



Sunny Optical Technology (Group) Company Limited

舜宇光学科技（集团）有限公司

(Incorporated in the Cayman Islands with limited liability)

(Stock Code: 2382.HK)

Corporate Presentation

Investor Day

June 2021



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Agenda

1 **Company Overview**

2 **Market Trends & Opportunities**



Company Overview

- Established in 1984 and listed on the Main Board of the Hong Kong Stock Exchange in 2007, issued 1 billion shares. In September 2013, the Company had successfully placed 97,000,000 new shares.
- 4 production bases in China with strong technical and manufacturing capabilities and new production bases in India and Vietnam
- Strong R&D capabilities, with R&D centers set up in China, South Korea, USA, etc.



 Production Base  R&D Center

Yuyao Chengxi Production Base



New Production Base in Yuyao City



New Production Base in Vietnam



Phase II Production Base in Xinyang City



New Production Base in India

Leverage on Optical Technology Advantages to Diversify Product Portfolio

Handset Industry



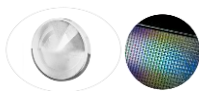
Lens set

Imaging lens set
Perceptual lens set



Camera module

New packaging module
Optical zoom module
TOF module



Other

Display optical component
Diffractive optical component

Automobile Industry



Vehicle lens set

Front lens set
Surrounding view lens set



Vehicle module

Front module
Surrounding view module



Other

OMS HUD
DMS LiDAR
Smart headlight

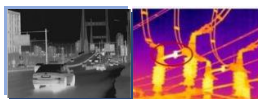
Security Industry



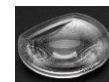
Visible light security



Infrared security



VR/AR



Fresnel



Optical engine

Robot Industry



Recognition area



Positioning area

Optical Instrument & Equipment



Industrial equipment



Medical equipment



Microscope

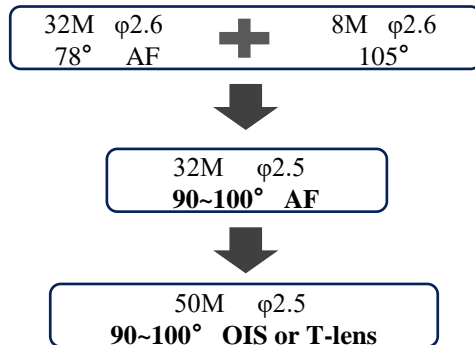
Market Trends & Opportunities

1 Mini-notch



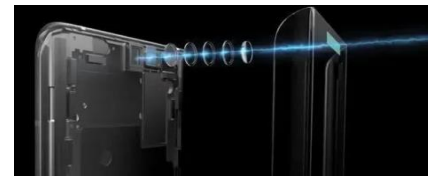
3 AF + Ultra-wide

To add T-lens between the upper and lower groups can realize the front AF function without VCM

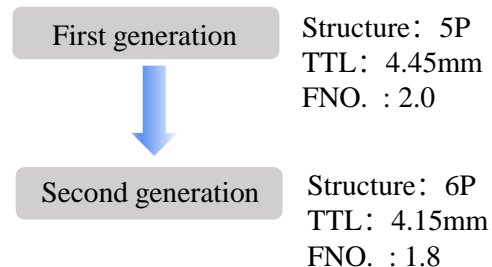


2 Under-screen Camera

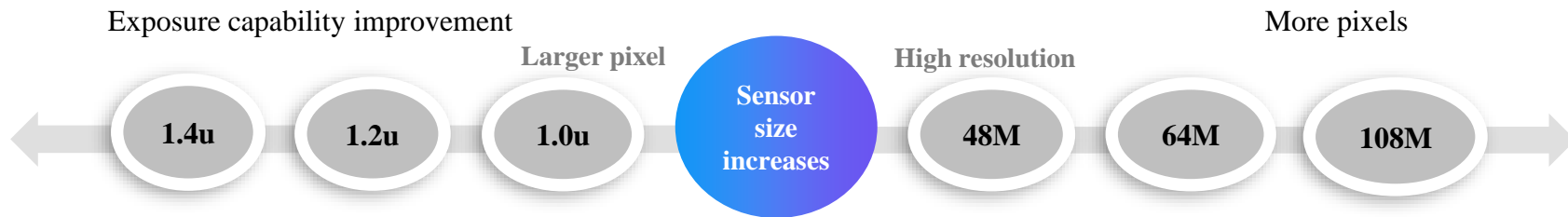
- ◆ Two major problems of the screen: ①Transmittance; ②Diffraction
- ◆ Impact: image fogging, severe flare, reduced signal-to-noise ratio



Requirement: large aperture, high RI, low TTL



1 Larger Sensor Trend



2 Variable Aperture



Electromagnetically driven mechanical shading sheet is used to adjust the amount of light going through the lens set to achieve aperture selected for shooting in more complex light environments.

