

# Control Zone



## **Networked visualization**

Joining forces in defense & security

## **Shared Situational Awareness**

Military command post case study

## **Ports, waterways, coastal & maritime security**

VTS and Common-Operational-Picture for disaster management

## **Camden County Council, UK**

CCTV control room solution

**BARGO**

Visibly yours

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Camden County Council have on their list of responsibilities the security of the Town and as a tool for this, they use a significant number of cameras placed around the town. The introduction of Closed Circuit Television (CCTV) has been one of the best weapons against crime. It has been proven to be effective in both cutting and detecting crime and, because of this, people now feel safer when they're out and about.

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# Editorial



**Robert Wu**  
*Senior Market Development Manager*  
*Barco Control Rooms*

Dear reader,

In our current world climate, safety and security concerns are ever increasing. In this second issue of the ControlZone newsletter, we focus on the applications of the control room solutions in addressing these needs. We shall see examples such as the defense of nations, securing borders while maintaining efficient transportation, protecting critical public and private infrastructures, and finally in the unfortunate event of incidents, crisis management. We hope to demonstrate with specific cases how Barco's networked visualization enables better decision making and reduce response times through maximizing display flexibility, minimizing equipment costs, and advanced visual integration features.

In defense, there is a general rise of informational requirements as more service branches are deployed together (each with their own information systems). The extreme case is the joint deployment of coalition forces of different nations. In such scenarios, informational superiority is critical. In joint deployments, collaboration and exchange of information are key to ensure operational effectiveness and reducing unnecessary loss. In 'Joining forces in defense & security' and 'Shared Situational Awareness', we will explore how Barco's solutions provide a visual integration of various disparate systems to allow our users to build and share a Common-Operational-Picture for better decision-making.

In securing borders, the modern realities of trade often impose an opposing requirement to security – efficient flow of people and goods. Public access points such as airports, ports, border crossings, and open borders or perimeters require efficient collaboration between many different staff members to ensure that all perimeters are under proper surveillance. In addition, proper escalation of events, event correlation and prioritization of responses should be coordinated to minimize threats and, in unfortunate circumstances, damage. In the articles 'Ports, waterways, coastal & maritime security' and 'US Coast Guard case study', we will explore port and maritime rescue operational control scenarios.

In protecting key public and private infrastructures, the need to balance security and free movement is made more acute with the impact of economics. In the 'Camden County Council' and 'Chevron' case studies, we will explore why private industry has chosen Barco's solutions to help economically secure their key infrastructures and public safety.

Last but not least, in the unfortunate event of an incident, we will explore in the 'Disaster management case study' how Barco's solution enhances the ability of crisis management centers to coordinate the responses across defense, internal national security, regional governments as well as the private sector.

At Barco we strive to provide excellence in solutions by working together with our customers to understand their needs and providing them with the capabilities and flexibility to address their concerns. It is our hope that 'You'll See' from the cases presented in this edition how committed we are as an organization to serve this market's specific needs and to provide the best technical solution with maximum flexibility.

Welcome to Barco's networked visualization solutions for defense and security and we wish you an enjoyable read.

# Joining forces in defense & security

In the defense and security market, collaborative decision making and real-time information sharing are of prime importance. Information from the field needs to be routed to command and control centers and dispatched to all stakeholders to provide increased situational awareness. Barco has traditionally offered key building blocks for visualization in defense & security and to respond to the market evolution towards integrated visualization, Barco's business units active in these domains are intensifying their collaboration to provide a networked visualization solution.

Barco's defense & security, air traffic control and vessel traffic services divisions are concentrating on (life-critical) operational decision-making applications by responding mainly to the needs of the single operator. Barco's Simulation & Presentation division is active in collaborative and immersive visualization solutions (including modeling & simulation applications), whereas Barco's control rooms division focuses on process-critical multi-media large-screen visualization platforms which are networked. In a natural evolution, all three divisions now are integrating their platforms to provide a seamless networked visualization solution to allow their customers to better respond to the demands of Shared Situational Awareness and Distributed Mission Operations.

In the sub-sections, we will provide an overview of Barco's solutions in these application domains and provide you with some of Barco's technology developments aimed at increasing Situational Awareness and providing an overall common operational picture through networked visualization solutions. We will explore the following capabilities offered by Barco:

- visualization solutions for
  - life-critical single operators
  - process-critical group operations
- increasing informational superiority and operational efficiency
  - maximum input flexibility
  - Fit for function displays
  - interactive interfaces
  - developing Shared Awareness
- networked visualization integration platform

## Visualization systems

In general, Barco's visualization solutions support C4I-SR (Command & Control, Computers, Communication, Intelligence, Surveillance & Reconnaissance) applications: from field-based operations of surveillance and reconnaissance activities where ruggedization and real-time visualization are a must to group command centers where intelligence is consolidated and overall group decisions must be made.

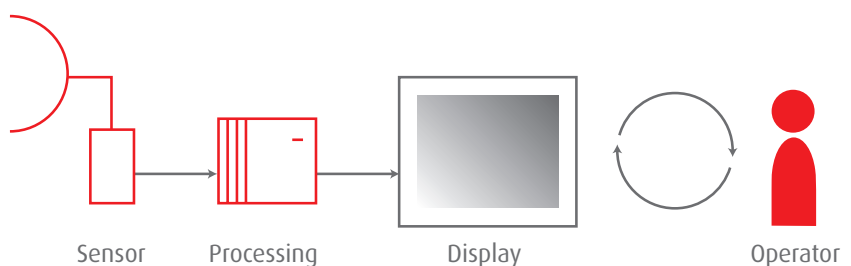
The following sub-sections will describe how Barco adapts our visualization capabilities from life-critical single operator visualization solutions to larger scale process critical group operations.

### Life-critical, single-operator visualization

Barco is dedicated to providing solutions for Operational Display Systems (ODS) in air & vessel traffic as well as in defense applications. This means that Barco provides solutions along the visualization path for many of the varied sensors that are used to gather information by military or Homeland Security customers.

A sensor can be a video camera, radar, sonar, thermal imagery or any other way of capturing a desired image that supports operational decision-making, usually referred to as Command & Control.

In Command & Control, officers assess a particular situation and provide commands to manage it. At Barco, we do not manufacture the sensors, but we connect to them. Traditionally, Barco has provided video processing (mixing multiple images or performing image enhancements), graphics cards (formatting the information for display on screen) and rugged displays for viewing the information. All of our products are specially designed and tested to survive in very difficult







Personal walls: doing away with a clutter of equipment from multiple computers for different functional systems and different display technologies

environmental conditions: extreme cold (-25°C), heat (+60°C), high vibrations, very high shock conditions and others. In recent years Barco has expanded its offering to include integrated products. This means that we have taken our traditional products (displays and graphics cards) and have combined them in innovative ways to provide the customer with creative new solutions. Barco's console offerings are an illustration of this innovative approach. Inside these consoles or other subsystem solutions is a mix of complex image processing, computing solutions and interior mounting and wiring for the harsh environments in which these consoles will operate.

