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THE ONLY WAY IS UP!

YAS HOTEL - THE
BIGGEST LED PROJECT
IN THE WORLD

YAS HOTEL

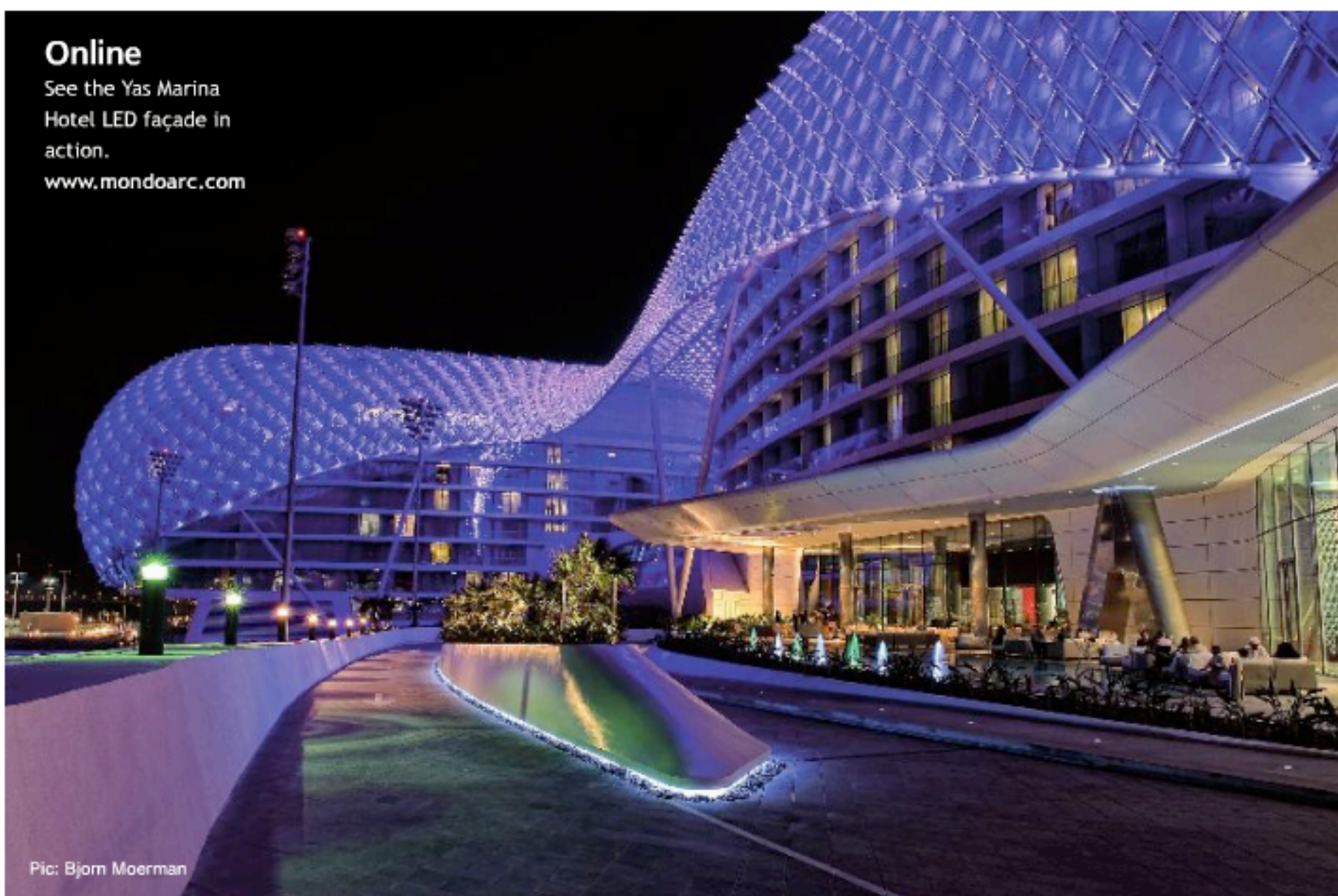
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ZIAD FATTOUH INTERVIEWED • EVENT HORIZON? 2009 LED ANNUAL ROUND-UP

LED ISSUE 09/10

Online

See the Yas Marina
Hotel LED façade in
action.
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Pic: Bjorn Moerman

LED PROJECTS

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Arup Lighting creates an iconic installation in time for the Abu Dhabi Grand Prix.

