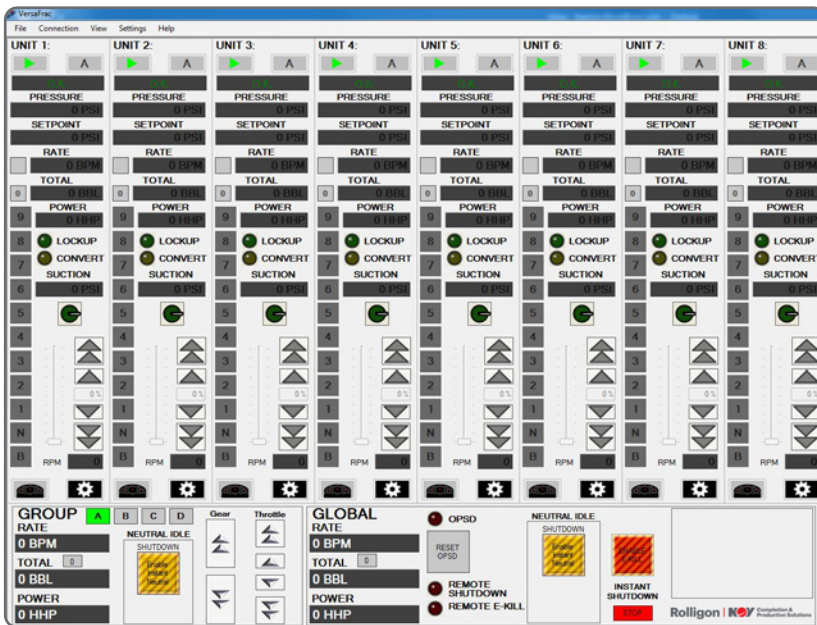
FCPC

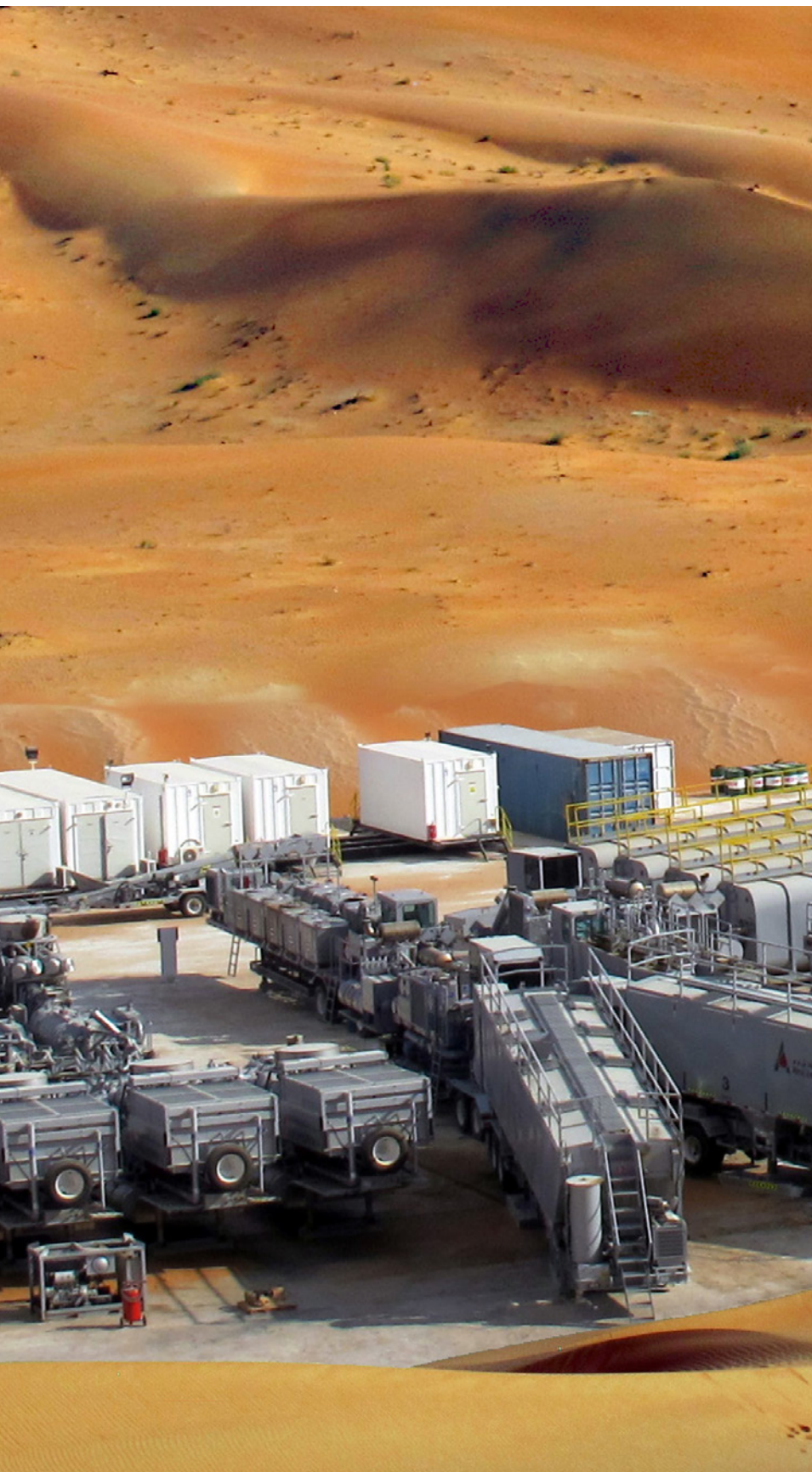
Rolligon FCPC multifrac control system is a PC-based frac control system designed to control up to 24 Rolligon hydraulic fracturing units. Utilizing the high-speed Rolligon CANbus or ethernet digital network, multiple units can be networked and controlled from a single remote operator station via a computer. Frac pumps can be grouped together for the ability to control multiple frac pumps simultaneously or individually.

