



## **CONTROL ROOM** BEST PRACTICES GUIDE

Seven practices to enhance the performance  
of your team and operations center

With the ever-changing landscape of threats our businesses and government agencies face today, what was a luxury several years ago is now a necessity. To ensure the highest level of situational awareness possible, the operations command center (NOC, SOC, GSOC or commonly referred to as the Control Room or Command Center) is a must for any facility.

Control Rooms provide a centralized location for situational awareness, managing operations, dispatching response personnel, as well as overseeing real-time operations of critical events.

Why have control rooms become a necessity? It's simple. They help us maintain operational continuity, improve in decision making, reduce response times, and, in some cases, save the lives of those in the communities we live in. The bottom line is that it's about managing risk.

Many of us know the obvious benefits of utilizing a control room, but what about those less obvious ones from leveraging the essential concepts of what goes into a well-designed and purposefully built control room? It's that 1% of additional thought, planning and effort you put into how to optimize your control room for peak proficiency that makes the difference, much like the 1% increase in water temperature that takes very hot water to boiling hot water.

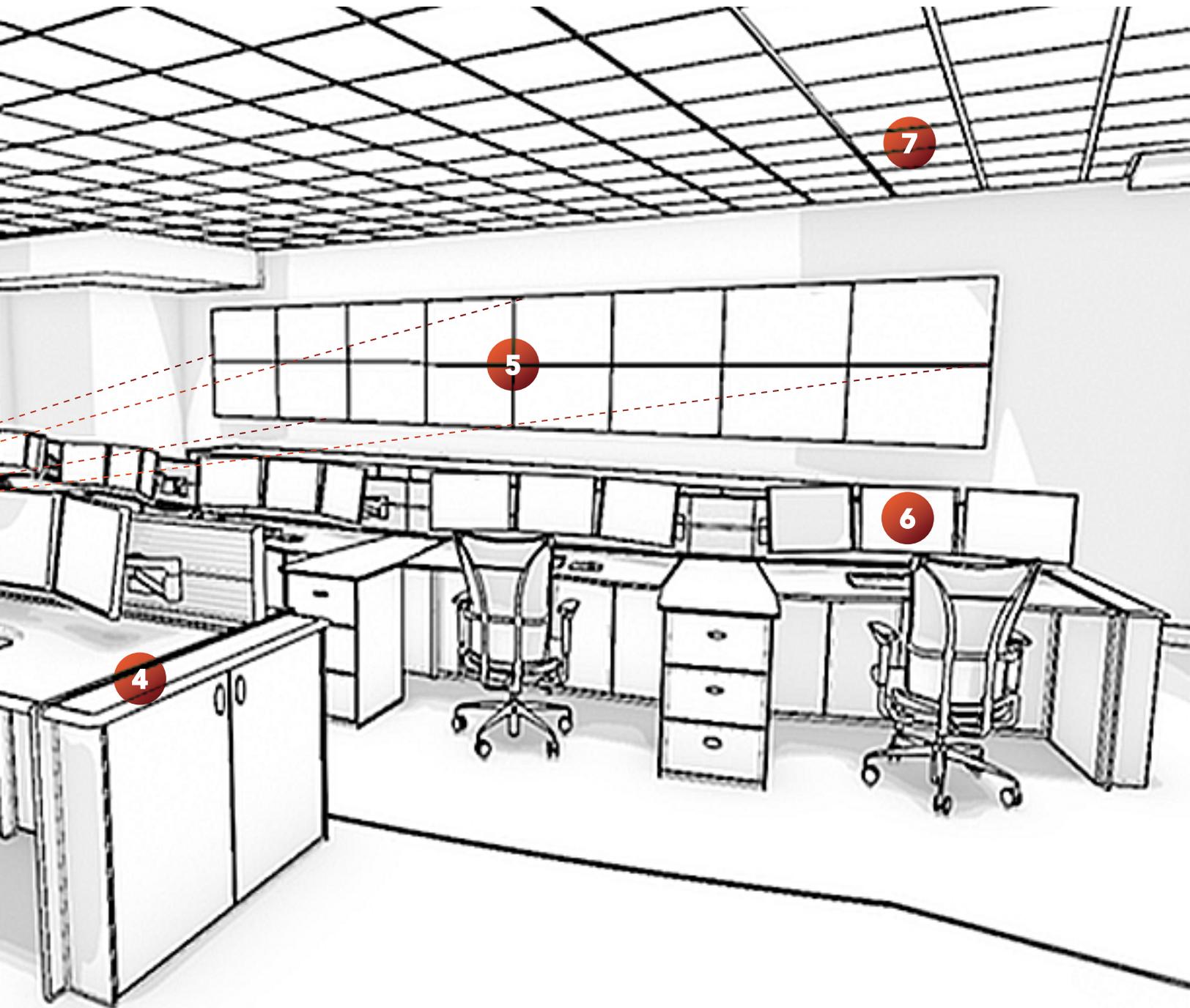
Think of the control room as an ecosystem. Much like any other living ecosystem, when the individual pieces are in balance, the ecosystem thrives. When they are not, the ecosystem suffers....in the control room environment, diminished functionality results in slower response times, increases in human errors, poor decision making, disorganization, and or employee fatigue/stress; all of these dramatically affect the performance outcomes expected of your control room.

