

System 800xA Operator Effectiveness

Control rooms of the future are here now



Pierre Schäring, MD at CGM, and Per Lundmark, responsible for the EOW-x workstation at ABB.

Imagine a process event suddenly requiring an operator's undivided attention. It's vital to stay alert. The operator needs immediate access to important information about what's happening. This can be overwhelming in a room full of systems with multiple monitors each with different user interfaces. It requires careful attention to design so the correct information appears on monitors exactly where an operator needs it most, accessed through a single multi-system keyboard and mouse.

This is the concept of “the operator as part of the process”. It goes further – imagine in the same critical situation the operator desk automatically rising, requiring him to stand and quite literally be ‘up and doing’.

Next, reflective ceiling lights change color from green to red to warn others that now is not the best time to chat about

the weekend's football matches. At the same time, micro-ventilation blows cooler air around the work station to match increased level of alert. You can imagine an operator as part of the process, ready to handle the increasingly complicated operating challenges in these 24 hour, 365 day environments.

The intelligent control room

Modern control rooms can be designed to be part of the direct production interface. By integrating intelligence into the environment, the rooms can blend process events into how the workstations respond to assist the operator in managing events. Better work environments have an important side effect – they add to employee satisfaction increasing retention rates of highly trained employees. “The need for an operator to work efficiently is not confined to crisis situations; it is a priority in day-to-day work as well,” Pierre Schäring points out. “A lot can be done to improve the operator's working situation.”

CGM and ABB have developed a new control room workstation over the last 5 years



The operator becomes a part of the process, ready to handle the increasingly complicated operating challenges in these 24 hour, 365 day environments.

Avoid moving from monitor to monitor

Pierre Schäring is CEO of CGM in Borås, Sweden. In a joint venture with ABB, the company has developed a new type of control room environment and optimized control center layouts. Today's operators need to keep an eye on several things at once ranging from process data to surveillance cameras, even weather forecasts. Things can get complicated because different information is usually displayed on separate systems via dedicated monitors, keyboards and procedures.

To get a complete view of these separate systems, the operator has to move between different displays. In addition, room configuration, space utilization and layouts present ergonomics challenges. Pierre contends that this shouldn't be necessary. Instead, his company designs working environments where the operator is integrated with the process and to easily gain access to information in every situation.

Seamless information flows

CGM is a Swedish company that manufactures workplace furniture, such as control room desks. A few years ago, they became interested in 24/7 environments and the special problems they pose. It was quickly determined that control room furniture could be something more than just a place to stack monitors and instruction manuals. It could be an active part of the process. Pierre worked with ABB over the next 5 years to develop the EOW-x workstation.

The workstation and its integrated set of 6-9 monitors display information and images from multiple simultaneous sources including control systems, data historians, document management, diagnostics, CCTV, and other inputs. The interface is a single multi-tasking intelligent keyboard. Each display uses the same aspect ratio (16:9) and the same resolution. Images can be transferred freely between monitors according to operator preferences via keyboard command keys or drag and drop.

"This is the first time that the operator really owns the large screen monitor," explains Pierre Schäring. "Usually operators do not take full advantage of the large screen monitor. It is seen as a benefit for control room visitors, while the operator performs most tasks on the 23 inch monitors. With the EOW-x System, they can place information in the most suitable place."

What about sound?

Telecom and PA systems are an integral part of modern control rooms. But sound is usually broadcast all over, sometimes loud or soft, and sometimes ignored by the operator under stress. Instead of the usual set up, the EOW-x workstations employ sound showers which direct the sound in discrete ways. A special audio and lighting box is located directly above the operator's work station, directed by ABB's System

800xA control system with automatic routing from the sound source. This adds to operator alertness and knowledge in both routine and stressful emergency situations.

The directed sound stays in the area of the EOW-x workstation and does not disturb other operators at other stations which may have their own critical tasks to perform. For more general audio information, such as announcements or alarms, there's a loud speaker system included with the large screen monitors along with camera systems for video conferences.

Monitors and multi-function keyboard

The large screen displays consist of two or three 52-inch monitors depending on specific needs. The control desk, where the operator works, has space for four or six 23-inch desk monitors. The multifunction keyboard can switch between workstations, automatically moving the mouse function with it so the operator does not have to move from one keyboard to another for different systems and tasks. The system can serve a single operator working alone in routine situations. However, it is possible to connect additional keyboards and mice when others need to work at the workstation.

The operator needs variation

When entering a control room furnished with the EOW-x System, most operator's first impression is on what is missing - the usual muddle of monitors and keyboards. But then they begin to explore the countless options for adapting the environment according to individual preferences and certain situational requirements. The large screen monitors can be raised and lowered. The desk monitors can be tilted backwards and forwards, and can be positioned at different angles. Workstation "focus" can be changed with one keyboard. Everything can be customized. "It's a good idea to change the position of the monitors and desks during a shift to provide variety for the operator. It improves ergonomics for the operator and can add "alertness" to the control room," Pierre Schäring notes.

Settings can be changed throughout the day by the operator, but they can also be controlled by the process because the working environment is integrated with ABB's System 800xA. The process can affect the entire workstation.

Micro ventilation and lighting

Micro ventilation means that the temperature around the work station can be varied according to the operator's

All functions are controlled from one and the same keyboard. Operators don't need to scramble between keyboards simply to deal with different systems and tasks.



preferences, regardless of the temperature in the rest of the control room. It's even possible to have one temperature above the desk and another down on the floor for someone who suffers from cold feet. The control room's curtains can be opened and closed from the work station, adding to the comfort level of the environment. The ability to control ceiling lights is another option. The ceiling lights can also be designed to change color automatically according to the working situation.

Optimizing the number of operators and control room locations

CGM and ABB are demonstrating that more can be done to streamline control room work. There is a clear trend towards fewer operators with greater responsibility so it is essential to ensure that their work is made as easy as possible. Also, several facilities may share one control room or it may be hard to find qualified workers willing to work at remote facilities resulting in operations being controlled and monitored from central office locations. This is often the case with offshore oil platforms using onshore control rooms. "If there's a considerable distance between the control room and production, or fewer operators due to various factors, it is vital that the operator has access to all operational information. Even knowledge about the weather is significant to someone who isn't actually at that location."

Positive customer feedback

Pierre is convinced that the EOW-x work station concept is leading the trend to consider all aspects of an operator's working environment. "Interest in efficient control room work is increasing all over the world and the market is positive. New innovations are often the result of customer feedback and we are always learning and adapting the design." So far, CGM and ABB have sold thirty projects with the largest delivery being for a copper mine in Chile. Several Oil, Gas, and Petrochemical customers have also embraced the approach, often redesigning existing plans to incorporate these ideas.

Attracting new talent and retention

The EOW-x concept increases operator efficiency and minimizes operator mistakes. But is there documented proof? A joint project is underway with Chalmers University and the SP Technical Research Institute of Sweden to measure efficiency increases. Initial results look good. And then there's an entirely different aspect that Pierre points out. "It's currently difficult for industry to find qualified operators. Better work stations will make it easier to attract young people to jobs like these. And get them to stay."

Original article by Dag Toijer (text and photos), edited internally by ABB.

Quick facts System 800xA with EOW-X

ABB's delivery included:

- CGM and ABB have developed a new control room work station over the last 5 years.
- Information can be displayed and moved according to need on various monitors using the same aspect ratio controlled from one keyboard and mouse.
- Images can be freely transferred between large eye level monitors and desk monitors.
- Desk height, lighting, sound, ventilation, and other functions can be set according to user preference which can then be automatically overridden by the process system in pre-determined situations requiring heightened alert status.





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