This system consists of a PC-based interface and control software package, along with an interface connection panel with controller. It allows one or multiple operators to control multiple frac pumps from a single or multiple PC computers and touchscreen monitors.

The multi-unit frac control window can be launched with each multiple frac control screen controlling and displaying up to eight frac units. This package will allow the operator to select which position on the screen is used to control a pump connected to the FCPC connection panel by utilizing an identification number that is pre-programmed into each frac unit's controller.

For a more detailed look at a frac unit's performance parameters, the operator can use the individual frac control window. This screen can be accessed quickly and easily from the multi-frac control window for providing detailed information regarding an individual pump unit. Included in the additional data provided on this screen are error code messages and specific engine/transmission/pump information such as temperatures and pressures.





Features and benefits

- Interface with Rolligon VERSAFRAC™ control system
- Same capabilities as local control of the frac unit
- Grouping feature to control up to four different groups
- Global control of all connected units
- View individual unit data and combined data from entire frac spread quickly
- Alarm log for storing alarm events and maintenance data
- Overpressure system to accept a pressure input from multiple sources and shut down individual or multiple units
- Network entire frac spread to reduce setup time and lengthy cabling
- Modify unit settings and calibrations remotely
- Network data to DASTRAC III data acquisition software for acquiring pressures and combined pump rates
- Hard-wired and wireless capabilities
- GoConnect-compatible

Frac pump controls

- Protection for the frac pump based on machine data
- Reports alarms and shutdowns to the operator
- Configurable OPSD setpoint
- Works with all frac application transmissions and engines
- Tracks operating hours for major components

Controls





CHEMTRAC

Our CHEMTRAC™ liquid additive system controls allow auto proportion chemical injection into your fracturing fluid.

This system ensures proper chemical-to-fluid ratio on-the-fly when the selected base fluid has a rate change, allowing an immediate adjustment.

⚙️
●
⏸️

Run
Standby
● Hold
Clear Total

Data

Engine RPM 0.0 RPM

Oil Press -50.0 PSI

Coolant Temp -50.0 F

Fuel Rate 0.0 G/H

Engine Hours 0.0 Hours

System Voltage 27.1 V

Chemicals Backup Tank Levels

Chemical Name	Rate	Grand TTL	Stage TTL	Ratio	Target	Override
—	-24.92	0.0	0.0	0.00	0.00	● Off
—	-24.84	0.0	0.0	0.00	0.00	● Off
—	-24.92	0.0	0.0	0.00	0.00	● Off
—	-24.84	0.0	0.0	0.00	0.00	● Off
—	-24.96	0.0	0.0	0.00	0.00	● Off
—	-24.81	0.0	0.0	0.00	0.00	● Off
—	-24.54	0.0	0.0	0.00	0.00	● Off
—	-24.92	0.0	0.0	0.00	0.00	● Off
—	-24.77	0.0	0.0	0.00	0.00	● Off
—	-24.73	0.0	0.0	0.00	0.00	● Off
—	-24.92	0.0	0.0	0.00	0.00	● Off

Stage

Blender1: Blender2: DualBlender: Hydration:

Features and benefits

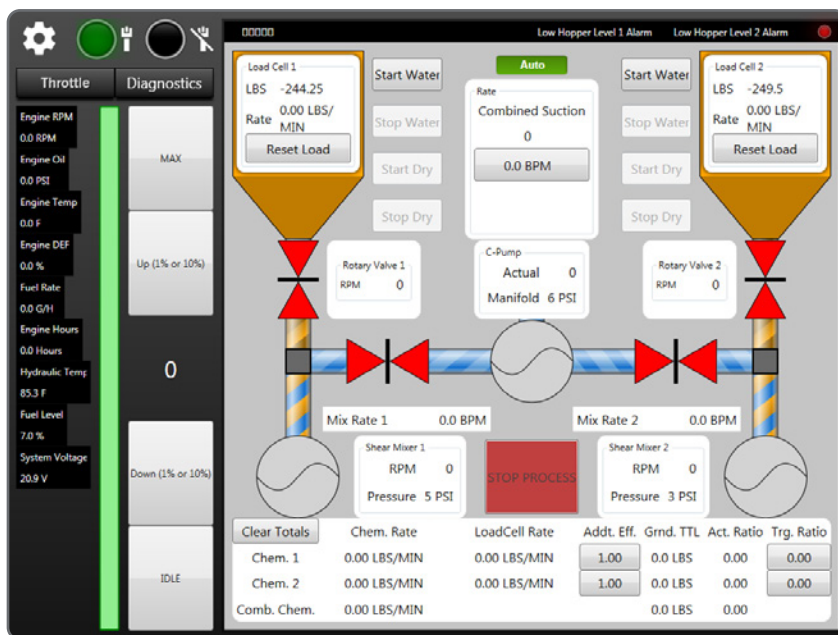
- Receives suction rates from two blenders and hydration controls
- Controls up to ten chemical pumps and one transfer pump
- Monitors tank levels
- Predefined job stage control
- Field-proven PID system for feedback control
- Multiple parallel data transmission protocols - CAN, ethernet, and serial
- Stand-alone manual bypass
- Wireless option available
- Integrated data acquisition system that feeds data to the primary DASTRAC system
- Lifetime maintenance and software license
- GoConnect-compatible