In the pages ahead, we have listed seven fundamental characteristics of a well-designed control room, which when applied strategically together, promote more efficient decision making, reduce stress and fatigue on the staff, increase awareness, and help you effectively respond to a rapidly changing environment.



# THE ECOSYSTEM

ERGONOMICS, HUMAN-FACTORS, TECHNOLOGY



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## ONE | COLLABORATION

There have been hundreds (if not thousands) of studies performed and countless hours of research done on the subject of “how we learn and make better decisions”. It’s not difficult to go online and find a wealth of information about the subject. Collaboration is often at the heart of improving the decision-making process.

What is “collaboration”? While its meaning varies in different situations, here it can best be defined as “the effective exchange of critical information to facilitate the outcomes of responding faster, more accurately and effectively to critical decisions that need to be made by those that manage and monitor real-time operations or life altering events”.

Collaboration can be as basic as two people talking or as advanced as large groups of people sharing vast amounts of real-time mission critical data across the globe.

In the control room environment, collaboration is helping improve the decision-making process by leveraging a combination of software, visualization platforms (such as video walls), as well as interactive whiteboard solutions--all of which facilitate the sharing of information needed by key decision makers.

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### BEST PRACTICE

Explore and understand what technologies exist and how they are being utilized by your industry peers to solve the same challenges you face.

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## TWO | SIGHT LINES

Many control rooms today have video walls or other visual display devices in use, most are located on the front wall of the control room and used to establish a Common Operating Picture (COP). The benefits of having a common operating picture are significant.

Having a single location in your control room to display information relevant to your daily operations or needed in the event of a crisis helps to keep everyone on the same page. While using video walls and other display technologies help create the COP, there are a few things to keep in mind that can make or break the effectiveness of your technology investment. One of the most common mistakes made when working with video wall solutions is referred to as “sight lines”.

Sight lines include both viewing angles (horizontal and vertical, as well as on-axis and off-axis viewing) and viewing distances of the video wall displays, all affecting how effectively information is received. More importantly if it can't be easily seen, read and understood, the human-factor side-effects can reduce your staff's productivity, introduce health-related issues, and hinder the accuracy of decisions being made that rely on the video wall as the COP.

Here are couple of things you should know.

- Viewing distances will vary with technology. LCD, LED, screen resolution, display size, and type of information (text/graphics or video) you will be displaying will all have an impact on how close or far away from the video wall your staff should be located. Video tends to be more forgiving than text/graphics, but still varies with other factors.
- Ceiling height can automatically restrict how large of a video wall solution can be implemented in your room. The bottom of the lowest set of screens of the video wall (called the Sill-Height) ideally needs to be 48" – 52" off the finished floor. This allows the bottom row of video wall monitors to be seen by most (if not all) of the staff sitting at their console position and looking over their desk top monitors to view information on the wall.

At the top of the video wall, it's recommended to leave 6" – 8" of space between the top row of video wall monitors and the ceiling. The space between the Sill and ceiling clearance determines how large of a wall your facility can reasonably accommodate.

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### BEST PRACTICE

Understanding your content types and the unique characteristics of the room is paramount to delivering an optimal solution. Ask questions!

