D/3®

An Overview of the D/3
Distributed Control System

Overview

The D/3® Distributed Control System (DCS) is a leading edge process control system that includes a comprehensive suite of software applications, networks, and computing hardware. D/3 features system-wide redundancy and the ability to upgrade without stopping plant operations. D/3 provides visualization and real-time access to process information, equipment status, system status, batch status, and operational logs. Reporting functions facilitate batch, production, and shift change reports. D/3 is certified to operate on the latest Windows® operating systems, and features intuitive configuration, management, and visualization tools.

Enterprise Wide Control System
D/3 is scalable from a small pilot plant or single unit operation to an enterprise wide system encompassing multiple production facilities. All configuration for the entire system resides on a secure master configuration server that is accessible by hundreds of simultaneous users from locations around the world.

Continuous Control
Easily configure complex control strategies using intuitive graphical tools, or rapidly configure thousands of points using powerful database-driven applications.

Batch / Recipe / Sequence Control
Manage sophisticated batch control strategies with powerful FlexBatch® Sequence and Batch Language (SABL®). Built-in ISA-88 recipe management, equipment allocation, and batch reporting features simplify development of the most complex control strategies.

Alarm Management
Comprehensive alarm management features include alarm inhibit, dynamic alarm management, alarm suppression, and alarm delay. Users can dynamically change alarm classification, category, destination, or priority. They can also display, filter, and sort alarms in multiple InstAlarm™ windows. Since all alarms are managed at the Process Control Module (PCM) level, the possibility of inaccurate alarms at the HMI level is eliminated. Implement ISA-18.2 alarm management strategies using PAS PlantState Suite™ add-on.

Data Historian and Trending
D/3's TrendR™ data historian can collect up to 10,000 points and store them on redundant servers. Data may be viewed on customizable console and VersaTrend™ displays, or may be exported via any standard ODBC data source.

Object-Oriented Development
Simplify logic development and deployment with virtual device objects that are designed, written, and tested once but can be executed in thousands of instances. Users can easily manage complex automation projects with object-oriented logical device authoring, and can graphically create master devices for pumps, motors, and valves defining normal and abnormal logic for each device type. SABL is used to automate the most complex of plant operations and Unit Relativity minimizes the amount of software to be created, tested, validated, commissioned, and maintained.
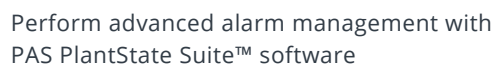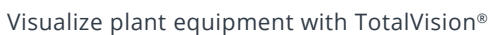
System-Wide Redundancy
All D/3 System components, including servers, networks, PCMs, and I/O modules, can be deployed in a redundant architecture to ensure the highest levels of system reliability.

Ethernet Connectivity
D/3 is built upon open standards and non-proprietary network technology. Both the backbone and I/O networks can be composed of off-the shelf Ethernet components. A single Ethernet card can simultaneously connect to multiple I/O families, including the NovaTech 8000 Series I/O, PLCs, and bus networks. Furthermore, the I/O network allows the pass-through of HART® information from field devices to the PCM without any additional wiring.

Visualization
D/3's ProcessVision™ console software provides a comprehensive visualization experience that includes customizable system status, alarm, trend, batch, recipe, report, analytical, and graphic displays.

Visualize plant equipment with TotalVision®

Diagnose problems with D/3 ProcessVision™ console software

Quickly create and configure tags with MDL Builder

Deploy and debug sequence programs with WinSSD

Analyze and tune control loops with D/3® Loop Optimizer

Perform advanced alarm management with
PAS PlantState Suite™ software

System Architecture

Powerful

No other system offers the raw horsepower of the D/3®, with the ability to handle over 50,000 I/O points, its best-in-class Process Control Module (PCM), scalable vector graphics, and comprehensive operator console software.