In applications where ruggedization plays a less prominent role (e.g. Homeland Security applications), Barco's Control Rooms division offers its personal wall. The personal wall represents a flexible workstation that can either be used as an individual independent workstation or for collaborative or group decision-making. The latter configuration allows the operators to respond to multiple incidents individually or manage a single incident with multiple operators to cover different perspectives. The personal wall's display size also allows for supervisory overviews by management without interfering with the operator's work.

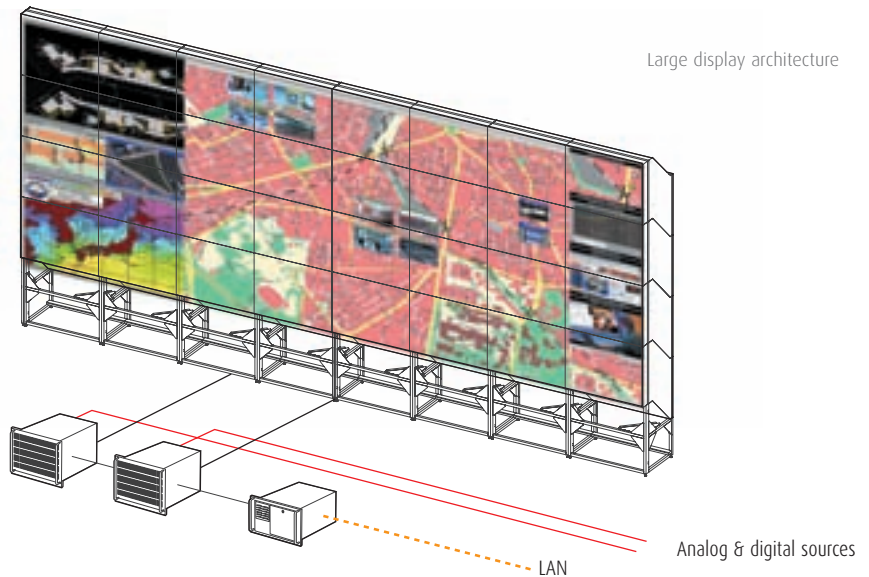
The personal wall consolidates all the display requirements for the workstation into one managed intelligent display solution. Traditionally to achieve this, the operator workstation would have a clutter of equipment from multiple computers for different functional systems (at the same security level) and often different display technologies ranging from computer monitors, to video monitors and sometimes even projectors. The personal wall solution provides the users with an integrated work environment where multiple inputs from various applications to analog or digital video sources may be displayed on a single large screen display solution. With graphical insertion and isolation-based capabilities, even input from systems with different security classifications may be safely deployed on one personal wall.

#### **Process-critical group visualization**

It is a natural progression from providing effective single workstations to providing visualization support for process-critical group-based visualization. In this, Barco is regarded as the leading expert for tactical analysis centers, 24/7 watch and alert centers, crisis centers and briefing rooms, Integrated Battlespace Centers, Combat Rooms and National Military Command Centers (NMCCs), Military ATC and Air Defense Battlespace Centers. Barco's success in providing control room solutions for Homeland Security applications (from border, coast & transportation security, emergency preparedness & response to infrastructure protection) originates from its expertise in integrating traffic management centers, surveillance centers and network operating centers. More specifically, Barco's success in security markets builds on Barco's ability to provide a visualization solution to support real-time monitoring, response dispatching/co-

# Joining forces in defense & security

ordination, access/flow control, recording and overall systems control in the surveillance market. These capabilities extend above the visual and ergonomical aspects of the solution which is critical in the single operator environment. Barco's solution is built on the principles of networked visualization where all display devices are capable of being networked and share a common platform. This allows information exchange, centralized control and management. These capabilities translate into value added features for group based visualization as the users can build a specific COP and disseminate it easily to others within this network. This reduces confusion among remote groups and allows better decision making. The next sections will discuss these capabilities in detail.



## Information superiority and operational efficiency

Barco's solutions provide information superiority through their ability to accept and process a myriad of media input types and provide a visually and contextually integrated composed Common-Operational-Picture. Based on the ability to share and disseminate this COP, Barco's solution can reduce decision-making times and allows higher quality responses. The following sections will illustrate how the various components of Barco's solution fit together to provide information superiority and operational efficiency.

## Maximum input flexibility

In most command environments, Common-Operational-Pictures (COP) need to be built out of input from a myriad of diverse and different sources. Barco's solutions provide a controller based platform to externally process these inputs independently of the displays. This provides the solution with a large scalable platform that can accept multiple types of media input simultaneously from simple NTSC or PAL video to RGB in analog formats or streaming media over IP networks. In addition, Barco's platform processes them independently and allows only graphical information to be passed through. As such, the system will assure the integrity of different levels of secured networks are not being violated even though the visual data from such networks are being displayed on the same display to form the proper COP.

Barco controller





OverView cDG67-DL high-resolution COP display system using Apollo for effective content management

**Fit for function displays**

To achieve better operational efficiency especially to integrate information visually and generate knowledge (i.e. make decisions faster), the output display format must also be appropriate for the environment. Based on physical and ergonomic principles, Barco's visualization solutions have been designed to range from ruggedized monitors, simple boardroom projectors to flat panel displays to large display walls to simulation 'caves'.

As examples, consider the following two display solutions used in Command and Control scenarios. The first represents a general overview display while the second is an immersive simulation type environment. Barco's visualization technologies provide the maximum display flexibility for users.

The image below demonstrates Barco's DMO (Distributed Mission Operations) solution that can be configured with Barco's SEER mini-dome system. This is a compact and flexible visualization solution that consist of a custom 240°/270° spherical dome structure and multi-channel projection system. Barco's HALO rear-projected continuous view display is another possible visualization component in the DMO concept.

SEER simulator



Integrated digital whiteboarding



**Interactive interfaces**

Continuing with the ergonomics and usability of displays, Barco also provides support for interactive displays such as integrated large-area digital whiteboarding. The concept is available with limited active touch areas (typically of max. width of 3.25m and max. height

of 1.30m) and typically up to 3x3 50" displays (including 1x1, 2x1, 3x1, 2x2, 3x2) and up to 2x2 67" displays (including 1x1, 2x1).

# Joining forces in defense & security

## Developing Shared Situation Awareness

The key to effective collaboration and to produce high quality and timely decisions involving cross functional teams is the ability to network and share information. In this area, Barco provides tools to enable efficient exchange between various displays. Barco's solution allows users from regional command posts to exchange graphical application information and also send synthesized information from field command to central command and vice versa.

In addition, for typical surveillance video content, Barco added video encoders and universal video decoders capable of supporting multiple compression algorithms from MPEG-1, MPEG-2, MPEG-4, MJPEG and selected Wavelet compression schemes.

Last but not least, Barco has now also introduced its graphical encoder solution. In combination with Barco's Content Sharing software, the TRANSFORM SCN completes the solution for high quality and high performance remote distribution of computer graphics. With Barco's TRANSFORM SCN, any computer graphics source can be transported over an IP network without the need for extra software installations on the computing platform.

