Smart
Optical
Sensors

SOS LAB

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www.soslab.co

Will (Chan M Lim)
Head of Solid-state LiDAR Business Division

Company Highlights

Bio-info

Since	IP	Funding	Projects
2016	**65**	**45M**	**30+**
June 22nd	155 application	Sep. 2023	Global company, Government

Investors

futureplay, Mando, KDB캐피탈, KDB산업은행, 현대투자파트너스, 유안타증권, Ventures, 신한금융그룹, BRIDGE ALLIANCE PARTNERS, true friend 한국투자증권, ulmus INVESTMENT, Emford Equity Partners, BNK 투자증권, SK증권, 키움증권

Awards& Government Certification

SOS LAB's Mission

0. Solid-state LiDAR

Solid-state LiDAR : Silver Bullet

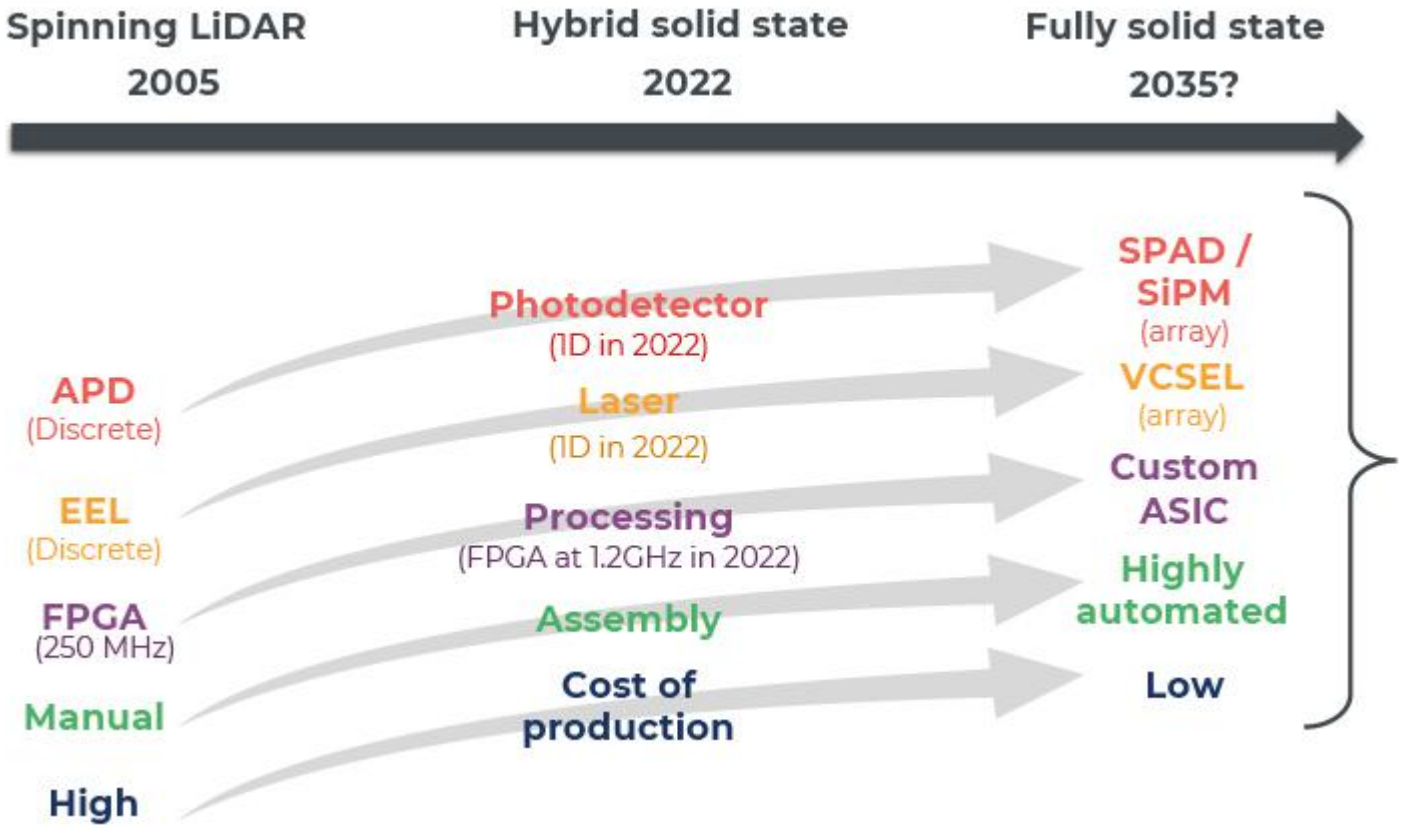
Autonomous Vehicles and LIDAR: Why Solid State isn't a Silver Bullet

Raffi Mardirosian
Head of Corporate Development
Ouster

Solid-state LIDAR has gained a reputation as a necessary component for autonomous vehicles, as compared to spinning and mechanical LIDAR. Solid-state is regarded as the more cost-effective, more robust, and automotive-grade alternative, ideal for mass production of consumer vehicles. However, this perception is based on comparisons against older mechanically spinning LIDAR technologies. Recently, companies have been innovating mechanically spinning LIDAR to achieve smaller form factor, lower cost, higher resolution, greater robustness, and mass production levels, while solid-state LIDAR continues to suffer from challenges ranging from production to resolution to reliability. In addition, most LIDAR sensors marketed as solid-state are in fact based on MEMS technologies, meaning there is still a moving micro-mirror component. This talk will discuss the factors and tradeoffs to consider when choosing LIDAR solutions, rather than the "solid-state" label, and why solid-state technology is not a near term solution for autonomous capabilities. The talk will also provide an overview of the leading companies providing each type of LIDAR, as well as a brief roadmap of technology development for mechanically spinning LIDAR in the near future.

Biography: Raffi Mardirosian is Head of Corporate Development at Ouster. Previously, he was VP, Corporate Development at MODO Fuels, pioneering the production of ultra-low carbon fuels, Principal at Flagship Ventures, where he focused on launching and investing in companies in sustainability and climate change, and President at Midori, a technology startup pioneering its breakthrough carbohydrate catalysis platform with impact across human nutrition, animal nutrition, and human therapeutics. Prior to Midori, Raffi developed renewable power projects in Africa, including creating the first utility-scale solar photovoltaic power plant in East Africa which currently contributes to over 6% of Rwanda's power and broke the record for fastest African energy project finance deal to reach financial close and interconnect.