Scalable

D/3 can scale from 2 to 160 nodes, drive up to 256 operator consoles, and control processes incorporating up to 128 PCMs. A D/3 System can manage hundreds of simultaneous batches and product recipes with no performance degradation.
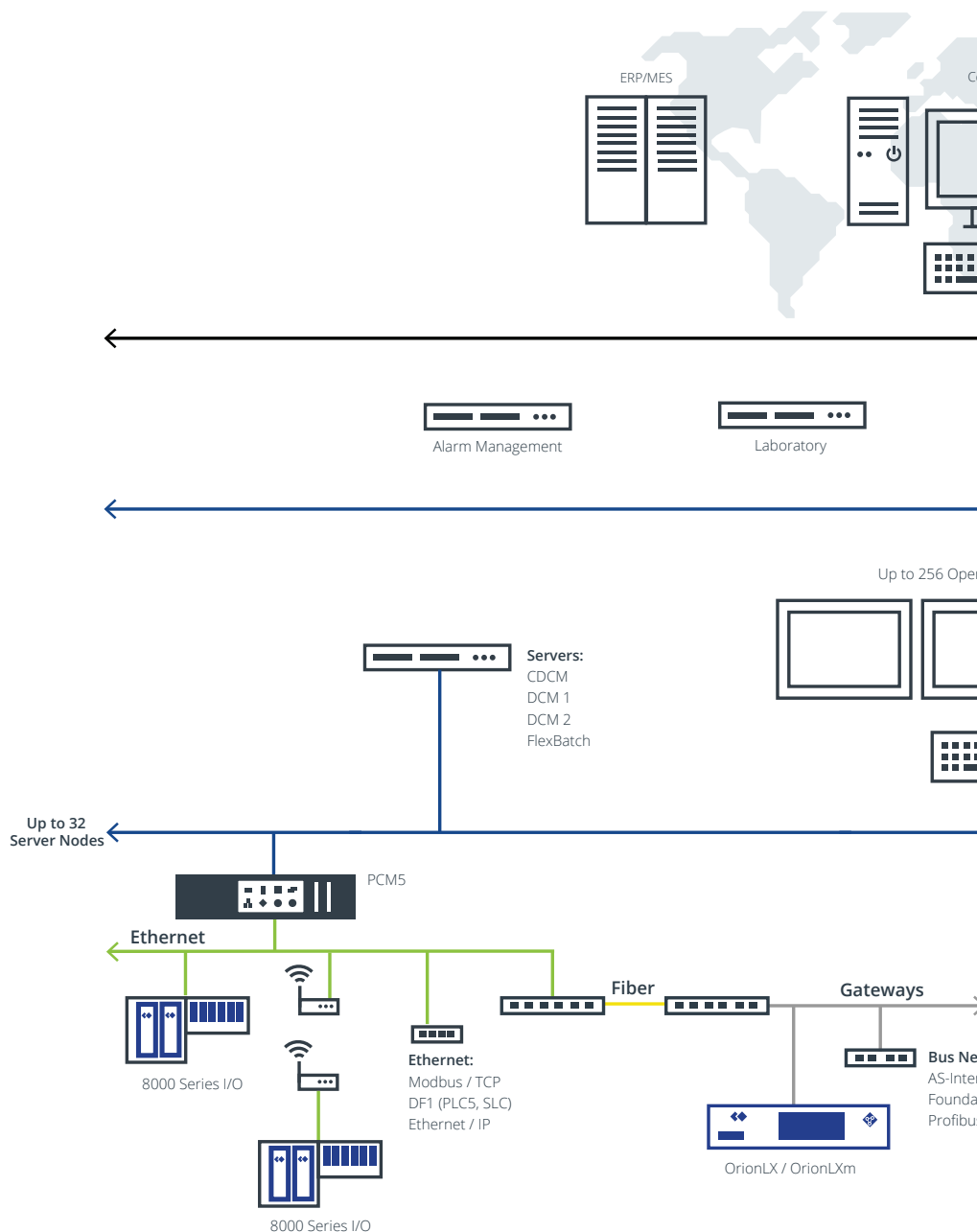
Flexible

