# ABB Ability™ Symphony® Plus
S+ Operations

# Keeping the operator in focus

Improving operator effectiveness is fundamental to a plant's performance. However, with fewer plant operators, a generational shift in the operator workforce, and increasing complexity and scope of plant operations, it is becoming ever more challenging. ABB Ability™ Symphony® Plus, with its intuitive, easy-to-use human machine interface (HMI), leads operators to greater awareness, faster response and better decisions.

Process operators live under constant challenge. The operator's actions have a direct impact on uptime, production output, quality, and safety. However, operators are often hindered by a lack of attention to human factors like; operator interface design, information flow and preparation on how to handle abnormal situations.

S+ Operations HMI is designed to improve operator effectiveness in every aspect involved: high performance design, integrated operations, embedded functionality, information management, alarm management, security, and supported with a flexible, scalable fault-tolerant design. Further, an extended operator workplace console keeps the 'operator in focus' by providing unparalleled operator ergonomics, control room consolidation and a pre-integrated large screen operator view display for clear and concise plant-wide visualization.

**$20 BUSD**
On average global annual production loss due to unscheduled downtime.

**80%**
of unscheduled shutdowns are preventable

**40%**
of which are caused by humans

How do we tackle this opportunity to maximize production and quality, while minimizing the risks of accidents and unscheduled downtime?

# The four pillars of operator effectiveness

ABB is at the forefront of operator effectiveness. To help customers reach the optimal goal we have brought together the necessary technology and business practices as four essential pillars:

**Integrated operations and embedded functionality**
Raw data and other input must be transformed into actionable information in context with plant equipment to promote better decision making. The challenge is to provide seamless access to multiple sources of information while being careful not to overload the operator with irrelevant data.

**High performance HMI**
The user interface must be intuitive and allow operators to manage views dynamically and efficiently. A high-performance interface supports situation awareness with how the information is displayed. It supports abnormal situation handling through efficient navigation and the application of best practices in alarm management.

**Attention to human factors**
Just as manufacturing processes are designed to be carefully controlled and manipulated to achieve desired outcomes, high-performance control rooms and operator stations must be designed with operator performance in mind.

**Operator competence and confidence**
Operator training simulators ensure process operator competence and confidence when dealing with normal production as well as unplanned events. In today's business climate simulators make even more sense due to the lack of experienced resources to instruct new, inexperienced operators.

S+ Operations puts ABB's four pillar approach into action to improve the operator's visibility to plant performance while filtering out the "noise" to lead operators to greater awareness, faster response and better decisions.