Solid-state LiDAR : Silver Bullet



<2005-2035 automotive LiDAR technology roadmap>

[LiDAR 2022 – Focus on Automotive and Industrial], Yole Intelligence, 2022

SOS LAB's Mission

I. Ultra-compact LiDAR that does not compromise vehicle design

Solid-state LiDAR : Ultra-compactness

500cc

Plastic bottle

>

ML-X

485cc

(95 x 50 x 102mm³)

Ultra-compactness :
Not Compromising on Mobility Design

Solid-state LiDAR : Ultra-compactness

Solid-state LiDAR : Ultra-compactness

ML-X

485cc

(95 x 50 x 102mm³)

>

ML-A

263cc

(86 x 34.5 x 88.5mm³)

Solid-state LiDAR : Ultra-compactness

330cc

can

>

ML-A

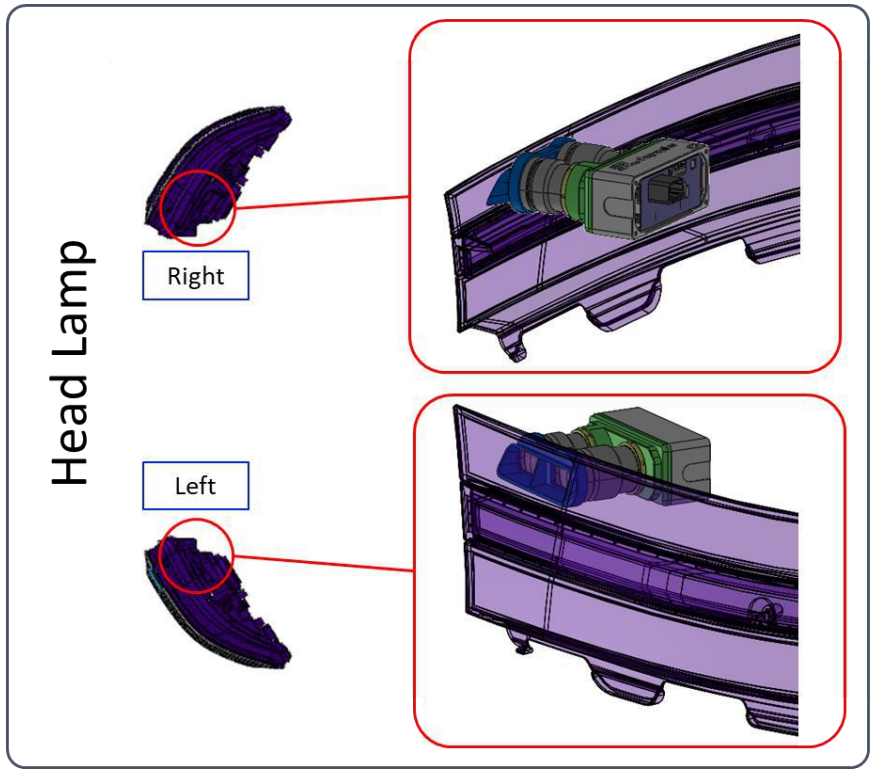
263cc

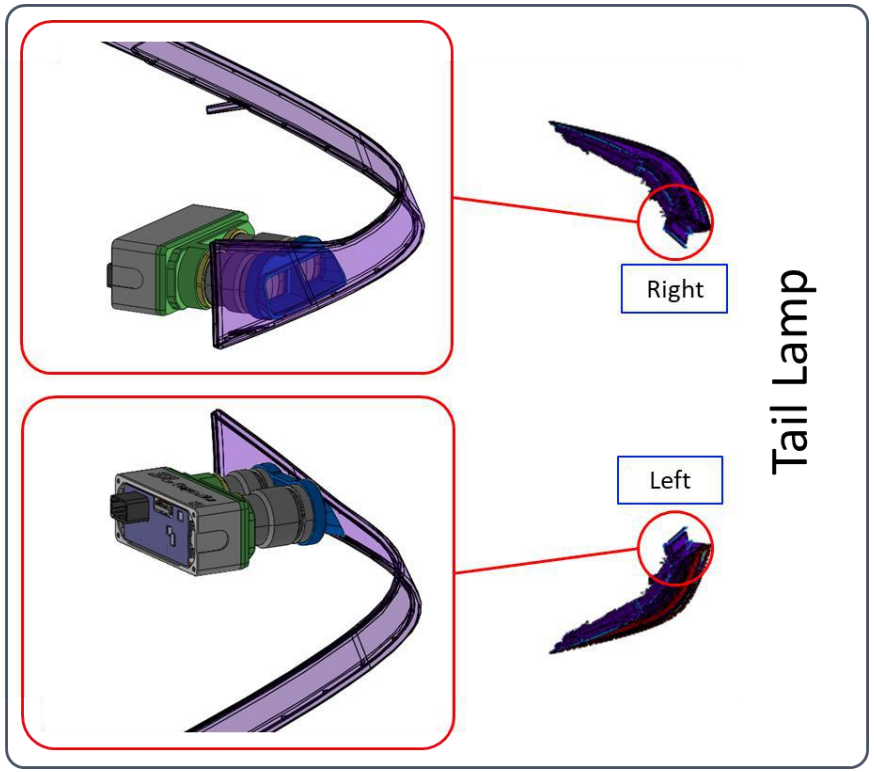
(86 x 34.5 x 88.5mm³)

Solid-state LiDAR : Ultra-compactness

Solid-state LiDAR : Ultra-compactness

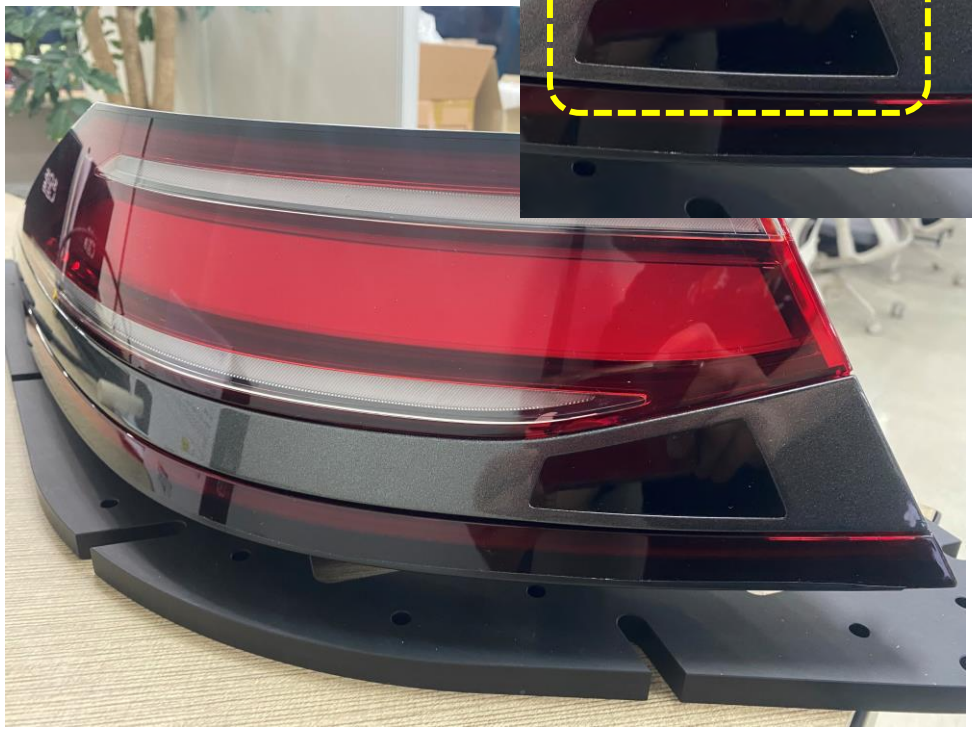
SOS LAB Co., Ltd. × SL Corporation





* Genesis G90 Lamp
(Hyundai motors)