Transform SCN



This allows better security, requires less processing power and provides remote viewing of the graphical source. The TRANSFORM SCN provides external capture of the computer graphics output, thereby allowing complete host computing platform independency (in case of alien OS's or for Open GL, Direct X or for video in overlay content). It is a hardware-based encoding solution providing optimal compression performance.

In summary, with networked visualization, the user can now gain significant flexibility in visualization. This enables operators to share operational pictures and develop shared situational awareness to ensure timely decision-making, coordinate appropriate responses and save time, money and space.

## Barco's added value

### Dynamic visualization capabilities

- Common-Operational-Picture (COP)
- added screen scraping & scenario-building functions

### Network-centric visualization

- distributed platform able to handle secured and non-secured sources at the same time
- COTS & customized, ie scalable to site, regional, national and international applications
- increased interoperability

## Homeland Security & Defense Challenges

robust COTS products or customized solutions that feature multi-modal interaction

- flexible handling of multiple secure/non-secure sources
- effective communication of commands and capability feedback (from deployed operators)
- network-centric solutions
- operation efficiency and ergonomics
- graceful migration from analog to digital

## Integrating Barco technologies

Typically, all of the discussed technologies come together in 'Integrated Battlespace Centers' and in design and engineering labs of complex defense and security systems. In these systems warfare scenarios are simulated with highly realistic dynamics and complex multimedia, interactivity, enabling distributed operators to collaborate and/or inject situational variables in real-time and test system capabilities.

The joint expertise of Barco's divisions, as technology solution providers with the widest range of visualization platforms and network-centric capabilities, makes Barco best suited to respond to specific interoperability requirements in defense and homeland security.

# Shared Situational Awareness

## Case study

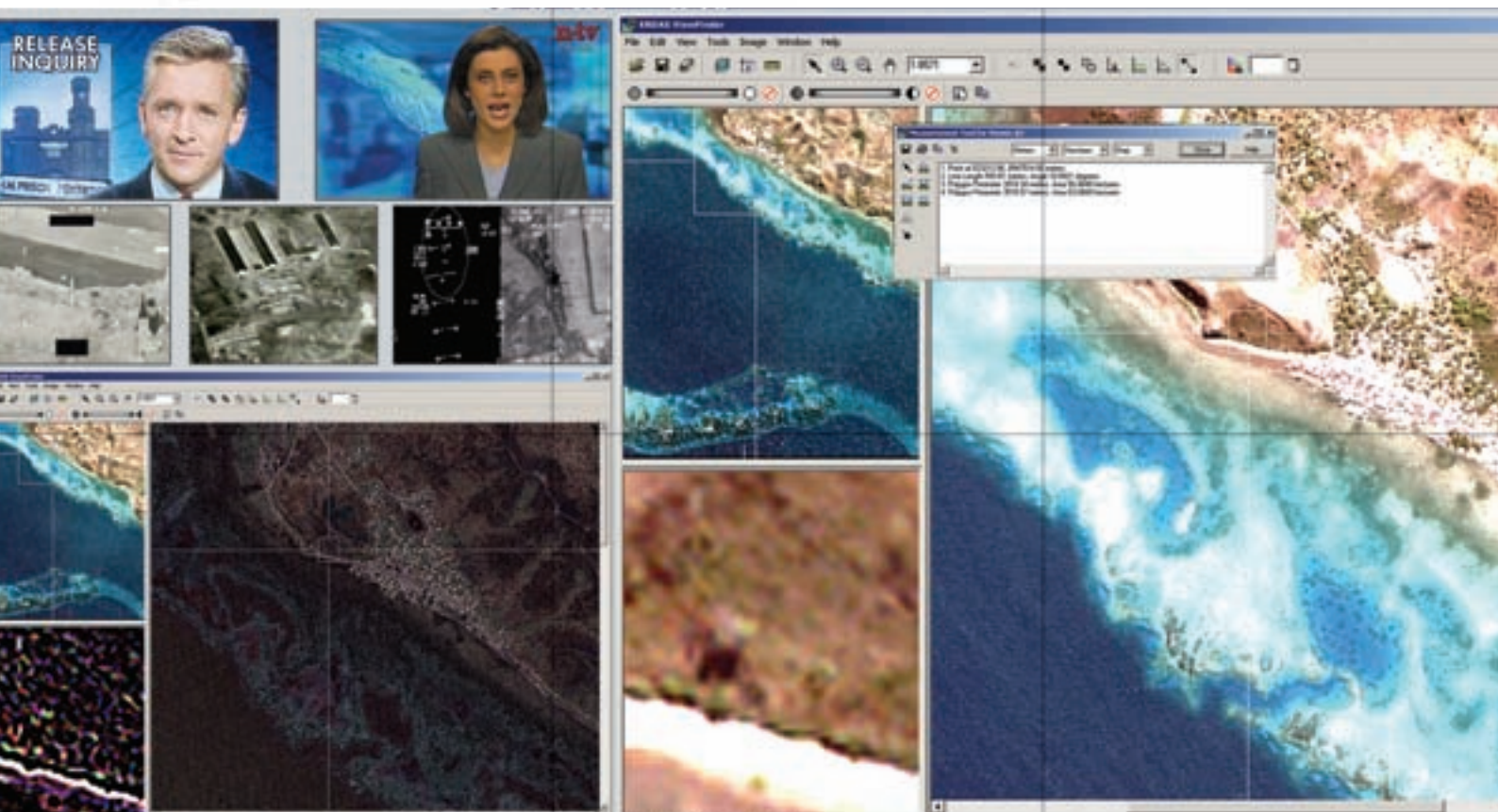
Shared Situational Awareness is key in any military operations to ensure effective response and minimize losses. To enable a military command post to exchange graphical application information and send synthesized information from field command to central command or vice versa, Barco offers both software and hardware technologies.



Consider a sample case where each command post (field and HQ) has a collection of applications that are used to generate a local COP and have a clear requirement to be able to display a variety of different applications simultaneously on one display solution with sufficient resolution and size.

Secondly, the users in central command have to be able to execute a variety of automated scenarios (see crisis development 1,2,3 etc.) based on best practices.

Thirdly, all users have to be able to duplicate what is shown on their display in the different locations to share the various individual command post COPs among field and central commands.

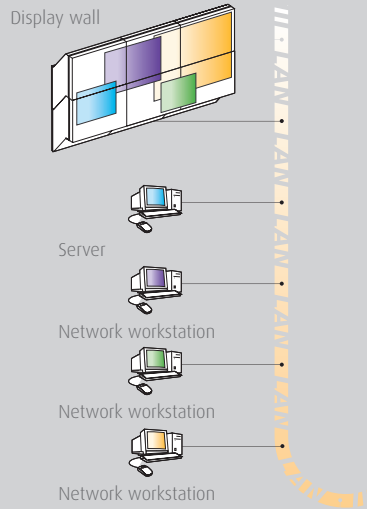


The display devices used in each command post can range in size and resolution. Each large display wall can be 'screen-scraped' with Barco's CONTENT SHARING software and the images can be distributed to any other display.

