



SIEMENS



Subject to changes and errors. The information given in this document only contains general descriptions and/or performance features which may not always specifically reflect those described, or which may undergo modification in the course of further development of the products. The requested performance features are binding only when they are expressly agreed upon in the concluded contract.

Oil & Gas Production Automation

# Driving more profits from well stimulation and completions

Siemens Automation. Fueling Efficiency.

**Siemens Industry, Inc.**  
3333 Old Milton Parkway  
Alpharetta, GA 30005  
1-800-241-4453  
info.us@siemens.com

Subject to change without prior notice  
Order No.: AMTA-WLLST-0116  
Printed in USA  
©2016 Siemens Industry, Inc.

[usa.siemens.com/oil-gas](http://usa.siemens.com/oil-gas)



# Boost well productivity with greater automation and operational visibility

Stimulating wells to drive more oil and gas out of them isn't new. It dates back to the U.S. industry's earliest days when "shooting wells" involved detonating explosives lowered into their bores to blast nearby rock and release trapped hydrocarbons.

Today's hydraulic fracturing is similar in concept but has come far since first used to juice an Oklahoma vertical well in 1949. Technology advancements have enabled lateral bores to be drilled horizontally from kickoff points in vertical wells, and then fractured.

All this has led to much greater production efficiencies, especially by eliminating the need for many more vertical wells to fully tap the in-ground reserves of a particular lease. That's why horizontal drilling and associated hydraulic fracturing now dominate efforts to maximize asset returns. Yet the need for even more efficiencies in well-stimulation and completion activities remains.



## Stay ahead of your cost curve

Why? Unconventional producers, especially those using horizontal fracturing, must stay ahead of their production cost curves to ensure their profitability. And, to be sure, more and more are taking advantage of new approaches and techniques in well stimulation and completion. Among those are multi-well pads, zipper fracking, and longer laterals, often stacked.

These innovations derive their greater efficiencies from increasing above-ground and down-hole operational densities. However, producers can realize additional benefits by using more automation in their well-stimulation and completion activities. And it's imperative that they do.

## Simplify your operation

With operational density comes complexity. This can short-change the overall benefits that come from increasing economies of scale. Manual controls and data-gathering systems don't scale well. Nor do standalone mechanical and relay-based schemes. And that's not to mention they're all expensive, time-consuming, and often error-prone.

How do you tame this problem? By deploying Siemens Totally Integrated Automation (TIA) as your single-source solution across any number of points in your well-stimulation and completion efforts.

## Seamless integration of components via uniform interfaces between them

Given its open system architecture, the Siemens TIA portfolio provides uniform hardware and software interfaces, consistent data management, and global standards to interoperate with legacy and vendor systems. n technologies and techniques.



This portfolio comes with the TIA Portal, an integrated engineering framework for every automation task. Many Siemens industrial customers worldwide have used the TIA Portal to cut engineering and commissioning times by as much as 30 percent, even more in a number of cases.

Boost the output and profitability of all your wells, or those of your client customers, with intelligent, highly scalable Siemens TIA solutions which can increase your production efficiency, reliability, safety, and security. And tame the complexities that can otherwise grow unmanageable with new well stimulation and completion technologies and techniques.

## Protect your intellectual property and off-load lifecycle risk

If you have in-house or proprietary systems and solutions, consider migrating them to our line of industrial PCs (IPCs) and powerful programmable logic controllers (PLCs), like the new SIMATIC S7-1500. Not only do these platforms offer the performance you need in rugged packages and compact form factors, but they also offer special protection to ensure the integrity and security of your intellectual property.

Or, consider using them for new "green board" designs. As one of the world's largest electronics manufacturers, Siemens invests billions each year in the most advanced ASIC designs for automation and controls.

Either way, you'll be off-loading the hardware lifecycle risks to us. And you'll gain access to the powerful and proven software engineering tools and code libraries of the TIA Portal.

Boost the output and profitability of all your wells, or those of your client customers, with intelligent, highly scalable Siemens TIA solutions which can increase your production efficiency, reliability, safety, and security. And tame the complexities that can otherwise grow unmanageable with new well stimulation and completion technologies and techniques.