**Integrated operations**

**Design for high performance**

**Attention to human factors**

**Operator competence**

The four pillars of operator effectivenes

# Robust and flexible operations architecture

**Enterprise layer**
S+ Operations allows monitoring and control of entire fleet of plants from a single location. Reports and KPIs required for fleet wide business decisions can be generated from the corporate location.
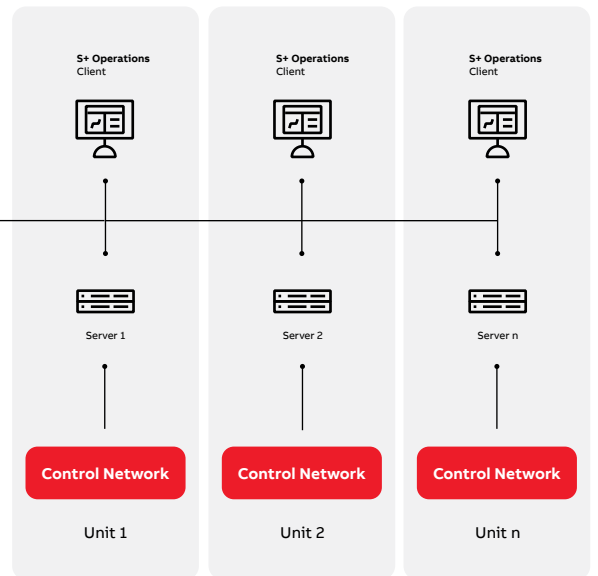
**Segregated architecture**
For medium to large applications where independent servers are required for plant areas. Each server only acquires and maintains data from related plant area but the clients can share graphical pages and tags from other servers.
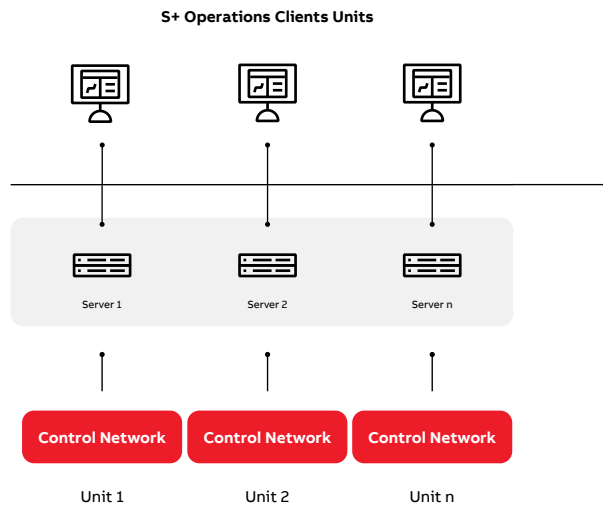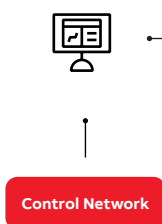
**Composite architecture**
For medium to large applications where servers are required to maintain a complete database. Each server acquires data from related plant via controllers and other area servers through the PN800. Clients can see all tags from all areas of the plant.

S+ Operations Clients Units

Server 1    Server 2    Server n

Control Network    Control Network    Control Network

Unit 1    Unit 2    Unit n

S+ Operations Client    S+ Operations Client    S+ Operations Client

Server 1    Server 2    Server n

Control Network    Control Network    Control Network

Unit 1    Unit 2    Unit n

**Standalone architecture**
For small independent processes that do not need multiple nodes.

Control Network

**S+ Operations for SCADA applications**
Scalability from very small to very large and from local to wide area networks. Interface to RTU, PLC and IED based protection systems. Seamless integration of your renewable plants into your portfolio.
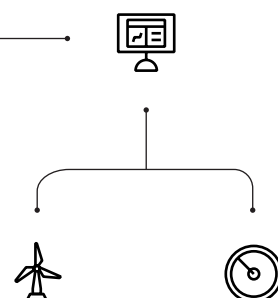
# Integrating operations promotes collaboration

**One common interface**
S+ Operations provides a broad view of the plant by integrating data from all plant areas and systems, including turbine control, electrical balance-of-plant as well as remote SCADA systems. By providing a comprehensive view of the plant, it enables the operators to see a complete picture of process operations which ultimately results in increased safety and efficiency.

S+ Operations perfectly integrates with Symphony Plus control system as well as other ABB control platforms. Through its open architecture, it flawlessly integrates with 3rd party devices and systems. Through one common and consistent operator environment, regardless of underlying control system, S+ Operations lets operators oversee and manage the total plant with improved insight and visualization.

**Electrical integration via IEC 61850**
Electrical system integration with the plant control system allows industrial and utility processes to be run at a higher level of availability and energy efficiency. It provides a substantial reduction in plants' operational costs and overall safety and reliability. S+ Operations provides native MMS communication with IEC 61850 IEDs in order to acquire and display three-phase current, voltage and all protection values. This native communication is an easy and fast solution which reduces the cost of implementing electrical integration. Moreover, S+ Operations allows full control of the electrical structures, modelling the most relevant power system applications including transformer bays, generator, incoming, measuring, outgoing, busbar, VFDs and motor bay.

**Geographical information system**
S+ Operations offers an integrated Geographical Information System (GIS) for easy, interactive exploration of spatial and process information of wide area applications like hydropower stations and water distribution networks. Customizable pre-configured GIS layers present relevant information with seamless association with the automation system's devices and alarms.