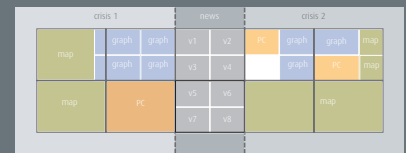
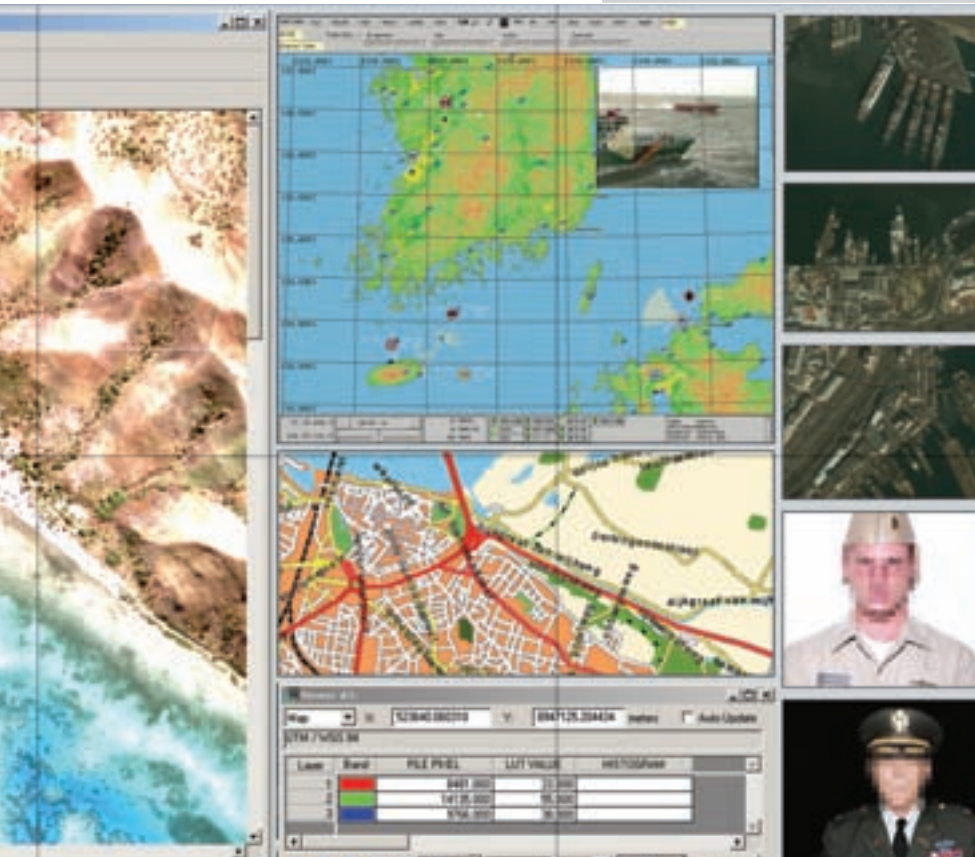
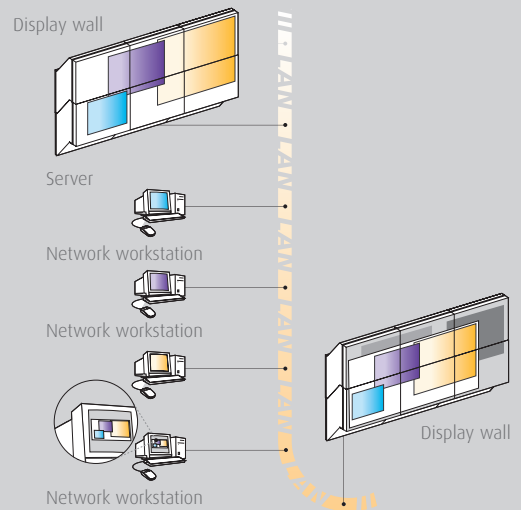
Barco's CONTENT SHARING Software provided, in this case, a solution that supports efficient sharing of situational awareness across multiple disparate locations. Bandwidth usage at peak utility for this system is measured to be between 3-4 Mbps, enabling it to be communicated over existing secure network facilities. To attempt this with traditional analog technologies would have required new dedicated networks typically proprietary in nature, requiring much more installation time, effort and equipment and highly specialized audio-visual expertise for service and support.

In summary, Barco's Networked Visualization CONTENT SHARING Software can truly provide distributed command collaboration with proper displays to effectively create the required shared situational awareness across multiple sites and teams.

*Due to the classified nature of the project, no specific names or descriptions of the end user may be used.*



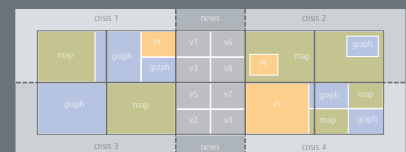
Content sharing between 'small' display devices and large-area display and vice versa



Scenario 1: COP of crisis situation A



Scenario 2: COP of crisis development B



Scenario 3: COP of crisis development C

- Application over LAN
- RGB video from PC
- Application running on the wall
- Video

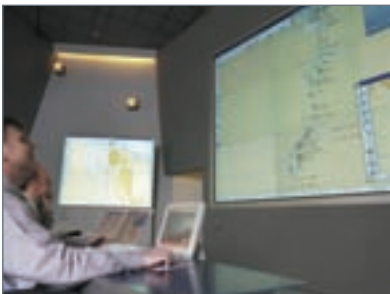
# Ports, waterways, coastal & maritime security

## Vessel Traffic Services and Common-Operational-Picture for disaster management - Case study

In February 2005, Barco was selected by the Shipping Assistance Division of the Ministry of the Flemish Community in Belgium to build a new Maritime Rescue and Coordination Center (MRCC) in Ostend together with Fabricom GTI and Tein Telecom.

Barco delivers an integrated monitoring system combining an advanced version of OPScenter VTS with an Incident Management System and a Search & Rescue module.

With the new system, operators will be able to display traffic data coming from different external sensor sites such as the 'Schelderadarketen' (Scheldt radar chain). In case of an incident, the MRCC can rely on a lean, reliable and cost-effective Incident Management System, which fully supports all port control and maritime rescue activities.



Large-area displays used for maritime security operations



Common-Operational-Picture on large-area display



Outside view, multisensor inputs for MRCC

Along with its role as maritime coordination center, the new MRCC will also be used as incident room and press information center. For this purpose, Barco will install a large-scale high-resolution OVERVIEW display with the TRANSFORM A graphical controller and APOLLO display wall management software, providing 24/7 operational capability with multiple inputs and adjustable screen layout functionalities. In this case, the MRCC Ostend can choose to display the information from their radar network, cameras as well as other systems simultaneously to provide an immediate situational awareness overview of the overall port. The large display is required to support the high pixel count and size to be able to create non-cluttered overview of the port operations crucial to coordinating multiple activities and monitoring their progress.

One of the key security concerns today is the safety and security of ports. Barco's Control Rooms and Vessel Traffic Services (VTS) divisions are closely collaborating to provide solutions that ensure the safety and efficient operations of maritime transportation systems, waterways and the ports into which the vessels travel.

