

# Economic & Compact LED solution for Advanced Front Lighting System

DVN workshop  
25th. April .2019  
Shawn Li

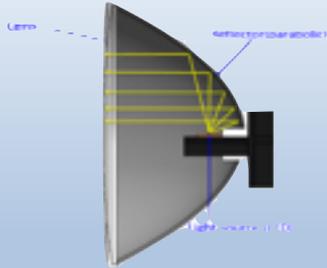
[www.everlight.com](http://www.everlight.com)

**EVERLIGHT**  
— **AUTOMOTIVE**

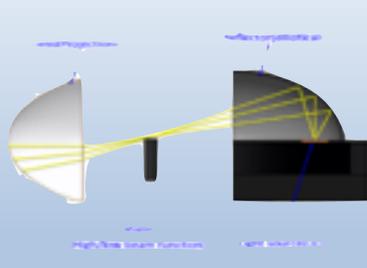
# Front Lighting – Head Lamp Types & Evolution

Application

**Reflective**

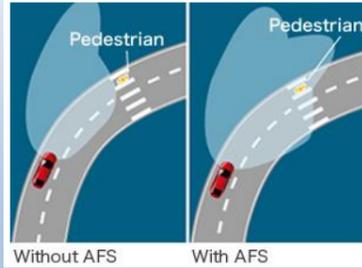


**Projection**

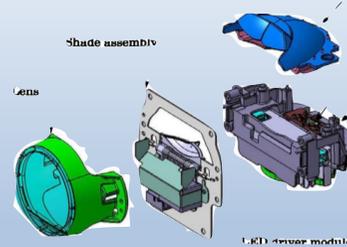


**AFS**

(Adaptive Front-lighting System)

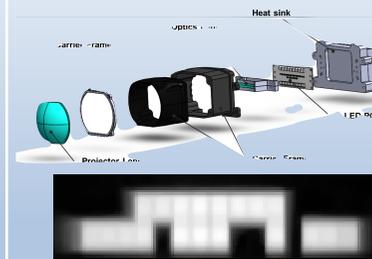


**Bi-functional**



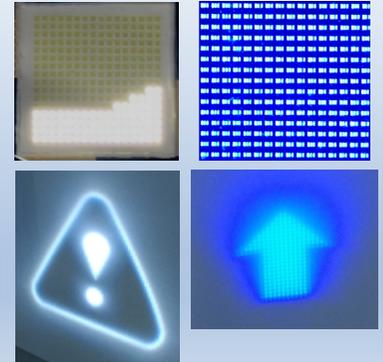
**Matrix ADB**

(ADB: Adaptive Driving Beam)



**HD ADB**

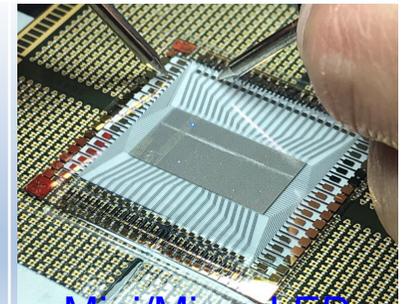
(HD: High Definition)