With pre-configured GIS layers, this built-in feature allows users to pan and zoom over the map of entire network without leaving the operations environment. With simple "one-click" navigation between the two, the time required for spatial investigations is significantly reduced with overall network management improved. Not bound to any specific GIS platform, S+ Operations can support existing background street maps, satellite imagery, etc. and background maps from popular providers such as Google Maps™ and Microsoft Bing™ Maps. This flexibility makes S+ Operations the ideal choice for large or small installations with or without existing GIS infrastructures.

**Paperless operations management**
Maintenance costs are greatly reduced by streamlining operation and maintenance work interactions. The HMI's integrated CMMS (Computerized Maintenance Management System) environment allows seamless navigation to asset-specific service activities. From a single click, operators can submit new equipment work orders or review and update existing ones logged in the CMMS system. Further, The HMI's ShiftBook and electronic shift log options provide alternatives to "paper" shift logs. Shift changes and open work actions are automatically noted in the operator shift log and the next shift's "To Do" list respectively.

# Designed for high performance

Symphony Plus offers a high-performance HMI that provides operators with an easy-to-use, optimized interface that supports fast operator-process interaction and reduces the risk of disturbances and unplanned downtime.

### Consolidated and consistent operations

S+ Operations is a window-based, web enabled HMI providing outstanding information integration and user navigation within a standard Microsoft Windows™ environment. Based on industry standards, S+ Operations provides users with detailed, well-arranged process overview displays to present better situation awareness and recognition of abnormal conditions anywhere throughout the plant or process.

### Personalized workplaces

State-of-the-art-graphics with intuitive control faceplates provide for well-arranged and detailed displays of any control point in the plant. Favorite places, history lists, short cuts and hot buttons facilitate quick and easy navigation through plant or process. Workplace layouts are adjusted and optimized according to the user's needs and preferences. These workplaces are optimized to individual preference and access rights based on user log-in. Windows management functions, such as

safe areas, pinning and stacking, prioritize the presentation of important material.

### Intuitive navigation

The environment design provides intuitive and easy access to all integrated information through simple "right click" on the object. Navigation becomes simple and independent of where the information is located. Through S+ Operations' context navigation, any piece of information is only one click away. Direct and seamless cross-navigation between operation displays and engineering documentation provides users with the ability to easily troubleshoot any control loop or process area.

### Accessing data anytime and from anywhere

With today's mobile workforce, it is critical to access data from anywhere at any time. With S+ Operations Pocket Portal, users can easily expand their operations view now directly from their smartphone, tablet or laptop. Pocket Portal is a

platform independent, HTML5 web-based application that runs in any browser without the need for additional client software. Configurable dashboards with full touch navigation capability allow subject matter experts, supervisors and managers to "see what the operators see" thereby promoting collaboration to correct problems faster and keep operations running at peak performance.

**Abnormal situation awareness**
S+ Operations use of next generation high-performance displays provide operators with easy recognition of abnormal situations. S+ Operations high performance graphics support pattern recognition and highlights the most important information for the operator. The hierarchical display structure allows operators to surveille conditions in a consistent way at a plant level and then easily and intuitively drill down to system and sub-system when an alerted of a trending abnormal situation. Root cause help screens, and diagnostic and purpose-built decision displays all aid the operator to make confident and timely decisions.

**Flexible Point of Control**
S+ Operations Point of Control feature provides the possibility to distribute monitoring and control privileges in geographically distributed systems. Any operator can delegate monitoring and controlling privileges of one area to another operator responsible of a different plant area.

**Secure environment**
Implementing and maintaining a secure and reliable control environment with minimal effort and time is a challenging mission faced by all plant operators and personnel today. Based on the IEC 62351-8 security standard, S+ Operations defines rights and roles for a user or user groups with very fine granularity. Sophisticated authorization and role-based access control (RBAC) provide a tight guard against unwanted activities.

S+ Operations system hardening is easily deployed to protect servers, workstations and supported network equipment. Security audit trail logs all security relevant features, such as login, log-over and more. The "USB event logging" tracks, logs (audit trail), notifies, allows and prevents USB memory device transactions in general according to user group defined security level. The security level defines if, and which kind of data the particular user group is allowed to export to USB. Export actions include: alarm list, trend list, tag values and general file copies from predefined directories to the USB device.