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### BEST PRACTICE

While it's probably not high on your priority list, having the proper seating for your staff will pay dividends that last for years. If you're in the process of renovating or upgrading your control room, seriously consider evaluating seating options and learning more about how this will help you improve your staff's attitude about work, increase productivity, and reduce health related issues that cost your organization time and money.

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### THREE | PERFORMANCE-BASED SEATING

In the control room environment, an employee's productivity is directly influenced by ergonomics and human-factor considerations related to their seating. Simply put, chair design and construction make a difference. What are ergonomic and human-factor considerations? They are the things that hinder or improve the efficiency of people in the work environment. In this conversation, we'll talk a little about the importance of seating, and yes, this can be the difference between not productive, productive and highly productive.

It's no secret that if you're not comfortable, your lower-back hurts or the chair doesn't allow you to adequately adjust for your specific height and build, the constant discomfort becomes a distraction. ....and distraction is a major factor in diminished productivity.

When looking for ways to enhance productivity in your control room, evaluate your staff's seating/chairs; look for seating that has multiple adjustment points that include lumbar, armrest-height and range-motion, knee-tilt recliner, height-width and good headrest support. The construction of the chair should also be factored in; quality seating designed to minimize stress and fatigue will include a metal sheet-pan, multi-density foam cushioning, and will have a frame made of high-gauge tubular steel. A good indication the seating solution you are looking at will provide the human-factor benefits you are looking for is if it's rated for 24x7 use.

## FOUR | CONSOLE FURNITURE

When it comes to furnishing your control room with the right console furniture, the word “right” carries a lot of weight. Far too often, this is one aspect of the control room ecosystem that doesn’t get the attention it requires. There is a science behind employee productivity. Ignoring those factors can significantly impact how well your staff performs.

The Science:

The control room is a demanding work place with higher levels of stress, constant engagement with situational awareness, critical decision processes, and a need to be on top of your game at all times. The mission critical worker can easily burnout if attention is not paid to the nuances that can help offset the stress and fatigue associated with the control room work-environment.

When evaluating a console for your control room, consider the following:

- **Sit/Stand** – This feature allows the employee to work in a seated or standing position. Having an option to stand while you work allows not only variety that keeps an employee stay engaged, but also gives the body a needed break in routine.

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### BEST PRACTICE

Give serious consideration to the consoles your staff work at every day. While it is sometimes hard to justify spending more money upfront on professionally designed consoles, it’s worth it in the long run.

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- **Bull-Nose Edging** – The desktop work-surface of the console, if not treated with BNE along the edges, can be extremely uncomfortable to work at for long periods of time. The sharp-edges of a traditional work-surface dig into the resting forearm while working on a PC keyboard. Bull-Nose Edging has a rounded-curve that is angled downward and is made of a durable (but soft) rubber that eases the discomfort associated with the hard edges of the traditional work-surface.
- **Task Lighting** – Most control rooms are intentionally designed with minimal lighting in the room which introduces more contrast on the work-surface between the illumination from the PC monitors and the contrasting darkness of the areas outside the immediate work-surface. Task lighting can be added during console manufacturing, providing direct light on the work-surface over the keyboard/mouse or can be angled to provide direct lighting to other areas of the work-surface. This helps reduce eye-fatigue and the possibility of headaches as well as improves your employee’s performance.





## FIVE | COMMON OPERATING PICTURE

Some look at video walls as the wow-factor of their control room, giving little thought to the role it actually plays in how decisions are made within the space. Video walls certainly have wow-factor, but its ultimate purpose is to create a common operating picture (COP) that allows the control room staff to aggregate disparate information to a single location while enhancing situational awareness. Whether it's to support daily operations or when you're managing a crisis, the video wall helps to get and keep everyone on the same page.

Video wall technologies have dramatically changed over the past few years. With the introduction of LCD several years ago to the more recent introduction of LED, one size doesn't fit all. When looking at video wall solutions, consider what your source content is—software, live-video, maps, news/weather or a combination; and consider how much detail you need to read. The screen size and resolution will have a dramatic effect on this. You may be attracted to or have a solution recommended based on its brightness, but in the control room, brightness is less of a consideration than is contrast and how well the video wall replicates color and detail. Price is always a factor when making a major purchase, and video walls are no exception. However, consider not only the upfront cost but also the long-term cost of ownership. You may find that paying a little more upfront saves you significant money in the long-run.