HYDRATRAC

Our HYDRATRAC™ hydration controls system maintains tub level, pump speed, and controls up to eight chemical circuits.

This system feeds an accurate, continuous gel mixture to the blender. These controls display all real-time process data and relay all information back to DASTRAC for job reporting and data storage.



Features and benefits

- Receives suction rates from two blenders
- Controls up to eight on-unit chemicals
- Dual dry additive control and mixing automation
- Monitors tank level
- Predefined job stage control
- Field-proven PID system for feedback control
- Multiple parallel data transmission protocols - CAN, ethernet, and serial
- Stand-alone manual bypass
- Wireless option available
- Integrated data acquisition system that feeds data to the primary DASTRAC system
- Lifetime maintenance and software license
- GoConnect-compatible

FRACTRAC

Our FRACTRAC™ blender controls system maintains tub level, pump speed, and controls up to eight chemical circuits.

This system ensures an accurate continuous frac fluid mixture to be fed to the pumps. These controls display all real-time process data and relays the information to DASTRAC for job reporting and data storage.

The screenshot displays the FRACTRAC control interface with the following sections:

- Run/Standby/Hold/Control Buttons:** Run (selected), Standby, Hold, Clear Total.
- Engine 1 Data:** Engine Hours (0.0), Engine RPM (0.0), Coolant Temp (0.0 F), Oil Press (0.0 PSI), Percent Load (0.0%), Fuel Rate (0.0 G/H).
- Engine 2 Data:** Engine Hours (0.0), Engine RPM (0.0), Coolant Temp (-50.0 F), Oil Press (-50.0 PSI), Percent Load (0.0%), Fuel Rate (0.0 G/H).
- Control Out:** 0
- Tub Level:** A vertical scale with 'Tub Level' and 'Set Point' labels, and 'AUTO' (selected) and 'MANUAL' buttons.
- Process Data Table:**

	Rate	Grand Totals	Stage Totals	Concentration		
Discharge	0 BPM	0 BBL	0 BBL	Measured	0 PSA	
Suction	0 BPM	0 BBL	0 BBL	Target	0 PSA	
Proppant	0 LB/M	0 LBS	0 LBS	Calculated	0 PSA	
- Custom Channels:** A table with columns for Name and Value.
- Auger RPMs:** Auger 1 (0 RPM), Auger 2 (0 RPM), Auger 3 (0 RPM), Auger 4 (0 RPM).
- Parameters:** Sand Factor (1), Target Vol. (0 BBL), Curr. Stage (0), Sys. Voltage (23.6 VDC).
- Chemicals Table:**

Chemical Name	Rate	Grand TTL	Stage TTL	Ratio	Target	Override
CHEM 1	-37.50	0.0	0.0	0.00	0.00	Off
CHEM 1	0.00	0.0	0.0	0.00	0.00	On
CHEM 3	0.00	0.0	0.0	0.00	0.00	Off
CHEM 4	-25.00	0.0	0.0	0.00	0.00	Off
CHEM 5	0.00	0.0	0.0	0.00	0.00	On
CHEM 6	0.00	0.0	0.0	0.00	0.00	On
CHEM 7	0.00	0.0	0.0	0.00	0.00	On
CHEM 8	617.85	0.0	0.0	0.00	0.00	On

Features and benefits

- Predefined job stage control

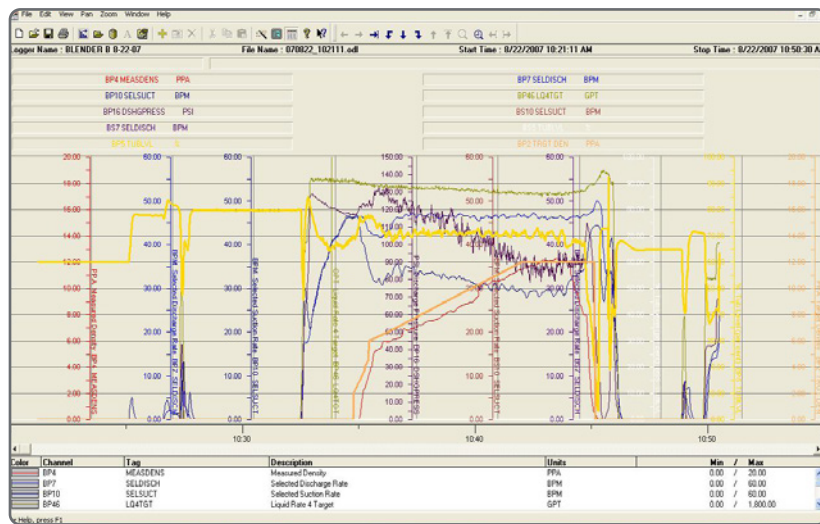
Field-proven PID system for feedback control includes:

