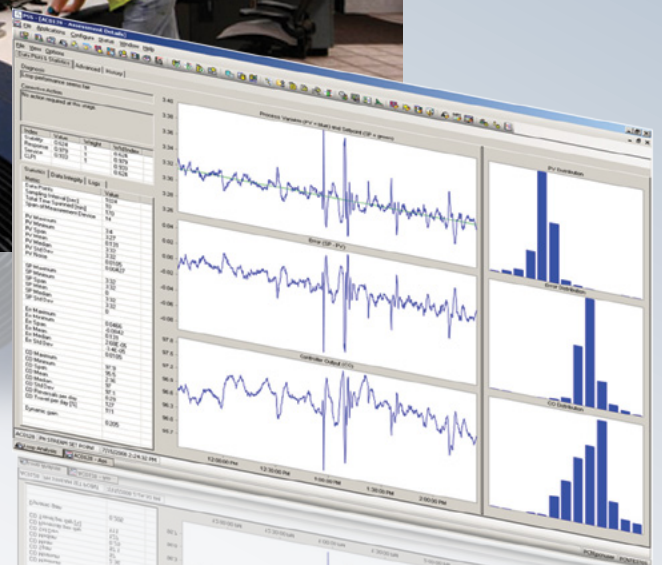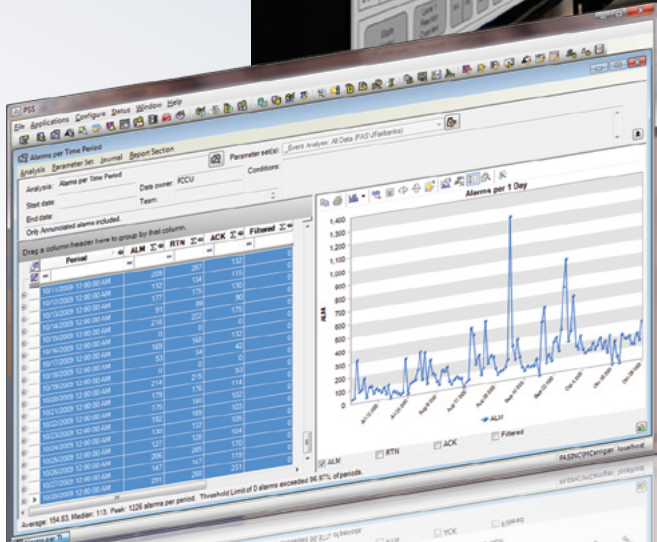# Alarm Management and PlantState Suite™

Improving Operator Effectiveness and Meeting ISA/ANSI 18.2

PAS

Industry Leading Alarm Management
Tools and Best Practices

Partnering to Deliver Operational Effectiveness

NovaTech®

Process Automation, Engineering Services
and Worldwide 24/7/365 Support

Effective Alarm Management Minimizes Plant Shutdowns and Improves Safety

Where would you want the disturbance to stop?

Steady State
Minor Upset
Major Upset
Plant Shutdown

PID
Operator Intervention
SIS
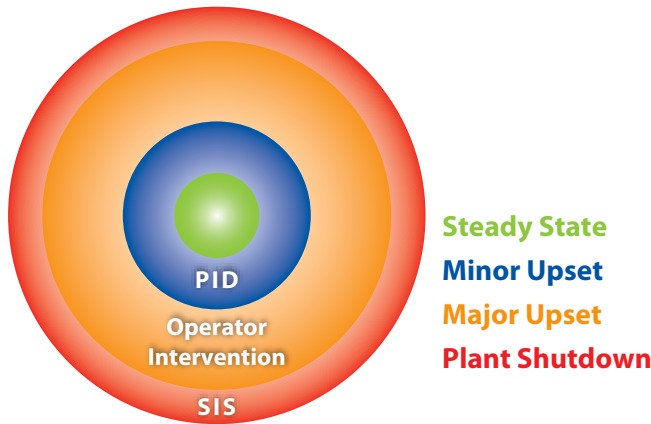
Expanding the buffers of a plant's self-regulating (PID) control and Operator Interventions layers dramatically reduces the possibility of an emergency shutdown enacted by the Safety Instrumented Systems (SIS) layer.

Empower the Operator

Industry incident investigations have shown that time is the most critical factor in a console operator's ability to deal with abnormal situations. They must often be able to take action within seconds to safely mitigate the impact of an upset. Poorly designed and maintained alarm systems can overwhelm the operator with alarm floods and hinder their ability to effectively manage plant upsets.

Effective Alarm Management means providing plant operators with the right information at the right time to reverse an escalating problem. Unfortunately, many Alarming strategies are poorly designed and inconsistently maintained, and operators may be overwhelmed with a flood of nuisance and irrelevant alarms when situational awareness and speed of response are critical.