D/3 Online Upgrade technology allows customers to upgrade to newer D/3 versions without stopping plant operations. Its Client/Server architecture allows the logical separation and organization of plant control system functions. Users can change control system strategies on-the-fly with intuitive configuration and management tools.
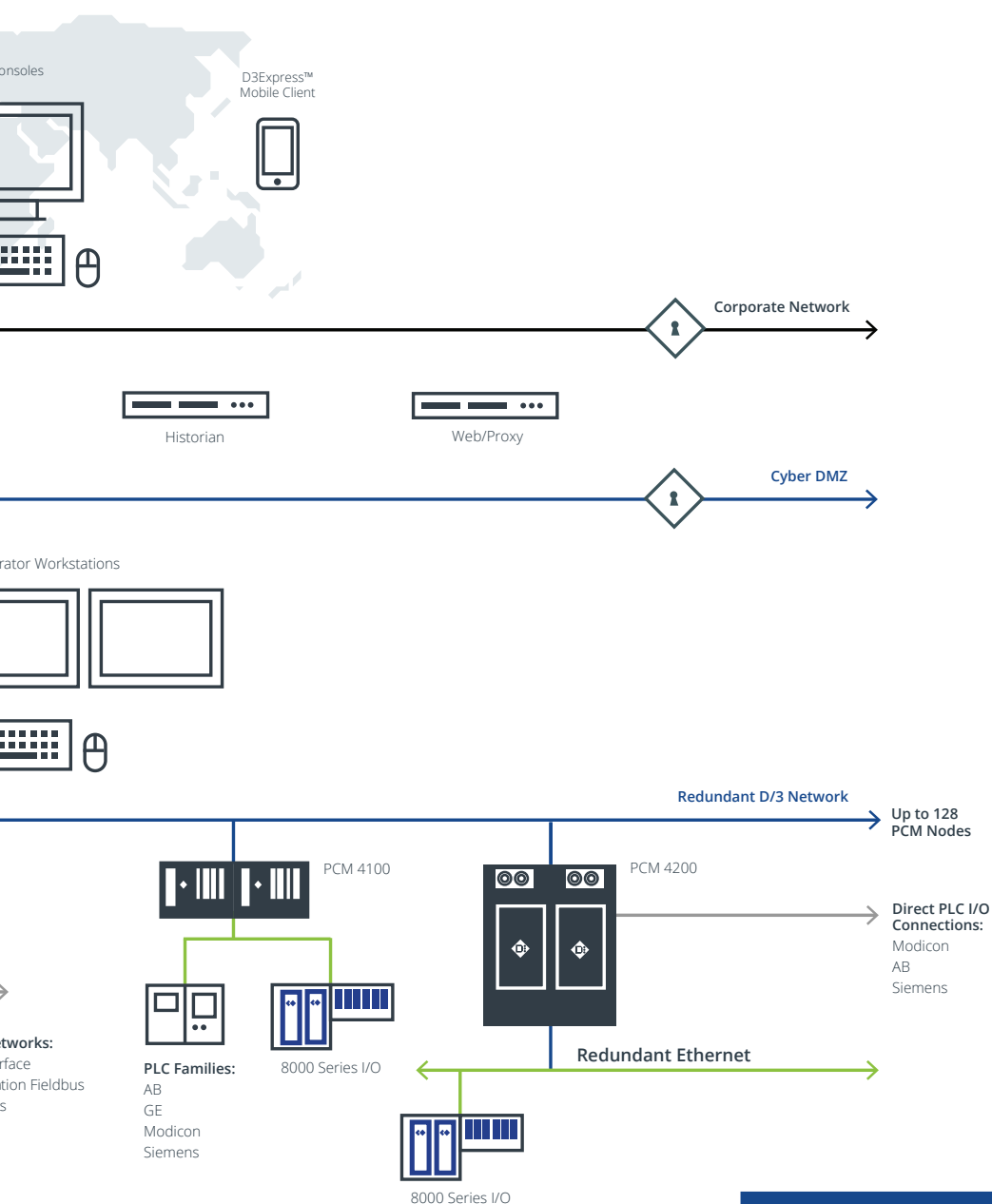
Reliable

Customers have trusted their processes to D/3 since 1982 because of its proven reliability. D/3's powerful PCM performs critical functions typically relegated to the HMI layer on less robust systems, allowing control functions to continue even if the HMI layer is disabled.

Cost Effective

Each PCM can control numerous unit operations and run hundreds of SABL® programs simultaneously. Thousands of I/O points from multiple vendors can be connected via a single Ethernet I/O module, and entire processes may be simulated within the PCM. These and other features of the D/3 reduce hardware, wiring, licensing, programming, startup, maintenance, and other costs.

ERP/MES

Alarm Management

Laboratory

Up to 256 Oper

Servers:
CDCM
DCM 1
DCM 2
FlexBatch

Up to 32
Server Nodes

PCM5

Ethernet

8000 Series I/O

Ethernet:
Modbus / TCP
DF1 (PLC5, SLC)
Ethernet / IP

8000 Series I/O

Fiber

Gateways

Bus Ne
AS-Inter
Founda
Profibu

OrionLX / OrionLXm

Consoles

D3Express™
Mobile Client

Corporate Network

Historian

Web/Proxy

Cyber DMZ

rator Workstations

Redundant D/3 Network

Up to 128
PCM Nodes

PCM 4100

PCM 4200

Direct PLC I/O
Connections:
Modicon
AB
Siemens

tworks:
rface
tion Fieldbus
s

PLC Families:
AB
GE
Modicon
Siemens

8000 Series I/O

Redundant Ethernet

8000 Series I/O

NovaTech 8000 Series I/O
- Analog modules
- Digital modules
- Analog with HART®
- Pulse Input
- Pulse Output
- Thermocouple modules
- RTD modules
- Intrinsically Safe (IS) modules
- IS with HART
- 16000 Series I/O also supported