- Tub level/suction pump control
- Discharge pump pressure control
- Controls up to ten on-unit chemicals
- Proppant delivery
- Multiple parallel data transmission protocols - CAN, ethernet, and serial
- Stand-alone manual bypass
- Wireless option available

Data Acquisition System

Our data acquisition controls system (DAS) is our hardware-based acquisition system to bring in raw signal data, scale, and display actual values.

This system can be customized to fit frac vans, acidizing, coiled tubing support pump, cementing, and any miscellaneous data acquisition requirements. These controls display all real-time process data and relays to DASTRAC for job reporting and data storage.



Features and benefits

- Multichannel inputs to include: analog, frequency, PWM, digital
- Multiple local or remote display options
- Up to 40 input channels
- Basic nitrogen rate calculation
- Totals rate inputs
- Digital OPSP output
- PPA concentration calculations for up to 3 densitometers
- Works with transmitter-less Thermo Fischer Scientific and Berthold densitometers
- Sends wellhead pressures to the VersaFrac system
- Portable options
- Multiple parallel data transmission protocols - CAN, ethernet, and serial
- Wireless option available
- Integrated data acquisition system that feeds data to the primary DASTrac system
- Lifetime maintenance and software license
- GoConnect-compatible



SandBank Software

Our SandBank™ software solution incorporates a complete platform to control our patent-pending field proppant storage system.

This system automates the loading of proppant into the silos through our drive-over unloader. The base unit also automates silo selection via primary and secondary discharge gates, belt speed, and blender hopper level control. Additionally, proppant inventory control is included via cloud-based technology, allowing the user to have real-time remote access to proppant storage capacity.



Features and benefits

- Anti-belt sand off control
- Overfill warning and protection
- Belt alignment feedback
- Automatic/manual blender discharge control
- Primary and secondary discharge gate
- Monitors tank level
- Predefined job stage control
- Field-proven PID system for feedback control
- Multiple parallel data transmission protocols - ethernet, and serial
- Stand-alone manual bypass
- Wireless option available
- Integrated data acquisition system that feeds data to the primary DASTRAC system
- Lifetime maintenance and software license
- GoConnect-compatible



VERSAFRAC

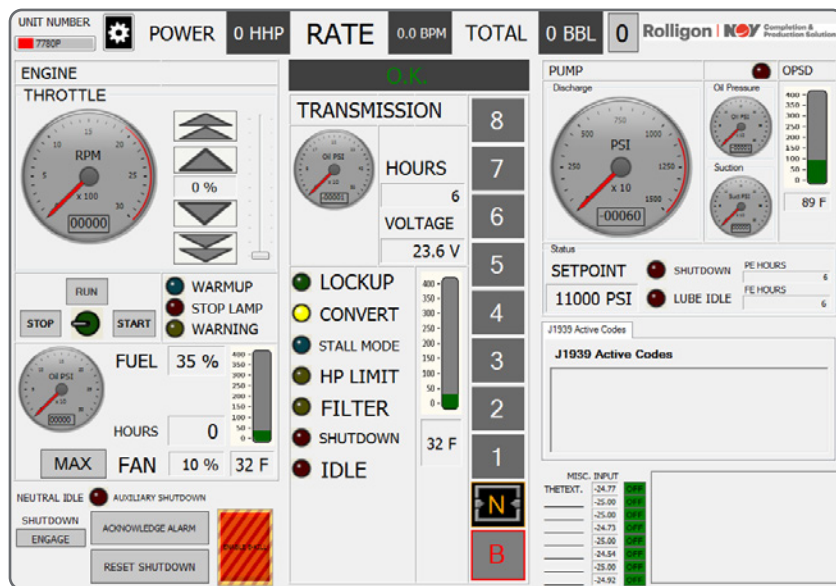
Rolligon VERSAFRAC control system is a single solution designed to operate and monitor hydraulic fracturing units. As a frac equipment OEM, we understand your equipment and are able to provide specialized expertise when it comes to the software and controls.

Our system uses a universal software package that can be adapted to fit any engine, transmission, or pump combination without having to rewrite the code. The product is known to be highly adaptable and reliable with years of experience driving the features.

Our increased safety functions prevent equipment failure and increase uptime. Some of the benefits of our controls over analog or basic digital controls are equipment and human safety features. The safety features used in our digital controls are faster than human reaction time needed to protect the equipment, the well, and operating personnel.