【Advantages】 :

Low light: a large aperture increases the amount of light

High light: a small aperture to achieve deep depth of field and obtains more details

The combination of software and hardware reduces the loss of image quality due to algorithm optimization.

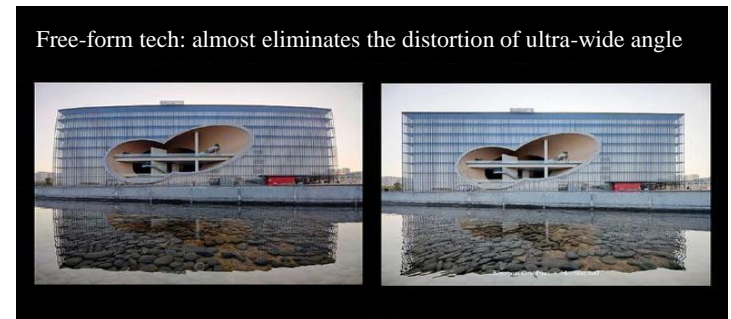
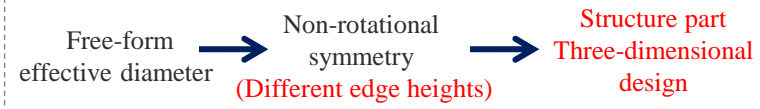
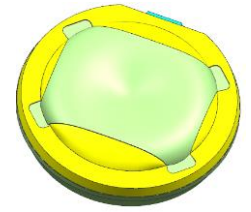
3 Ultra-wide Lens Set



5 Tele Lens Set



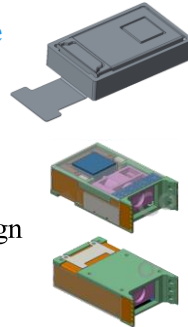
4 Free-form Lens Solution



6 5X Periscope Tele (low cost)

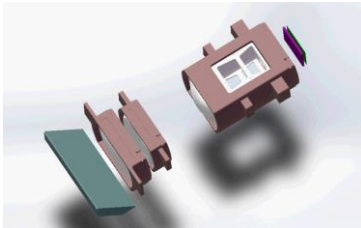
- Motor one-piece design: the device components will be reduced as to simplify the process steps to achieve the cost reduction

Module one-piece design



Motor one-piece design

7 Continuous Zoom Tele Lens Set



- 3 lens groups, G2/G3 movable focal length changed when G2/G3 location adjusted by guide rod VCM;

8 GM Lens Solution



- **Main camera lens set:** As the image surface increases, the use of GM lenses can reduce the TTL and improve optical performance; or at the same TTL, a larger aperture can be achieved;
- **Periscope tele/continuous zoom lens set:** 1) Solve the BFL change caused by temperature drift of the lens set; 2) Improve the stress problem of plastic lens after trimming; 3) Improve chromatic aberration and purple fringing;
- **Video lens set:** Solve the performance degradation caused by long-time shooting

1

VR

Near-
to-eye
display

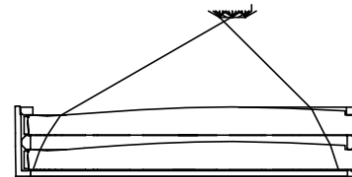


➤ VR Large lens and subassemblies

1P (Fresnel, Aspheric)



2P Subassemblies



- Self-designed structure solution
- Self-developed assembling and testing equipment

2

VR/UAV/Robot...

Space Position-ing



Dual-cam with high resolution



Dual-cam with ultra-wide angle

Dual-cam with fish eye



Eye-tracking



Gesture recognition

(Single RGB/multi-cam/TOF/structure lights)

