White Paper

Resolution Matters

Why would someone who needs a control room display system or video wall choose one technology over another?

Overview

The current crop of digital display technologies provides a wide range of capabilities, resolutions, sizes, and brightness at a wide range of prices. New technologies, like Direct-View LED, are competing with established technologies, including LCD panels and projectors. So why would someone who needs a control room display system or video wall choose one technology over another? The choice involves trade-offs between resolution (how much information can be displayed), size (how much information and how large can it be shown), and cost.

Control rooms, including NOCs, SOCs, threat assessment centers, fusion centers, and more, typically have lots of data to show: maps, SCADA applications, camera feeds, monitoring dashboards, video feeds, etc. This combination of high information density and the need to show it to several or many people at once leads to the need for a large display system, typically at the front and, often, sides of the room. Currently, these display systems are video walls comprised of LCD panels or projectors, or even a combination of the two.

LCD Panels

LCD panels provide high resolution, good brightness and viewing angle, and moderate power consumption at reasonable cost. LCDs are also easy to align with proper mounts and can be bought with thin bezels, so the view will be minimally obstructed.

Projectors

Projectors can cover a large area with moderate resolution and little to no obstruction of the image. Projectors can be aligned precisely with effort and technology. High brightness projectors can be very expensive, but moderate brightness ones are reasonably priced.

OLED Panels

OLED panels have not caught on in 24/7 operations, even though they are often used in high end TVs, because of shorter lifespan and burn-in that currently makes them less suitable for control room video walls.

Direct View LED Panels

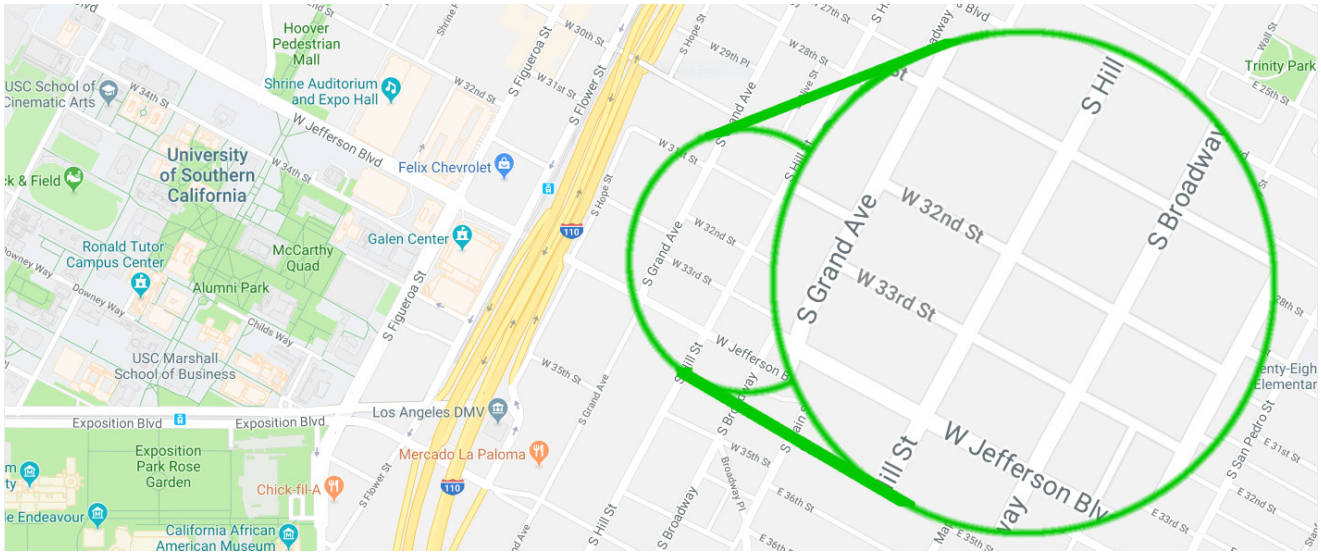
A newer display technology that is gaining popularity is direct view LED. These systems are very bright with typically excellent viewing angle and can be quite large, though with lower resolution than LCD panels. Direct view LED display meshes appear seamless, even though they are composed of modular tiles fitted together precisely. The defining characteristic of these systems is their pixel pitch – the distance between rows or columns of pixels. These can vary from a few millimeters to 0.9mm (though smaller is surely coming). Usually the several millimeter pitch systems are used in concert venues and for long-distance viewing, while 1.9mm is common for digital signage. As the pixel pitch decreases, the cost increases, often dramatically. Using current technology, an LED display system that could be suitable for a control room (say 1.2mm pitch) is likely to be much more expensive and have significantly lower resolution than a similarly-sized LCD panel video wall.

Does that resolution matter?

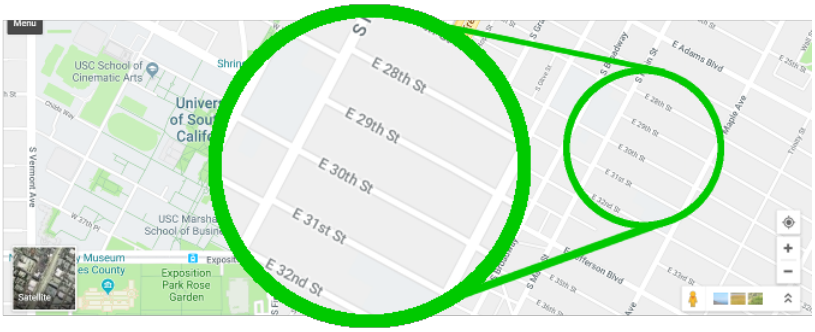
In short, for control rooms, yes; for digital signage, no.

