

FROST & SULLIVAN

TRIHEDRAL

2022
TECHNOLOGY
INNOVATION
LEADER

GLOBAL
SCADA AND HMI SYSTEMS INDUSTRY

Best Practices Criteria for World-Class Performance

Frost & Sullivan applies a rigorous analytical process to evaluate multiple nominees for each award category before determining the final award recipient. The process involves a detailed evaluation of best practices criteria across two dimensions for each nominated company. Trihedral excels in many of the criteria in the SCADA and HMI systems space.

AWARD CRITERIA	
<i>Technology Leverage</i>	<i>Business Impact</i>
Commitment to Innovation	Financial Performance
Commitment to Creativity	Customer Acquisition
Stage Gate Efficiency	Operational Efficiency
Commercialization Success	Growth Potential
Application Diversity	Human Capital

A Market Snapshot

Industrial organizations face constant pressure to lower costs while simultaneously increasing speed, driving the need for highly sophisticated automated applications to gather real-time data insights from the plant floor (e.g., levels, flows, temperature, and pressure). Wireless machine-to-machine communication technology helps by allowing companies to operate Supervisory Control and Data Acquisition (SCADA) systems from remote locations. Integrating SCADA systems with security and environment controls lowers costs by up to 25%, drastically increasing operational efficiency gains and plant asset performance and further supporting market growth. However, significant challenges, such as high costs, a lack of SCADA network protocol knowledge, and integration complexity, continue to restrain adoption.

Frost & Sullivan estimates the global SCADA market will reach \$5.76 billion by 2023, growing at a compound annual growth rate of 1.7% from 2018 to 2023.¹

¹ Strategic Analysis of the Global Supervisory Control and Data Acquisition (SCADA) Market, Forecast to 2023 (Frost & Sullivan November 2019)

A Legacy of Innovation: Trihedral Engineering

Founded in 1986 and headquartered in Bedford, Canada, with nine offices in three countries and serving customers in more than 100 countries, Trihedral Engineering Limited (Trihedral), a Delta Group company, is an industry-leading developer of SCADA systems for creating customized industrial monitoring and control mission-critical applications for industries like power, water/wastewater, manufacturing, food and beverage, and oil and gas, among others. The company differentiated itself early through WEB, one of the first personal computer-based SCADA packages that ran on the disk operating system. Since its founding, Trihedral continues to demonstrate its innovation excellence through best-in-class software designed to deliver high-quality end-to-end performance across various use cases.

Meeting Real-world Client and Market Needs

Backed by world-class subject matter experts, Trihedral developed VTScada over several years. The company refined its holistic approach to SCADA and Human-Machine Interface (HMI) software, continuously building its technology to bridge industry gaps.

Several industrial verticals leverage VTScada in various applications, such as a digital broadcasting system that monitors over 1.2 million tags at transmitters across the United Kingdom.² As of 2022, the company reports it is the sole SCADA software for the City of Houston's 400 million gallons per day water

"Frost & Sullivan identifies Trihedral's VTScada as a groundbreaking innovative technology. Its robust intellectual property portfolio safeguards its pioneering technology, adding value relative to its growth potential, thus securing a competitive edge."

***- Samantha Fishe,
Best Practices Research Analyst***

purification plant expansion.³ The intuitive, no-code platform enables operators to create highly-customized industrial monitoring and control applications that empower end-users with security (as demonstrated by its recent IEC 62443-4-1 cybersecurity standard certification and its military-grade encryption) and ease of use. The streamlined system alleviates the frustration inherent to traditional SCADA/HMI software lifecycles, including pricing, licensing, development, and support.⁴ VTScada's unique architecture includes every core SCADA component in

a one-stop shop, eliminating the need for multiple vendors. More importantly, Trihedral focuses on forward migration paths when developing VTScada, which translates to perpetual forward compatibility. New application updates work perfectly with the latest version.

Trihedral outfitted VTScada with key features and functionalities that increase customer value exponentially. For example, the system includes unmatched industry-leading technical features designed to reduce the time to implementation and deliver seamless results, such as integrated version control, real-time configuration, bidirectional synchronization, intuitive operator interface, ISA 18.2 alarm management and fully-integrated alarm notifications, operator-created trends, reports, mobile

² VTScada by Trihedral. "Evaluating SCADA – Seeing Beyond the Checkbox." eBook. April 2022. Accessed July 2022.

