

Case Study



Case Study: Vatican Mobile Podium

Space Cannon uses LUXEON Rebel to Light the Stage for the Pope.

There may be over 1.1 billion Roman Catholics worldwide, but there is only one Pope, and there is an insatiable demand from the faithful for his presence at both formal and less formal events. So in late 2005, the Vatican Director of Technical Services, engineer Pier Carlo Cuscianna, envisioned a way for Pope Benedict XVI to meet the many requests he receives to address large audiences—both inside and outside Vatican City—in a way that was intimate and dignified, but at the same time easily portable.

With the help of Vatican architect Giuseppe Facchini, Mr Cuscianna conceived a podium-in-a-trailer, capable of being towed by a standard road vehicle, that when opened becomes a 10m x 10m stage. When closed, it is the size of a standard trailer, riding easily on highways, passing underneath typical highway underpasses and, most importantly, fitting through the Arch of Bells, one of the main entrances to the Vatican City.



PHILIPS

LUMILEDS
LIGHT FROM SILICON VALLEY

When it arrives at its destination, the Vatican Mobile Podium automatically assembles itself, quickly and without manual assistance, into a stable, well-lit 100m² platform with broad stairs, handicap access, and a 4m-high ceiling.

Lighting this stage are 196 luminaires from Space Cannon (www.spacecannon.it), each of which contains 10 LUXEON® Rebel LEDs from Philips Lumileds (www.philipslumileds.com).

How the Podium Works

After rolling into place, the sequence of the Podium assembly begins with the unstacking and sliding of four deck modules that form the platform. Next, the two vertical pillars rise in a telescoping structure to form the sides and raise the two ceiling panels. Finally, these two panels rise and unfold in two sections like giant wings to form the roof and ceiling. The entire sequence is performed by electro-hydraulic motors under electronic remote control from a touch-screen panel, and is completed within minutes.



The external surface is covered with stainless steel and sheet aluminium, while the stage itself is surfaced with teak wood decking. The Podium is accessible in front via a broad flight of steps, with separate handicap access. Apart from the mechanisms moving the wings, the cover contains an infra-red heating system and LUXEON-based lighting exclusively planned and produced by Italian manufacturer Space Cannon for the Podium.

The Lighting Design Problem

Lighting designers at Space Cannon were asked to supply a lighting solution after the failure of a standard luminaire produced by another company. But the roof space had already been manufactured, and so the size of the holes in which the downlighters were to be recessed was now fixed. The first luminaire was rejected because its total light output was insufficient for television cameras to be able to shoot high-quality footage.

Space Cannon therefore had not one but a number of considerable technical challenges. Vanni Roldi, Designer at Space Cannon, describes the problem: "The chief requirement was to design a luminaire that produced dramatically more light than the original luminaire, but with exactly the same mounting area.



At the same time, our luminaire had to be robust—the Vatican hauls the Podium for thousands of miles over public roads, so the light fittings and components get shaken about and bumped.

Then, on top of that, the Vatican told us the Podium had to offer a low power profile, so that the mobile stage could be powered up in outdoor locations that did not have access to a mains electricity supply. This ruled out the use of halogen lamps.

To top it all, we had to move very fast! The lighting element of the project was now running behind schedule because of the failure of the original luminaire."



Space Cannon's Solution: Light By LUXEON

It was clear to Space Cannon that the only technology capable of meeting these requirements was the high-power LED. LEDs are extremely resistant to shock and vibration, they are compact, and they are a highly efficient light source.

But the chief requirement—raising the light output without increasing the mounting size—led to Space Cannon's choice of the LUXEON Rebel LED from Philips Lumileds. This tiny but powerful device offers higher light output per mm² than any other LED. A LUXEON Rebel package is just 3mm x 4.5mm, a footprint 75% smaller than any comparable surface-mount power LED.

So small are they that Space Cannon was able to fit 10 neutral-white (4000K) LUXEON Rebel LEDs in a luminaire that fits a 37mm mounting hole. The output from each luminaire exceeds the 500 lumens specified by the customer. In fact, each downlighter is almost as bright as a car headlight.

In keeping with the requirement for maximizing light output, Space Cannon chose to use the 150° optics that come as standard with the LED. As Mr. Roldi says, "Our priority was to achieve a high density of light sources in the ceiling. The use of secondary optics would have decreased overall system efficacy."

With so many LEDs so close together, considerable heat is generated at the printed circuit board on which the LEDs are mounted. But the PCB is mounted on an aluminium body that has an aluminium heatsink affixed to it. The heat is dissipated effectively into the free air in the roof space of the Podium, with no need for forced-air cooling.

Outstanding Results

"This little 10W fixture represents the perfect mix of advanced technology and high quality," says Bruno Baiardi, Founder of Space Cannon.

"These high-efficiency LUXEON LEDs have an extraordinary light output, and allow our designers to dramatically reduce the dimensions of the fixture. The resulting Space Cannon luminaires have outstanding resistance to extreme operational temperatures, vibrations, and shocks. At the same time, they are extremely safe and provide easily manageable heat emissions."

Mr. Cuscianna agreed: "It can get very hot in Italy in the summer. Typical stage lighting makes the situation even worse. The Space Cannon luminaires are not only efficient and durable, but they are also more comfortable than any of the other options because they radiate no heat into the lit area."

The Podium was inaugurated on Sunday, June 3rd 2007 in Rome, and is now used regularly by the Pope to address huge crowds in St Peter's Square and venues around Italy. It has passed all the technical and design tests it was set, operating reliably from the beginning while providing a high output of attractive light that allows the Pope to be viewed by thousands of visitors and millions of viewers watching the pictures taken by the TV cameras that follow the Pope around Italy.

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