# Deploy digital production fields for improved speed, control, and monitoring

More than ever, oil and gas producers in North America and worldwide are turning to Siemens to help them deploy digital production fields. With our extensive network of partners, we help them do so to enhance critical well stimulation and completion phases, while minimizing disruption risks.

Digital production fields are highly integrated operations that apply proven factory automation and process technologies to the rugged, and often remote, requirements of the oil and gas industry.

They provide producers with tremendous scalability and flexibility to adapt their operations to a wide range of variables. These can include different types of underlying geological formations, surface topologies, hydrocarbons, proppants, regulations, and even company operating protocols.

The results? Faster setups and tear-downs of control and monitoring systems. Better operational visibility and control above and below ground. Improved decision-making. More simplicity, less complexity. Lower costs and greater profitability.

Siemens Totally Integrated Automation (TIA) product portfolio can help provide your production facility with:

## Increased availability.

Cut the risk of costly production downtime. Predictive maintenance and remote system diagnostics will enable a much more cost-effective and proactive approach to overall reliability. Built-in ruggedness ensures greater reliability. If service technicians are needed, remote diagnostics can provide them with troubleshooting insights and needed parts in advance, so they can resolve issues much faster.

## Improved visibility.

Gather, consolidate and analyze real-time data from every point of your mechanical operations and process flows as well as from the sensing fabric itself – even if your production facility is remote and unmanned, as most are. This visibility will support better, faster, and more informed decisions, too.

## Better safety and security.

Improve the safety of your facility with Siemens TIA components that have built-in, fail-safe protective features. Many are certified to the highest safety levels defined in IEC EN 61508, the global international safety standard. Also, their hardened industrial security will help protect against cyber-attacks.

## Better safety and security.

Collect and compile the data for the detailed reporting that federal, state, and local regulations require much faster and more easily. Not only will you save time, but you'll also reduce non-compliance risks of penalties, or worse – shutdowns.



## Put scalable, plug-and-play modularity to work for you

Siemens Totally Integrated Automation (TIA) portfolio offers a wide range of modular, plug-and-play automation, and control solutions. These include PLCs, analytics and instrumentation, and wireless networking systems. We also offer a wide range of drives, motors, and motor controls, with every power rating, size, and horsepower needed.

In fact, our TIA portfolio's breadth is hard to match. Plus, the interoperability of our solutions makes integrating the various operations that span production fields much easier, faster, and more economical. Our solutions can scale to any size facility. And they can be quickly and easily replicated to work across all of your sites, for any number of them, no matter how far apart.

### Increase reliability and efficiency with standardization

By deploying solutions from the Siemens TIA portfolio, you'll increase standardization of your operations, thanks to the consistent architectural design of every component.

This can simplify your operations, improve reliability, enable new efficiencies, and reduce costs. If you choose to sole-source, you'll also streamline your procurement, maintenance, spare inventories, service, and support.

Don't worry about stranding your existing investments in legacy automation and control assets. The Siemens TIA portfolio's open architecture and protocols, such as PROFIBUS and PROFINET make it possible to collect data from the products of many different suppliers.

We design our hardware components for optimal modularity and replicability, so you won't outgrow them – just add more as needed. And with software now delivering most of their value, periodic firmware downloads will keep it all up-to-date. Additionally, all downloads can be automated and done remotely.





## Use cases: Well stimulation through completion

### Pressure Pumping Unit (Frac Truck)

A mobile system on a truck or trailer, providing 1,300 to 3,000 hp for generating up to 10,000 psi of well pressure powered by a large engine, transmission, and pump.



#### Key features

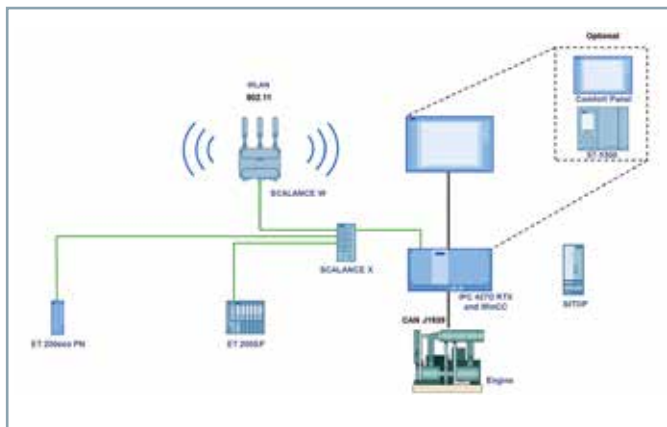
- One-box solution for computing, visualization, and control
- Small, rugged, high-performance industrial PC
- Highly integrated diagnostics