Since the goal of a control room is to show lots of information to help the people in the control room make the best decisions as quickly as possible, resolution does matter. A high-resolution video wall can show significant detail much more clearly than a low-resolution display of the same physical size. Even when viewed from a distance, the detail is still apparent, and that detail could be critical to decision making. The pictures below show examples of high

resolution Google Maps imagery. Both images have been scaled to 50% to conserve space, but a full-resolution zoomed area is preserved to show that more detail is preserved in the higher resolution image. This becomes even more apparent if the content is zoomed out on the display. Try zooming out your web browser now (pressing Ctrl-Minus to zoom out, then Ctrl-Plus to zoom back in). Isn't the higher-resolution image much easier to read and comprehend?

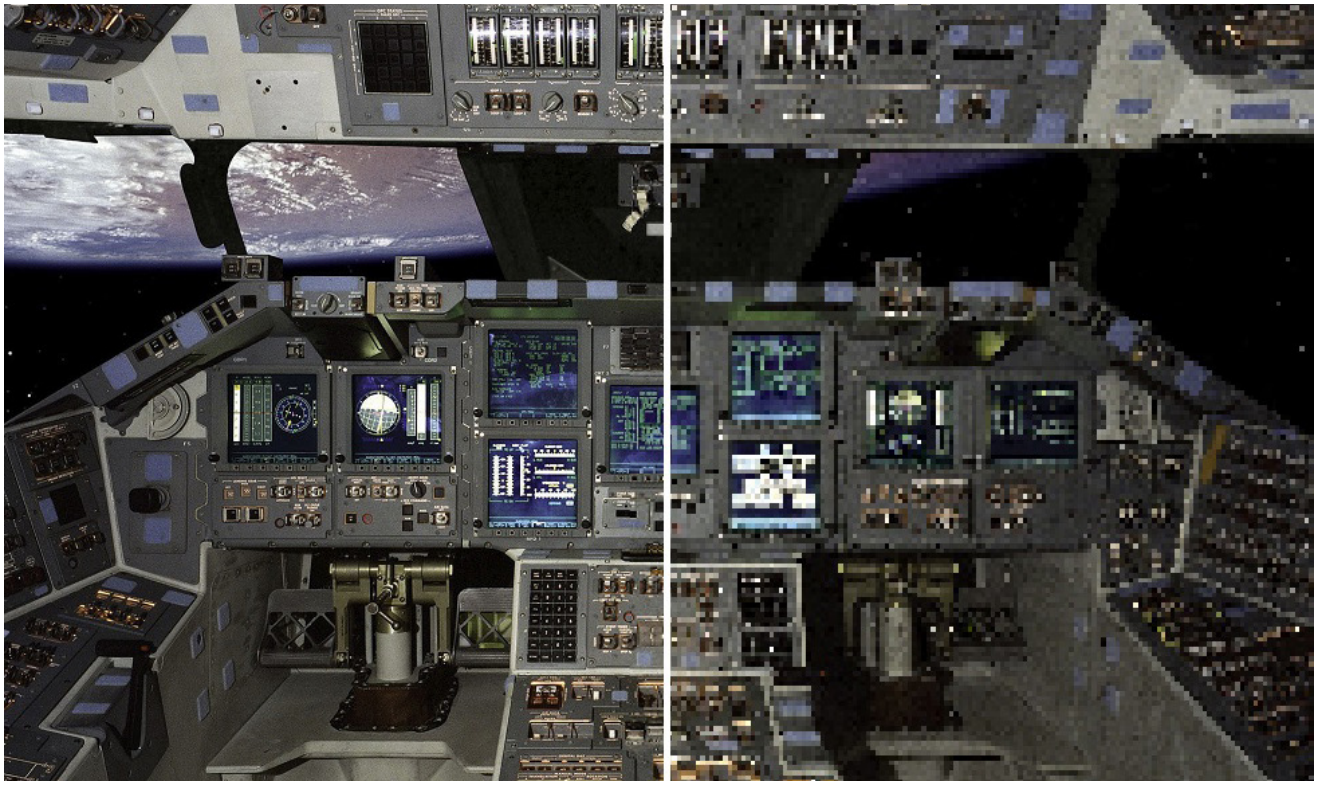


High resolution map shows more details than the lower resolution one below, even when viewed from a distance or zoomed out.



The lower resolution of direct view LED displays becomes even more apparent when content is zoomed out. Because the pixels are so large, zoomed out imagery or content becomes chunky and pixelated, making it very difficult to read and not as valuable for situation assessment and quick decision making.

So, does this mean direct view LED systems are bad? Absolutely not. Currently, they're not appropriate for control rooms that need to show lots of content, because of the low resolution and high cost. They are terrific for digital signage, where information density is much lower. As the pixel pitch gets smaller and smaller, and as prices go down over the next several years, they will begin to be more appropriate for control rooms. Once the pixel pitch is 0.7mm or below, the amount of information that can be displayed, while still not as good as LCD panels, will be reasonable. Then the very compelling seamless nature of direct view LED systems may become more important than the lower information density they can display. Choose technology to drive your Control Room video wall that is display agnostic and future proof so you can replace your displays with newer technology when it becomes compelling without having to replace the entire system and disrupt your workflow.



Here's an example of high resolution (on the left) vs. low resolution. Obviously high resolution conveys a lot more detail.

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