LED KPG

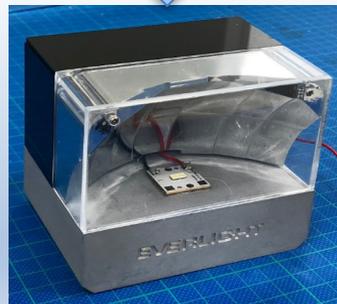
## Everlight Head Lamp Package Lineup

Series Name	ALFS1B	ALFS2B	ALFS3B	ALFS4B	ALFS5B
Photos					



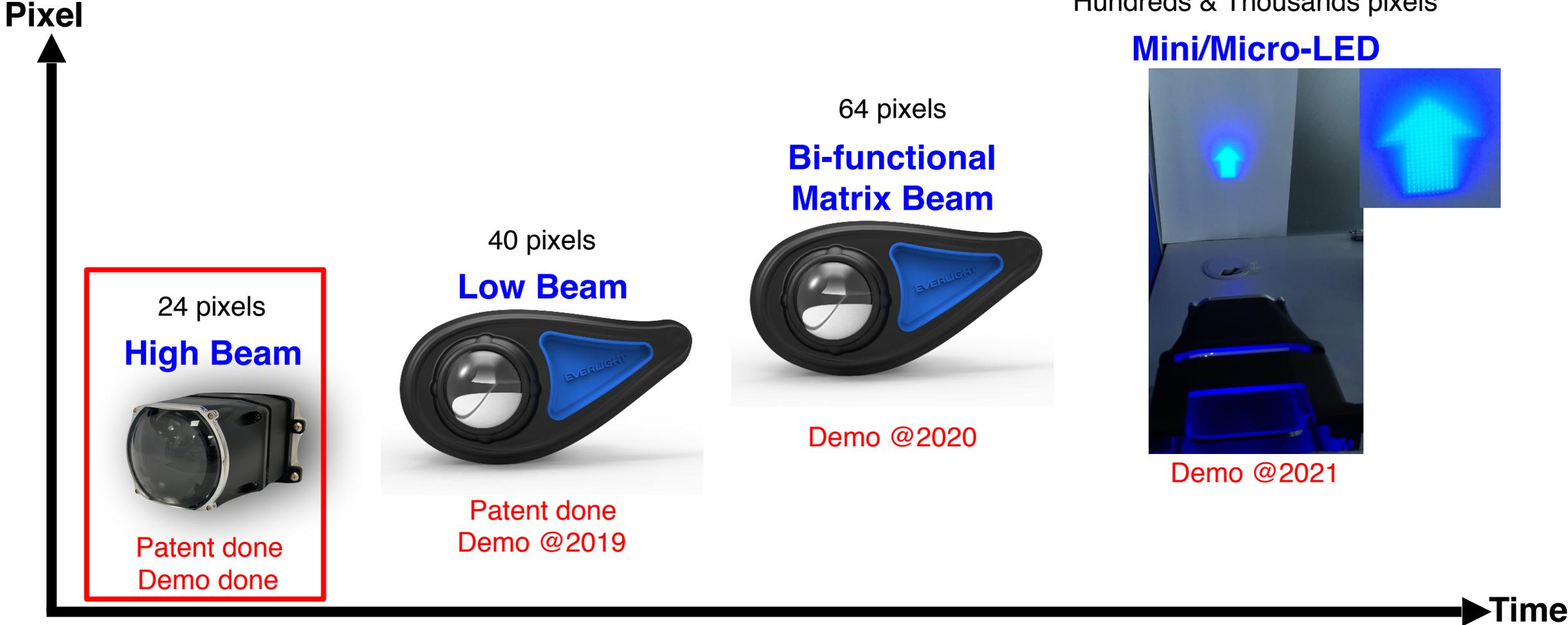
Mini/Micro LED  
@developing

Module Demo



Under  
Optical Study

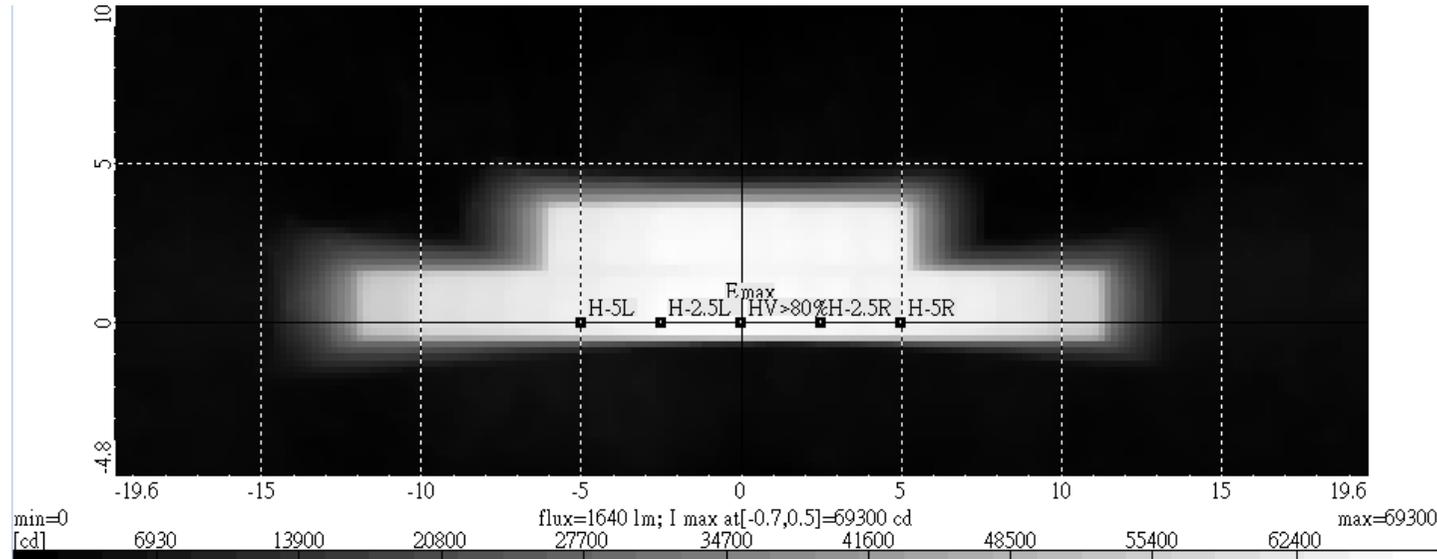
# Roadmap of Matrix Head Lamp Demo



# New Optical Design for Matrix High Beam

- Sharp and Clear
- 24 segments by ALFS-1B with pillar lens
- Individual segment controlled thru CAN Bus
- Meet ECE R112 and R123 is being arranged
- Super Cost-effective and Compact