³ Ibid.

⁴ VTScada by Trihedral. "What Makes VTScada Different?" Brochure. 11 April 2017. Accessed 5 July 2022. <https://www.vtscada.com/wp-content/uploads/2015/02/Brochure-VTScada-WhatMakesItDifferent.pdf>

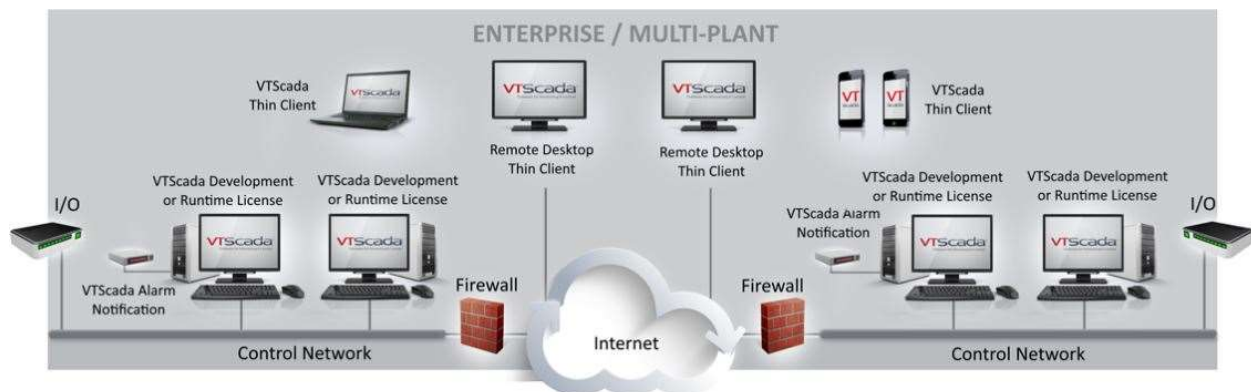
connectivity, graphic development, among others. VTScada consists of a user-friendly HTML5-based interface that simplifies the SCADA programming process, as well as allows monitoring and controlling systems from virtually anywhere (e.g., smartphones, tablets, etc.).

For example, the system’s Historical Data Viewer empowers operators to create trend groups based on previous performance metrics. The VTScada Historian enables users to log up to 4,000 values per second and sync up to 160,000 values per second across a wide area network.⁵ The solution also offers Application Version Control, which rolls back single or multiple changes, merging them when multiple users work on the same project simultaneously. The change history automatically distributes across all synchronized SCADA servers.⁶

Frost & Sullivan identifies Trihedral’s VTScada as a groundbreaking innovative technology. Its robust intellectual property portfolio safeguards its pioneering technology, adding value relative to its growth potential, thus securing a competitive edge.

A Strong Success Rate

Trihedral has a proven track record. The company’s VTScada differentiates itself from its competitors through flexibility, ease of use, and reliability. More importantly, the system delivers unlimited scalability that other providers cannot accomplish, supporting clients as they grow, and is designed for mission-critical applications, supporting redundant communication networks and unlimited system-wide redundant servers (featuring server failover, load sharing, synchronized historians, and alarm databases). As a result, Trihedral has achieved commercialization across various industries, providing it with a strong foothold in the market.



Source: Trihedral (www.vtscada.com)

⁵ VTScada by Trihedral. “Historical Data Management and Trending: Standard Components.” Data sheet. Accessed 5 July 2022. <https://www.vtscada.com/documents/datasheets/Datasheet-VTScada-Historian.pdf>

⁶ VTScada by Trihedral. “Evaluating SCADA – Seeing Beyond the Checkbox.” Slide show. PDF. April 2022. Accessed July 2022.

Use Case: Aker Solutions

Aker Solutions enables low-carbon oil and gas production via integrated solutions, products, and services. Trihedral partnered with the company to develop Aker SMACS (Subsea Monitoring and Control System) and install it globally on over 190 oil platforms. This system enables operators to monitor distribution pipelines, control subsea valves, manage alarm and emergency response, and sequence wellhead shutdown. Trihedral enables communications over various mediums, including cellular, radio, satellite, seafloor-to-surface, and umbilical) and brings redundancy to all system points.