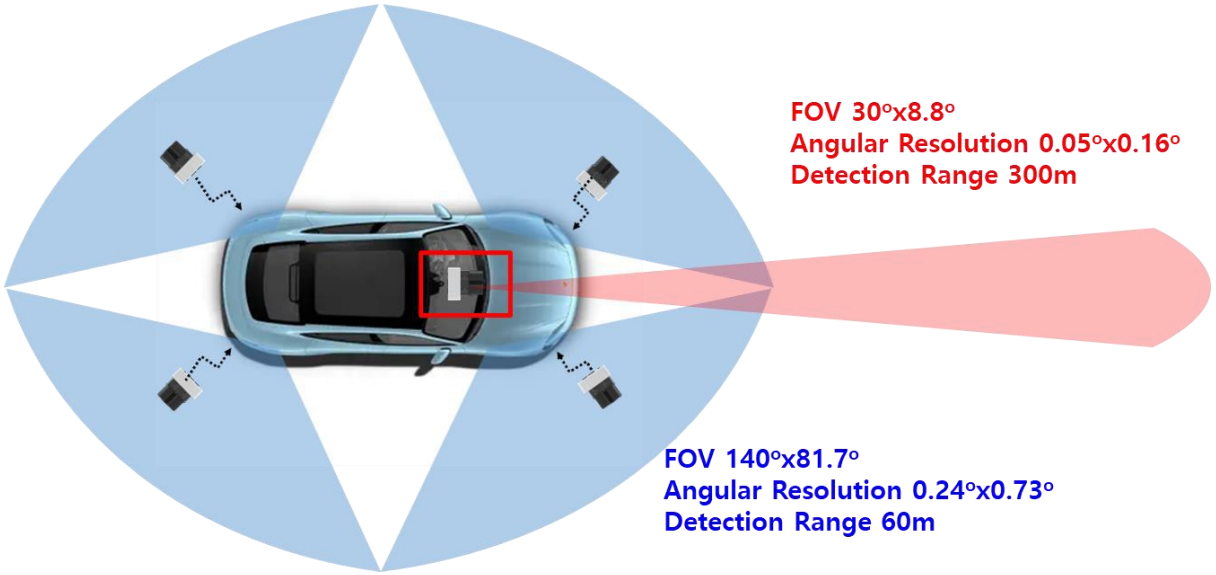
Solid-state LiDAR : Ultra-compactness



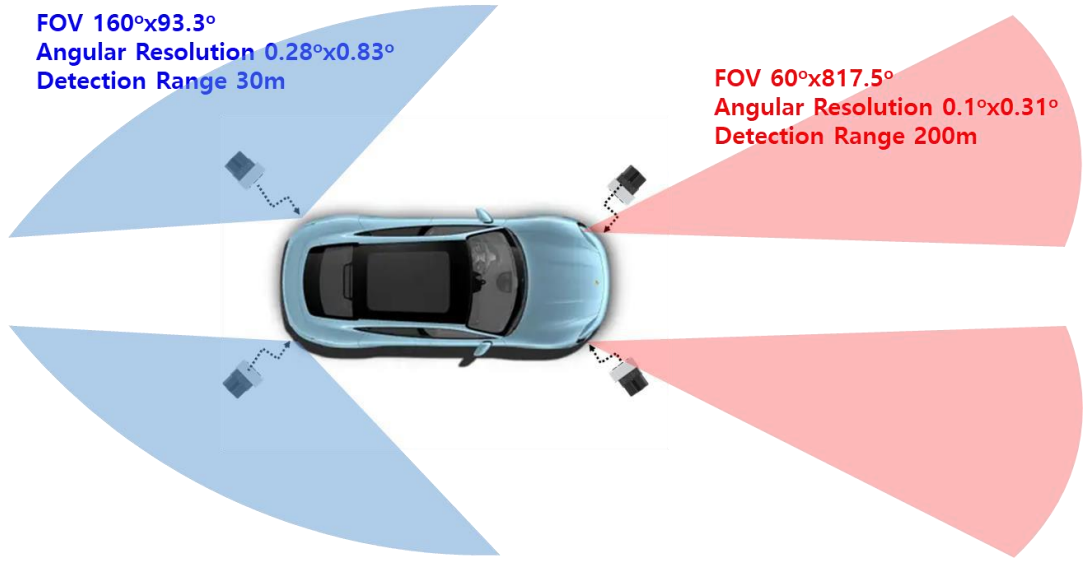
SOS LAB Co., Ltd. × SL Corporation

Solid-state LiDAR : Ultra-compactness

√ Diverse configuration that can meet customers' requirements are attainable



Configuration example #1



Configuration example #2

SOS LAB's Mission

II. solid-state LiDAR with **high-performance capabilities**

Solid-state LiDAR : High-Performance

ML-X

> 80m