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### BEST PRACTICE

Video walls in the control room are specifically engineered/ designed to deliver a unique experience and solve visualization challenges that many other projectors and stand-alone monitors can't. When looking at video wall technologies, do your research and ask a lot of questions. Don't look at the video wall as just monitors hanging on the wall, there is a lot of science and engineering that goes into developing video walls. It requires strategic engineering and design to help you see the bigger picture.

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## SIX | SOFTWARE

If there is an area of the control room that productivity is most easily measured, the use of productivity enhancing software wins hands-down. Productivity means different things to different people, depending on their job and responsibilities. However, in the control room environment, productivity is often related to continuity of business operations and the efficient management of crisis.

While there are many aspects of the control room that contribute to productivity, software has advanced to the point that solutions are available today that reduce human-error, provide automation of process and, through advanced analytics and correlation algorithms, software can provide predictive outcomes that allow you to take a preemptive corrective approach to managing crisis rather than a reactive one.

Today's software is becoming increasingly intelligent. Not just smart, but capable of making very complex relational decisions based on rapidly analyzing and cross-referencing vast amounts of data from disparate sources that are now available. Software automates processes to reduce human-error, improves workflow processes and streamlines operations. While artificial intelligence and artificial reality are still in the future, that future is not very far away.

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### BEST PRACTICE

Software is constantly evolving. If you want to improve how your control room maintains operations and helps you to better manage a crisis, leverage the advances in automation, analytics/correlation, and collaboration software.

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## SEVEN | LIGHTING

Lighting is another overlooked attribute of a control room that can make or break how your room functions and looks. Improper lighting is attributed to a host of health-related issues, not the least of which are headaches, stress, and the inability to concentrate. Additionally, poor lighting is closely associated with our mood (happy, depressed, anxious, etc.) and can directly affect performance.

While spending the time and money to incorporate the right lighting plan for your control room can be very worthwhile, there are other ways to improve your current arrangement and provide immediate benefits.

When making changes to your control room lighting, think of lighting as zones—dimmable versus on/off and direct/indirect. There are many more considerations including temperature, candles, ambient, task, and therapeutic lighting, but for the purposes of best practices, we will focus on the basics for now.

- **Zones** – The lighting plan for your room is called an RCP (Reflective Ceiling Plan), mapping out the location, type, electrical /conduit requirements, where various lighting fixtures should be placed, etc. When making changes to your lighting plan, evaluate your current lighting zones. You may find that you have several lights in one area of the room wired to operate separately from another area of the room, or you may have all your lights on a single switch. Ideally, you want to have flexibility and not have all the lights on a single switch. You may find it beneficial to have your lighting zones above each of your console rows and set up to be installed directly above each of the workstation positions. Additionally, set up the lights in front of the video wall on a separate zone so that ambient light from your room's lighting doesn't reduce the effectiveness of your video wall.
- **Dimming** – For most control room applications, having the flexibility to dim your lights or the zones will give more control in how light is used in your room. This is particularly beneficial for lighting that is directly over the console work-areas.
- **Direct/Indirect** – Direct lighting is most commonly used to illuminate work areas, while indirect lighting is more often associated with the feel of how a room looks, or its aesthetics. Both should be zoned separately and on dimmable switches.

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### BEST PRACTICE

Lighting can be your friend or your enemy. Don't cut corners and think that you shouldn't give serious thought to how your lighting is set up. If you want to improve performance and reduce health-related issues, lighting is a great place to look.

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Control Rooms are unique work environments; they impose demands on the body and mind that introduce higher-levels of stress and fatigue to your staff. While some stress and fatigue is obvious and can be dealt with quickly, there are hidden stress points and poor work-environment designs that are less obvious; having a long-term negative impact on the health and well-being of the control room worker. Understanding the science behind how technology, product solutions, and how the human-condition work best together, will increase productivity and help to mitigate health issues. The benefits you will realize, could be what allows your staff to respond to a critical event faster/more effectively that saves your organization money, reduces operational downtime, limits property losses or in some cases....maybe helps to save the life of someone in the community they serve in.

There is a wealth of information available to those that want to approach their control room holistically as an ecosystem; to bring about changes that will show meaningful results. We hope that by reading our Best Practices Guide, you will be encouraged to seek out a deeper understanding of how to employ some of the nuances that make a lasting difference.



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