Use Case: Ontario Power Generation (OPG)

Trihedral worked alongside OPG to bring SCADA solutions to Toronto, Niagara Falls, and North Bay, Ontario. As a result, OPG delivered province-wide power generation SCADA to the three areas. The technology-enabled improvements covered 14,000 real-time inputs, 442 transmission lines, 223 generators, and 164 revenue metering sites for Toronto. The Niagara Plant Group integrated monitoring, control, data logging, trending, and alarming for five generating stations, resulting in redundant

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*- Sebastián Trolli,
Sr. Industry Analyst, Industrial Technologies*

PLC/servers, and flow control and monitoring for the Niagara River. Finally, Central Hydro Plant Group (North Bay) connected 23 remote generating stations.

The company continues to demonstrate its leadership through its strong commercialization in various regions. Trihedral has a significant footprint in the Eastern half of North America, where the company has offices. However, in November 2020, Delta, a leading power and thermal management solutions developer acquired Trihedral, which broadened its regional presence. Since then, the company has worked on adding western North America regions for various use cases, with the

predominant being oil and gas. Since the acquisition, the company has attracted new clients, specifically notable organizations in the automotive and pipeline sectors.

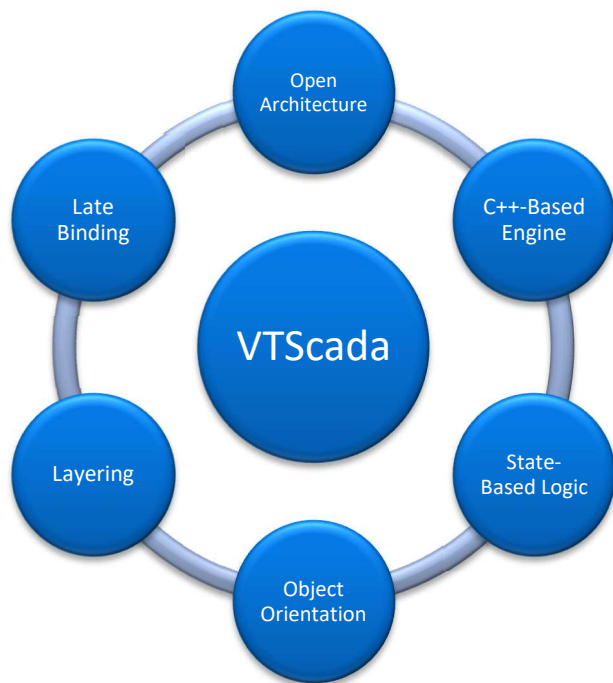
Frost & Sullivan anticipates rapid, widespread technology adoption. The company's first-mover status strengthens its position on emerging opportunities.

The Power of Foresight: Sustained Leadership

With its customer-led strategy, Trihedral consistently brings to market best-in-class products and updates designed to enhance the client experience. VTScada is a complete solution offering bundled into a straightforward install and license agreement, which includes fully-integrated alarm management, operator-created trends, encrypted operator notebooks, and report generation. The company designs its products and services to deliver undeniable results and best-in-class user experiences.

Trihedral’s technical support philosophy based on the belief that personal approach and accessible support is a key component of a SCADA/HMI system, is highly regarded among its customers. Trihedral treats each customer issue as a top priority, even if this issue is not related to VTScada. For example, the company stayed on the phone with a client for 12 hours and discovered the problem was in some other network; however, Trihedral did not abandon the client. In such situations, the company’s representatives and leaders continue to work with the client, often triaging the problem to the most knowledgeable and available team. This robust customer-centric approach continues to serve the company, resulting in client satisfaction and acquisition.

In the 35 years since its founding, Trihedral continues to perform well, demonstrating a stark increase in sales and customer base from the previous year. The company saw a 25% increase in 2021 compared to 2020 and anticipates a stronger 2022. Despite resource limitations, Trihedral’s agility enables it to meet customer needs. Another growth avenue for the company is its viral marketing campaign, which allows customers to download and use software for free without sales pressure from Trihedral. This approach initiates organic word-of-mouth promotion, enabling the company to strengthen its reputation further. Trihedral also participates in trade shows to demonstrate VTScada’s performance and reliability, as shown in their latest VTScadaFest, where a well-known company of no-code dashboarding development and analytics software exposed the results of a benchmark test consisting in measuring the data transmission speed between their solution and several SCADA systems, where VTScada outperformed some of the most recognized systems in the industry by speeds of 100-to-1.