Protocols Supported
- Allen Bradley DF-1
- Ethernet/IP
- Ethernet Modbus/TCP
- Modbus
- Modbus Plus
- Profibus-DP
- ControlNet
- Foundation Fieldbus
- Data Highway Plus
- AS-Interface
- OPC

PLC and Direct I/O Connectivity
Modicon
I/O: 200, 800, Quantum
PLC: Quantum, 584, 984

Rockwell
I/O: 1771, Flex (1794)
PLC: 2.3.5.SLC5, ControLogix

Siemens
I/O: 505, S7, ET200

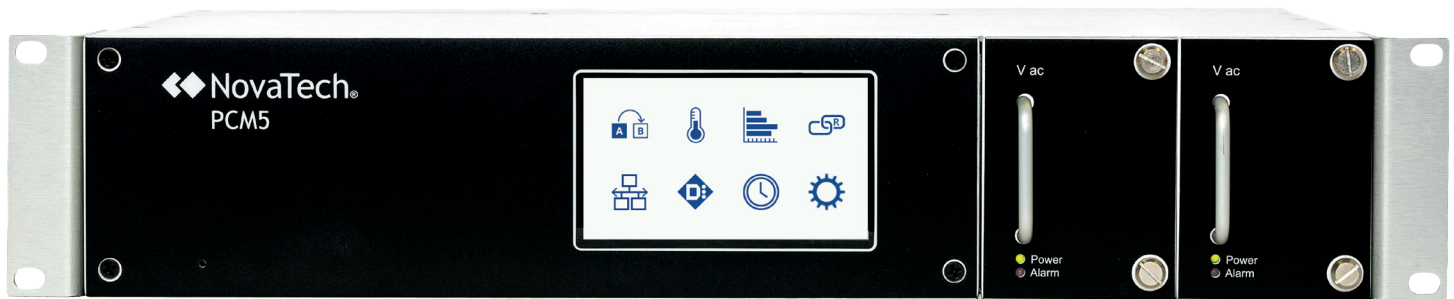**Triconex**
Safety System PLCs

"Our D/3 based Pipeline Control System has performed flawlessly and NovaTech helped move our control center in less than three hours."

———

- Gilles de Kok, MPT, Integrity, ZEBRA Gasnetwerk B.V.

Hardware Features

PCM5
Process Controller

- Provides distributed automation and control capabilities for continuous and batch process plant operations
- Connect to over 10,000 I/O from multiple vendors
- Fully redundant configurations including Ethernet communications and hot swappable power supplies
- Autonomously performs all continuous, sequential, and batch control functions in a 2RU format
- Four Ethernet I/O ports

- Available in 250, 500, 1000, 1500, and max tag license configurations
- 0-50°C operating range with no moving parts (fanless)
- Self-configuring firewall
- Touchscreen diagnostics
- 250ms scan rate

PCM 4100 & 4200
Process Controllers

- PCI & ISA busses support older I/O communication cards and protocols
- Up to four I/O communications cards including Ethernet cards
- PCM 4100 supports redundant controllers
- PCM 4200 is fully redundant including hot swappable power supplies

8000 Series
I/O Family

- General-purpose and intrinsically-safe I/O within a single node
- Up to 50 nodes per PCM Ethernet port
- Up to 64 I/O modules per node
- High channel density
- Wide operating temperature range, -40°C to +70°C
- Redundant Local Area Networks (LAN) and power supplies supported
- Zone 2 and Division 2 hazardous area mounting as standard

- I/O module hot-swapping even in Zone 2 and Division 2
- HART® pass through
- Integrated (per-channel) fusing and loop-disconnect facility
- Bussed field power on carriers eliminates daisy chain wiring at field terminals
- 1:6 Redundancy (one backup module per six online modules)