Features and benefits

- Protection for the frac pump based on machine data
- Reports alarms and shutdowns to the operator
- Configurable OPSD setpoint
- Tracks operating hours for major components
- Dual-fuel compatible
- Fail-safe mode during loss of communication
- Multiple remote control options available
- Multiple parallel data transmission protocols - CAN, ethernet, and serial
- Wireless option available
- Limited integrated data acquisition system that feeds data to the primary DASTRAC system
- Lifetime maintenance and software license
- GoConnect-compatible

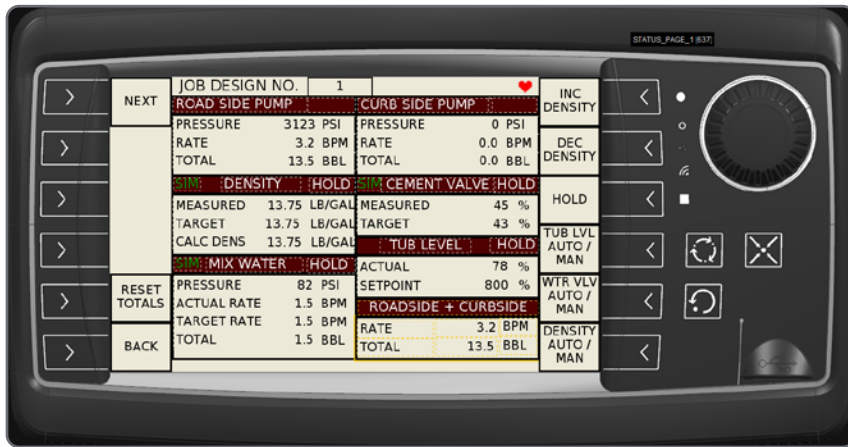




CAM III

Rolligon CAM system is a continuous automated mixing control system designed for twin or single cementing pumping equipment. The system automates all aspects of the cement mixing process including mix water, bulk cement, and tub level. Combined with the industry-leading TEM™ mix head, the CAM system can accurately place cement in your wellbore.

The integrated data acquisition system feeds process data to the primary DASTRAC system that allows for data storage, graphing, and customer reports. The combined system makes a complete standalone software suite.



Features and benefits

- Automated water, bulk, and tub level control
- OPSD alarms and shutdown
- Support for four chemical additives
- Combined rate and totals for twin pump support
- Field-proven PID systems for feedback control
- Multiple parallel data transmission protocols - CAN, ethernet, and serial
- Stand-alone manual bypass
- Wireless option available
- Integrated data acquisition system that feeds data to the primary DASTRAC system
- Lifetime maintenance and software license
- VERSAFRAC-compatible
- GoConnect-compatible



GoConnect for Intervention and Stimulation Equipment

Leading the industry's digital transformation for intervention and stimulation equipment

GoConnect for intervention and stimulation equipment provides streaming field data for process monitoring, predictive analytics, and condition-based maintenance capabilities for NOV's pressure pumping, coiled tubing, nitrogen, and wireline equipment. Our new service uses artificial intelligence and machine learning to provide data-driven insights into the condition, health, and performance of customers' equipment and operations, allowing them to reduce downtime-related costs and improve the operational efficiency of completion services.

We understand that condition monitoring and predictive analytics are changing the way we support, maintain, and design our equipment, allowing us to deliver better performance for your operations.

Our GoConnect system for intervention and stimulation equipment is powered by NOV's Max™ platform, which also powers NOV's successful Rigsentry™ condition monitoring system for drilling equipment. This platform allows you to view real-time and historical data from the field or in your office.

Features

- Enables maintenance based on utilization
- Smart notifications with usage and symptom calculations
- View data in AccessNOV consolidated web portal
- Monitor equipment KPIs and create customizable reports
- Secure remote access to equipment information
- View fleet and equipment status and notification history
- Customizable dashboard
- Trend data visualization tools
- Utilizes specialized equipment health-monitoring sensors
- Simple installation and startup
- Monitor physical location of equipment
- Powered by NOV's Max big data platform and analytics

Benefits

- Avoid unplanned maintenance during hydraulic fracturing and well intervention operations
- Reduce unnecessary maintenance, lowering cost and risk
- Increase uptime and equipment efficiency
- Facilitate improved planning and optimization of maintenance costs
- Make decisions faster and with more confidence
- Establish a foundation for reducing total cost of ownership

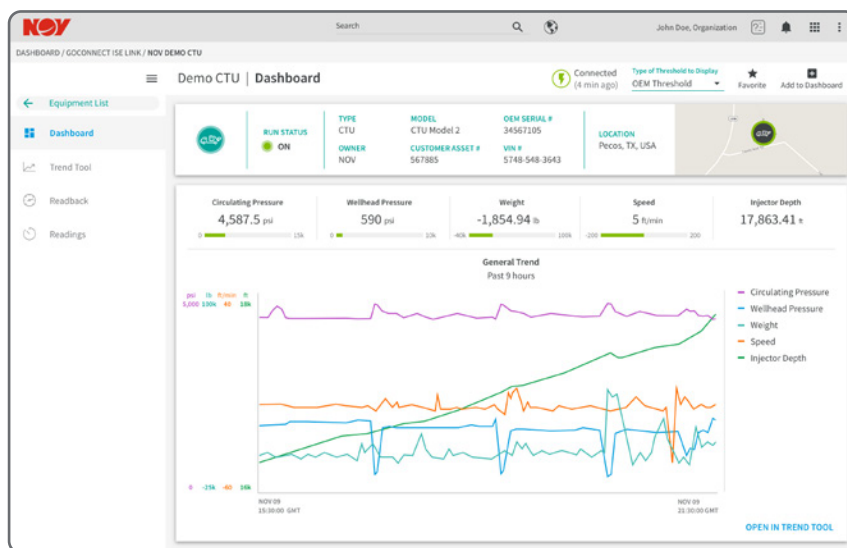
Your equipment. Health information. On demand.