Barco's VTS systems today are no longer reserved for major ports, waterways and maritime authorities, but are increasingly significant for a wide array of smaller though equally important maritime service providers. Barco has designed affordable, versatile entry level VTS systems, fulfilling standard to advanced requirements for vessel traffic services. Barco provides state-of-the-art technology and components offering high-performance and highly reliable vessel traffic management services across a wide range of VTS needs.

**Barco focuses on  
Common-Operational-Picture**

The nature of maritime crisis management means that different agencies such as the military, anti-terrorist units, emergency response services, security companies, ship owners and harbor organizations, are dispersed in virtual organizations. They need to work together to look at situations, assess the risks, identify potentially critical situations that may develop into crises, develop strategies for aversion, mitigation or aid, plan for these and then implement. Continual re-planning and updating is also required as the situation changes. Different agendas, levels of awareness of the problems, different resources and resource allocation mechanisms, different language and terminology, organizational structures, command structures, levels of empowerment, different access to technology and so on must be considered. Given this, it is difficult for information and knowledge to be shared to ensure a high degree of group awareness of how the situation is managed to ensure timely, accurate and effective decisions are made throughout the process. With Barco's Networked Visualization solutions, the Common-Operational-Picture can be composed of any networked sources and can be shared with all network enabled parties.

**Barco's worldwide  
references for  
ports & waterways  
management**

**Singapore Harbour**

**USCG**

**Estonia Coastal Surveillance**

**Zelzate bridge**

**Port of Houston Police**



## US Coast Guard

In September 2004, after receiving an \$8 million Blanket Purchase Agreement (BPA) in August 2003, Barco Control Rooms was awarded an expanded purchase agreement from the United States Coast Guard for the delivery of large display wall solutions that will play a central role in the Command Centers of the US Coast Guard. The expanded BPA brought the total purchase authority of the contract to \$23 million over the next four years. With this new contract, Barco further strengthened its position as the leading supplier of large screen display solutions for Homeland Security requirements.

In September 2004, the United States Coast Guard (USCG) completed the first installations of Barco's large screen visualization platform at each of its Area, District, and Section Command Centers, providing operators with a robust Command and Control Display System. To meet increased Homeland Security responsibilities and traditional CG missions, the system will facilitate overall awareness, mission planning and execution, and decision-making. The system is a large-scale display that provides 24/7 operational capability with multiple inputs and adjustable screen layout functionalities ideally suited for Common-Operating-Picture and scenario building and dissemination.

This allows the Coast Guard operations to develop a situation awareness based on different inputs from multiple disparate systems on one overall view and to formulate decisions for response in a timely manner, taking into account all aspects of intelligence. The overview size is also important as this helps the operators within the same operational center to collaborate and provide input to interpret the situation simultaneously and in concert.



# Council security & traffic management

## Case study



### Camden County Council, UK

Camden County Council is responsible for the security of the town. A vital tool for this, is the use of a significant number of cameras placed around the town. The introduction of Closed Circuit Television (CCTV) has been one of the best weapons against crime. It has been proven to be effective in both cutting and detecting crime and, as a result, people now feel safer when they're out and about.

The Home Office states CCTV surveillance is particularly valuable when used as part of a wider crime reduction strategy, thus strengthening partnership with the local police. Pictures from the cameras are continuously monitored in real time at the Communications Centre and can also be viewed by the police from their offices.

#### The CCTV control room at Camden

Space is at a premium at Camden. Previously there was a monitor stack in place which uses one camera feed per monitor. The monitor stack offers a high resolution but requires extra monitors to be added as cameras are added. This is not only costly but takes up a lot of space and continually increases power consumption and the resulting need for expanded air conditioning. The requirement was therefore set for a system that would be flexible enough to allow the increase of camera feeds and yet still maintain resolution and quality of image. Another consideration was the networkability of the software, enabling multiple operators ease of access and ease of use.

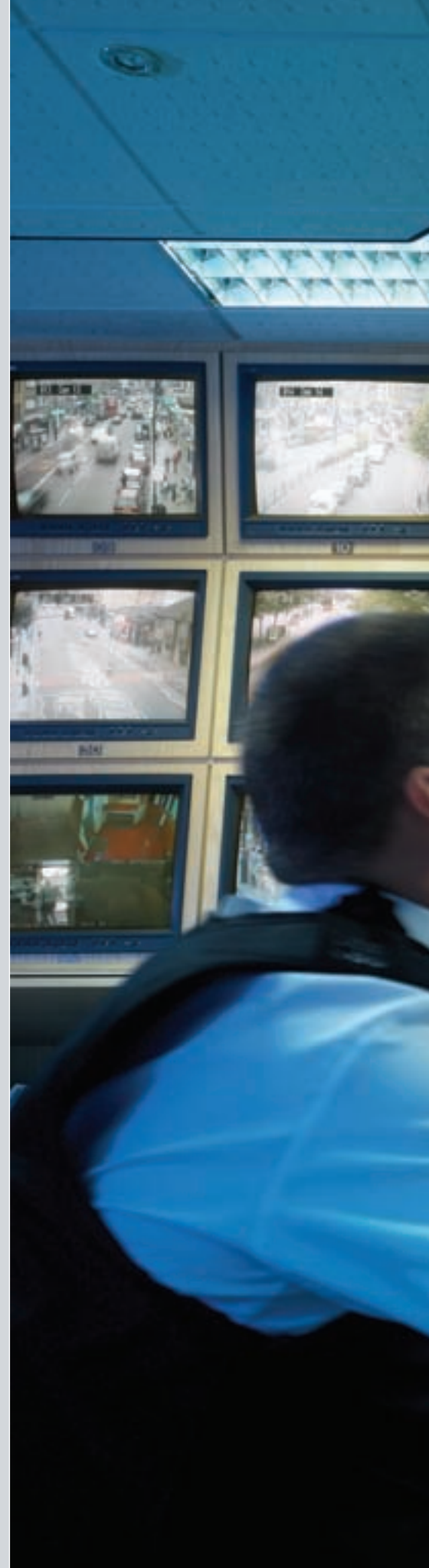
The officers at Camden needed to be able to view historic footage along side current footage for comparison purposes as well

as access the internet from the control room for complete information review.

The Barco iSURVEILLANCE solution resolved these issues easily. There are a total of three 80" displays all based on Barco's latest high resolution DLP™ rear projection technology. Two are used for community safety and one is used for the parking section, and all ensure optimal image quality. The multiple camera feeds are routed via Barco's compact HYDRAS populated with analogue video inputs and RGB computer inputs.

The new system also now facilitates integration of data information. Mapping software provides helicopter views, while live camera feeds can be viewed adjacent to the actual cameras location on screen. Currently the Barco displays are operating alongside conventional monitor stacks. Clive Paul, Camden's Control Room Manager, already has plans underway to move the whole control room over to the Barco solution and make more of the space and technology available.

Simon Turtle – Market Development Manager, Traffic and Surveillance, EMEA stated 'The Camden application provides a perfect example of the benefits that Barco's iSURVEILLANCE solution provides over and above the conventional monitor stack. Camden divide their systems between the town center monitoring and Parking enforcement. The added flexibility in terms of multiple sources; image scalability; low cost of ownership and ability to easily migrate to digital sources both now and in the future will ensure Clive that his team's plans will be easily met.'



