

Your Research Partner for Photonics Solu3ons

## CENTRE FOR ADVANCED PHOTONICS & PROCESS ANALYSIS

Innovation Through Light

# **Optical and Illumination Design**

### **Capability Case Study**

Efficient optical design can be a crucial element of product development, not only to ensure the correct spatial distribution and intensity of light delivered, but also to achieve this in the most power- efficient manner. CAPPA has the expertise and a suite of advanced software modelling tools (Zemax, Lumerical, Comsol) to address a range of design tasks, from simple illumination to complex optical components and complete optical engine design.

#### Case Study: Design of linear wall-wash optic

•Customer Problem: Retail/marketing sector. Optical redesign of an outdoor luminaire, illuminating a large (3x6m) target area. Current design provides weak and uneven illumination of target area. Alteration of form factor also required, to reduce manufacturing costs.

•CAPPA Contribution: Custom linear, extrudable, asymmetric/freeform lens designed.

•**Project Outcome:** Uniformity and efficiency of illuminator greatly enhanced (approx. doubled). Manufacturable and cost-effective design.

Funding mechanism: 50% Enterprise Ireland / 50% Direct funded



SMS design methodology



Optical ray trace of lens design

#### Case Study: LED emergency ligh3ng

•Customised optical design required for LED based illuminated emergency lighting.

• Key requirements: 1) High efficiency, 2) Cost effective; 3) Compliance with product standards.

•New design developed, using off-the-shelf components. Integrated with mechanical & electronic designs.

Funding mechanism: Enterprise Ireland / Direct funded



Case Study: Long-range linear illuminator
Modification of existing customer product to extend working range, for machine vision.
Custom total internal reflection lens designed and integrated with existing optical components.
Working range of illuminator extended from 1.5m to 5m.

Funding mechanism: Enterprise Ireland / Direct funded

Design Specification Requirements & Specifications Limitations & Restrictions

Design Concept & Development Ray tracing, mapping, colorimetry, etc. Parts selection/specification, integration

**Design Verification** Test and measurement Prototype build

Solution Delivery/Transfer Reporting & documentation Trainina

Ollscoil Teicneolaíochta na Mumhan Munster Technological University

#### Applications

- Customised optical component/lens design
- Off-the-shelf component selection/modelling
- Design enhancement & integration

#### Tools

- Zemax OpticStudio
- Dialux EVO/4.12
- Autodesk Inventor Professional

#### Sectors

- Retail/Advert/Industrial/Interior lighting
- Exterior/Building/Public space lighting
- Machine Vision
- Specialist e.g. medical device/sensing



**ENTERPRISE** 



**Design Process** 

Optical

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