



Your Research Partner for Photonics Solutions

CENTRE FOR
ADVANCED PHOTONICS
& PROCESS ANALYSIS

CAPPA

Innovation Through Light

Optical and Illumination Design

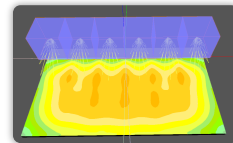
Capability Case Study

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.

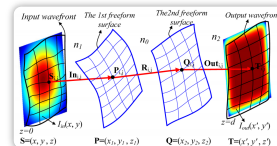
Case Study: Design of linear wall-wash optic

- **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.

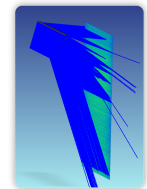
Funding mechanism: 50% Enterprise Ireland / 50% Direct funded



Illumination map of target area



SMS design methodology



Optical ray trace of lens design

Case Study: LED emergency lighting

- 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

Optical Design Process

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
Training

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