120º x 35º

ML-A

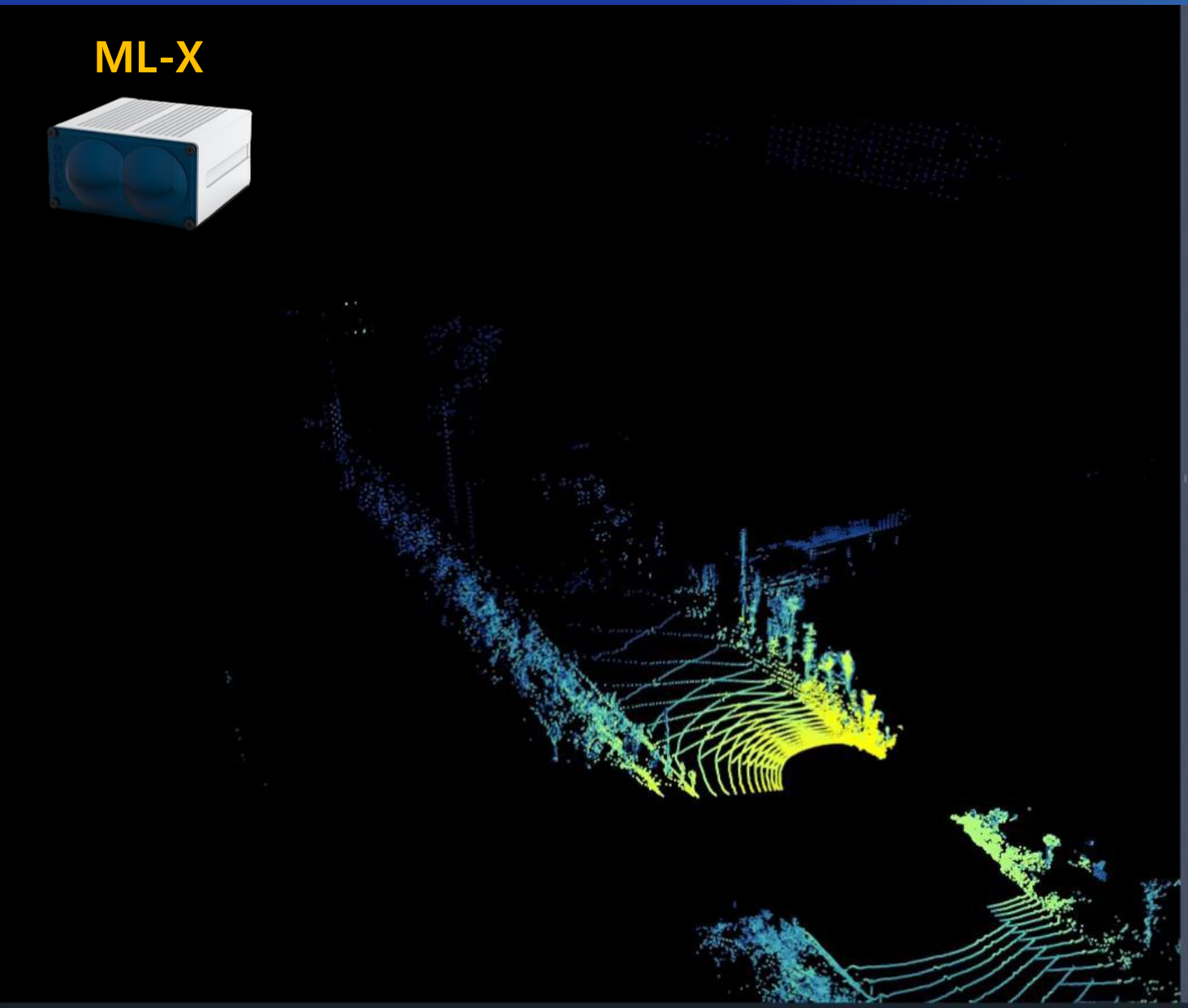
> 200m

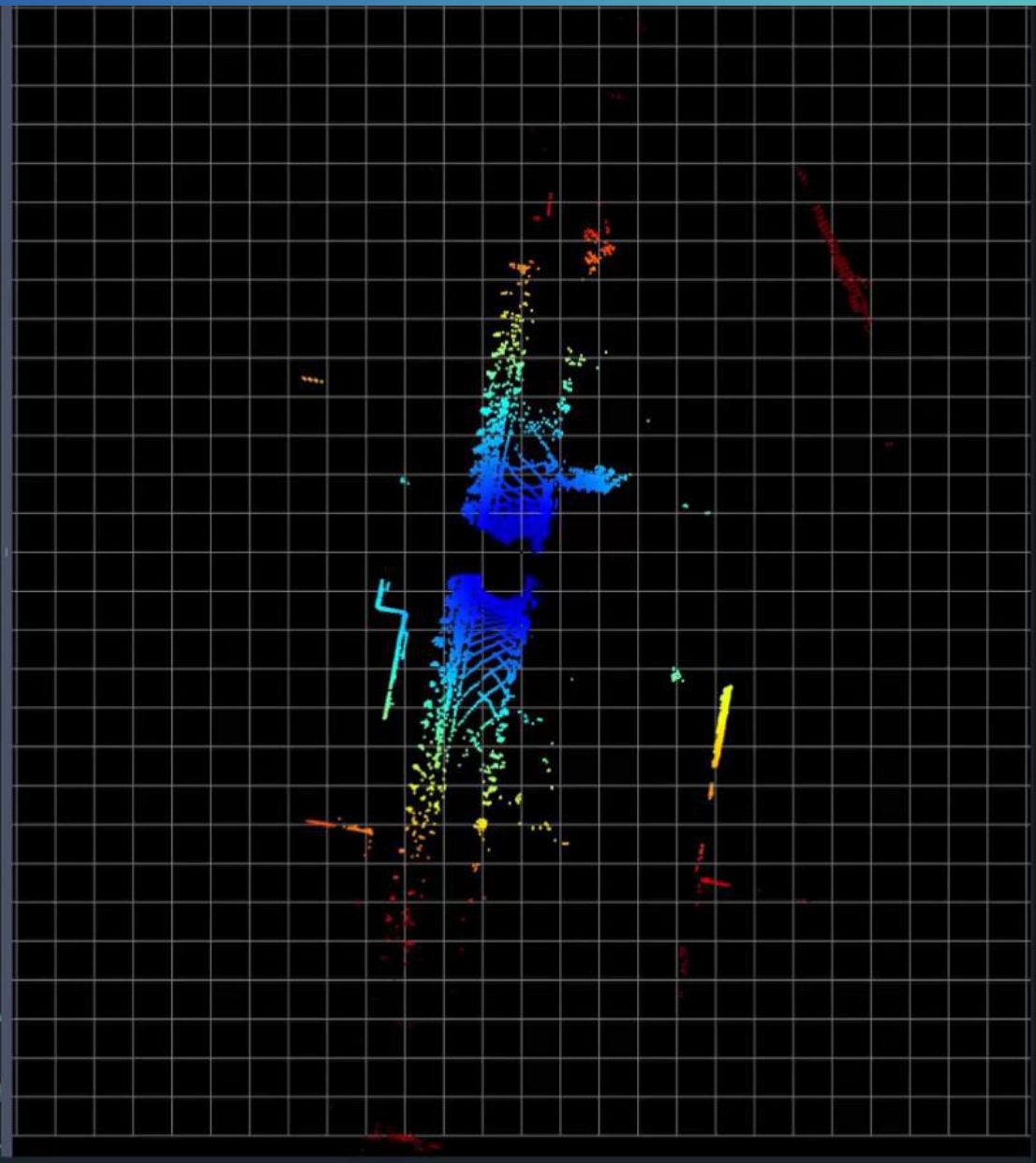
60º x 17.5º

* Detection Range : 10% R & 100klux

Solid-state LiDAR : High-Performance

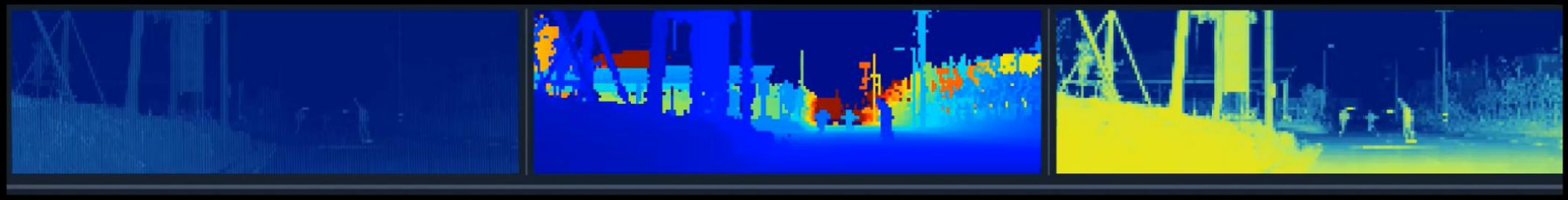
ML-X

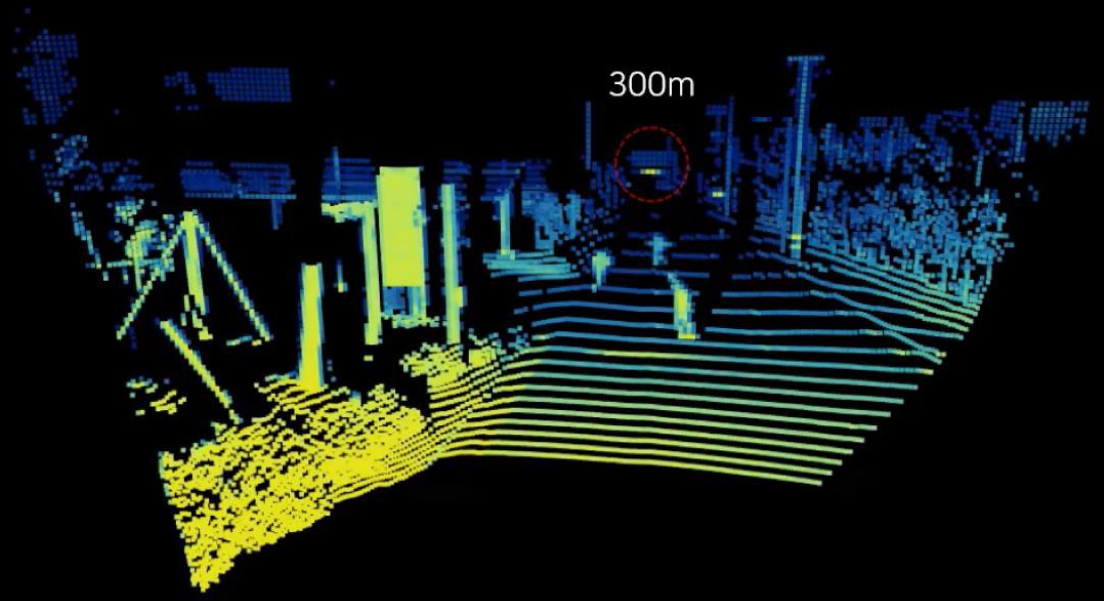




Solid-state LiDAR : High-Performance

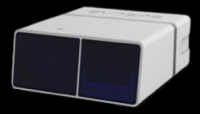
ML-A

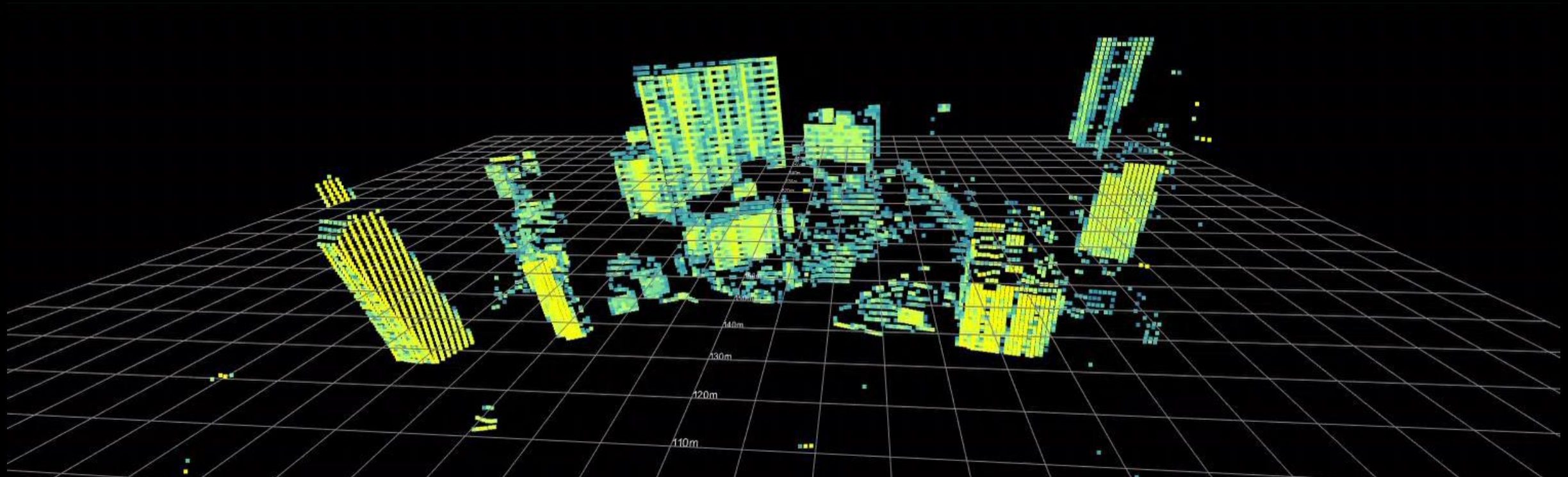




ML-A : Ultra-Compact LiDAR

ML-A





SOS LAB's Mission