Asset Link

Asset Link™ delivers real-time process and machine data to stakeholders. This data can be used to monitor equipment health and to make field job design changes on the fly. Historical data can also be analyzed to refine future job designs and to identify pending equipment issues.

What equipment is GoConnect-ready?

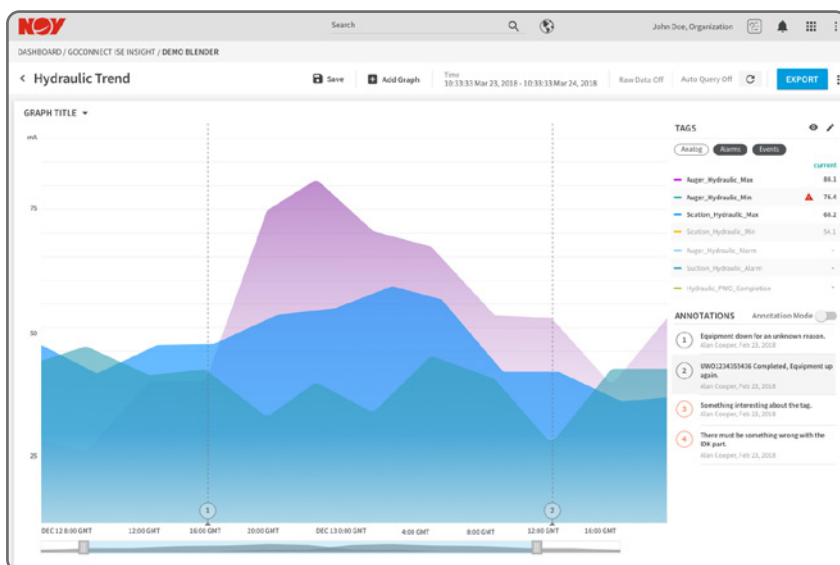
- Hydraulic fracturing units and components
- Coiled tubing units and components
- Nitrogen units and components
- Wireline units and components



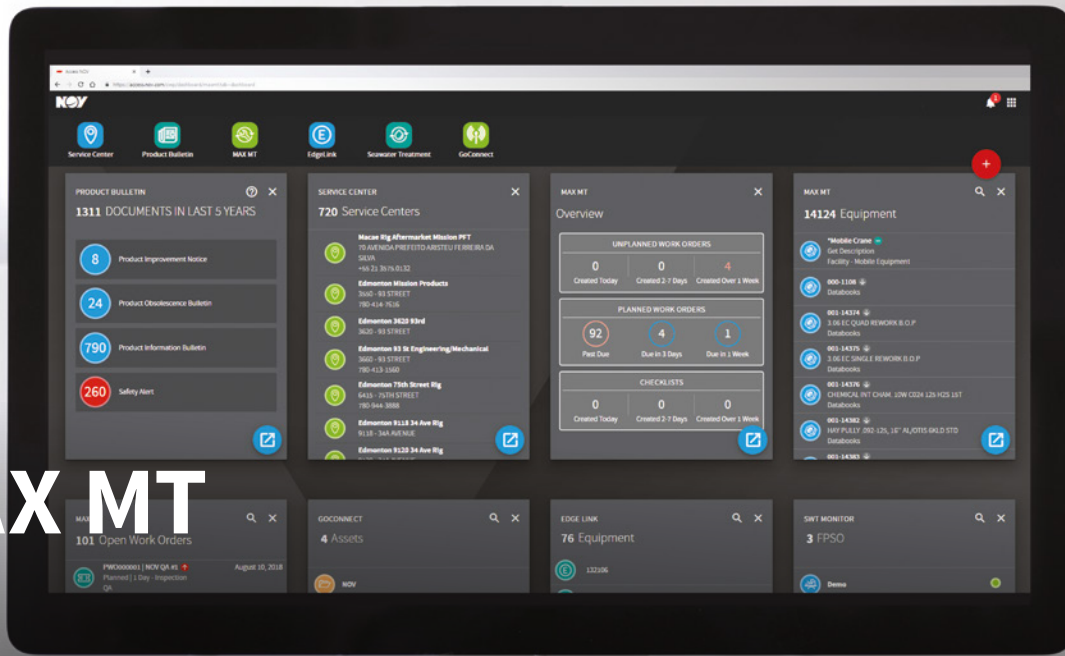
Take the guesswork out of maintenance.