Total and selective 'backup and restore' is possible through the system administration features. System nodes are replaced easily by deploying all original software and configuration data to the new replacement node.

# Ensuring each alarm is meaningful

A high-quality alarm system is an essential tool for operators to run a plant safely and efficiently.

### ABB alarm philosophy in action

In many plants, modern devices and systems generate all types of alarms too easily, which unfortunately leads to a flood of alarms and overwhelms the operators' cognitive capabilities. With S+ Operations, ABB's alarm management philosophy is fully integrated within its HMI environment. This improves navigation, analysis and handling, and reduces the cost associated with running and maintaining a non-integrated alarm management system. Without a separate system to distract them, operators can devote more time to running a safe and efficient process.

### Integrated alarm management

S+ Operations' integrated advanced alarm management solution provides all the necessary instruments for efficient and stringent alarm management. The EEMUA 191 and ISA SP 18.2-compliant alarm analysis tools help users to categorize occurring alarms, while the integrated alarm management system keeps operators focused and undistracted, allowing them to act with confidence.

### Embedded alarm management features

S+ Operations' alarm management functions help promote safe plant operations. Simple "right click" navigation from alarm list to alarm-context information improves the operator's capability to detect and respond to abnormal situations in an instant. Further, embedded alarm management features such as alarm grouping, filtering, inhibiting, shelving, and suppressing remove unnecessary alarms to bring those alarms that need action to the forefront and define alarm relevancy to the operator.

### Alarm Portal advanced alarm analysis tools

S+ Operations have advanced alarm handling and analysis tools that support implementation of alarm management strategies based on EEMUA 191 and ISA 18.2 requirements, S+ Operations' alarm management functions lead to alarm statistical analysis and advanced alarm reports.

Pre-configured alarm report types such as Alarm priority distribution, Alarm duration, Alarm performance levels, Alarm and event frequency, Alarms over time, Time to acknowledge, Co-occurrences and Detailed event sequence support the implementation and maintenance of a plant's effective alarm management strategy to ensure that each alarm generated will alert, inform, and guide the operator to take the proper action.
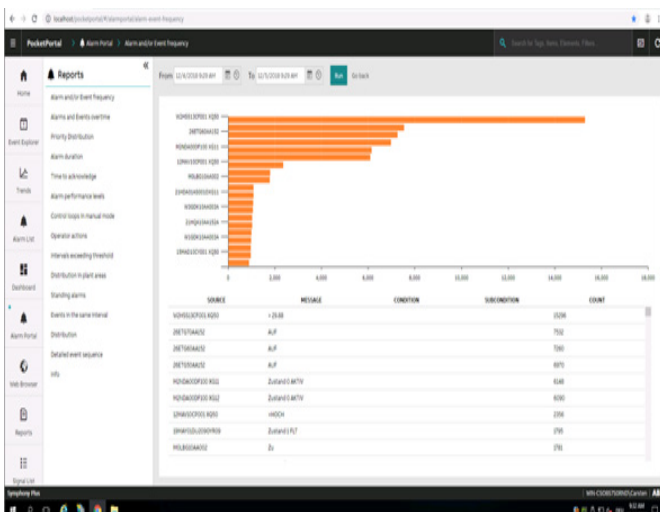
# Reaching new levels
# of information management

Timely collection, transformation and distribution of actionable information into the hands of the right personnel can provide sustainable competitive advantage.

**Integrated information management**
S+ Operations collects and processes information from multiple sources and locations as well as different information systems and databases throughout the entire plant operations. Real-time, historical and statistical data help operators and operational managers gain a better understanding of the plant's operational status and performance. This supports their ability to make well-founded operational and business decisions and leads to improved process efficiency and business profitability. Standard report templates are available and easily customized to specific operational and business needs.

**Information at your fingertips**
Not only should operators be aware of the plant data, plant management needs to be informed in order to make business decisions. With its integrated information management capability, S+ Operations provides support at every organizational level to improve efficiency and profitability. It enables viewing of real-time data and historical information simultaneously in one display. Further with S+ Operations Pocket Portal, users can expand their visibility with views to real-time and historical device status, process conditions,

trends, alarms and events, performance dashboards, etc.