# Luminous Intensity Measurement

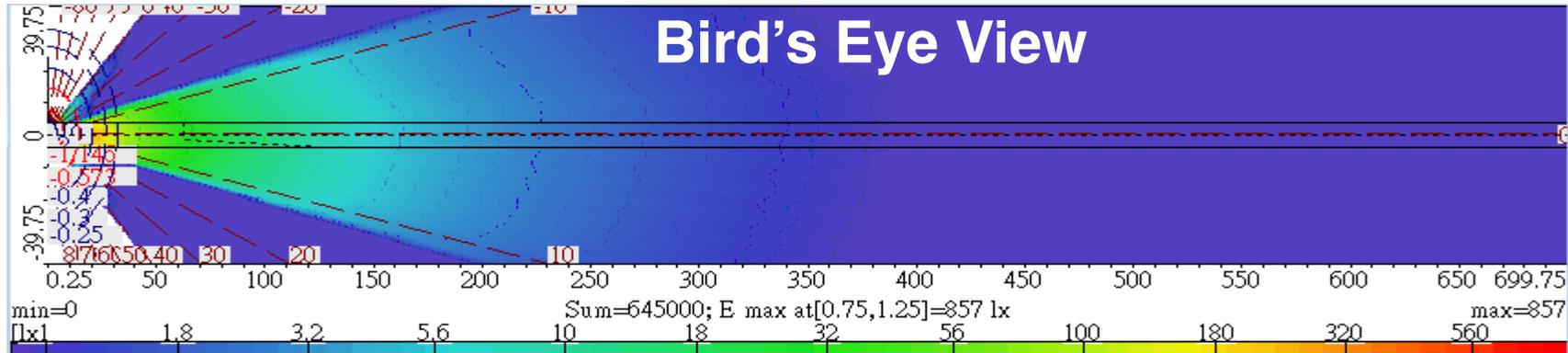


Optical Measurement Driving Current/per LED	Luminous intensity(cd)	
	HV	Maximum
350mA	40580	43989
400mA	44500	48498
500mA	51310	56096
550mA	54010	59235
600mA	56470	61864
650mA	58820	64638
700mA	60520	66444

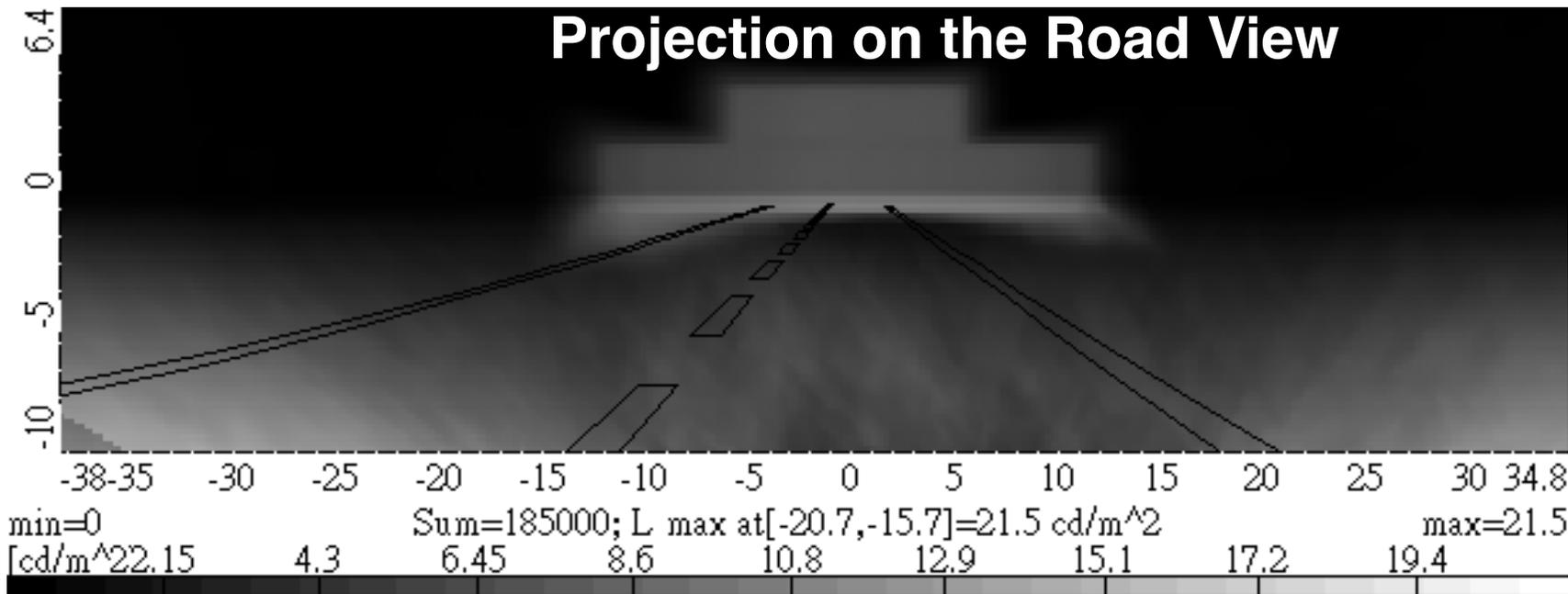
Pass ECE R112 class B regulation ( $I_{max} > 40500\text{cd}$ ) @  $I_f > 350\text{mA}$

ECE R112 Class B		
Test Point	Angular coordinates (Degrees)	cd (min.)
$I_{max}$		40500
H-5L	0.0, 5.0L	5100
H-2.5L	0.0, 2.5L	20300
H-2.5R	0.0, 2.5R	20300
H-5R	0.0, 5.0R	5100