Platform Independent Implementation

Once an Alarm Management Philosophy is developed by plant personnel and NovaTech facilitators, the resulting methodology can be deployed in any control system environment, including:

- ABB
- Emerson
- GE
- Honeywell
- HMI/PLCs
- Invensys
- NovaTech
- Rockwell
- Siemens
- Yokogawa

Seven Step Alarm Methodology

Based on their extensive experience in Implementing alarm management best practices, PAS has developed the industry's most rigorous alarm management methodology. The seven steps are:

1. Develop Alarm Philosophy
This comprehensive document, developed through a rigorous process customized to each plant, defines best practices for alarm design, implementation, and maintenance.

2. Data Collection and Benchmarking
The benchmark process incorporates PAS and EEMUA best practices, provides a base line for continuous improvement, and identifies "Bad Actor" alarms.

3. "Bad Actor" Alarm Resolution
By reconfiguring the most frequent, irrelevant, and chattering alarms, alarm load is typically reduced by 60%. This gains support among operators for subsequent maintenance and improvements.

4. Alarm Documentation and Rationalization
Guided by the Alarm Philosophy and working with a NovaTech facilitator, all plant stakeholders - board operators, process and control engineers, health and safety representatives, environmental compliance personnel, production and maintenance engineers - assess the validity, priority, causes and consequences of alarms.

5. Alarm System Audit and Enforcement
After completing the rationalization process, the ongoing Audit and Enforcement helps to avoid "alarm creep" and protect efficiency gains.

6. Real-Time Alarm Management
The next level of alarm management allows for dynamic adjustment to different stages of plant operation such as startup and shutdown, feed and product changes, and equipment maintenance. Techniques include state-based alarms, alarm flood suppression, and alarm shelving.

7. Control and Maintain Performance
With established metrics and infrastructure for optimal alarming in place, plant managers can maintain performance goals at the console, unit, site and enterprise levels.

Overloaded   **Reactive**   **Stable**   **Robust**   **Predictable**

Progressive and Measurable Improvement

PlantState Suite™ Software

PlantState Suite (PSS) Alarm Management Software is a comprehensive alarm management and operations support software suite that facilitates event analysis, documentation and rationalization, auditing and enforcement, and dynamic alarm management to optimize any alarm system. Together with professional analysis and facilitation services provided by NovaTech, PSS ensures that operators are presented with only the most important alarms requiring intervention and can take appropriate action before an upset or accident occurs.

PSS Functions and Features

Alarm & Event Analysis
Categorize Nuisance and Problematic Alarms with:
• Real-Time Alarm Scanner
• Process and Event Explorer
• Alarm and Event Journal

**Documentation
& Rationalization**
• Single and Multi-State Alarm
• Objective Analysis with
  Equipment Grouping

Alarm Audit & Enforce
• Master Alarm Database
• Auditing and Enforcement, MOC
• Event-Triggered Audit

Dynamic Alarming
• Alarm Shelving
• State Handling
• Flood Suppression

Alert Director
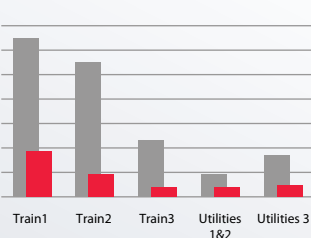Configurable Operator Decision Support System

Loop Maintenance

Related to Alarm Management functionality, PSS Control Essentials Software provide improved control loop performance. It performs an assessment of the plant's control loops, which users can view in both tabular and graphical format. Users may drill down to details on individual loop performance, including time trends, statistical analyses, time-series analyses, and correlation analyses. Additionally, they may isolate loops that lack adequate disturbance rejection capability.
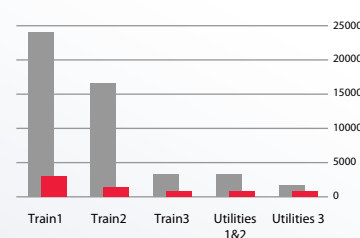
Case Study

Below is an example of a comprehensive DCS alarm management improvement project. The project included developing a site wide alarm philosophy standard, benchmarking system performance, mitigating problem alarms, redesigning the alarm system via the Documentation & Rationalization process, and implementing a Real Time Alarm Management strategy.
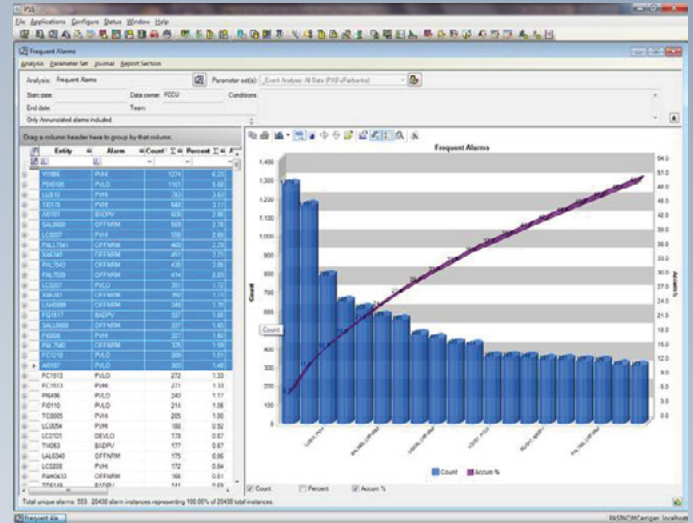

