Barco's Flagship Laser for 24/7 Control Rooms

About Barco

Barco, a global technology company, designs and develops networked visualization products for the Entertainment, Enterprise and Healthcare markets. Barco has its own facilities for Sales & Marketing, Customer Support, R&D and Manufacturing in Europe, North America and APAC. Barco (NYSE Euronext Brussels: BAR) is active in more than 90 countries with 3,300 employees worldwide. Barco posted sales of 1.029 billion euros in 2015.

1 Introduction

The whitepaper "Large Screen Visualization for Critical Infrastructure" revealed a clear **preference for rear-projection technology for large screen visualization in control rooms**. A total of 9 key requirements for control rooms were considered for the comparison between rear-projection cubes, near-seamless LCDs and narrow-pixel-pitch LEDs. These requirements included Ergonomics, Image Quality, Seamlessness, Real Estate, Reliability, Longevity, Serviceability, Power Consumption and Cost-of-Ownership. Rear-projection technology scored the highest in all these areas apart from Real Estate, where it scored moderately versus near-seamless LCDs and narrow-pixel-pitch LEDs – an easy compromise considering the critical benefits rear-projection cubes help fulfill.

Continuing to raise the bar in rear-projection-based display walls, the **Flagship Laser for 24/7 Control Rooms** is the newest state-of-the-art display product from Barco. The **ODL-721** is the latest addition to the OverView O series display walls from Barco. It is built by combining the strengths of the current front-runner OL product (its shallow depth, minimal real estate, choice of screens, front accessibility) with the next-generation illumination technology from Barco in the form of the RGB laser light engine, bringing many distinct and important advantages to end users.

Following the market trend of the ever increasing global popularity of the 70" diagonal at HD (1920x1080) resolution, the next logical step for Barco was to release its Flagship Laser for 24/7 Control Rooms under this category.

2 Benefits of Barco's Flagship Laser for 24/7 Control Rooms

2.1 Sustained brightness

Barco's Flagship Laser for 24/7 Control Rooms offers the **highest possible combination of brightness and lifetime**. This is a critical parameter pair. While some laser (phosphor) cubes may claim comparable or higher brightness, they suffer immensely from longevity issues.

With unparalleled brightness of up to 2 times that of conventional LED-lit video walls, the ODL-721 enables control rooms to operate equally well in a bright daylight setting as in a closed environment and achieve brightness levels equaling those of LCD display walls. Such high brightness levels also offer a major advantage when visualizing 3D stereo content in VR (Virtual Reality) centers.

An exceptional lifetime of over 11 years in continuous 24/7 operation mode is made possible through the use of independent red, green and blue laser light sources as opposed to consumable parts such as phosphor color wheels, which decay over time and thus affect the maximum possible lifetime. For this reason, laser-phosphor technology is not recommended for use in 24/7 control rooms. The ODL-721 supports over 95% brightness uniformity (ANSI 9) and is capable of on-screen brightness levels up to 620 NITS.

By way of comparison, Barco's best-in-class near-seamless LCDs are capable of achieving on-screen brightness levels between 500 NITS (KVD series) and 700 NITS (OVD and IVD series).

2.2 Ultimate image quality

Laser-sharp contrast and the richest colors deliver a **never-before-seen image quality** ensuring that no detail is ever overlooked in critical operations. Experience the richest colors thanks to the unmatched focus, sharpness and contrast levels. The ODL-721 supports brightness uniformity of over 95% (ANSI 9) and color uniformity of up to 170% of the EBU Color Triangle.

2.2.1 Automatic calibration

Barco's next-generation **Sense X automatic brightness and color calibration** technology is now also embedded in the ODL-721 product. This ensures that the brightness and color of all ODL-721 displays are uniform at all times. Since the ODL-721 uses extremely stable and narrow-bandwidth laser light sources, the (micro) deviations in light spectrums no longer need monitoring using a spectrometer. Hence, with Sense X, each ODL-721 uses the latest generation of an advanced high-performance dual-use sensor providing a unique sensor algorithm for narrow-band laser light sources to determine brightness and color uniformity and accuracy.

2.2.2 Brightness & color uniformity

The ODL-721 supports brightness uniformity of over 95% (ANSI 9) and color uniformity of up to 170% of the EBU Color Triangle.

2.2.3 Screen options

The ODL-721 continues to offer the same variety of choices for screens as previous-generation products. Three screen types are available: Barco's revolutionary NoGap screens, WV-FEL screens and CSI screens, depending on the application and screen requirements. Each screen has unique characteristics in terms of viewing angles and gains (see 1.6.1 below for further details).