# Light Distribution



Distance	Illuminance
157m	5Lux
210m	3Lux
366m	1Lux
667m	0.3Lux



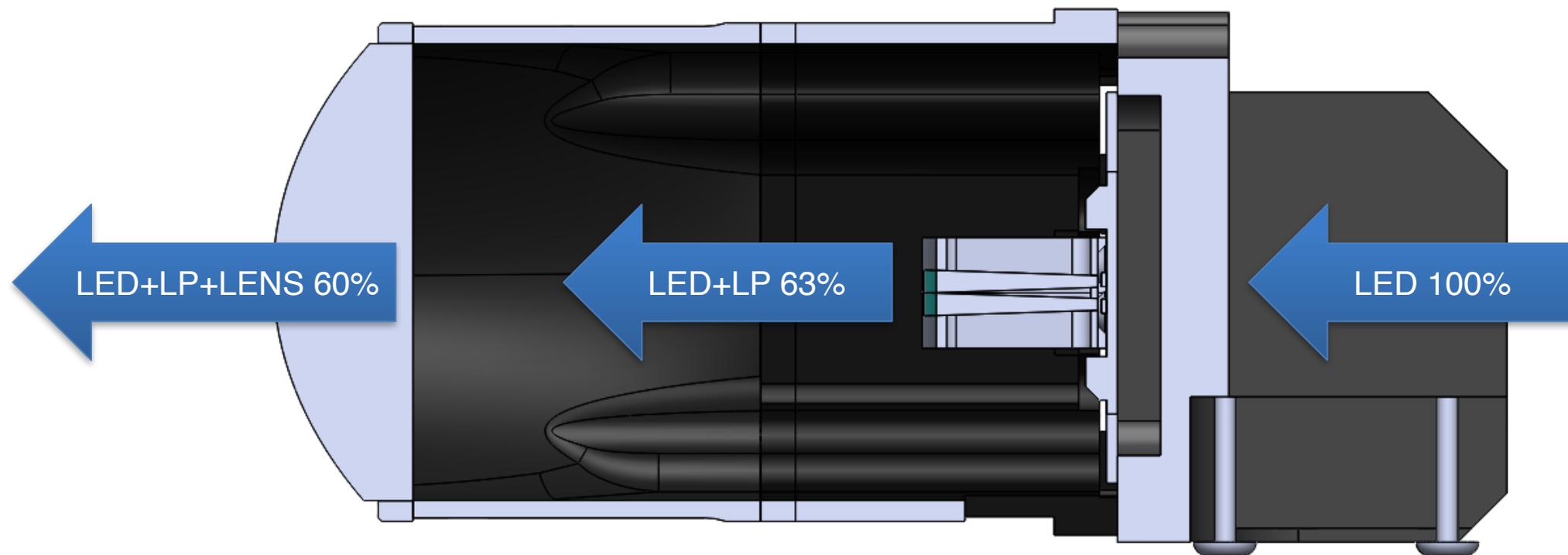
Items	Degree
Width	$\pm 12.5^\circ$
Height	$-0.5^\circ/+4^\circ$
Resolution	$1.2^\circ$

# Visual Simulation for Driver View

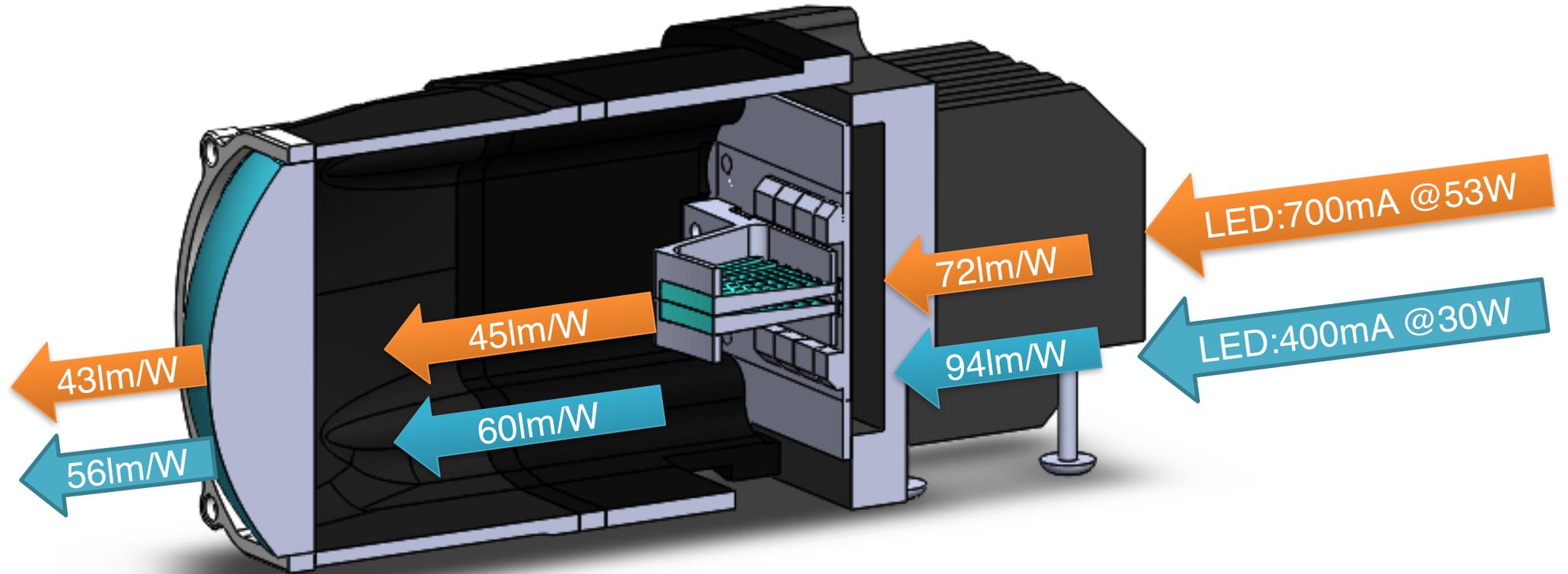
24 pixels Matrix Glare Free High Beam:  
It prevents the preceding and oncoming vehicles from glare light.