Orion Automation Platform and Secure Data Gateways
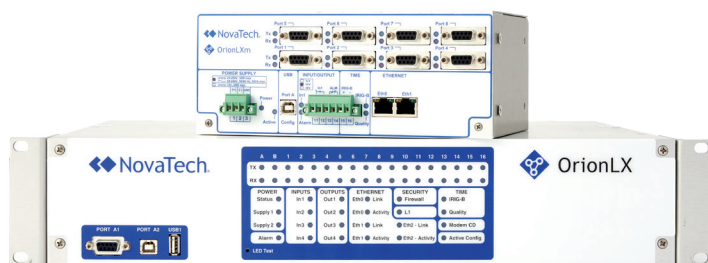
- Protocol converter connects legacy equipment to D/3® using standard Modbus/TCP interface
- Hundreds of protocols supported
- Custom protocols available
- Easily connect equipment such as scales and chart recorders in electrical substations, wastewater plants, and load-out facilities to the D/3

PCM5
Virtualization
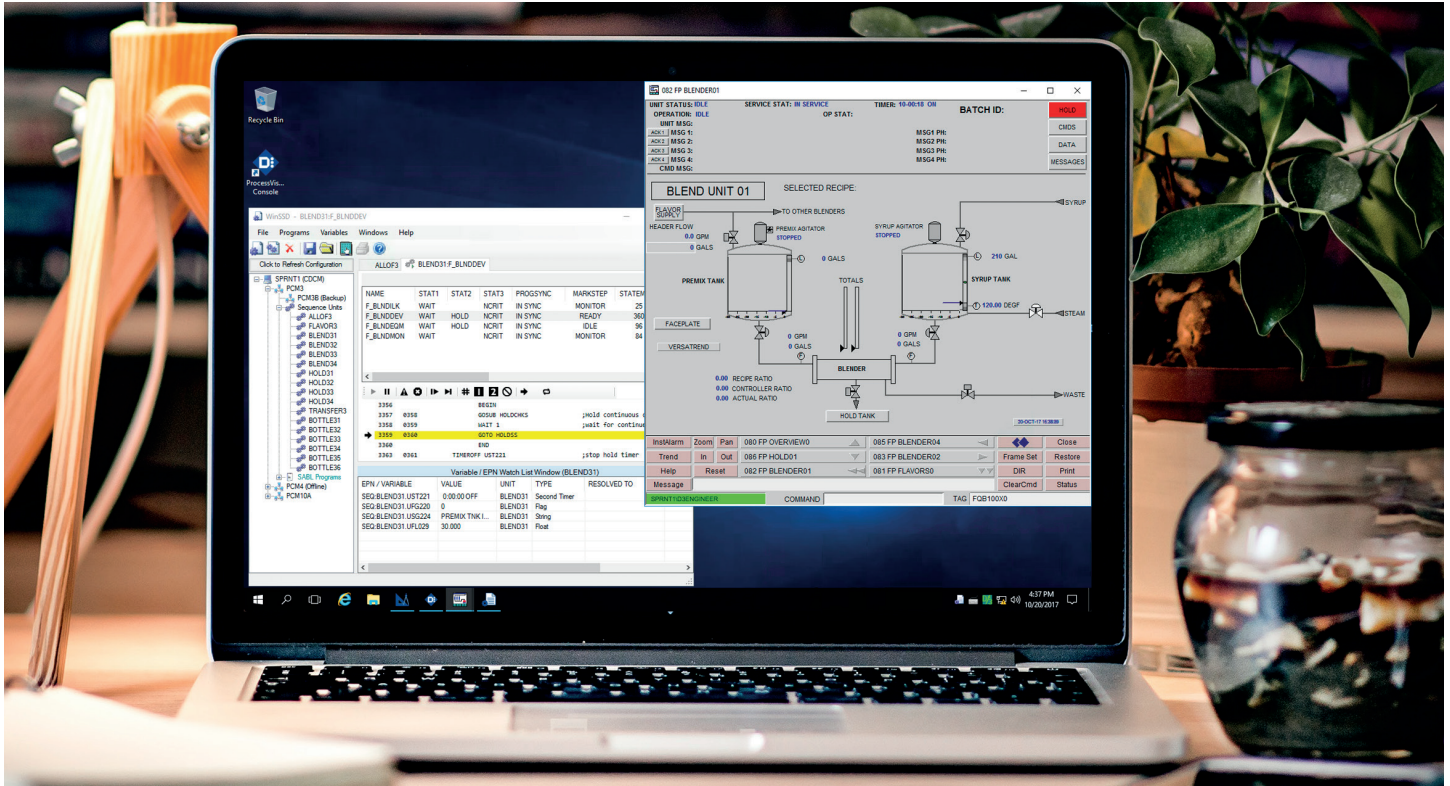
D3v16 provides D/3 users with a hardware-independent development, testing, and training environment. These portable and easy-to-maintain virtual D/3 Systems allow users to learn, innovate, and optimize plant operations with greater convenience and flexibility than ever before.