Source: Frost & Sullivan

This outstanding, unmatched performance level is possible through the combination and synergy of a series of technical features and capabilities, such as open architecture, C++-based engine, state-based logic programming (in fact, VTScada is, at its core, a programming language), object-orientation, late binding, and layering.

While evolving from a technology standpoint, Trihedral never loses sight of its customers’ perspective. Its brand maintains its North American presence while meeting customer-specific needs. Given today’s landscape, Frost & Sullivan believes the company is in a prime position to increase its market share in this highly competitive SCADA/HMI systems industry.

Conclusion

Technology is a critical success factor for the Supervisory Control and Data Acquisition (SCADA) industry. Yet, with many options available, market stakeholders need to leverage the most appropriate and best technology-based solutions to optimize their market impact. With its VTScada, Trihedral delivers critical benefits, such as a user-friendly HTML5-based interface that simplifies the SCADA programming process. Additionally, its human-machine interface (HMI) software enables industrial operators to monitor and control equipment via computer, which includes monitoring and operating assets. The HMI also communicates with programmable logic controllers and distributed remote telemetry units, alleviating the frustration inherent to traditional SCADA/HMI software lifecycles. Trihedral stands out from competitors based on its commitment to innovation and creativity while achieving commercial success, with increased growth year-over-year since its founding. The company's word-of-mouth and organic marketing efforts enhance its already top performance, ensuring its leadership for years to come.

With its strong overall performance, Trihedral earns Frost & Sullivan's 2022 Global Technology Innovation Leadership Award in the SCADA and HMI systems industry.

What You Need to Know about the Technology Innovation Leadership Recognition

Frost & Sullivan's Technology Innovation Leadership Award recognizes the company that has introduced the best underlying technology for achieving remarkable product and customer success while driving future business value.

Best Practices Award Analysis

For the Technology Innovation Leadership Award, Frost & Sullivan analysts independently evaluated the criteria listed below.

Technology Leverage

Commitment to Innovation: Continuous emerging technology adoption and creation enables new product development and enhances product performance

Commitment to Creativity: Company leverages technology advancements to push the limits of form and function in the pursuit of white space innovation

Stage Gate Efficiency: Technology adoption enhances the stage gate process for launching new products and solutions

Commercialization Success: Company displays a proven track record of taking new technologies to market with a high success rate

Application Diversity: Company develops and/or integrates technology that serves multiple applications and multiple environments

Business Impact

Financial Performance: Strong overall financial performance is achieved in terms of revenues, revenue growth, operating margin, and other key financial metrics

Customer Acquisition: Customer-facing processes support efficient and consistent new customer acquisition while enhancing customer retention

Operational Efficiency: Company staff performs assigned tasks productively, quickly, and to a high-quality standard

Growth Potential: Growth is fostered by a strong customer focus that strengthens the brand and reinforces customer loyalty

Human Capital: Commitment to quality and to customers characterize the company culture, which in turn enhances employee morale and retention

About Frost & Sullivan

Frost & Sullivan is the Growth Pipeline Company™. We power our clients to a future shaped by growth. Our Growth Pipeline as a Service™ provides the CEO and the CEO's growth team with a continuous and rigorous platform of growth opportunities, ensuring long-term success. To achieve positive outcomes, our team leverages over 60 years of experience, coaching organizations of all types and sizes across 6 continents with our proven best practices. To power your Growth Pipeline future, visit Frost & Sullivan at <http://www.frost.com>.

The Growth Pipeline Engine™

Frost & Sullivan's proprietary model to systematically create ongoing growth opportunities and strategies for our clients is fuelled by the Innovation Generator™.

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Key Impacts:

- **Growth Pipeline:** Continuous Flow of Growth Opportunities
- **Growth Strategies:** Proven Best Practices
- **Innovation Culture:** Optimized Customer Experience
- **ROI & Margin:** Implementation Excellence
- **Transformational Growth:** Industry Leadership



The Innovation Generator™

Our 6 analytical perspectives are crucial in capturing the broadest range of innovative growth opportunities, most of which occur at the points of these perspectives.

Analytical Perspectives:

- **Mega Trend (MT)**
- **Business Model (BM)**
- **Technology (TE)**
- **Industries (IN)**
- **Customer (CU)**
- **Geographies (GE)**