**Digital solutions for better performance**
S+ Operations includes an advanced set of calculation packages to optimize plant performance by monitoring short-term and long-term degradation of plant equipment. Further with ABB Ability Edgenius, S+ Operations is connected to powerful edge and cloud computing and related digital and machine learning applications such as asset performance monitoring on a fleet or enterprise level.

S+ Operations connects local operations with remote central operations and ABB experts via a comprehensive suite of advanced ABB digital services to raise plant's performance and profitability. Specifically, ABB Ability Collaborative Operations remote services connect to the Symphony Plus system over a high-speed, cyber secure connection and cover almost everything from plant, fleet and equipment optimization to improving operator effectiveness, implementing advanced emissions control and enhancing safety throughout the organization.
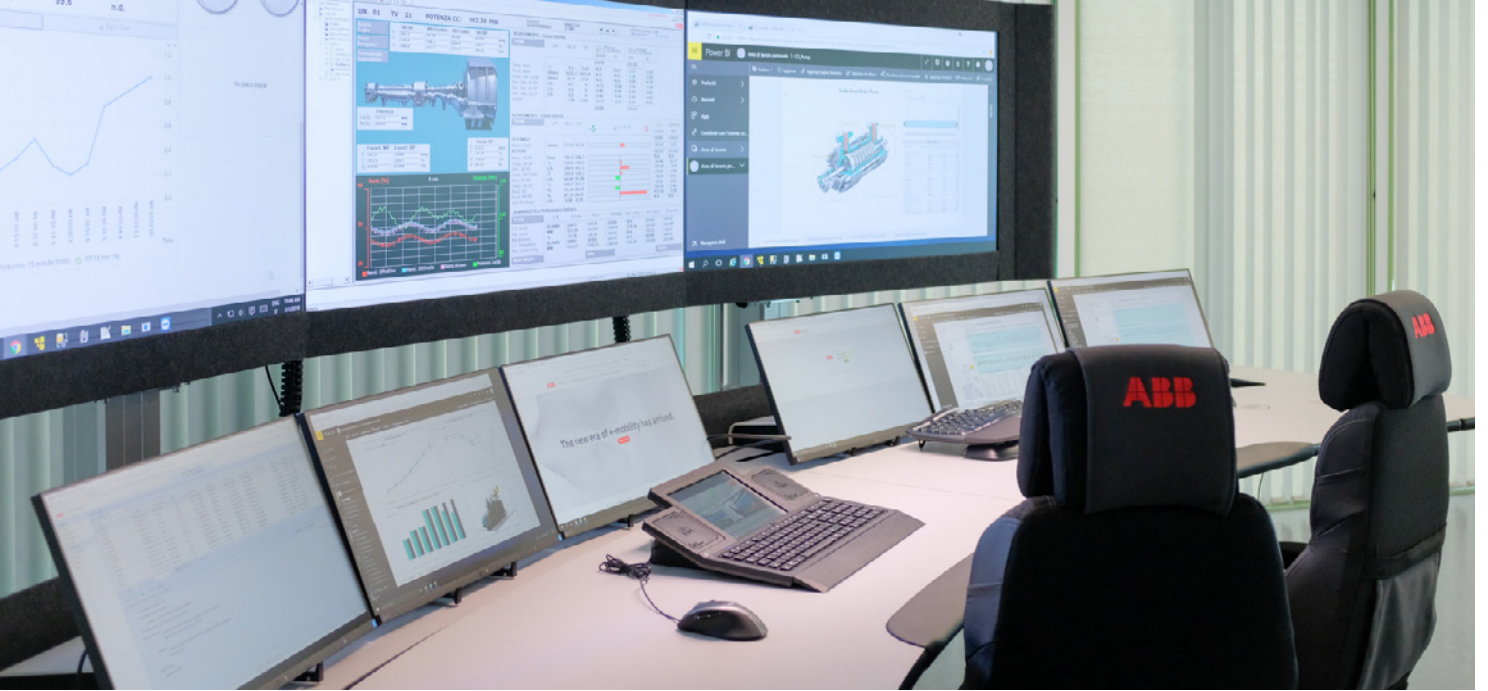
# Attention to human factors

S+ Operations with Extended Operator Workplace (EOW) offers unparalleled ergonomics, visualization and communication solutions to support effective interaction and collaboration.

