



**Teuvo Viljamaa**  
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**Upstream Engineering Oy**

[www.upstream.fi](http://www.upstream.fi)

# Upstream

- The developer of the unique PhotonVacuum™ optical technology
- Advanced optical solutions for LED projectors and LED lighting
- The highest efficiency in the smallest size



# Upstream

- Founded 2002, based in Oulu Finland
- Optics for LED-based projector applications
- Optics for advanced LED lighting applications
- Optical design service
- Optical measurement and prototyping service



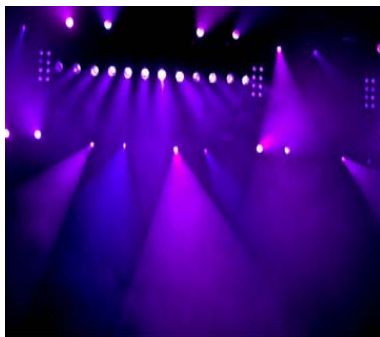
# Market - LED Projectors

- Enhanced performance for LED projectors
- Picoprojectors 10-30lm
- Embedded projector 20-150lm
- Home theater projector 800-1500lm
- Rear projection cubes 200-800lm



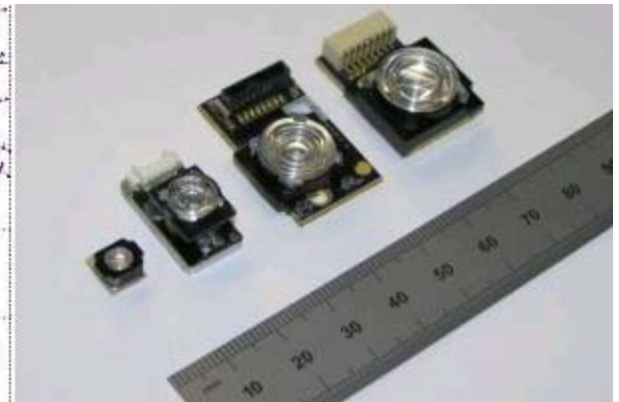
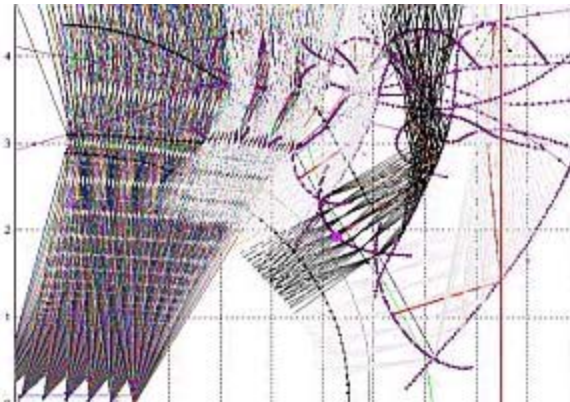
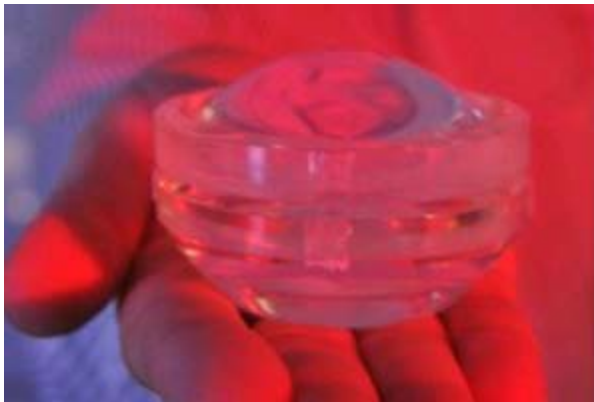
# Market - LED Lighting

- Application specific LED lighting
- Entertainment & architectural lighting
- Technical lighting and street lamps
- Fiber projectors
- Industrial, medical, military equipments