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I've seen the future of LEDs. And it's good.

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TALL AND MIGHTY

Andrew Hyman takes a look at an expertly engineered project in the capital of Estonia

Following a two-hour ferry across the Gulf of Finland from Helsinki to the Estonian capitol of Tallinn, visitors arriving during the evening can easily spot in the distance an urban feature not commonly found within this capitol city of 401,000 residents: an LED-washed facade. Located roughly half a kilometre inland from Estonia's largest port is the newly constructed headquarters of Tallink Group. This publicly-traded, Estonian-based organisation is one of the region's largest passenger and cargo ship companies operating within the Baltic Sea region.

Designed by innovative Estonian architectural firm Meelis Press Architects, this four-story building features a repeating pattern of diamond-shaped supports surrounding three-quarters of the facade's perimeter. The concrete pillars provide structure for a glass-skin, characterized by both vertical and inward-sloped surfaces, a unique architectural feature not commonly found within this city. By incorporating the use of LED, Meelis strived to develop a "visually-accessible" canvas of colour that would allow their work to become an icon of light

within the surrounding underlit environment. Meelis invited several companies to participate in developing the best strategy for discretely blending light sources within the 400mm-deep supports. Out of all the companies, only one lighting team provided a demonstration based on precise calculations. Having successfully collaborated on several projects previously, Volta Lumen offered a solution that was welcomed by the firm: a custom-designed project-tailored luminaire.

Volta Lumen is a small, eight-person design-studio/solution-provider led by electrical engineer Madis Reivik. At only three years old, Volta Lumen is gaining recognition by manufacturing locally designed, highly technical lighting products. They are an independent department of 110-year old electrotechnical company Volta AS, who have supported a wide range of mechanical and electrical services over the years. As they began receiving ever-increasing requests for lighting services, Volta AS saw an opportunity to develop a new group specifically for supporting their clients. As engineers of

light, Volta Lumen's designs are meticulously thought out and crafted, creating functional tools rather than ornate housings.

The Tallink luminaire is Volta Lumen's first outdoor-rated custom design. The 60W F97 is a fixture stripped down to its functional necessities. Elegantly minimal, the 245mm-wide IP67 wall-mounted unit has no visible cabling and is supported by a 5mm-thick aluminum mounting-bracket. Curved outwards and positioned between 25mm-tall heat sinks, an array of 24 Cree LEDs are grouped into six individual RGBW sets, housed under three different lens types. The F97 is visually unique in that it is characterized by a simple bend of aluminum. Though, the 56° curve is the result of finalized fixture locations and photometric calculations. With critical angle requirements, beam accuracies of $\pm 1^\circ$, and to retain the clean aesthetic of the fixture, adjustment control was deemed an unnecessary mechanical addition to the unit. Furthermore, the fixture is vandal-proof, designed to withstand excessive force from jumping, and was personally tested by the client, who while not able to break the

prototype, had to repair his office floor. The fixtures are installed in pairs within the upper and bottom coves of the diamond pillars. Volta Lumen's HE4x4FD sub-control modules, twenty-nine in total, are installed within the second-story and basement ceilings, supplying single-cabled power and data to individual fixtures via four separate ports. Although the Tallink F97's are configured as 4-channel luminaires, they can also be segmented into smaller sections if required.

The Tallink F97 went through five prototype revisions before installation, with Meelis providing minor suggestions on such characteristics as the fixture's bending radius, bracket thickness, and surface finish. The Volta Lumen team refined the mechanical design of the foot bracket, the lens optics, and the positioning of the internal wires.

One of the more complicated challenges within the project was in the illumination of the architecture's four corner pillars. Due to the positioning of the supports, and the casting of the concrete, the mounting locations were forced to be located on the forward-facing surfaces, rather than the internal coves. Yet again, function dictated form. An additional bracket was crafted, that required a series of precise bends within a single-axis, to ensure illumination continuity.