#### Key benefits

- Rugged reliability
- Lowers cost of ownership by enabling higher productivity, flexibility, and investment security

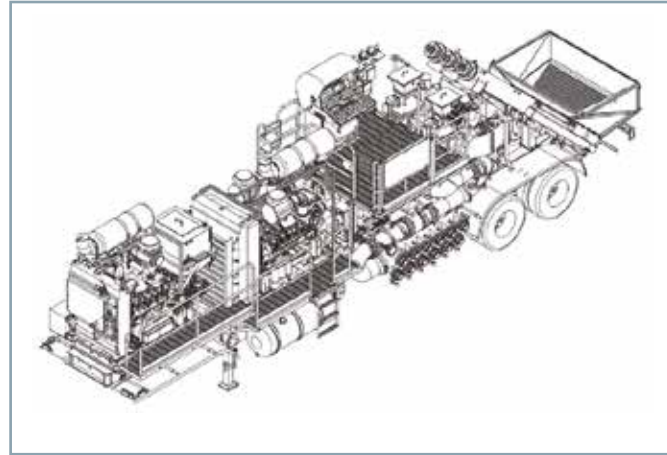
#### Key components

- SIMATIC IPC427D w/ RTX and WinCC SCADA
- SCALANCE X Ethernet switch
- SCALANCE W788 WLAN access point (802.11n)



### Automated Proppant Mixing

A mobile system with enclosed mixing and metering elements that improves the consistency of the mix while reducing dust.



#### Key features

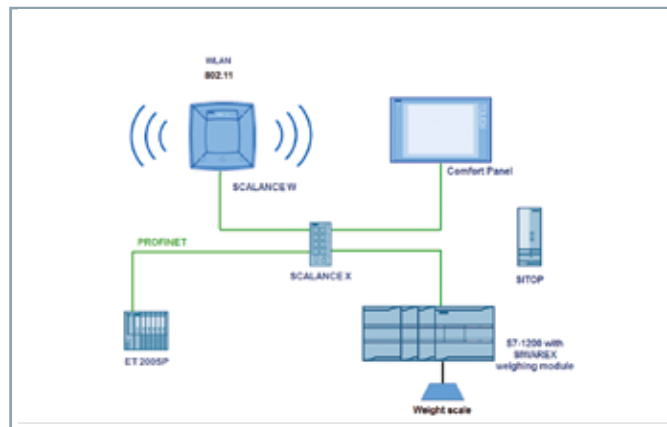
- Scalable performance in a compact package
- Ethernet communications built into all models via PROFINET
- Flexible expansion

#### Key benefits

- Modular
- Easy to use
- Greatest price-performance to value in the compact controller class, with documented savings up to 60%

#### Key components

- SIMATIC S7-1200 PLC w/ SIWAREX Weight Scale Module
- SCALANCE X Ethernet switch
- SCALANCE W788 WLAN access point (802.11n)



### Data Van

A mobile trailer or truck-based system, where site operators remotely monitor and control pressure, proppant mixtures, and all other site assets for the hydraulic fracturing process.



#### Key features

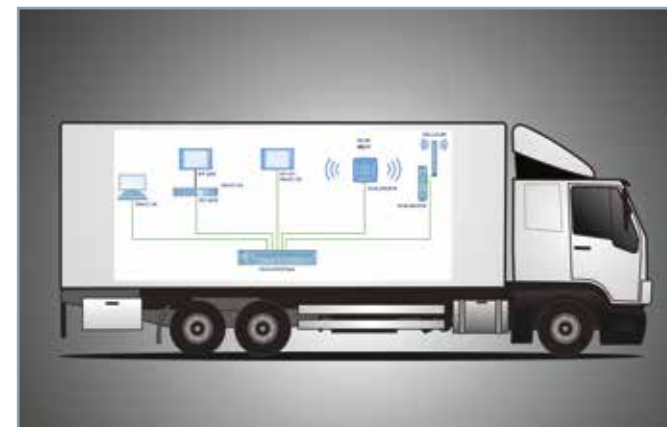
- Scalable SCADA, from small to complex systems
- Operating system/platform independence
- Object-oriented programming reduces engineering time