### The workplace as a cockpit solution

When collaboration and information interaction is prioritized, operators stay alert and motivated. Good workstation ergonomics and a well-designed control room layout reduce operator stress and increase focus. S+ Operations with Extended Operator Workplace (EOW) offers unparalleled ergonomics, visualization and communication solutions for operators. Everything is designed to support effective interaction and collaboration:

- Plant visualization and information all in one view
- Process overviews on close-by large interactive panels
- One fast-acting functional keyboard for controlling the complete operator environment
- Control room space reduced by around 30% or more
- Improved plant-wide collaboration and optimization
- Increased applicant appeal and job satisfaction

### Large-screen interactive overview boosts control and collaboration

Operators have close-by, large-screen overview displays and several personal screens. The EOW workstation is customized with either two or three large overview displays. Operators can arrange graphics to give an optimal view of the process under their control. The EOW's interactive nature means that it can immediately show any information relevant to any situation to anyone they choose – either in the control room or else-where. This facilitates collaborative problem solving by ensuring that key personnel groups always have a clear view of what is happening and can see what needs to be done.

### Control room optimization

Since operators always have personalized, interactive displays close at hand, the need for huge 'full-wall, cinema-like' screens can be eliminated, saving space in all directions. Floor space requirements can be cut by a third or more using modular design and integrating information into one operator environment. Additional features such as directed 'sound showers' (where only the operator at a specific console will hear a conversation) mean that they can sit closer to one another yet still enjoy a quiet workplace free from distraction.

ABB provides complete control room solutions with a clear focus on operator performance, health and job satisfaction. Our solutions often exceed current ISO/EEMUA requirements. Get ABB involved early in your next project, and we'll provide layout proposals that include the latest and most advanced environments and solutions – for the control room as well as adjacent areas.

# Simulator solutions boost operator competence

While control systems automate large sections of most plants, human error remains a critical aspect in most accidents. Symphony Plus virtual simulator solutions provide a safe and realistic environment where operators can learn to master the process, thereby reducing risks and the number of unplanned shutdowns.

**Developing confident operators**
Better trained operators can help increase overall plant safety, reduce start-up time as well as the number of unplanned shutdowns. Simulation gives process operators a safe and realistic environment where they can learn to master the process and improve their operator skills. Further, a simulator is also a powerful tool for engineering testing and optimization studies to improve productivity and energy savings.

**Lessons learned transferable to real world operation**
Connected to dynamic low, medium or high-fidelity process models, Symphony Plus virtual simulator solutions use the same engineering data, visualization and control logic as the Symphony Plus physical system. This provides the operator with an off-line environment identical to the real system, making it much allowing skills acquired to be 100% transferable to real-plant operation.

# Innovation through continuity

S+ Operations is designed for continuous value evolution to ensure customers remain productive and effective while maintaining lower total cost of ownership.

**Our lifecycle commitment**
Control system life cycle management and investment protection have always been cornerstones of ABB's development programs. We serve our customers by crafting product solutions that ensure the continued productivity, reliability and capability of all installed ABB assets. We develop new products in a way that allows for incremental adoption, minimizes risk to operations and maximizes investment protection. For example, S+ Operations use of Microsoft Windows 10 Enterprise LTSC platform provides customers with a stable environment to run their long-term operations solution providing minimal disruption and lowering their product life cycle support costs.

**Protecting existing operation asset investments**
For our long-time customers considering evolving their existing HMI platform(s) to S+ Operations, there is a seamless path forward. Existing console database and graphics from previous generation consoles like Conductor NT, Conductor VMS, PPB, PCView and others can be directly re-used in S+ Operations. This allows for continued use of the existing knowledge base within your plant without re-training the operators. Moreover, the evolution can be executed online, in parallel operation of the running HMIs. This online upgrade capability significantly reduces the down time and loss of production.

# ABB