FRI 12 AUG 14:12



# Disaster management

## Case study

In its primary role, a National Disaster Management Center heavily relies on a control center to help visualize information from diverse sources and groups in order to form an accurate picture of the situation and facilitate decision making.

Typically this represents a large system in which multiple emergency response teams would gather in multiple control rooms, visualize their respective situations and share those visualizations with each other. This control center is comprised of several control rooms, all inter-connected with an IP network to allow sharing of images and visualization content. The nerve center of this operation is the central decision room where the minister in charge and his respective staff and colleagues would be provided with an overview of the events from the appropriate sources and make final decisions on how best to allocate resources and priorities.

In this project, Barco provided several large display walls of varying sizes from 3x2 50" display configurations to 6x2 67" display configurations for each of the control rooms.

These control room visualization walls are all controlled by the Argus processor and are connected to each other via an IP network powered by equipment from



CISCO. In addition Barco also provided multiple overhead projectors and flat-panel displays which are used for other meeting rooms and also to augment the viewing of the walls. The projectors and flat panels are also connected to the IP network. Feeding this IP network are various sources of video and audio signals as well as applications. Due to the fact that these signals are all digitized and available on the network, this information can be viewed anywhere, anytime. Networked visualization of any source on any display wall, projector or flat panel may also be controlled from a central point (and respective control rooms) via software. This allows the disaster management center staff to be able to provide the central decision room with the ability to view any of the signals and launch any of the applications that are relevant to ensure fast and accurate decision making.

'The flexibility and scalability of the system was the primary reason for the selection of Barco'. The original concept included an analog solution but due to the unpredictable nature of emergencies, flexibility was paramount. According to the end users, 'Barco's all digital networked visualization solution provided us with the maximum flexibility

to add new signals with minimal effort and disruptions.' As the disaster management center is a 24/7 operation that runs 365 days a year, disruptions for system level changes are not acceptable. With a digital solution, new signals sources can be added without any cabling at the display points – only at the source connection to the network. In addition, routing comes for 'free'. This is achieved through the virtual switch fabric that is provided by a digital IP network where any source can be delivered to any point of the network as long as there is sufficient bandwidth. Therefore, with an IP network, the disaster management center has maximum flexibility to add and route signals to the limit of their network bandwidth.

This system also provides full audio support to operators at specific work stations who are interested in specific video and audio streams that are on the network. The operators are capable of selecting the corresponding audio signal of any video available on the various displays near their work stations from their workstation and listen to the associated audio feeds through headphones.

The system Barco installed represents a full IP audio visual network built on streaming video and audio technologies with integrated decoding on the visualization products. This solution represents one of the most advanced audio visual solutions, implemented over an IP network that Barco has integrated with its partners.



# Campus security

## Case study

*Due to the classified nature of the project, the detailed client information may not be discussed. However, the general design principles and requirements that Barco helped address may be extracted and presented.*



### Chevron, USA

Chevron is the second largest integrated energy company in the United States and one of the largest in the world. Its primary activities are Oil and Gas Exploration, Production and Refining. In addition, Chevron businesses extend beyond producing and refining with a chemicals venture, Chevron Phillips Chemical Co., and interests in 13 power projects in the United States and Asia. The company also looks to the future through the development and commercialization of several advanced energy technologies such as fuel cells, hydrogen storage and gas-to-liquids. Additionally, the company is investing in the field of nanotechnology, evaluating a new class of molecular building blocks that potentially may be useful in many industries.

Although Barco has traditionally supplied many control room visualization solutions for the control of oil and gas production and distribution operations worldwide, Chevron has also selected solutions from Barco to provide its security staff with world class visualization tools to help protect Chevron's critical infrastructure and assets at its worldwide headquarters.

In the new control room, Chevron operates a 24/7 surveillance and security operation with two operational positions. The primary functions are to manage access control, loss prevention, dispatching services, life safety systems coordination, site emergency responses, and coordination with local emergency responders such as police and fire services.

The security control room is a very compact and efficient operation. It manages all the above functions from a 30 m x 20 m operations center covering 14 buildings over 145 acres, with approximately 3500 employees and 200 visitors daily. The security systems manage over 350 Access Points and 175 cameras.

Barco, with its partners Spinitar and Catalyst Consulting, designed and installed a display wall in a 2 x 1 configuration using the cDR67-DL (67 inch diagonal with rear projection DLP™ system) powered by the HYDRA controllers. This system was designed to simultaneously display up to 64 live video inputs and two PC applications such as DVR client programs or access control programs. The display wall was chosen primarily 'to provide increased volume of displayed video information', Mr. Tim Downey, Project Manager for Catalyst Consulting said.

The visualization system quality and flexibility generally improves reaction times of its operators or users. Its larger viewing area also allows collaborative decision making as both supervisor and co-workers are able to view the scenario at the same time. Last but not least, the visualization system also saves energy and cooling costs due to the smaller power requirements – 2 x 150W per projector (300W for system) versus potentially 64 x 100W per monitor (6400W for traditional monitors). For mission critical operations, the displays are equipped with a redundant lamp solution that automatically switches if any of the projection lamps fail.

As summed up by Mr. Downey, 'The versatility for screen layouts and labeling, frameless screens to maximize use of space for displays, high clarity, high resolution and versatile integration of video inputs were important features for Chevron to maintain compact and efficient operations'.



## Traffic

### To achieve a common operational picture in ITS today

Intelligent Transportation Systems today not only have to address the traditional traffic flow management requirements but increasingly are also seen as a tool to both enable and enhance the security of critical infrastructures vital to the safety of society.

For example, for effective alternative route management there has always been a strong need to share information between Highway and City Traffic Management. With security concerns, however, the scope and complexity of information sharing takes on a new scale. The image on the right page shows how disparate the systems can be. It should be noted that while there are common components such as CCTV, the technologies deployed are often very different – ranging from traditional analog to streaming video with MPEG-2. In addition to different technologies, integration also has to accommodate different operational perspectives, command chains, priorities and last but not least dissemination of classified information. In such an environment, setting a common standard for all parties involved across different technological and political boundaries is not an achievable solution.

” Visualize any situation, anytime, anywhere ”

In this capacity, ITS systems will have to share information not only between traditional traffic jurisdictions and related agencies (e.g. fire and police) but also with regional and national security agencies to enable faster and better decision making for a more effective first response to natural and man-made disasters. Below is an example of integrated emergency response.

In concrete terms, all decision makers and stakeholders require a Common Operational Picture – to steal a word from the Defense and Security industry. The Common Operational Picture helps ensure proper collaboration, timely and appropriate decisions to result in the best utilization of scarce resources for the maximum benefit of society. This is similar to a medical analogy; performing triage to determine treatment priorities. The idea or need is not novel. Even within ITS there has been a push to enable different traffic management centers to share information or to serve as backup.

However, with flexible visual integration tools and properly designed network connectivity, there is a workable solution. In Barco's experience of deploying control centers worldwide, we regard this solution as networked visualization.