#### Key benefits

- Addresses specialized needs for scalability and customization
- Reduces engineering time and costs

#### Key components

- SIMATIC WinCC Open Architecture
- SIMATIC IPC with WinCC SCADA
- SCALANCE X Ethernet switch
- SCALANCE M875 3G cellular modem
- SCALANCE W788 WLAN access point (802.11n)



### Site Communication & Coordination

Provides secure, reliable, and wireless site communications for fast setup of well stimulation assets to control and monitor all production operations.



#### Key features

- Advanced wireless networking features; mesh, diagnostics
- Redundancy in wireless, wired, and power
- Rugged metal housing

#### Key benefits

- Addresses demanding needs for easy setup and tear-down, availability, reliability, and durability

#### Key components

- SCALANCE W788 WIFI modem (802.11n)

# Gain the experience, expertise, portfolio, and support you need

## Use Siemens Totally Integrated Automation to improve your midstream efficiency, reliability, and safety

Siemens Totally Integrated Automation (TIA) solutions portfolio can help provide your midstream transport solutions and operations with:

- **Increased availability.** Cut the risk of costly downtime. Predictive maintenance and remote system diagnostics will enable a much more cost-effective and proactive approach to overall reliability. Built-in ruggedness ensures greater reliability. If service technicians are needed, remote diagnostics can provide them with troubleshooting insights and needed parts in advance, so they can resolve issues much faster.
- **Improved visibility.** Gather, consolidate, and analyze real-time data from every point of your mechanical operations and process flows as well as from the sensing fabric itself, along the full length of your midstream infrastructure. This visibility will support better, faster, and more informed decisions, too.
- **Better safety and security.** Improve the safety of your pipelines with Siemens TIA components that have built-in, fail-safe protective features. Many are certified to the highest safety levels defined in IEC EN 61508, the global international safety standard. Also, their hardened industrial security will help protect against cyber-attacks.
- **Simplified compliance.** Collect and compile the data for the detailed reporting federal, state, and local regulations require much faster and more easily. Not only will you save time, but you'll also reduce non-compliance risks of penalties or, worse, shutdowns.



Siemens' approach to help you address your issues first starts with learning your transport challenges, learning your business, and learning what keeps you awake at night. We then help you turn these challenges into opportunities to fuel greater efficiency, reliability, and safety across all your operations.

Siemens counts among its customers all the industry majors as well as the top oil services firms worldwide. In fact, with some, we have strategic global partnerships. At the same time, hundreds of smaller oil and gas producers are among our best customers, too.

### Our experience and expertise is yours to use

Point is, we have decades of experience – experience that's yours to use – in providing solutions to all sorts of issues that the oil and gas industry faces. In the most remote places. And in the harshest conditions.

From the towering waves of the North Sea and deep waters off Brazil, to the steaming jungles of Africa and Latin America. From the blistering deserts of West Texas and Saudi Arabia, to the sub-zero tundra and boreal of Alaska and Canada. Wherever you go, you'll find Siemens there.

With that experience, comes expertise in our people and some of the world's best and brightest engineers and technicians. Their experience and expertise includes designing and engineering automation and controls for the world's most sophisticated and complex industrial applications. This includes critical infrastructure like nuclear plants, high-speed transportation, health care and, yes, oil and gas.

### Expert support when and where you need it

The value of our experience and expertise is demonstrated through the technical support we provide for all of our Siemens TIA solutions throughout the lifecycle of our engagement with you. After all, we know that when you have a problem that threatens or disrupts hydrocarbon transport, minutes matter.

You can count on expert support whenever and wherever you need it. From the pre-sale, through solution design, engineering, deployment, and thereafter. From your day-one commissioning, to system diagnostics 10 years from now. Highly trained technicians are available via toll-free phone support 24/7/365.

