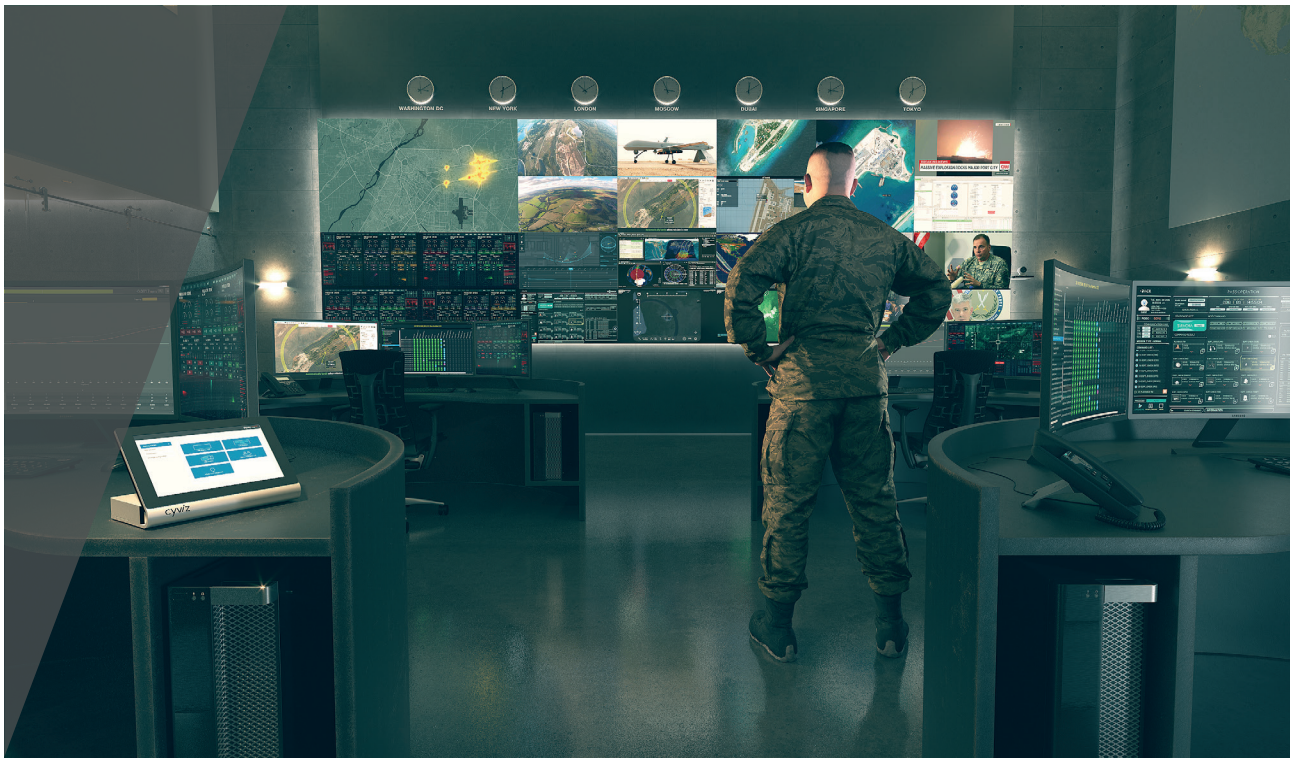
Building the next generation of *secure and dynamic* Command & Control Centers.

The landscape of threats on the global stage is ever changing, with an increasing number of natural disasters, the rise in political and economic unrest, as well as the multiplication of military challenges. As an effect, government, defense and intelligence organizations are looking for new generation of Command & Control Centers that are secure, effective and dynamic. These new types of control centers need to be flexible and adaptive to allow rapid mode and scenario changes to accommodate appropriate security classifications and situations. The key objective of the modern control center is to deliver the most adaptive and agile environment, and to provide the level of situational awareness required to support informed and fast decision making.

Defense and governmental organizations need a Common Operational Picture (COP) to establish situational awareness. This COP acts as the single shared source of truth for direction and coordination, and ultimately decision-making. This COP is crucial and requires that all information and content is accurate, and can be shared, displayed, and acted on in real-time on a high-performance video wall and secondary target displays.



A Flexible Common Operational Picture

To further enhance decision intelligence, consideration should be given to the specification of the space in order to create a flexible and adaptive environment with the ability to quickly change for any situation, any operator, or any mission at hand with the relevant security classifications and certifications. A new generation of COP - a Flexible Common Operational Picture (FCOP) needs to be created to support varying mission requirements, or for cyber incidents due to their ever-changing nature. Technological developments make it possible to implement more sophisticated solutions to manage the ever-changing situational landscape.

Immediate scenario switching using pre-sets

An effective way to technically facilitate seamless mode switching and dynamic workflows, is to use scenario pre-sets. As situations constantly evolve, it is critical for the video control system to be able to display all relevant information providing total visibility, context, and continuity, both quickly and accurately. Operators cannot factor in wait time for additional programming, but instead must be able to switch modes as situations develop. For example, a new set of experts may need to be brought in, new security clearances may be required for the mission, or the location or objectives might change completely requiring different user settings and new content sources to be viewed.