III. Low price and quality assurance

Low Price and Quality Assurance

SOS LAB Co., Ltd. × SL Corporation

√ SL-corporation is one of the largest Tier-1 companies in South Korea

√ They specialize in automotive lamps and sensors, which are their areas of strength.

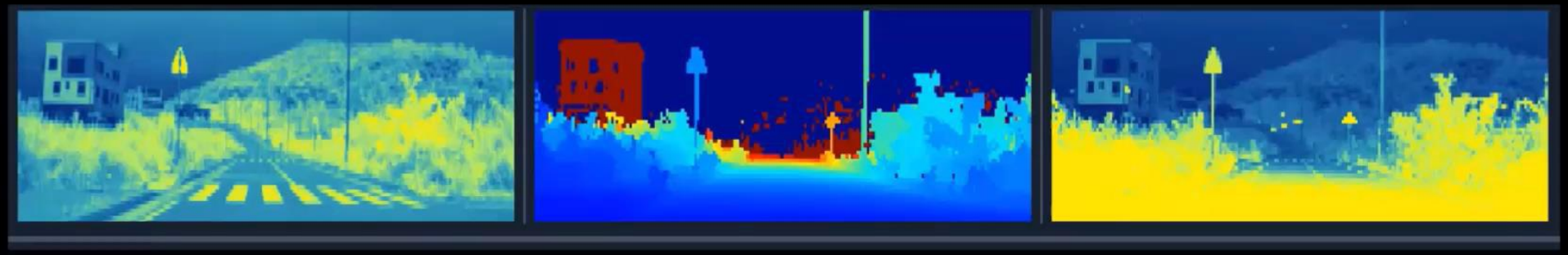
√ SL Corporation handles **manufacturing and quality assurance for OEMs**.

√ Thanks to SL's superior purchasing power, 25% reduction in material cost.

