Triconex
Process Safety
Safe and Sound
Triconex solutions have helped the world’s leading process plants run for more than 600 million hours without failure on demand. After more than 30 years as the foremost supplier of process safety systems, we continue to find new ways to ensure the safety of your people and your plant — as well as the soundness of your business.

“Process safety is about ensuring that plants and equipment are well-designed, operated safely and properly maintained to prevent harm to people, property and the environment.”

— ARC Advisory Group, 2013
Safety and profitability in sync

Today, Triconex® process safety addresses an ever-changing landscape of increasing complexity, looming threats and rising risks.

Complicated process requirements and new generations of automation equipment challenge functional safety systems on the plant floor. Globalization and ever-evolving cyber threats present new problems at the operations level. A volatile business climate, tightening regulations and the ever-present need to safeguard employees, the community and the environment demand constant monitoring and management of risk.

The Triconex Process Safety Pyramid

These challenging conditions require a broader approach to keeping your operation safe and your business sound. It is represented by what we call the Triconex Process Safety Pyramid.

Triconex process safety embodies a holistic, integrated vision that goes beyond functional safety systems to include operations and strategic management.

This expanded vision of process safety impacts everyone. It can transform the way they view their jobs, empowering a new, safety-centric vision across functions from safety, engineering, operations and maintenance to management. This transformation is supported by advanced, ultra-reliable Triconex systems, applications and services.

Triconex process safety encompasses the three essential elements of process safety management:

- **Trusted technology**, which must form the foundation of any definition of process safety
- **Informed operations**, which requires attention to potentially dangerous activities traditionally beyond the reach of functional safety systems
- **Lifecycle management**, which involves continuously monitoring and managing process risks and gains across the entire safety lifecycle to produce sustained safety and profitability
Trusted technology

For critical safety and control applications across industry, the Triconex brand supplies flexible, scalable, high-availability infrastructure, renowned throughout the world for its reliability. Our dependable systems are always available to keep your people and your plant safe and your business running.
Experienced Engineering

Triconex process safety draws on years of successful project engineering excellence in delivering the following services to IEC 61508/61511 standards:

- Application design
- Logic validation
- Software validation
- Hardware design and validation
- SIF proof testing
- Site assessment
- HAZOPS and SIF review
- Conceptual design
- Policy consulting
- ORA-SIL verification
- Documentation

Intelligent Integration

Effective risk management requires secure network integration. Triconex systems integrate seamlessly with leading DCSs via industry-standard open protocols such as OPC and Modbus, and support major field device protocols such as HART™. Our award-winning Triconex Tofino® firewall provides ISA 99 compliant cyber security protection via connected OPC, Modbus™, TCP and TriStation™ 1131 hosts.

When used in conjunction with our Foxboro Evo™ process automation system, Triconex process safety integrates tightly and securely via our new unified communications module (UCM).

Proven Platforms

Tricon™ safety platform
The gold standard in safety instrumented systems (SIS). Based on industry-leading triple modular redundant (TMR) technology, ideal for critical tasks requiring safety integrity levels (SILs) 1, 2 or 3. Features high availability and hot-swappable processors; supplies extensive diagnostics; offers no single point of failure. Easy to operate and maintain.

Trident™ safety platform
Also based on proven TMR technology; certified up to SIL 3. Compact; designed to fit smaller applications. Offers advanced diagnostics and maximizes both high reliability and high availability.

Tri-GP safety platform
Provides protection up to SIL 2 in a compact, economical TMR architecture. Ideal for smaller safety and critical control applications requiring high availability.

Safety in Numbers: The Triconex Advantage

- More than 30 years' experience
- More than 600 million hours of safe operation without failure on demand
- More than 13,000 systems installed in over 80 countries
- More than 650 Triconex safety experts
- Number 1 in global process safety market share (ARC, 2013)
- Number 1 in global turbomachinery control market (ARC, 2013)
- Number 1 choice of Control magazine readers for safety and emergency shutdown systems (2014; 21 out of 22 years running)
Informed operations

Triconex process safety complements safety applications with advanced safety training and productivity applications. The goal is a safety culture enriched by operational insight.

**Safety Applications**

Functional process safety and critical control solutions form the backbone of the unrivaled Triconex safety record. Expertise is captured and applied through proprietary templates. Operations covered include:

- Emergency shutdown
- Burner management
- Boiler safety
- Fire and gas
- Nuclear safety and critical control

- High-integrity pressure protection
- Turbomachinery control
- Pipeline protection

**Productivity Applications**

Human error is acknowledged as a source of many safety breaches, but until quite recently, it was viewed as beyond the scope of automation. Today, Triconex process safety encompasses a broad array of solutions that can improve performance and enforce standard procedures, nurturing the culture necessary for safe operations.