Also, within an operation center, the senior staff will change over the course of the day, and when a new commanding officer starts, they may want to change the way the information is displayed. The use of pre-sets saves valuable time in critical situations and makes it possible to transform and 'personalize' the user experience at touch of a screen. This dynamic approach automatically displays the user's requirements for the environment and the mission to deliver the right common operational picture to assure the correct information and correct decisions.

Multi Classification Environments

The next generation of dynamic Command & Control Centers needs to support multiple security configurations within the same system. This flexible approach should differentiate between security levels as they apply to different personnel clearances and different networks. This flexibility in network source configuration provides a significant advantage in Cyber Security Operations centers (SOC), Joint Operations Centers (JOC) and in Command & Control environments where multi-level security is a requirement. Data sources from different networks and security classifications can be securely connected to the system, so content from multiple sources can be combined into an optimal representation of mission-critical information. In many instances, end users need to switch between two or more computers, at different classification levels, introducing data vulnerabilities. The implementation of strict security rules for the protection of classified information dictate data contained solely in red networks is not available and transferred to black networks, where unauthorized personnel would have access to it.

"The pandemic has accelerated the adoption of remote services and we believe it is indicative of how our industry is ready to embrace change".

Tijmen Klamer | Head of Section

Another focus is to ensure that operators are only granted access to the information in the systems that they are authorized to access. For instance, KVM systems are often designed to access multiple sources across multiple domains with different security classification levels. It is critical that a breach does not occur between the domains, even though they may exist as part of the same KVM infrastructure. Typically, there are two design methodologies to manage issues like these: partitioning and restriction.

Partitioning refers to the ability to dedicate resources within the system to isolated groups, with no chance of unintentional crossover, within a router, switch or system of routers and switches. Essentially, partitioning creates several routers within a router. Restriction addresses the idea of roles-based access on a user-by-user and source-by-source basis. A strong KVM system design will allow the system manager to determine which users gain access to which sources, and perhaps more importantly, which users are denied access to which sources.

The result is a secure system architecture engineered from the ground up resulting in a scalable solution which will not compromise the system administrator's ability to perform configuration management easily across the entire facility. The objective of physical separation is to prevent the threat (people) from physically accessing the content or the system. A common approach is to prevent unauthorized users from entering the physical location of the system, by restricting access via card readers, biometric readers, etc. The physical separation between Information Processing Units (IPU) of various classifications is maintained in a remote location(s), accessible by the system administrator and out of the way of the mission operators. This greatly reduces attack vectors and insider threat as computer resources and the IP network are no longer within the operating environment.

High-performance visualization to solve complex problems

The human aspect to complex decision-making within Command & Control Centers is crucial. The way images and content will be displayed, and the quality could lead to consequential differences in mission critical environments. To solve complex problems and ensure informed decision making, operators and senior staff need to be able to visualize and collaborate on information in an ultra-wide canvas at a superior resolution. Depending on the room layout, the wall space, the required number of inputs and content sources, but also the viewing distance for operators and staff chief need to be taken into considerations before choosing a video wall solution. Aspect ratio, pixel density and light constraints will also help inform the decision between LCD, LED or blended projections display technologies.

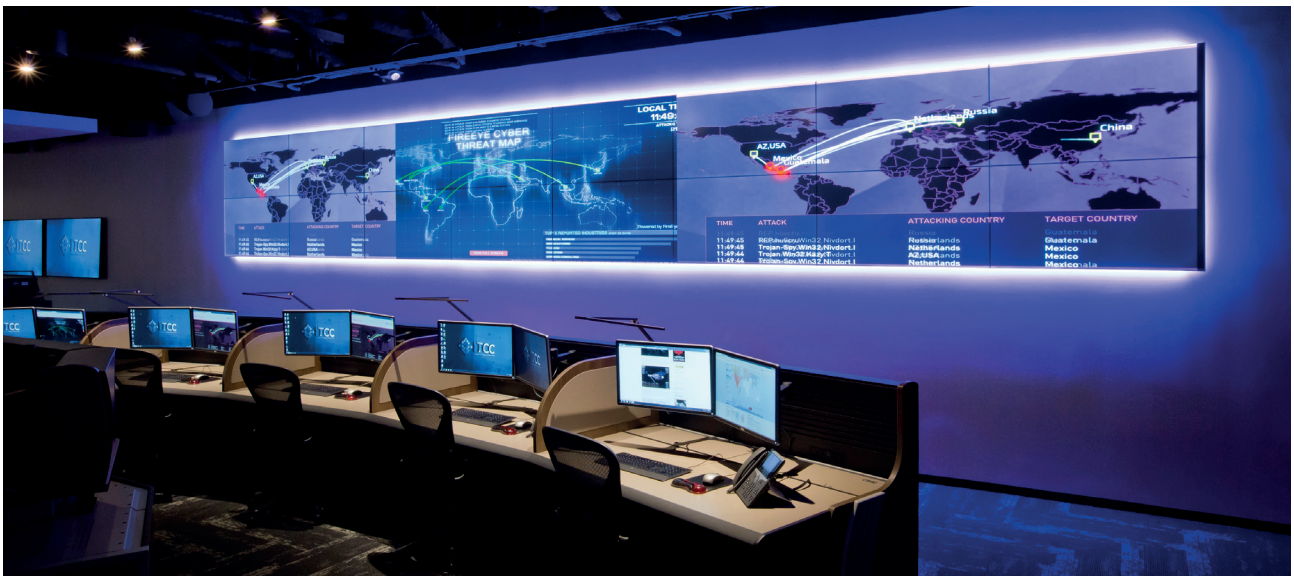
The minimum standard in modern Cyber Security Operations Centers is for the support of 4K video resolution that needs to be carried to the display wall and to multiple targets that are also capable of supporting 4K resolutions. A target display is one or more displays to the left, rear and / or right of the main operations center wall. Higher resolution in cyber provides detailed visuals and yields the advantage of increased identity of artifacts that could be critical to the defense of the network and other layers meaning the resolution requirements for an operation center must be considered at the initial stages of design.