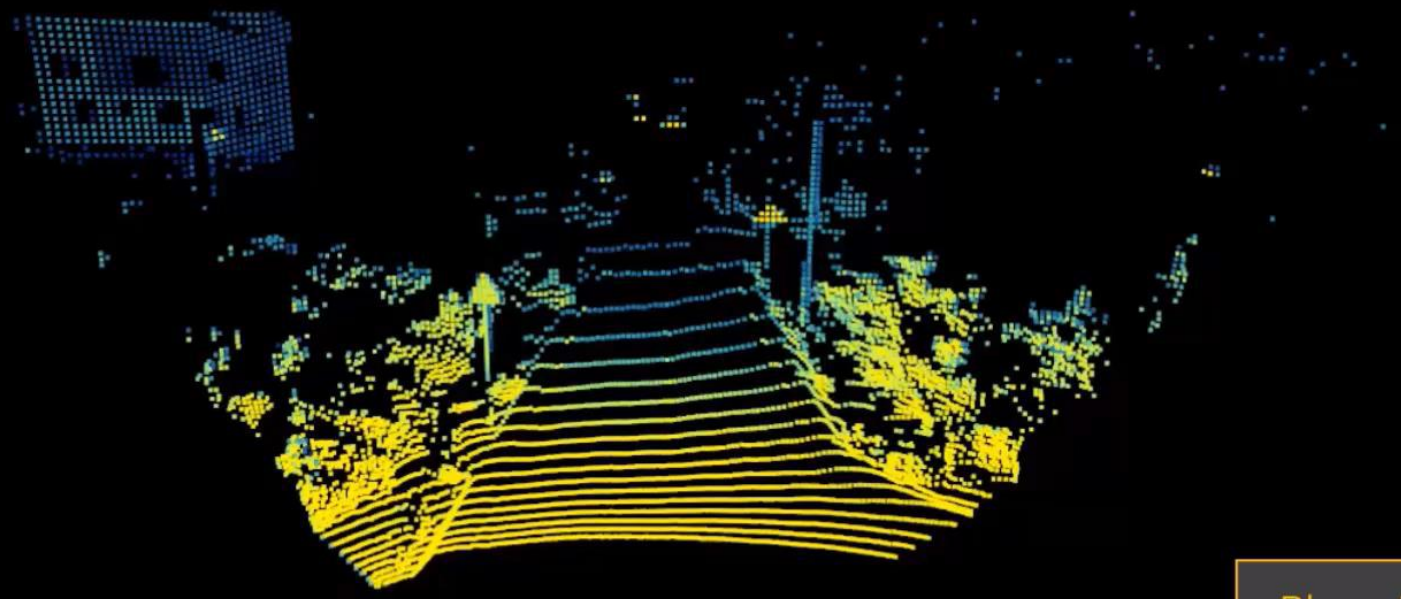
SOS LAB's Mission

IV. **Free from edge cases** (artifact data)

Free From Edge Cases : Blooming



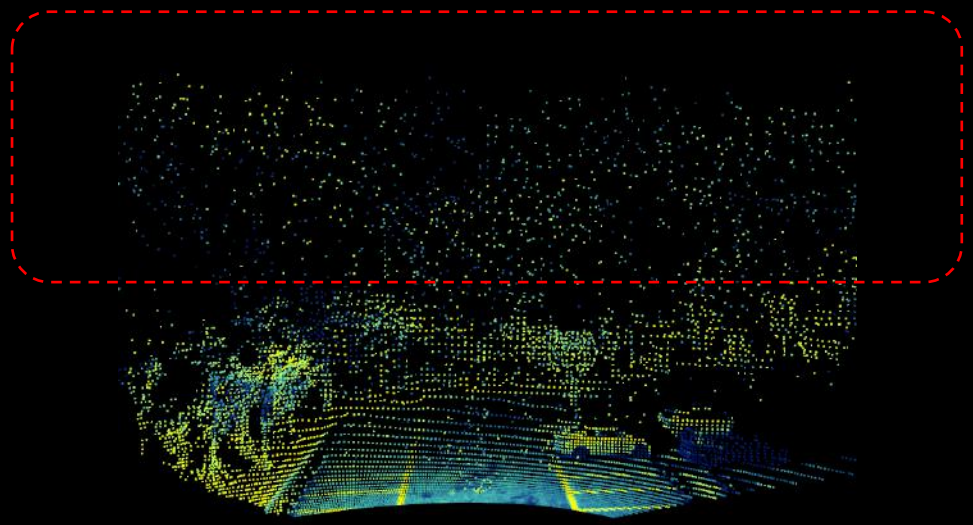
Ambient Image | Depth Image | Intensity Image



3D Point Cloud

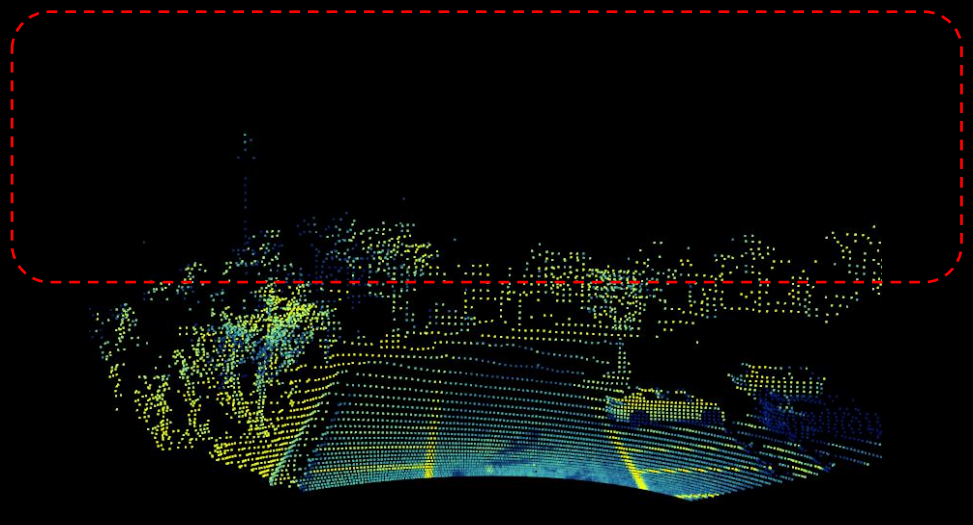
Blooming Removal On

Free From Edge Cases : Confronting Sum



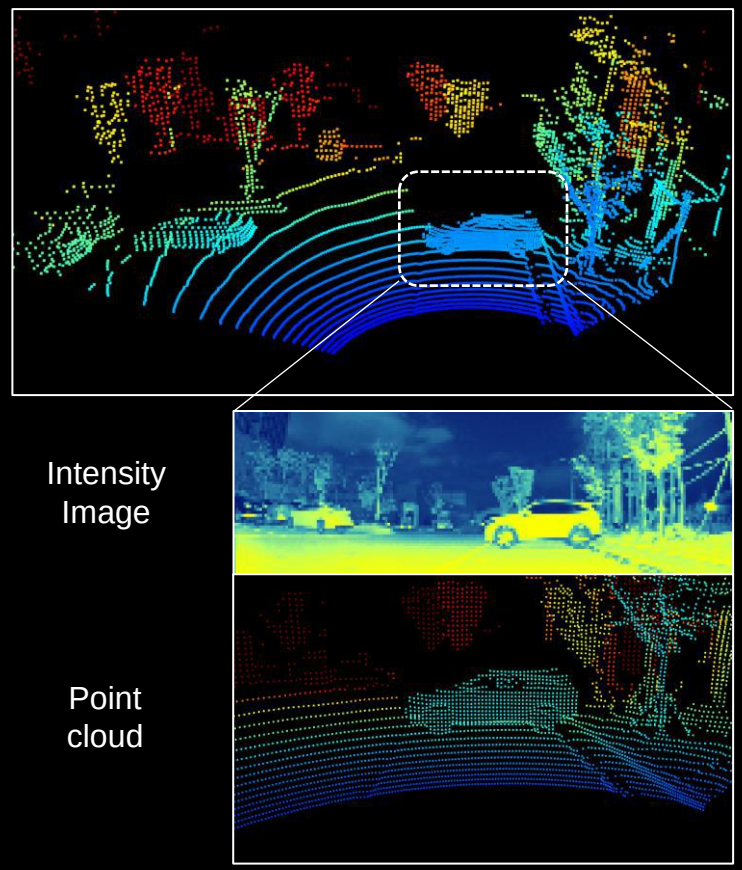
Raw Data

Only Remove Sunlight Noise (Preserve Object Signal)