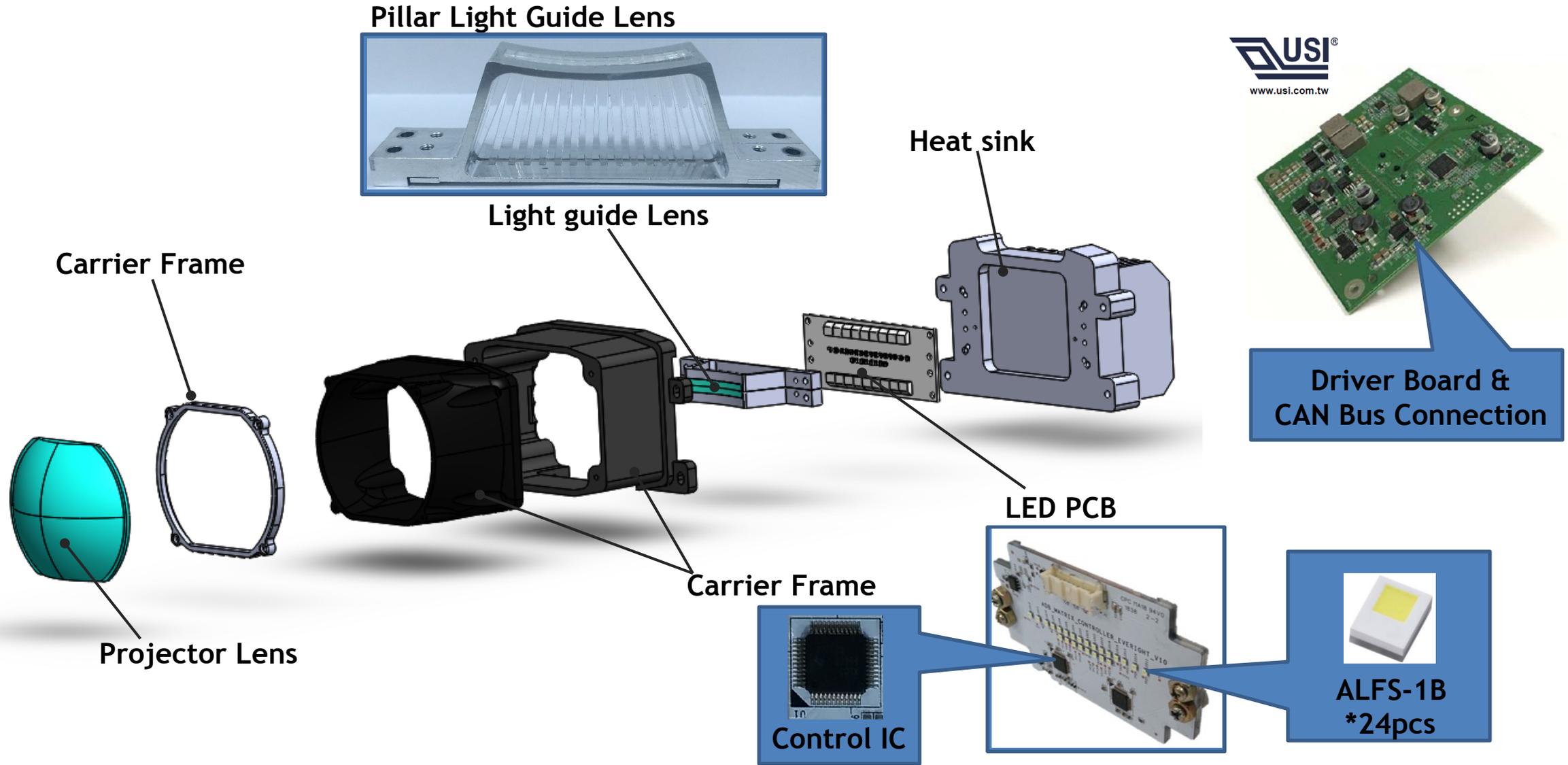
# Optical Efficiency



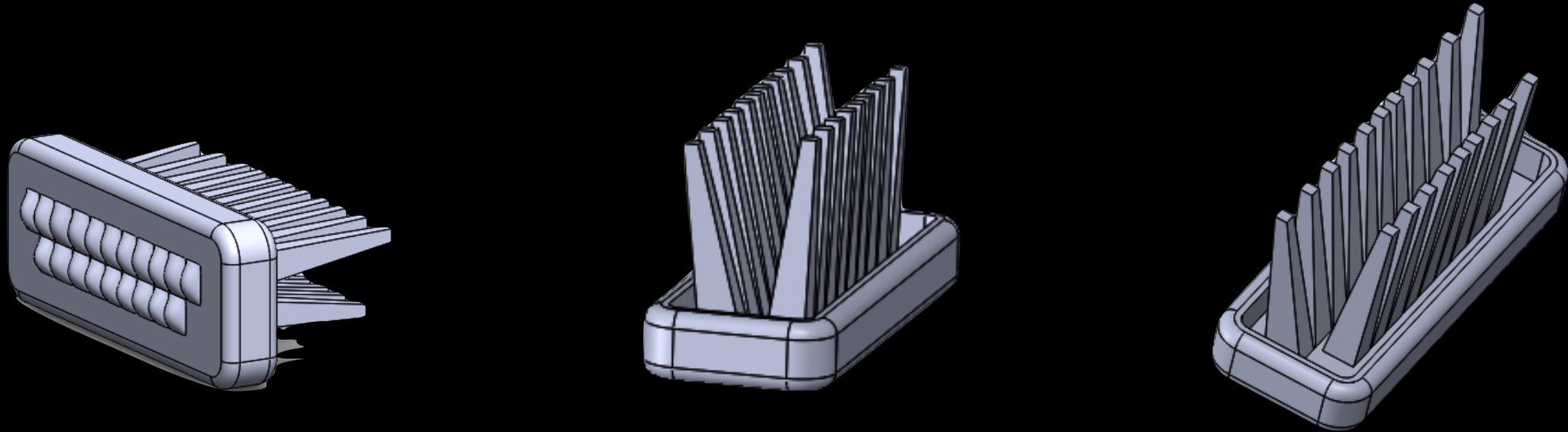
# Lumen/w of the system



# Exploded View of Everlight Matrix Module



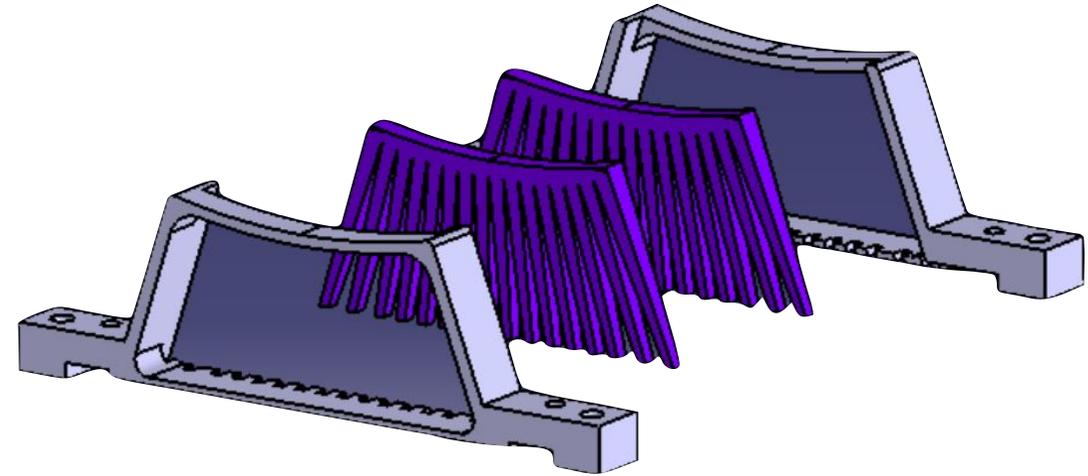
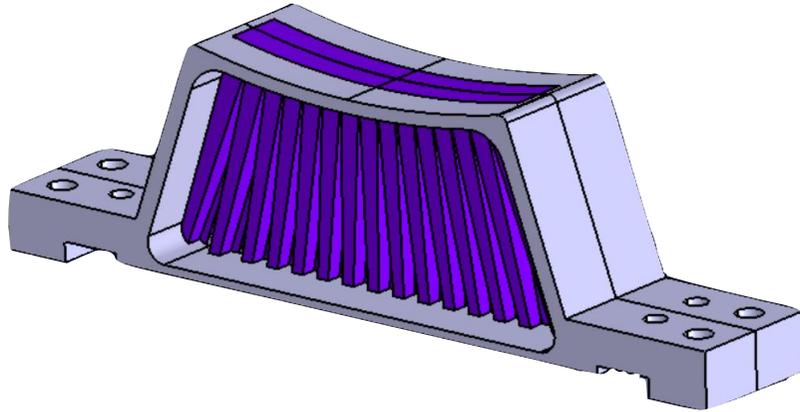
## Existing Pillar Light Guide Structure



### Features:

- Various 3D directional pillar light guides within an optical lens.
- More complicated molding tooling design