For issues requiring onsite assistance, Siemens' authorized distributors and certified solution partners can send skilled service technicians in your area. These technicians have the training, knowledge, and parts needed to troubleshoot and solve the most vexing problems quickly and effectively.

### Simplify, simplify, simplify

In dealing with the kinds of complexities we have, we've learned one important lesson: Simpler is better. That's the core philosophy you'll find underlying our Siemens Totally Integrated Automation (TIA) portfolio of plug-and-play automation and control solutions.

Our comprehensive and well-coordinated collection spans process and motor controls, analytics, instrumentation, networking, I/O, and HMIs.

You'll also find simplicity to be at the heart of our Siemens TIA Portal. It's a fully integrated, highly intuitive, and easy-to-learn engineering framework that can cut automation and commissioning time by as much as 30 percent or more by centralizing all your systems engineering.

For example, it has vast libraries of drag-and-drop software code to make software development much faster and replicable. To serve the needs of the oil and gas industry, we created American Petroleum Institute (API) and American Gas Association (AGA) function blocks.



# Siemens TIA portfolio

Here are just a few highlights from the many hundreds of products in our Siemens TIA portfolio that you can deploy in your onshore production facilities:

## ■ SIMATIC S7-1500 PLC



### Innovative features

- Large memory (storage and data management)
- Secure 128-bit encryption for tamper-proof operation and greater cyber security
- System and IO diagnostics pinpoint issues quickly from built-in screen, web server, or HMI panel
- Advanced interface and open communications, including PROFIBUS and PROFINET
- Available flow calculation blocks designed to API 21 standard
- SIL 3 safety optional for safe system shutdown

### What this means for you

- Offers more deployment flexibility with scalability for systems – large and small
- Reduces engineering and commissioning time and costs via simplified design
- Provides multiple levels of application security
- Provides future proof infrastructure capability for data driven architecture

## ■ SIMATIC S7-1200 PLC



### Innovative features

- Powerful processor and software features provide big PLC performance in a cost-effective microcontroller
- 64-bit processing and Structured Control Language (SCL) provide a framework for advanced calculations needed for pump control
- Numerous communication options provide flexibility for both local and remote connectivity

### What this means for you

- Increases operational flexibility control systems using proprietary PLCs
- SIL 3 level of safety in compact size

## ■ SIMATIC Comfort Panel HMI



### Innovative features

- Global hazardous location certifications in 4" to 12" models
- 80,000-hour LED backlight provides more than 9 years of continuous operation
- Daylight-readable, 16:9 widescreen with 16 million colors provides photo-realistic graphics
- Both data and system SD cards provide easy replacement of failed systems in the field without a computer need
- High-performance processor with Visual Basic for Applications (VBA) scripting allows for advanced HMI application development in 4" to 22" panels
- Maximum data security during a power failure

### What this means for you

- Reduced energy costs due to lower current consumption and longer lifespan
- Inexpensive preservation of all data without using an additional battery
- Operational efficiency through innovative commissioning, operating, and maintenance features

## ■ WinCC SCADA & Open Architecture



### Innovative features

- Complete SCADA solutions for wide range of requirements
- Support for latest Object Linking and Embedding for Process Control (OPC) Foundation standards for third-party interfaces
- Remote monitoring over a variety of wireless and wired networks
- Hot standby redundancy and Disaster Recovery System
- Platform Independent – installable on Windows, Linux and Solaris OS
- TÜV SIL 3 Certification for critical applications
- Long term support and streamline upgrade and migration support

### What this means for you

- Reduced system costs and complexity while providing scalable solutions
- Highest levels of system reliability and availability
- High versatility and portability along with scalability
- Can be deployed for mission critical projects
- Global availability and data transparency
- Investment protection and reduced TCO

## ■ SCALANCE X Ethernet Switches



### Innovative features

- Rugged design with the features and certifications needed for oil and gas applications
- Scalable managed and unmanaged switches available in different port configurations
- Memory card aids in field replacement of managed devices
- Built-in diagnostics, web server, and capabilities to integrate managed switches into control applications

### What this means for you

- Maximizes uptime and provides scalable solutions for your most demanding applications
- Future proof through highest operational performance
- Connecting IT and Control network according to their requirements
- Reduction in total maintenance and change costs
- Investment protection and reduced TCO