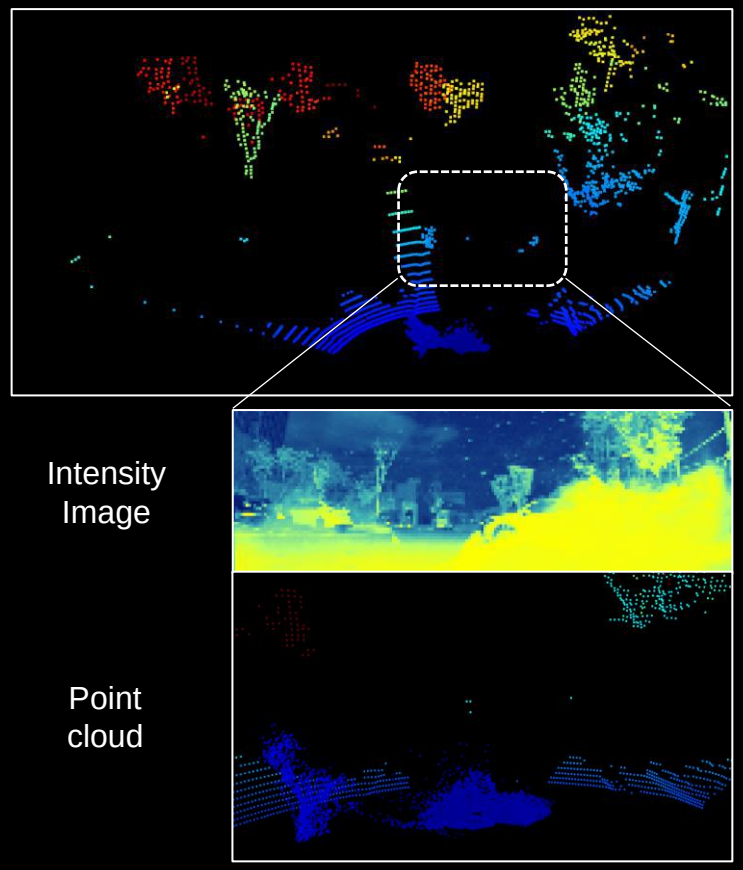


Ambient Noise Removal Result

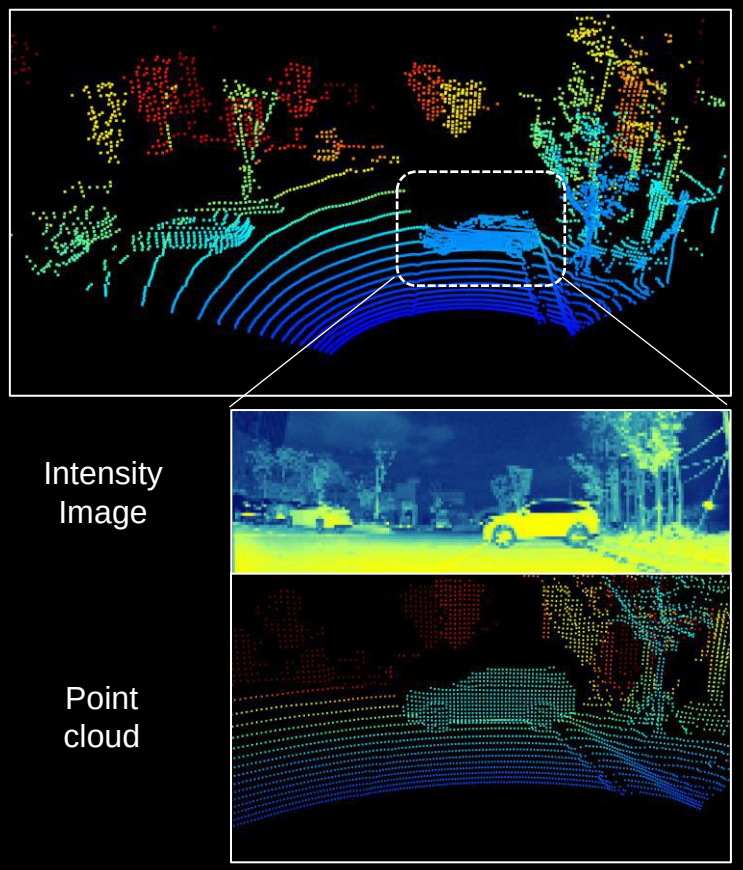
Free From Edge Cases : Adverse Weather Condition (Fog)



Reference. ML Data (w/o Fog)



ML Raw Data (w Fog)

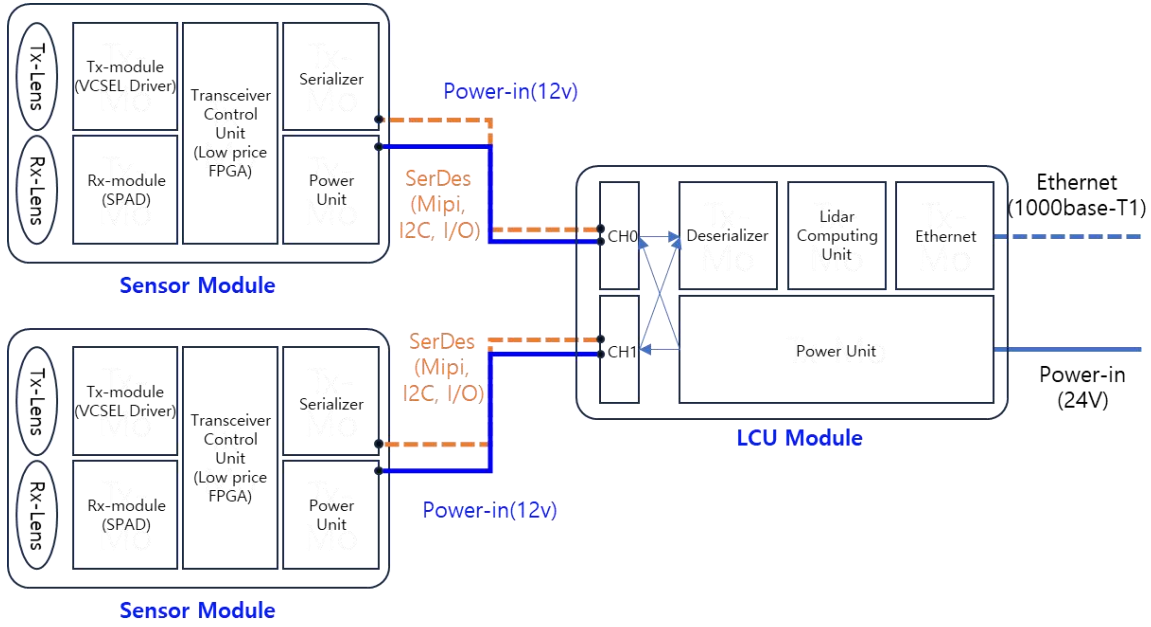


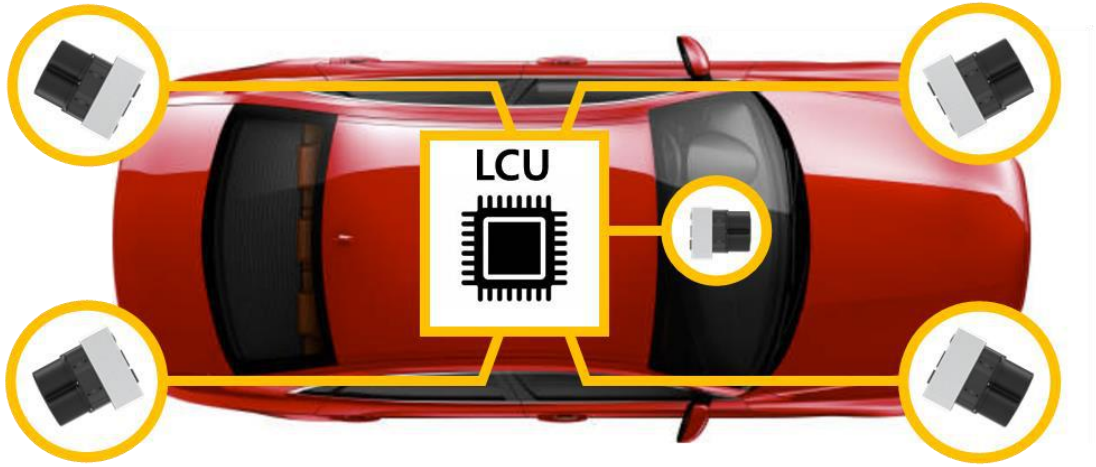
ML Multi-echo Processing Result (w Fog)