Future-proofed solutions

With the digital transformation now common place and the use of Augmented Reality (AR) and Artificial Intelligence (AI) picking up rapidly, government entities require a future-proof Command & Control Room that adapts to these new needs and will provide a positive long-term investment. Dynamic Control room solutions must be application agnostic, standardized and configurable to stand the test of time, regardless of changing underlying technology. Existing systems must be easily upgradeable with features and functions. The best Command & Control environments should offer the reliability and flexibility needed to meet the changing landscape of technologies, and remain relevant, powerful, and reliable.

An agile installation and maintenance expertise

Due to their sensitive and critical nature, Command & Control Centers must maintain 100% uptime especially during real-world operations but also when executing planned exercises. Installation and maintenance have often been pain points for these environments, demanding experienced support from vendors to make system changes or upgrades. Support staff will need to come with the appropriate clearances and minimize disruptions in workflows to ensure 24/7 operations continue without interruptions.



"We were looking for a dependable partner for the audio and visual technology, and Cyviz had a software-based solution which provided some unique advantages".

Tijmen Klamer | Head of Section

Cyviz Command & Control Center highlights

Operational structure that supports remote services delivery model

Cyviz central support, management and monitoring with the Cyviz Easy Server is an all-in-one control platform for centralized support and management of all Cyviz systems. It is designed to improve user experiences and reduce resources.

Configurable control

- The Cyviz Easy Controller communicates with other system components via TCP/IP or serial protocols and can be integrated with a CATx based extension receiver. The unit has two RS232 ports, which can be extended using an (USB-RS232) adapter.
- Built-in support for a selective and heavily vetted list of well-proven A/V components and designed to control systems built on the Cyviz Solution design model.
- Feature controls and menus can be password protected by a system administrator.
- Multiple configurations available.

Multi-classification and secure KVM integration

Cyviz seamlessly integrate with Thinklogical, which provides the only fibre optic KVM extension and Video Display System (VDS) solution to achieve Common Criteria, NATO (NIAPC) Green Status, JITC UCR and TEMPEST accreditations. It is also the only remote extension system approved to switch multiple security domains through a single chassis.

Thinklogical's products follow strict User Data Separation policies in which there is no data flow between Transmitter Port Groups or Receiver Port Groups and any other physical port on Thinklogical routers unless an authorized.

- Non-blocking, protocol agnostic Layer 1 switching. 10Gbps/6.25Gbps bandwidth per port and no latency or lost frames.
- Uncompressed video up to 4K60 (4:4:4, 10-bit across distances of up to 80km.
- Can be configured and deployed as a "Closed VDS System" per section 9.2 of the DoD UCR 2013.

Unique Video Processing

The Cyviz video wall processor (XPO 5), is designed to be used in conjunction with the Cyviz Easy Controller to achieve maximum efficiency and usability in the Command & Control space. This integration forms the basis of the consistent Cyviz system architecture based on IT principles. The Cyviz approach is to create a separate A/V net that moves video one-way to the display wall.

- Network access not required.
- Cyviz XPO applies proprietary video processing algorithms to the incoming video signals in DVI single link, DVI dual link, HDMI or Display Port 1.2, and outgoing video signals in either DVI single link.
- All video signals coming to the Cyviz video processors are one-way, subsequently passed along to the display wall.
- Creates Picture-in-Picture (PiP) images for individual sources and distributes the resulting image across multiple display units in real time when used in conjunction with the Cyviz Easy Controller.
- Proprietary algorithms for edge blending of multiple solid-state projectors, LCD flat panels, and small pitch LED displays.