Create

Simulate an entire D/3 System with multiple PCMs on a single computer.

Innovate

Develop, demonstrate, and validate prospective changes without impacting plant production and safety. Virtual PCMs have an inherent ability to simulate I/O and process characteristics, including interaction between process units.

Improve

Easily copy changes to the live system when testing is complete. Train new personnel on all aspects of D/3 applications, plant operations, and abnormal situations.

Visualization and Optimization Features
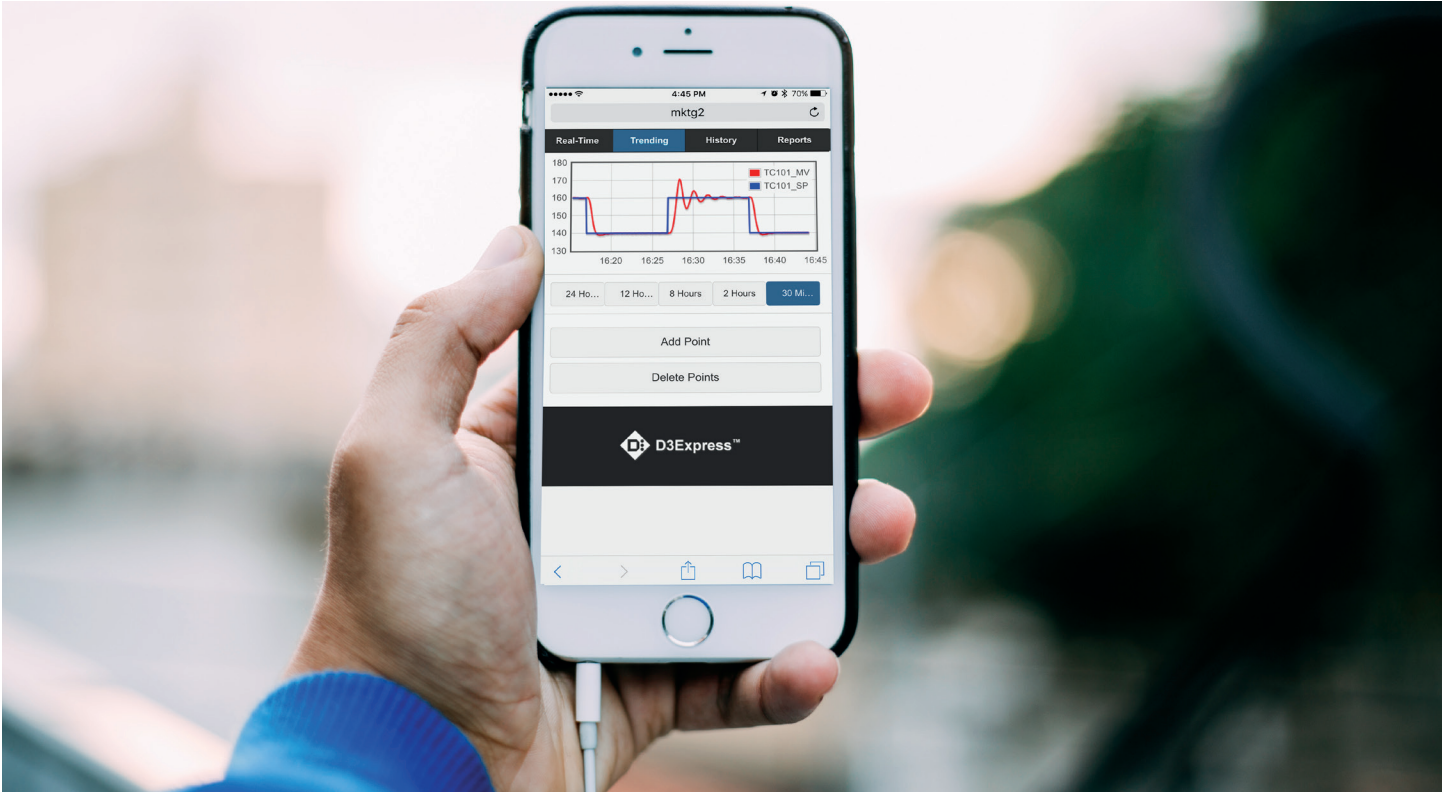
Users can create highly-effective, object-oriented graphics and displays using our TotalVision® HMI software. D/3® ProcessVision™ console software features numerous standard displays that require no custom creation. This allows users to start system commissioning immediately after tags are created. Easily create shift reports, analyze system components, or tune PID loops using our intuitive optimization software applications. Connect to other systems and display virtually any data point using D/3's industry standard OPC client software. Easily export data to other systems using OPC server software.