Barco's **NoGap** screen technology produces video wall screens that are extremely robust and not sensitive to temperature or humidity changes, which means that the traditional screen expansion gaps between cubes are no longer necessary. **NoGap** screens therefore touch each other, delivering a smooth video wall image with very limited interruptions. The NoGap screen is the most robust screen available anywhere and has passed stringent tests that include a ball drop test (dropping an iron ball of 1 kg from a height of 1 meter onto the screen). It can also be cleaned easily using commonly used non-alcohol-based solvents. Barco places maximum importance on user safety, and has also tested the NoGap screens for immunity against seismic activity to a value of 1G in accordance with the DIN IEC 60068-2-6: 2008-10 standard.

2.3 Eco-friendliness

A large display wall meant to run continuously for over 11 years should be as **energy efficient** as possible to save on energy costs over the long lifetime of such a product.

2.3.1 Power consumption

The ODL-721's **runs at 25% less power** than Barco's previous-generation LED-lit front-runner product at higher brightness, demonstrating immense technological advancements towards a greener product with this next generation of rear-projection displays.

2.3.2 Energy efficiency (W → Lu)

Energy efficiency of the ODL-721 **rates three times** that of the previous-generation LED-lit displays. Each watt of power supplied to the ODL-721 converts to 7.5 lumens as compared to just 2.3 lumens in previous-generation LED-lit displays. Meaning, every cent you spend on powering your Barco ODL-721 display wall gets you three times more brightness than before. Of course, if you were to operate your display wall at the OL brightness levels, this means 50% less power consumption or 50% less energy costs!

2.4 TCO

Equally as important as energy efficiency is the need for large display walls to adhere to a **low cost of operation** during their long lifetime of over 11 years. Several factors come into play when determining accurate Total Cost of Ownership, including rear estate costs, serviceability, remote maintenance, consumables, commissioning time and upgrade path availability.

2.4.1 Reduced real estate costs

The ODL-721 preserves the advantages of the previous-generation **shallow-depth cubes** making it space efficient with minimal real estate in the control room.

2.4.2 Flexible serviceability

Apart from standard rear access for servicing, the ODL-721 is also available in a **front access** variant that further minimizes the space needed at the back of the display wall and therefore saves even more space.

2.4.3 Non-interruptive remote maintenance of remote power supplies

Leveraging on Barco's innovative **remote power supply technology**, the ODL-721's power supplies can now be hosted away from the control room in an IT or equipment room. Customers now have the option to use either the inbuilt power supply or the 1U rack-mountable power supply with hot-swappable bricks that are user selectable (in terms of power ratings) and provide for redundancy. Not only does this allow maintenance tasks to be carried out remotely without disturbing critical operations in the control room, it also enables managed IT services to perform independent maintenance within the IT/equipment room. More peace of mind for your control room operators!

2.4.4 No color wheel replacements

Barco's Flagship Laser for 24/7 Control Rooms is fundamentally different from other display walls out there masquerading themselves as "laser cubes" as our product does not use laser phosphor as its light source. Laser-phosphor projection is a great improvement over lamp projectors and a good solution for meeting rooms where projectors are not used 24/7. However, a control room with critical infrastructure is expected to operate 24/7. When in 24/7 operation mode, laser-phosphor-based cubes can be expected to run continuously from 3 to 5 years (40,000 hours) at most – just half of the 9-year lifetime supported even by Barco's previous-generation LED-lit cubes. Barco's ODL-721 makes use of an **RGB laser engine**, providing a lifetime that is even 25% higher than that of LED-lit cubes. This **enables control room display walls to run continuously for over 11 years in 24/7 mode**.

2.4.5 Display wall commissioned with half the efforts

Up until the previous generation of rear-projection cubes, the entire display wall would need to be manually aligned by at least two engineers. Making geometric adjustments on the ODL-721 is easier than ever and only requires half the number of engineers, i.e. the same two engineers can now **adjust, align and commission the display wall with half the efforts**! All geometric adjustments on the ODL-721 take place through dedicated motor-based mechanisms. This includes fully motorized movements for adjusting X – Y, focus, zoom, keystone (H + V) and rotation through 7 settings using a software interface.