Typical ITS System			
Highway Management	Signals Management	Incident Management	TIS Management
Lane Control	Dispatch Service	CCTV Management	Reporting
Communications			
Network			
Cameras	Sensors	Devices	VMS

'Security' System			
Building Management	Guard Tour	Access Control	CCTV Management
Dispatch Service	Reporting	Communications	
Network(s)			
Cameras	Sensors	Devices	

'Surveillance' System			
Vehicle Registry	Duty Rosters	Offenders Database	Highway Management
CCTV Management	Dispatch Service	Communications	
Network(s)			
Cameras	Sensors	Devices	

Networked visualization is a collection of tools and capabilities that allow users to share video information, visualize data outputs, be able to compose new views or contexts consisting of video and data inputs, and the ability to display in proper rendered form at any point where the network is available.

In addition, it was envisioned to do all this without the need for any common software integration across disparate or classified systems! These solutions have been deployed primarily for military command centers where information from different security class applications as well as different command sectors are visually composed and then re-broadcast to enable a common operational picture for all command staff.

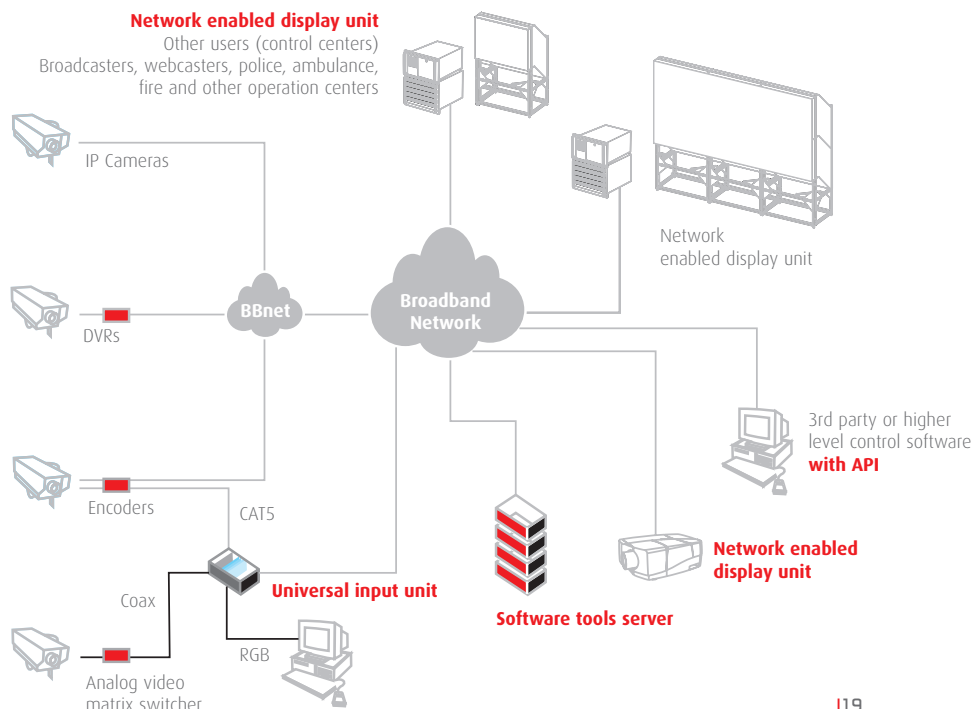
Other alternatives to networked visualization exist but would require even more disparate systems with different audio visual specific networking interfaces which are expensive to interoperate and transport across large networks that are physically far apart.

As illustrated here, Barco's networked visualization solution consists of the following components and capabilities:

- Universal Source/Input Capture Capabilities
- Network Enabled Output Displays
- Software Tools for composition, management, routing, etc.
- Application Programmer's Interface for integration.

The keys to the networked visualization solution are the standardization of data communications over IP networks and the integration done at the graphical (visual) level rather than the application level. These concepts are not novel. They have been in use for many years. For example, today one can screen-scan the output of one PC to be shown on a second PC over a LAN without the second PC being able to access and communicate with the first PC.

Barco's networked visualization solutions are unique in that they provide a large set of graphical or visual processing tools for all visual inputs, not just for computer data. This truly flexible visualization platform for input and outputs is then completely modular and distributed. Finally, this platform utilizes standard IP networks for interconnection for maximum cost effectiveness and interoperability. The combination of these in one platform forms a unique capability that is not available today.



With Universal Source Input capabilities, the networked visualization solution offers the ability to capture any type of input from composite analog video to serial digital interface to streaming video including RGB (computer) and keyboard and mouse inputs. With a modular design these capture units can be placed at the source or in a central location depending on the maintenance and operational model required. All units outputs in standard IP format which is flexibly transported using existing IP networking technologies. This allows universal connectivity and reach.

With Network Enabled Output Displays, users are able to connect IP networks directly to the display devices. Therefore, output displays can be configured to display any of the inputs natively or post processed inputs.

With the software tools, the users will be able to compose a collection of inputs (e.g. layouts), manage its display characteristics, route it to the proper display output, record inputs, playback inputs and execute the above functions based on predefined triggers (e.g. time, alarm, user command, etc.). These software tools will improve over time to enable users to execute more advanced features like graphical overlays, blending and other more interesting and context specific image processing capabilities.

With the Application Programmer's Interface, all Software Tools are packaged into a standard open interface to allow third party or higher level software to control the entire networked visualization solution. This allows users to customize their user interfaces and also develop special visualization routines, compositions, and functions for their different application requirements.

In summary, by processing the information at the graphical level and providing the proper input, output and control capabilities, disparate systems can be integrated without actually having to change any of the existing system. Graphical level processing integrates by working on the problem at a the visual layer, thus bypassing the need for application-level integration. This capability alone is not sufficient as the critical second piece is the ability to package this information and capability and deliver it over standard IP networking technology. Although not fully integrated from an application perspective, networked visualization provides an immediate and economical solution to an otherwise irresolvable problem. For some applications, the fact that it is not integrated is an added security benefit. Therefore, by processing information at the graphical level rather than the application level and leveraging standardization in networking protocols, visual integration can be achieved across disparate or classified systems without costly application level integration.