SOS LAB's Mission

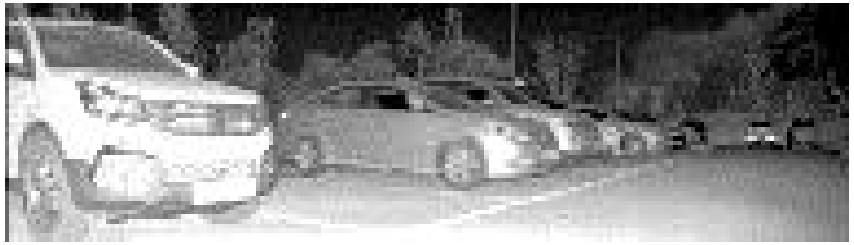
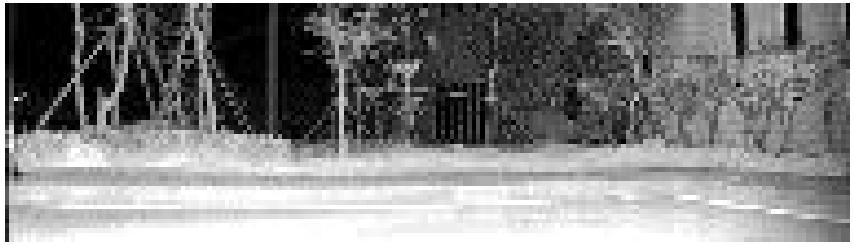
V. Perfect fit to SDV (Software-Defined Vehicle)

ML-A : for Software Defined Vehicles





ML-A : for Software Defined Vehicles

	Scene I	Scene II
RGB Camera (Reference)		
ML-X Intensity Image (Input)		
Colorization Image		

SOS LAB's Mission

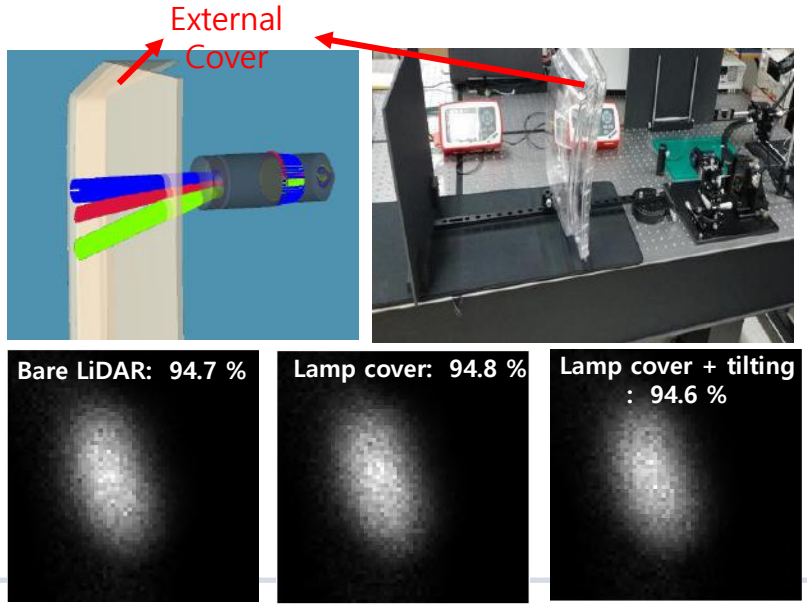
VI. Providing **comprehensive LiDAR solution**

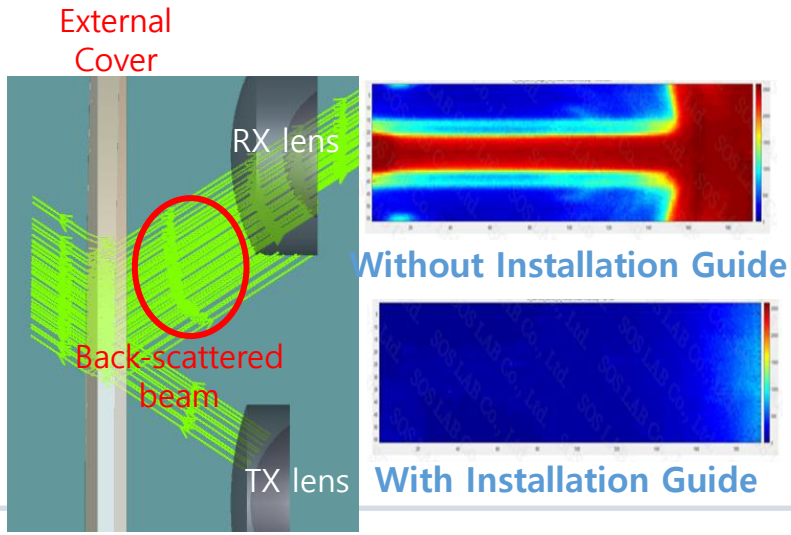
Comprehensive LiDAR Solution

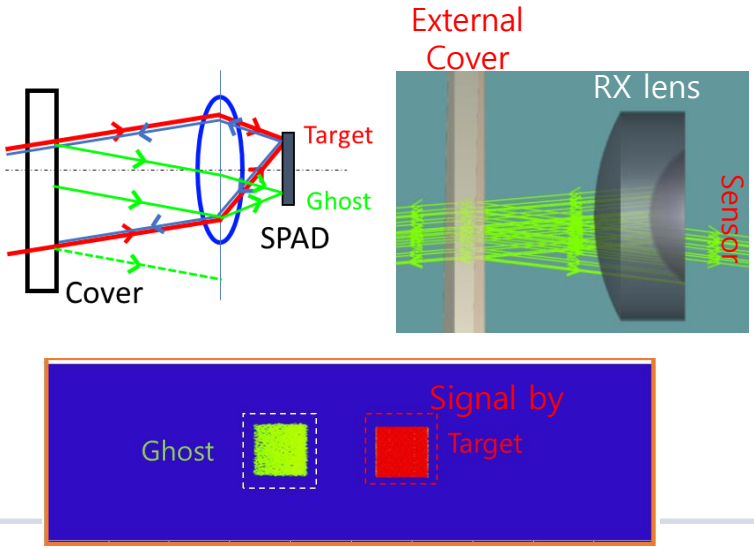
Fully-packaging

Partially-packaging

Optical Performance	Back-scattered Beam	Ghost
Optical Power Loss Distortion of FOV Optical Alignment Shift } By External Cover (Lens)	Undesired Laser beam Incidence on the Rx from reflection — By External Cover (Lens)	Artifact data (Ghost) — By External Cover (Lens)







Smart
Optical
Sensors

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Thank you

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