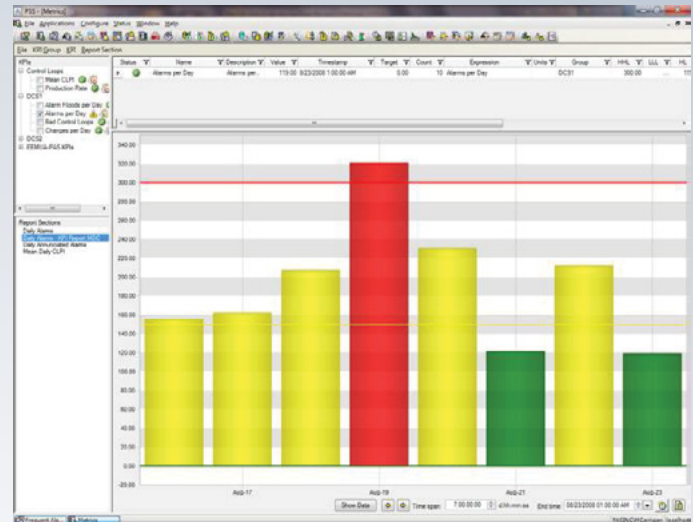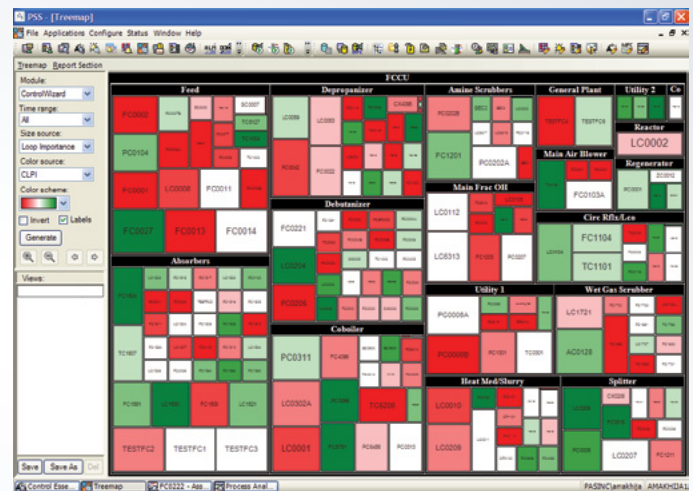Alarm Frequency Screens visualize the volume and rate of operator alarms by area of responsibility

KPI metrics show trends in rate and classification of alarms

Control Loop performance is analyzed and arrayed by size and color for fast diagnosis and continuous improvement.

Average Alarms Per Day

Chattering Alarm Events

■ Before Project   ■ After Project

◆◆ NovaTech®
Bitronics ◆ D/3 ◆ Orion

Partnering to Deliver Operational Effectiveness

Acknowledged thought leaders in Operational Effectiveness (Alarm Management, High Performance HMIs, and control loop optimization), PAS researches and develops tools and best practices that improve plant safety, reduce the risk of shutdown, and improve overall efficiency.

With more than 30 years of experience, NovaTech is a trusted and strategic automation partner to leading Fortune 100 process manufacturers. NovaTech manufactures and integrates best-in-class automation solutions and delivers them with responsive service, attention to detail, and 24/7/365 support from their engineering offices around the world.

How Can We Help?

For more detailed information on this offering or other NovaTech products, services, or solutions, email **info@novatechweb.com**, call us at **800.253.3842** or visit our website at **www.novatechweb.com**

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Other NovaTech Products and Services

D/3® DCS

Open, configurable, and highly reliable, the D/3® Distributed Control System (DCS) provides continuous and batch process automation worldwide. The D/3 DCS combines state-of-the-art features like Online Upgrades with a guaranteed migration path unmatched by any other process automation supplier.

Engineering Services

NovaTech provides custom hardware engineering, SCADA integration, panel engineering, Orion configuration, substation automation system design, HMI and SCADA configuration, and on-site commissioning support.

Orion Automation Platform

Orion serves energy management and protocol emulation roles in process facilities by integrating legacy, proprietary, or unsupported PLCs and other equipment into the D/3 or other control system via Modbus TCP.

FlexBatch®

FlexBatch streamlines ISA-88 Batch Management to increase yields, improve quality, reduce cycle times, and facilitate compliance to FDA 21 CFR Part 11, GAMP-5 and ISO standards. NovaTech actively participates on the ISA-88 Committee for Batch Control and is a Founding Sponsor of the World Batch Forum.

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