2.4.6 Upgrade path for future-proofing your investment

The ODL-721 will join Barco's successful display wall product line as the 10th-generation model! Throughout the 17 years of Barco display walls on the market, end users have vouched for the peace of mind brought to them by the guaranteed technology migration paths Barco continues to offer. Barco understands like no other that investments in control rooms are anything but short term and incorporates this fact rigorously when developing product roadmaps. A **guaranteed upgrade** path for Barco OL display walls protects and future-proofs our end users' investments, and Barco is and will remain committed to this promise.

2.5 Reliability

Several layers of redundancy are built in to all industrial-grade Barco products geared towards critical infrastructure applications. The ODL-721 is no different and provides even greater reliability than Barco's previous-generation LED-lit display walls.

2.5.1 Redundancy of Laser Banks

Each color segment is made up of two laser banks, each of which comprises eight diodes. For example, the red color is produced by red laser banks. Since there are two red laser banks and each red laser bank has eight red laser diodes, there will never be a situation in which all banks or all diodes fail at the same time. Hence, **each color is protected through a 16 light source redundancy circuit**.

By way of comparison, the previous-generation LED-lit engines offered 6 redundancies per color.

2.5.2 Redundancy of Laser Power Drivers

There is one circuit on the driver for one bank or 8 diodes respectively i.e. we have a 2 fold redundancy on laser driver side. For reference purposes, the previous generation LED-lit engines offered 2 power supply driver redundancies per color.

2.5.3 Redundancy of External Power Supplies

One of the weakest links in the chain and one of the major points of failure for any industrially built electronic product is now a thing of the past. Barco's revolutionary **redundant power supplies** are now also available for order with the Flagship Laser for 24/7 Control Rooms. Redundant power supplies provide ultimate peace of mind by mitigating power supply failure risks. If a power supply fails, the backup power supply takes over in a split second without any downtime at all. Furthermore, being **hot-swappable**, the faulty power supply can be removed and replaced with a fully functioning one without any downtime of the display wall.

2.5.4 Planning for future peace of mind

By working with Barco, our partners and end users are partnering with the only **trusted brand** with decades of expertise in providing innovative control room solutions. Barco's product innovations strictly adhere to the demanding industrial requirements of the mission-critical control-rooms market, ensuring the longest term for protection of investments and an assured technology migration plan. Barco is a global manufacturer who can claim that the **entire system has been designed and manufactured by the display wall manufacturer itself** - including the engines, structures and dark boxes. Core components such as engines and dark boxes are manufactured at Barco's own plants. With a stated lifetime of over 11 years (100,000h), it is very important for end users to understand that they should only buy from a technology vendor who has complete control over every part that goes into the product. If they buy from someone who does not have such complete native control, there will be no guarantee in terms of availability of spares or possible technology upgrade paths over the 11-year lifetime period. Talk to us in 11 years, and we'll be here to assist you!

3 [Checklist] Ask your vendor the following important questions!

3.1 Is there a color wheel in my control room laser display wall?

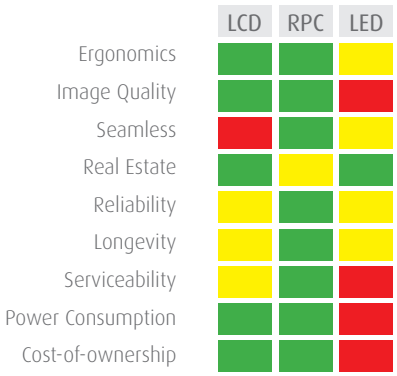
3.2 What is the guaranteed on-screen brightness level?

3.3 What is the guaranteed lifetime at the above guaranteed on-screen brightness?

3.4 What are the half-gain angles of the screen at the above guaranteed on-screen brightness?

4 Conclusion

When taking the requirements of control rooms into account and testing technologies against those requirements, the most logical conclusion is that Rear Projection Cube (RPC) technology is the best overall solution.



Barco's Flagship Laser for 24/7 Control Rooms now raises the bar even further for all large-screen visualization products, making it the new reference point for critical infrastructure management control rooms globally.

5 Appendix

5.1 Screen options listed with their viewing angles, brightness, lifetime and power consumption

Mode	On-screen Brightness (cd/m²)			Engine Lifetime (hours)	Power consumption (W)
	WV-FEL	NoGap	CSI	60000	260W
Boost	800	680	550	80000	200W
Normal	620	530	430	100000	120W
Eco	310	265	215		
Horizontal Half-Gain Viewing Angle	38°	36°	36°		
Vertical Half-Gain Viewing Angle	21°	33°	34°		