For true mobility, the D3Express™ cloud-based mobile application provides access to information anytime, anywhere via your PC, smartphone, or tablet.

Solving Complex Process Control Challenges for Over 35 Years

NovaTech Process Solutions has helped may of the world's most successful process manufacturers to reduce risks, improve plant performance, and grow profits since 1982.

Unique among process automation providers, NovaTech is a privately owned and operated business that designs and builds the majority of our hardware and software in the USA. We are a focused, pure-play automation company that works directly with customers throughout the entire plant lifecycle to ensure successful outcomes.

Futureproof Process Control

The D/3 delivers the highest lifetime in process control value through a continuous migration path, open automation philosophy, and maximum use of existing assets.

Empowering Operators

NovaTech improves plant safety and meets the challenges of an aging workforce with high performance HMI design, Alarm Management Optimization and our patented Augmented Manual Procedures (AMP) software, which makes it easy for every operator to do the right thing at the right time. In addition, our university partnerships provide a pipeline of next-generation talent.

A Trusted Engineering Partner

We work closely with customers to develop, deploy, maintain and upgrade our solutions, and we are directly accountable for every system's performance and customer's satisfaction. Programming standards, stringent internal engineering certifications, and culture of high ethics and personal responsibility are central to our track record of thousands of successful projects.
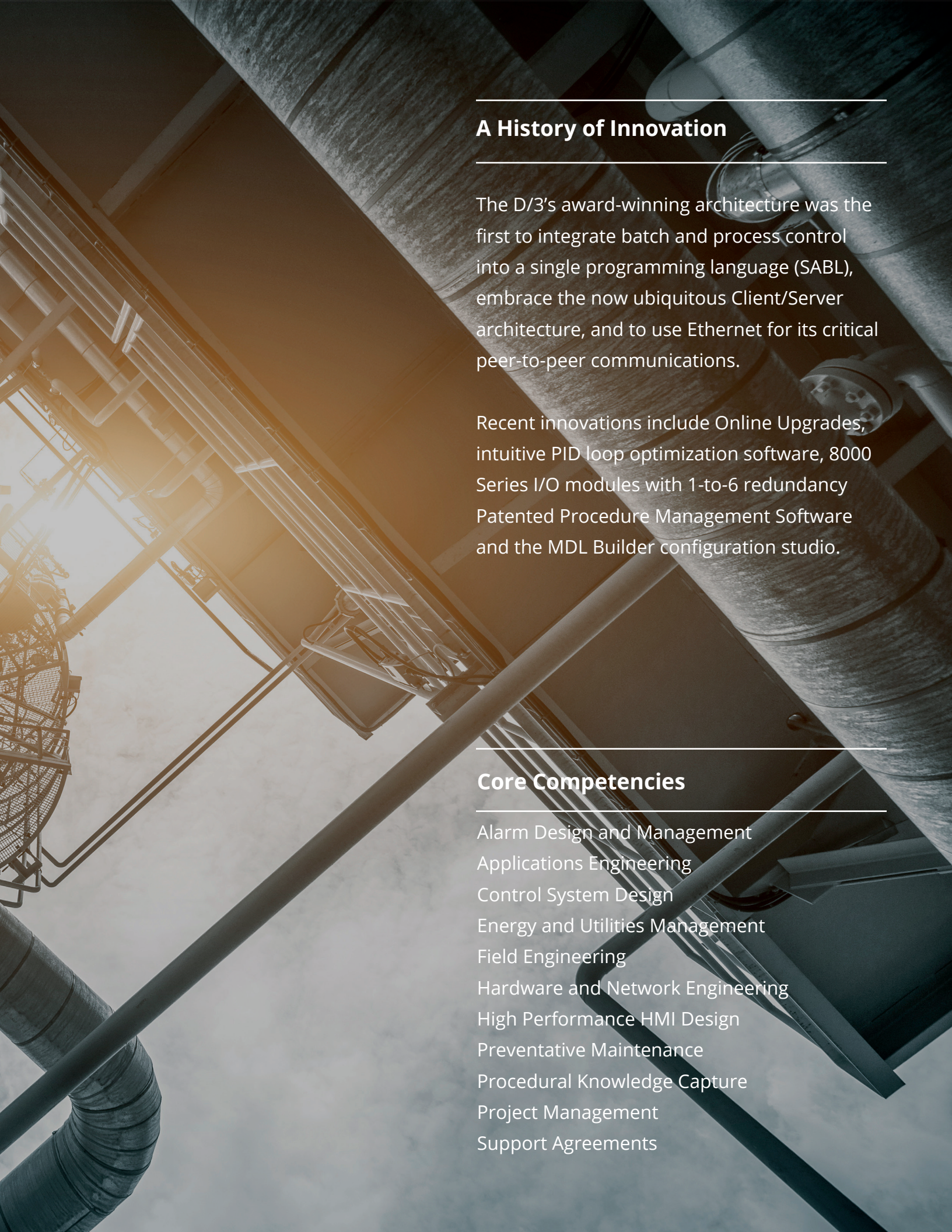
About NovaTech