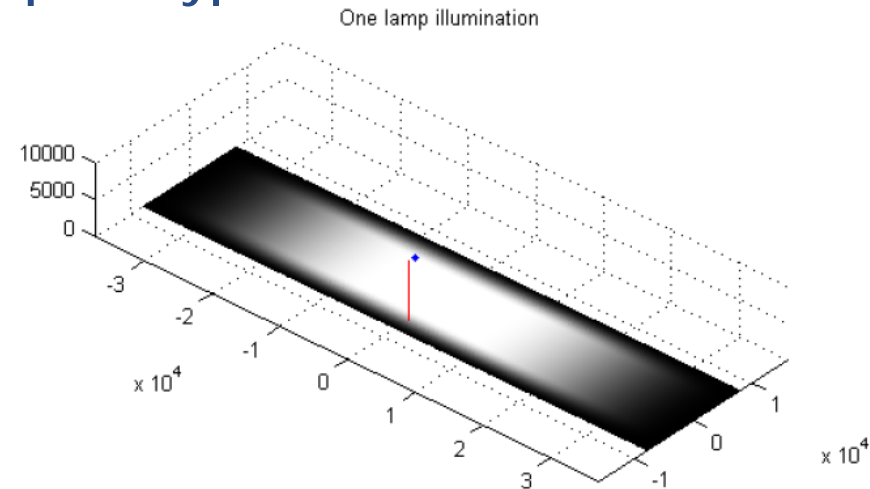
# PhotonVacuum Optics

- Advanced proprietary light collection and beam shaping design to maximize the brightness in LED based lighting
- High performance systems in small size
  - High collection efficiency
  - High lumens/watt efficiency
  - Excellent beam control and uniform illumination
- Several optical functions - All-in-One projector illuminator



# FreeForm Optics

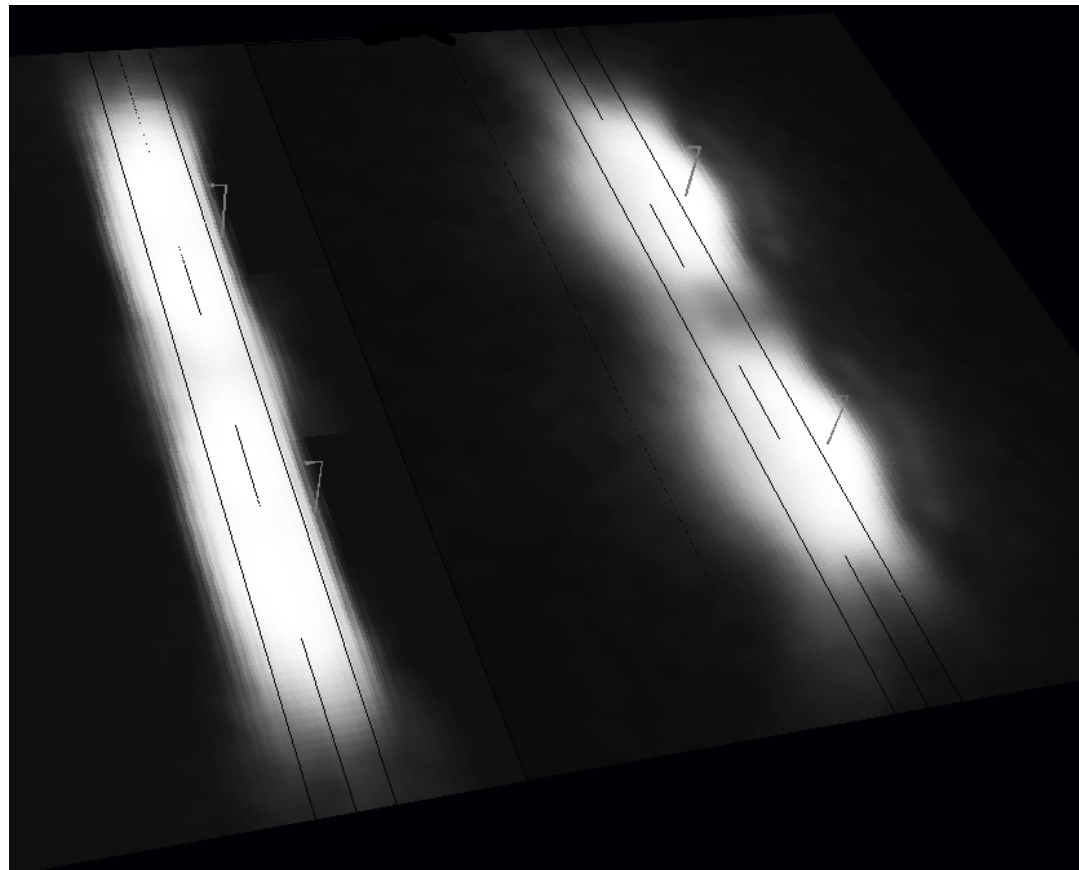
- Application specific optimal light distribution => energy saving, higher quality of lighting
- High collection efficiency with small size
- Well controlled beam with desired light distribution (rectangular, circular, elliptical, etc.)
- Allows asymmetric beams with desired offset
- Easy to use, modular: single lens makes the beam
- Fast to realize: custom design and prototypes in a week



# Comparison Example

Light distribution with  
conventional streetlamp lens

FreeForm  
lens delivers up to  
70 % more light  
to the street area  
and enables greater  
distances between  
lamps



Thank you for your attention!



 UPSTREAM