Asset Insight

Asset Insight™ provides advanced tools to monitor the condition of your hydraulic fracturing and well intervention equipment in order to maximize uptime and reduce maintenance costs. Smart notifications alert your maintenance personnel when there is a potential concern with the equipment, aiding them in the proper course of action. Tracking and trending of key equipment health indicators along with logging of past equipment alarm events provides valuable insight into the root cause of component failures. Key performance indicators and customizable reports are included to allow easy comparison of the performance of individual pieces of equipment up to and including an entire frac or coiled tubing fleet consisting of multiple spreads distributed across a wide geographical area. Access to online OEM equipment operating guides and maintenance protocols are included for quick reference.



Viewing the equipment dashboard from any web-enabled device provides you with a visual representation of current equipment health and physical location (via GPS) of the unit. Critical well treatment data (pressures, rates, etc.) is also available in this dashboard and is logged for future reference. Transitioning from a time-based to a usage-based maintenance plan reduces cost and improves equipment uptime.



MAX MT

Data visibility drives operational efficiency

MAX™ MT is a next-generation maintenance product that integrates with our Industrial Internet of Things (IIoT) data platforms to allow customers to better understand their equipment and more effectively use the preventive, predictive, and condition-based maintenance (CBM) practices we've developed through data collection and analysis.

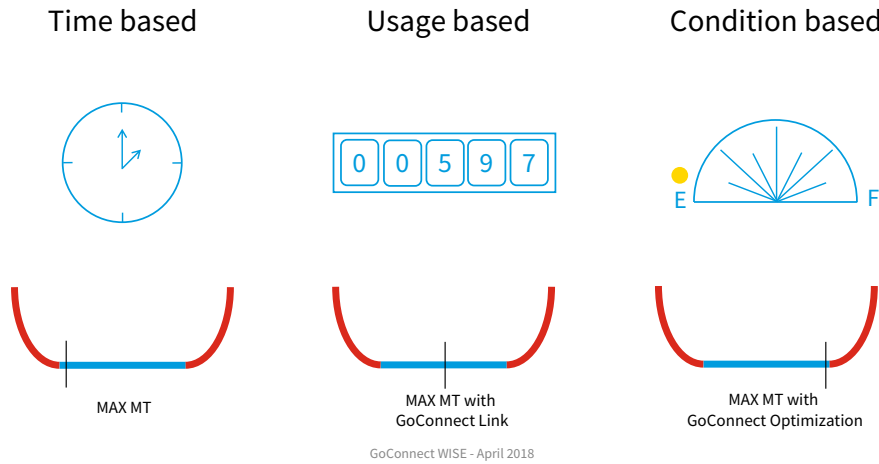
NOV has been using and developing the MAX MT platform for internal maintenance optimization for years, proving its value. Building on this success and now accessible to external customers, the legacy platform's UI has been updated to Access NOV Portal for increased ease of use and integration with other NOV technology products. The MAX MT interactive dashboard allows real-time visualization of maintenance-related data by using notifications for asset condition and performance, providing the customer with data to make critical operational decisions. MAX MT is not a bolt-on to an existing ERP, but offers immediate benefits as a standalone application.

Any time a MAX application is integrated, that data can also flow through MAX MT, offering near limitless levels of customization. Ultimately, using MAX MT as part of our broader condition-monitoring, CBM, and total-cost-of-ownership programs positively impacts your organization's equipment economics and enables you to move away from less effective forms of maintenance.

Key functionality includes:

- Planned/Unplanned Work Orders
- Task Request Module
- Time/Use/Condition-Based Scheduling
- Periodic Checklists Module
- Maintenance KPIs & Analytics
- Maintenance Reporting
- Failure Reporting
- Inspection Management
- Digital Document Library
- Industrial Internet of Things Integration
- Material Transfer Module
- Campaign Management for Fleet Initiatives
- RFID/NFC/QR Code/Bar Code Asset Identification for Serialized Assets
- Asset Location Mapping/Tracking
- Structured Asset Hierarchy/Taxonomy
- Inventory/Parts/Supplier Management
- Failure Mode Effects and Criticality Analysis
- Mobile Device Support
- Total Cost of Ownership Reporting