- More difficult manufacturing
- Lower yield rate of lens production
- Higher cost in terms of molding tooling & lens

# Everlight Pillar Light Guide Structure



Design concept:

**Duplicate Structure** and multi light guide units are combined.

**Regular Shape** with 2D structure and without arbitrary 3D direction.

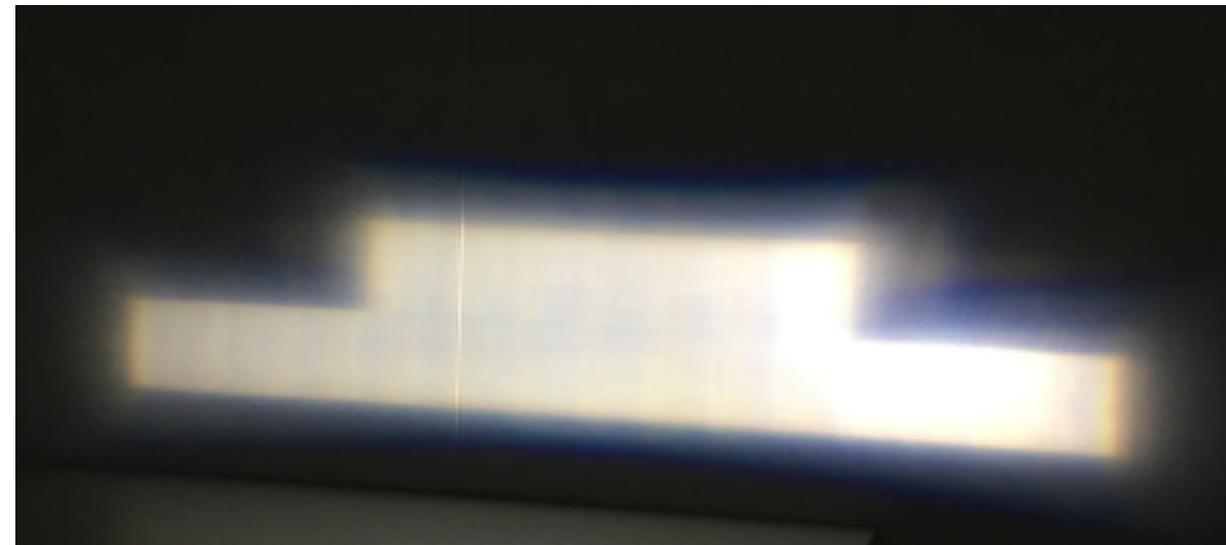
**Compact/Simple Structure** for clamp assembly → Flexibility