Although first appearing modest in comparison to towering skyscrapers clad in LED pixels, the Tallink Headquarters Building is a unique study in Estonian lighting aesthetics. Following in the footsteps of Estonia's Functionalist architectural style, the F97 is a significant marker within luminaire design trends. Developed from a highly proficient understanding in engineering and the materials' limitations, the luminaire blurs the relationship between fixture and structure. Six months following installation, the project has been operating without failure, and receiving positive feedback from the city. If Tallink Headquarters is one of Estonia's first LED facades, you should consider keeping the region on your lighting radar. This may only be a sample of what's to come.

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Project Details

Tallink Headquarters, Tallinn, Estonia

Client: Tallink Group

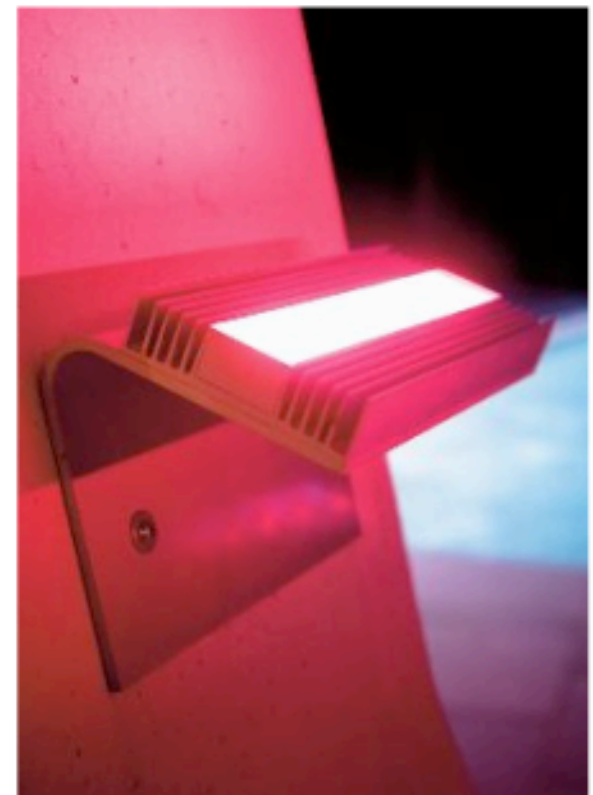
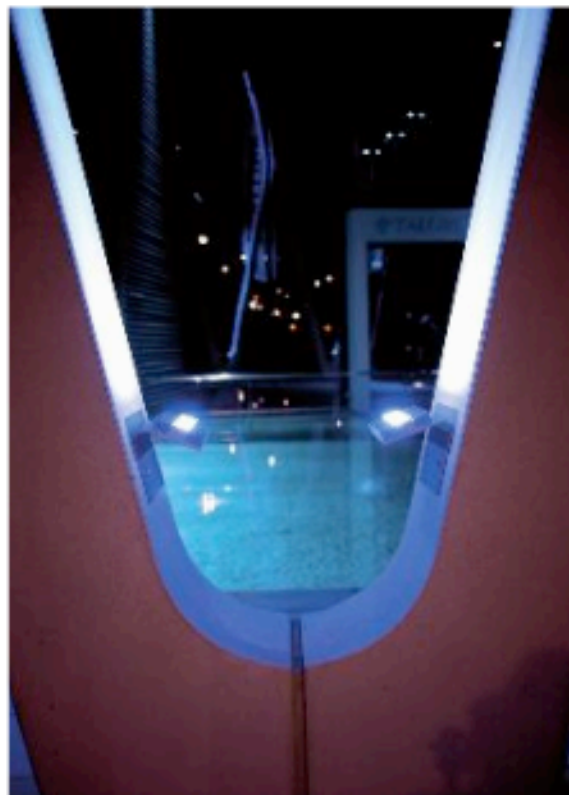
Lighting / Product Design: Volta Lumen - Madis Reivik

Architect: Meelis Press Architects

Architectural Engineering: Merko Construction

Lighting Specified

- Volta Lumen custom made Tallink F97 LED luminaires (60W)
- Volta Lumen HE4x4FD sub-control modules



The 245mm-wide IP67 wall-mounted Tallink F97 unit has no visible cabling and is supported by a 5mm-thick aluminium mounting-bracket. Curved outwards and positioned between 25mm-tall heat sinks, an array of twenty-four Cree LEDs are grouped into six individual RGBW sets, housed under three different lenses