- Workflow automation
- Real-time historians
- Key performance indicator (KPI) dashboards
- Mobile reporting tools and intrinsically safe handheld devices
- Pipeline control room management

**Safety Training**

Comprehensive classroom and simulation training keeps all users up to date. Functional safety classroom training:

- TÜV-certified safety
- Safety awareness
- Burner management systems
- Turbomachinery applications

Operator training simulations:

- 2-D HMI-based, high-fidelity
- 3-D virtual reality
Lifecycle management

Triconex process safety extends the standard functional safety lifecycle throughout the enterprise, addressing key roles and processes necessary to maintain profitability amidst the uncertainties of the future.

In addition to traditional lifecycle services, this includes integration with enterprise systems plus cyber security planning and consulting.

Constant Vigilance
Changes occurring after your system is commissioned can introduce hidden risk and new requirements. Triconex process safety includes automated tracking and validation of SIF performance, flagging corrective action and documenting the entire process.

Cyber Security
Triconex process safety also applies a lifecycle approach to preventing cyber intrusion that can lead to safety incidents. This augments firewalls and security-hardened hardware with the following services:

- Security assessment
- Security architecture and policy development
- Security modernization and implementation
- Security management and optimization

Profitable Safety Management
Lack of information about real plant risks can hinder plantwide operations. Triconex process safety can provide a clearer threat assessment, helping extract maximum performance without putting workers at risk. This starts with measuring and monitoring the actual risk of operating the business and identifying the safest window of operation that can optimize safety and profitability.
Empowerment for everyone

Triconex process safety blends trusted technology, safe operations and lifecycle management to empower people all across the plant. Now everyone can help improve safety and profitability.
Relentless Protection
Utilizing Triconex products and expertise, safety and security leadership teams access the most comprehensive solutions available to protect their plant. So they can:

▲ Ensure compliance with the most stringent standards and regulations
▲ Assess risks accurately to allow operating at maximum productivity without concern
▲ Reduce total costs of ownership (TCO)
▲ Ensure optimum process availability via fault-tolerant operations
▲ Avoid spurious trips

Smooth Operations
Operations managers and technicians get the real-time access they need to critical, actionable information. So they can:

▲ Improve operator effectiveness via an ergonomic environment
▲ Maximize production capacity
▲ Maintain a clear view of operations
▲ Safely operate increasingly more complex, demanding processes
▲ Streamline workflow via automation of responses to alarms and procedures

Engineering Ease
Engineering teams work with the most reliable technology, advanced engineering tools and world-class applications. So they can:

▲ Access a complete solution, including systems, services and expertise
▲ Apply the most appropriate, state-of-the-art technology
▲ Consult with the industry’s most trusted advisors
▲ Obtain complete control functionality in one box
▲ Receive high-reliability control and protection, at the lowest cost
▲ Perform online modifications and hot swap of safety modules
▲ Take advantage of the easiest available configuration and use

Focused Maintenance
With Triconex solutions, maintenance managers and technicians employ the most reliable technology, most actionable information and most advanced tools. So they can:

▲ Extend asset operational life
▲ Proactively improve asset management
▲ Improve physical production
▲ Detect faults before they occur
▲ Override alarms when necessary to perform management
▲ Reduce maintenance intervals and downtime
▲ Cut maintenance budgets
▲ Reduce asset risks

Scenario of a Save
A distillation unit producing explosive fuel is scheduled for routine startup after an overhaul — until Triconex process safety management software, constantly monitoring the entire process for abnormal conditions, notes that a key level transmitter and switch have missed scheduled maintenance. The dashboard’s safety performance indicator (SPI) slips into the critical zone. The system flags an alert and initiates workflow, e-mailing warnings and suggested fixes to all the right people. The maintenance team performs the upkeep and informs the system, which reschedules startup. Case closed — and possible catastrophe averted.
Business assurance

A major safety incident — in addition to risking life, limb and the environment — can threaten the profitability, perhaps even the survival of an industrial process business. This is why commitment to uncompromising plant safety must permeate the entire enterprise, driven from the highest levels of management.

In a landmark study by the Center for Chemical Process Safety, researchers established that companies that practice good process safety report significant direct cost benefits. Industrial safety control regimes that properly balance risks and profit potential produce results like these:

- 5% increase in productivity
- 3% reduction in production cost
- 5% reduction in maintenance cost
- 20% reduction in insurance cost
- 1% reduction in capital budget

Applying the ease of use and proven reliability of Triconex technology and expertise, managers may rest assured that a holistic approach to process safety can benefit their business in the following ways, among many others.

**Trusted technology helps:**
- Escape costs and consequences of major safety incidents
- Reduce TCO with easy engineering and focused maintenance
- Eliminate spurious trips

**Informed operations help:**
- Reduce cost of training while improving safety efficiency
- Empower people to operate for maximum profitability within a culture of safety
- Enforce sound policies and best practices

**Lifecycle management helps:**
- Profile and manage risk, strategically
- Achieve continuous optimization
- Adapt to changing market conditions
Triconex process safety:
Safe and sound. Today and tomorrow.

Discover how this new vision of expanded, integrated industrial process safety can keep your plant safe and your business sound — via trusted technology, safe operations and superior lifecycle management.

Visit triconex.com or call your Triconex representative today!