Benefit:

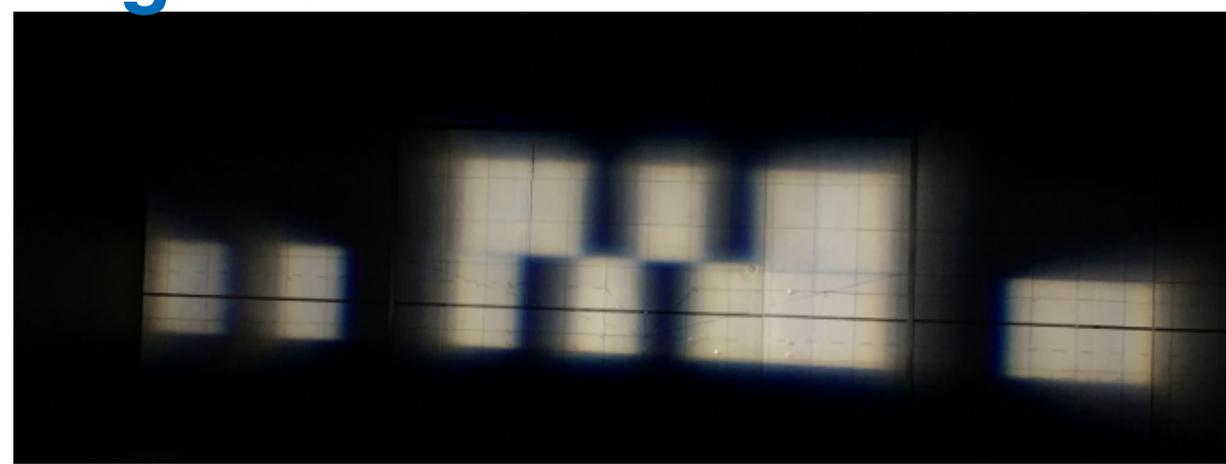
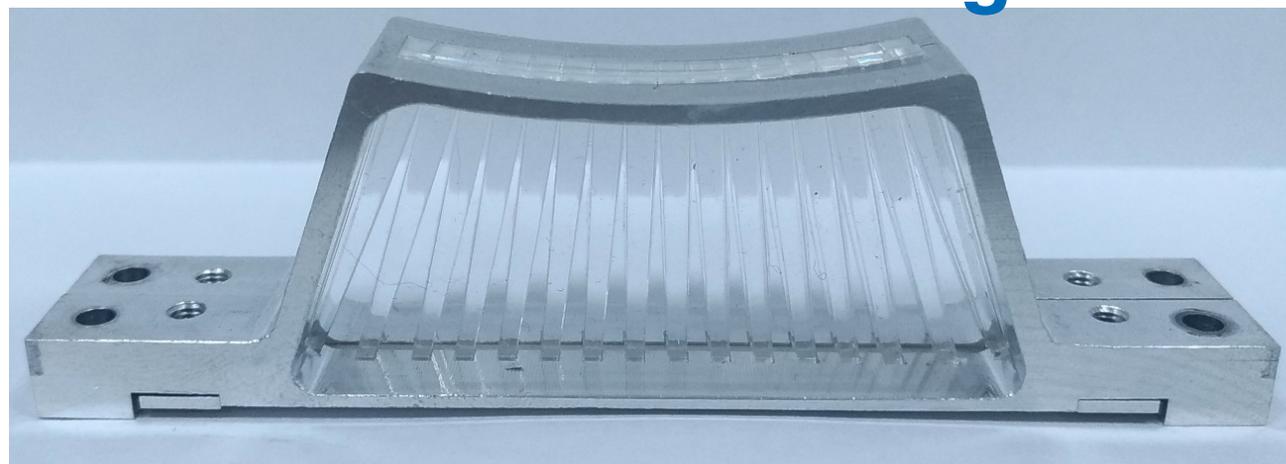
**Less complicated** for molding tool design

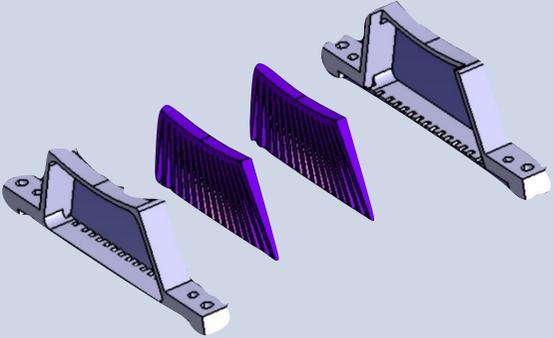
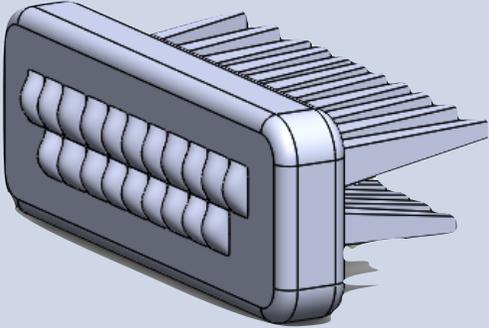
**Lower Cost**