NovaTech is a proven process automation, electric power measurement, and substation automation and integration solutions provider. We've outperformed in our industry sectors for the past five years because of our commitment to superior customer service, innovative products, and a level of customization unmatched by the competition.

Our solutions leverage proven technologies, open standards, and outstanding support. We offer a comprehensive range of engineering and training services, energy efficiency solutions, and best–in–class products, all designed to provide our customers with immediate returns and superior long-term value.

Distributed control technologies – measurement, communication, and control – are continuously evolving in every industry from agriculture to energy delivery. With solid experience in these key technologies, a customer-focused culture, and an agile corporate structure, NovaTech is committed to making customers' operations more reliable, efficient, and secure.

D/3® customers can take full advantage of the latest computer, networking, operating system, and data storage technologies while maintaining original applications software. This results in lower total cost of ownership.

A History of Innovation

The D/3's award-winning architecture was the first to integrate batch and process control into a single programming language (SABL), embrace the now ubiquitous Client/Server architecture, and to use Ethernet for its critical peer-to-peer communications.

Recent innovations include Online Upgrades, intuitive PID loop optimization software, 8000 Series I/O modules with 1-to-6 redundancy Patented Procedure Management Software and the MDL Builder configuration studio.

Core Competencies

Alarm Design and Management
Applications Engineering
Control System Design
Energy and Utilities Management
Field Engineering
Hardware and Network Engineering
High Performance HMI Design
Preventative Maintenance
Procedural Knowledge Capture
Project Management
Support Agreements

How Can We Help?

For more detailed information on NovaTech products, services, or customer references, contact the NovaTech representative in your area, email **info@novatechweb.com** or call us at **800.253.3842** or **+1.410.753.8300**.

novatechweb.com/process-control

Education & Training

Educational Services provides a full range of onsite, online, and classroom courses for NovaTech and Microsoft products, and OSHA Safety Compliance. D/3® and MCSE Certified trainers, with decades of instruction experience, lead hands-on classes at your facility or at any of our training centers.

Batch Management

FlexBatch® integrates recipe management and the manufacturing process so that product developers, engineers, and production staff can quickly develop, produce, schedule, and manage documented, executable recipes, reducing time-to-market and improving the bottom line.

Augmented Manual Procedures

NovaTech AMP™ combines digital procedures, mobile applications, analytics, and automation into an IIoT-enabled, connected worker platform that helps manufacturers mitigate the risks and consequences of incidents caused by human error, ensuring the accurate execution and validation of manual tasks.

Orion Automation Platform

The OrionLX™ Family of Substation Automation Platforms acquires data for energy management and "islands of automation" applications in process environments by connecting with legacy, proprietary, and unsupported PLCs, Intelligent Electronic Devices (IEDs) and converting their outputs to open protocols including Modbus TCP.

The D/3 Distributed Control System maximizes the lifetime profitability of a process plant by combining bulletproof reliability, maximum application software configurability, and a Continuous Migration Path unmatched by any other automation vendor. This balance of runtime performance and application agility allow a D/3-controlled facility to ensure product quality, speed development, ensure safe operations under all conditions, and deliver sustainable value over many decades of service. The D/3 utilizes off-the-shelf servers and network hardware along with our Process Controllers and 8000 Series I/O to create a remarkably reliable, scalable, cyber secure and fully redundant System Architecture. D/3 is the only process control system to have never forced a platform migration on its end users. We've maintained backwards compatibility for user applications while continuously incorporating new technologies and capabilities in easy-to-manage, stepwise upgrades that can be implemented without process interruption.

◆ The D/3 Design Team

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