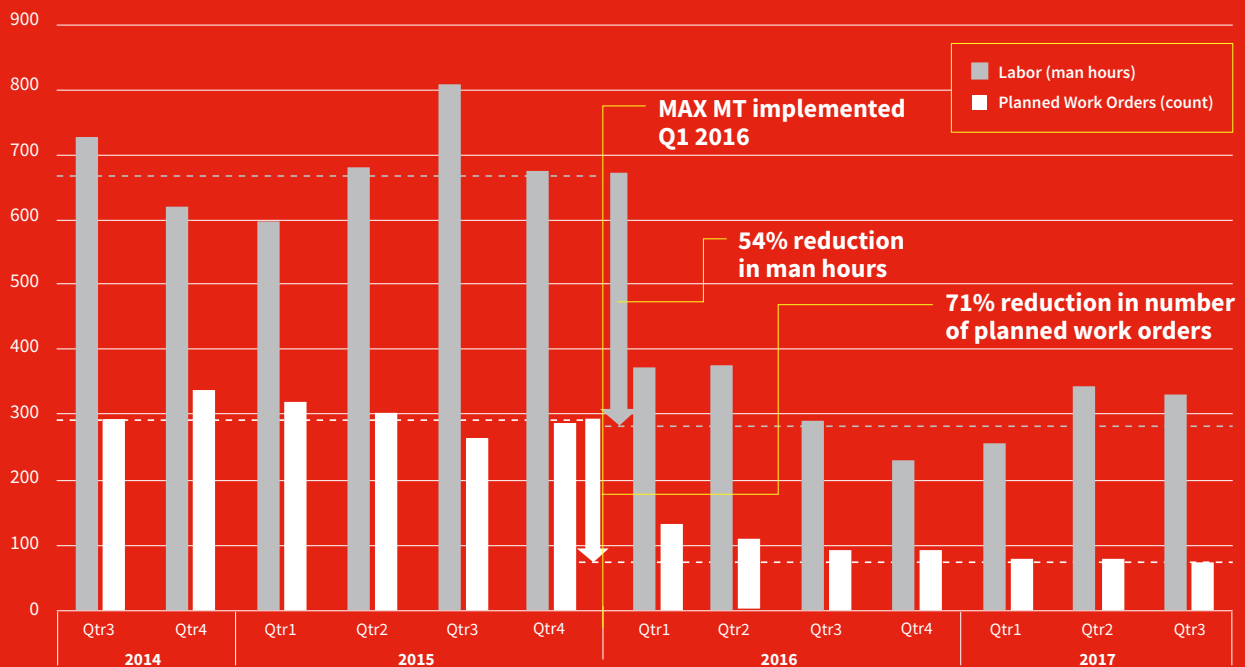
Levels of maintenance



MAX MT- built for purpose

- Compatible with your organizations asset management strategy
- Partnership for the journey through the levels of maintenance
- Adoption of CBM can decrease maintenance costs 10-40% compared to programs only utilizing time or usage based maintenance strategies

Impact of MAX MT on planned work orders at a large NOV facility



MAX MT implementation was performed in January 2016; and the site had previously been tracking maintenance manually before implementing MAX MT.

54%

Reduction
in man hours

71%

Reduction
in number of
work orders



used in over

400

NOV facilities

\$1B USD

**of maintenance
completed**

1,500

active users

700+

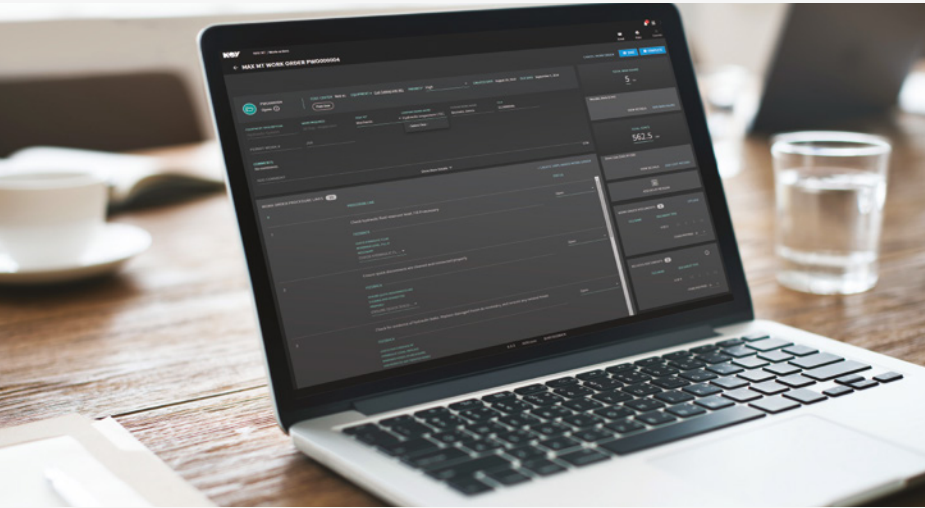
daily users

Advanced features enabled through NOV MAX:

- Seamless integration with NOV's IIoT and cloud platform including Edge analytic technology suite (hardware and software stacks), real-time data, and insights into asset performance and status
- Provide real-time equipment status and data for building a condition-based maintenance strategy
- Adjust schedules with predictive maintenance to further reduce cost of maintenance while maximizing equipment availability based on models developed by data scientists; develop models for predicting the future instead of only analyzing historical data
- Alignment with NOV advanced condition sensor packages such as GoConnect for seamless integration without third-party implementation
- Utilize data and analytics to drive the optimal asset management plan, enhancing OEM recommendations and increasing overall operational efficiency

Features and Benefits

- Enables seamless system integration and easy information access via a single portal.
- Access to product line SMEs, data scientists, analysts, and maintenance and reliability teams included.



- Eliminates the need for third-party service and integration while providing the expertise and know-how of the OEM.
- Asset identification technology - RFID, NFC, QR codes, and bar codes for field use with remote devices.
- Helps users build more robust asset management and equipment lifecycle programs, by developing maintenance and inspection reports and setting health and performance KPIs.



- Maintenance is now at the user's fingertips, providing real-time data on equipment health.
- Allows companies to transition away from calendar- and usage-based maintenance to CBM.
- Simplification of regulatory compliance and audits
- Provided to customers on a per-project basis with system implementation, training program, and configuration included.



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