**More Flexible**



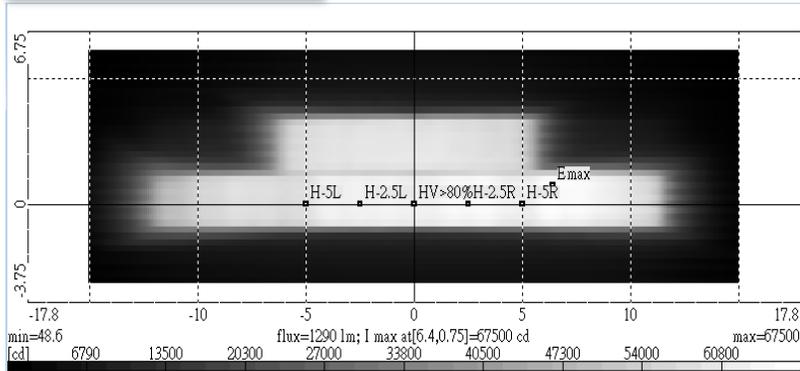
## Everlight Pillar Light Guide



Items	Everlight	Others
Drawing		
Shape	2D direction	Arbitrary 3D direction
Structure	Compact & Duplicate	complicated
Molding Tool design & manufacture	Much easier	More difficult
Molding tool cost	50% Lower	Higher
Lens yield rate	Higher	Lower
Lens Unit Price	30% Lower	Higher
Expansion Flexibility	High	Limited
Entry barriers	Low	High

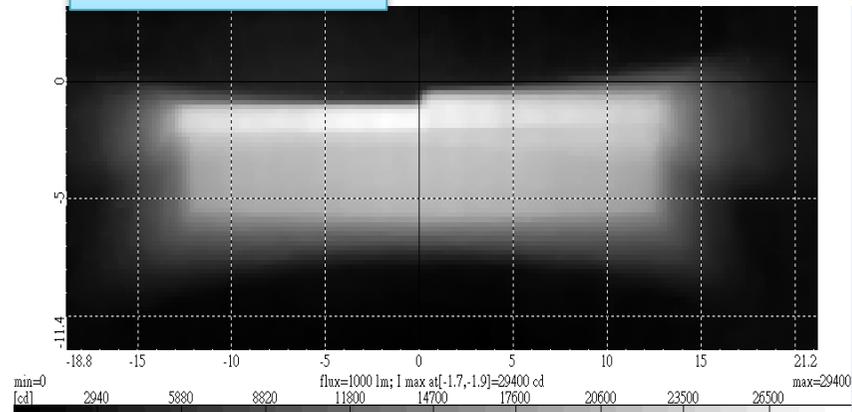
# Future Work

**High Beam** 24 pixels

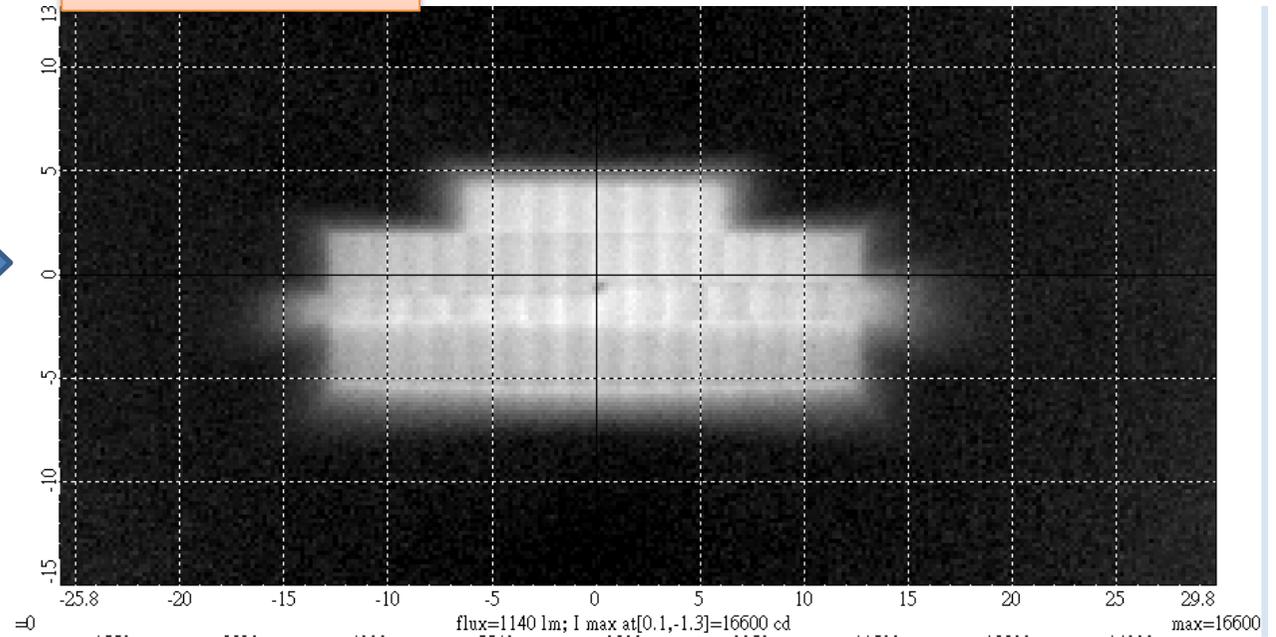


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**Low Beam** 40 pixels



**Bi-functional** 64 pixels



## Summary

- **We** provide an economic & compact solution for matrix optics which lower the development barriers.
- **We** achieve that by
  - **Cost-Friendly LED Components & pillar lens**
  - **Duplicate Structure (standardized)**
  - **Regular shape**
  - **Compact mechanical structure.**
- **We** will dedicate more on advanced lighting systems than ever.
- **We** are willing to authorize the technology to our partners or provide the LED board with pillar lens.

## EVERLIGHT

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