## Streaming video compatibility matrix

Name	Type	status	Format	Name	Type	status	Format
<b>AXIS</b>	241Q	Q4 05	mjpeg	<b>Siemens OTN</b>	MVIDIP	Supported	mpeg2
<b>AXIS</b>	2130	Planned	mjpeg	<b>Sony</b>	SNC-P1	Planned	mpeg4
<b>Bosch</b>	Videojet Xpro	Supported	mpeg2	<b>Sony</b>	SNC-RZ30P	Planned	mjpeg
<b>Bosch</b>	Videojet 1000	Supported	mpeg2	<b>Sony</b>	SNC-RZ25	Planned	mjpeg
<b>Bosch</b>	Videojet 8000	Supported	mpeg2	<b>Tandberg</b>	TT7116	Supported	mpeg2
<b>Bosch</b>	VIP 1000	Supported	mpeg2	<b>Tandberg</b>	TT6120	Supported	mpeg2
<b>Cieffe</b>	NETTUNO	Planned	mpeg4	<b>Tandberg</b>	E5710	Supported	mpeg2
<b>Cieffe</b>	NETTUNO	Planned	mpeg4	<b>Teleste</b>	easi BLUEbox	Supported	mpeg2
<b>Coretec</b>	VCX-2400-E	Supported	mpeg2	<b>Teleste</b>	S-Link	Supported	mpeg4
<b>DVB</b>	Man. Dependent	Supported	mpeg2	<b>Teleste</b>	EASI IPE	Supported	mpeg2
<b>iMPath</b>	i4000	Supported	mpeg2	<b>Telindus</b>	Cellstack Centauri	Supported	mpeg2
<b>iMPath</b>	i1000	Supported	mpeg2	<b>VBrick</b>	VBXcast 9140-4300	Supported	mpeg4
<b>IndigoVision</b>	VideoBridge 8000 882	Supported	mpeg4	<b>VBrick</b>	VB6000	Supported	mpeg2
<b>JVC</b>	VNC-30U	Planned	mjpeg	<b>VBrick</b>	VBXcast 9140-4200	Supported	mpeg4
<b>LANACCESS</b>	onSafe MPEG2	Supported	mpeg2	<b>VBrick</b>	VB4000	Supported	mpeg2
<b>Mavix</b>	MediaRacer 150	Planned	mpeg2	<b>VBrick</b>	VB5000	Supported	mpeg2
<b>Mavix</b>	MediaRacer 100	Planned	mpeg2	<b>Verint</b>	S1700e	Supported	mpeg4
<b>Mobotix</b>	Family of M1X-X	Planned	mjpeg	<b>Verint</b>	S1500e	Supported	mpeg4
<b>NiceVision</b>	Recorder Pro	Supported	mpeg4	<b>VideoLAN</b>	VideoLAN (VLC/VLS)	Supported	mpeg2
<b>NKF</b>	c20	Supported	mpeg2	<b>Visiowave</b>	Visibox	Supported	visiowave
<b>Optibase</b>	MGW3100	Supported	mpeg2	<b>Visiowave</b>	Visibox	Supported	visiowave
<b>Path 1</b>	Cx 1800	Supported	mpeg2	<b>Visiowave</b>	Evolution	Supported	visiowave
<b>Pelco</b>	PelcoNet NET4001A	Supported	mpeg2	<b>Visiowave</b>	Evolution	Supported	visiowave

This document is subject to change without notice. For latest information please consult the Compatibility Matrices section of the BCD Partnerzone  
 (\*) Interoperable: This is the minimal version of the firmware that needs to be installed on the board to support the specified compression protocol or feature.  
 A hardware upgrade is not required.



## Utilities & process control

### Supporting emerging countries in their growth and future development

Barco products are implemented in some of the largest utility infrastructure projects all around the world. These projects are needed to support emerging countries in their growth and future development. Barco products are chosen for their reliability of design, easy maintenance and the excellent international support capabilities making them perfect investment goods.

Some of the major infrastructures where Barco has provided large screen displays as an integrated solution with the large system integrators like Siemens, ABB, Areva or VA Tech include following projects:

- **Kazakhstan Electricity Grid Operation Co. (KEGOC)** Republic of Kazakhstan - upgrade of their electricity network. KEGOC, a state-owned company, runs the national high- and extra-high-voltage network, along with the associated

switchgear and substations. The corporate assets include 110- to 1150-kV transmission lines and master substations forming the national power grid that provides interstate flows and power supply from power plants connected to the regional power network companies and major customers. Total length of common transmission lines of the republic amounts to about 338,000 km (210,024 miles).

Barco will provide display wall, through Siemens for the major control center and several regional control rooms.

- **China Power Generation Pool**, China is enormously expanding its electricity pool. In 2004 there was a power generation capability of 2187 TWh with an annual growth of 14.5%. This results in the commissioning of hundreds of power plants. Barco is also providing dozens of display walls that will be used in the main control rooms of these power plants. Barco was chosen here because of its strong local presence.
- **Russia Power Grid** chose Barco and its local business partner Optima as their main partner for the visualization upgrade of the control and dispatching centers in Russia. This upgrade is required in the next 10 years as Russia is gearing up to become a major industrial power.
- **The great-man made river project** in Libya is regarded as one of the most ambitious projects in water, providing hundreds of farmers in the north of Libya with drinking water that is pumped from beneath the desert 1000 kilometers to the south besides large pumps and long pipelines, the project includes different SCADA systems that need to be visualized in the main central control room in Tripoli. Again, Siemens and the end user chose Barco as its main partner for this critical visualization center. The main center is also used as a visitors' room for presidents and kings.



NUON, The Netherlands

# From iStudio to the **new** Networked Broadcast Monitoring System

The success story of Barco in broadcast applications

For many years, Barco has been well known as the leader in visualization solutions. During the eighties, Barco introduced the first calibrated video monitor for the broadcast market. More recently, Barco anticipated the reduction of CRT manufacturing and launched iStudio, the first managed monitoring system for broadcast and distribution.

With iStudio, Barco is the only manufacturer providing a full system, including displays, controllers and software. This revolutionary system has been well received in the broadcast market due to the needs of customers to display more and more pictures with high flexibility.

iStudio offers the ability to display standard or high-definition sources with any size of picture with a 4:3 or 16:9 aspect ratio. In addition, iStudio provides the capability for dynamic updates of information including under monitor displays, tallies, clocks, duration timers or countdown timers.

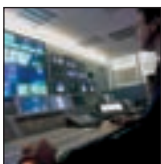
iStudio does more than display video; it also facilitates monitoring of the incoming audio and video signals and from these generates alarms and events. These alarms can be displayed on the screen and sent to a management system to assist the operators and service personnel. These capabilities have enabled the iStudio solution to be widely adopted by major broadcasters for use in their studio production and master control room environments.

Today Barco takes broadcast monitoring one step further with its new Networked Broadcast Monitoring System, which goes beyond the multi-viewer to facility-wide monitoring. This high-end solution allows high-quality, low latency distribution of video sources and metadata over an IP network to multiple screens, even in different control rooms, and offers ultimate flexibility for broadcast and distribution monitoring.

Barco's Networked Broadcast Monitoring System enables the operator to monitor the broadcast process and visualize the video content in real-time from anywhere in the facility.

2000

2000



- iSTUDIO
- HYDRA with up to 30 inputs
- Rear projection LCD 67" modules

2001

2001



- Front access LCD 70" modules

2002

2002



- Dual lamp front access with LCD 67" modules
- HYDRA up to 60 inputs, & HYDRA COMPACT up to 40 inputs & new Quad inputs boards

2003

2003



- New DLP technology
- Dual lamp DLP 67" modules
- iPRESENT
- New DLP 50" rear projectors with 3200K and 200W lamps







# There's more to master You'll see

Life's more than what you see. Revealing the unseen, showing the unsaid, anticipating the unexpected and understanding the unknown takes courage and dedication.

With Barco as a partner, together we can master the situation. Whether it is day-to-day campus security or coordinating the deployment of multi-national forces, we will help visually integrate intelligence and create shared situational awareness.

## ControlZone

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