LOMSS

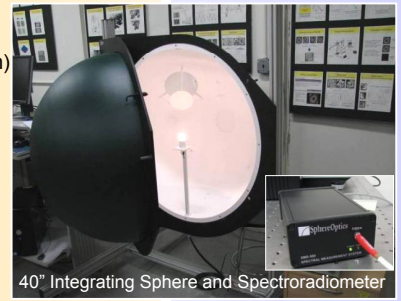
Lifetime Assessment of LED-based Luminaire

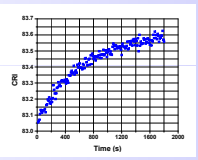
(Sponsored by GE)

Luminous Flux Measurement System

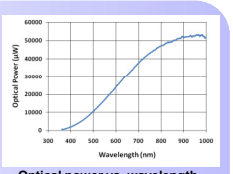
The light measurement system consists of a 40 inch diameter integrating sphere and a spectroradiometer

< Measurement parameters>
- Optical power vs. wavelength plot
- Luminous flux (lm)
- Dominant wavelength (nm)
- Peak wavelength (nm)
- CIE chromaticity coordinates
- Color correlated temperature (K)
- CRI

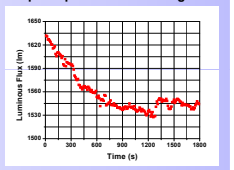




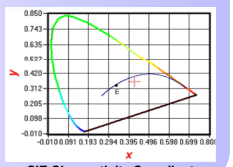
CRI vs. time



Optical power vs. wavelength

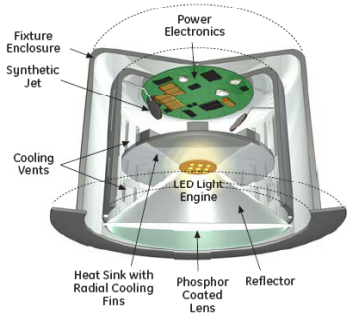


Luminous flux vs. time



CIE Chromaticity Coordinates

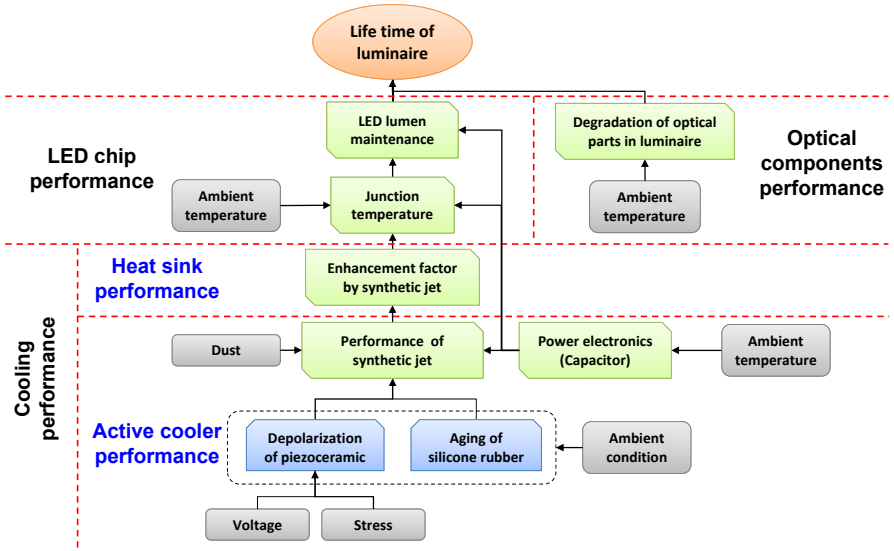
Requirements of LED-based luminaire



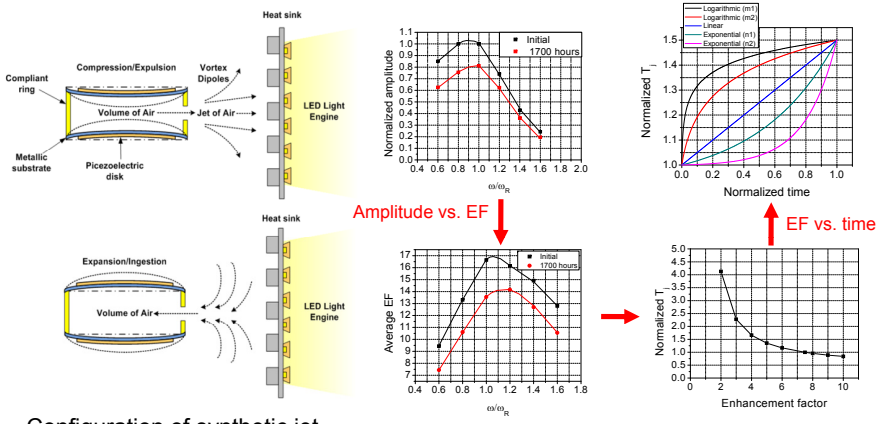
(1) Low power consumption (the power consumed by the cooling solution reduces the luminaire efficacy)
(2) Low cost (LED chips are expensive and any substantial extra cost is not desired)
(3) Compact size (the recessed downlight has a limited volume)
(4) Excellent reliability (reliability of the cooling solution should be at least as good as that of LEDs)

Prototype of LED based luminaire which incorporates active cooling device (GE)

PoF-based Life Prediction Model of LED Lighting Luminaire



Cooling device reliability



Configuration of synthetic jet

- The synthetic jet consists of PZT disk, nickel-coated substrate and silicone rubber tendon.
- The aging of pzt disk and silicone rubber alters the cooling performance of synthetic jet.

Data Flow to Achieve Lifetime of the Luminaire