➤ Environmental perception



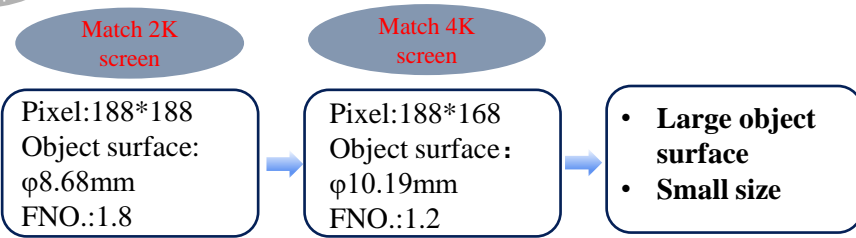
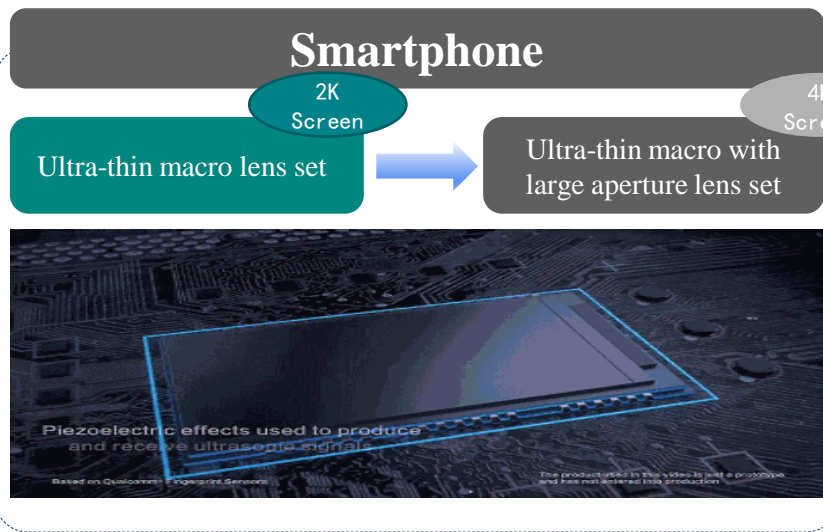
5P/6P (wide angle)



6P(wide angle)/G(GM)+P

3

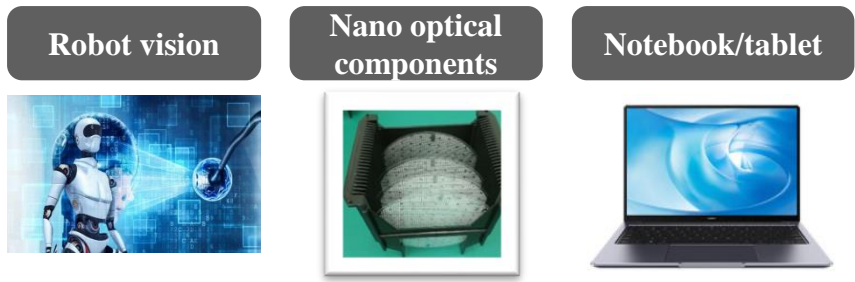
Under-screen fingerprint



Trend: Large object surface → Full screen

4

Others

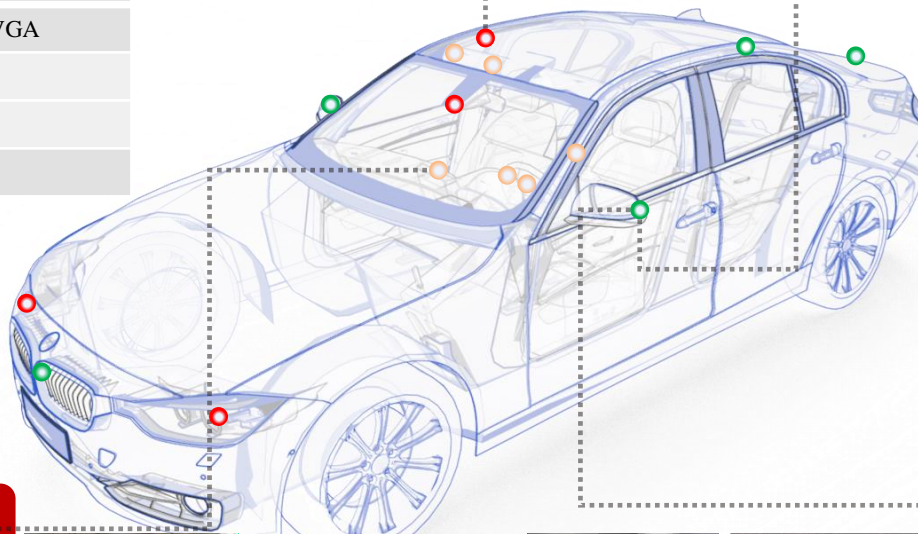
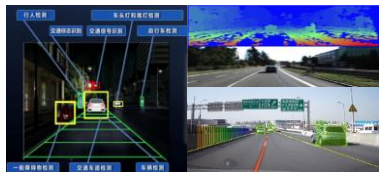


- Single cam/Dual-cam RGB lens set
- Diffuser
- DOE
- ...

- Obstacle avoidance perception**
- Monitoring function**
- Face recognition payment**
- ...

Front Sensing Camera

Single camera	Multi-camera	IR Camera
1M	1M	VGA
2M	2M	
5M		
8M	8M	



Outside Viewing Camera

360° View Soc	360° View Raw	Rear Camera
VGA	1M	VGA
1M	2M	1M
2M		2M
Side View	Streaming Rear-mirror	DVR
VGA	1M	1M
1M	2M	2M
2M		

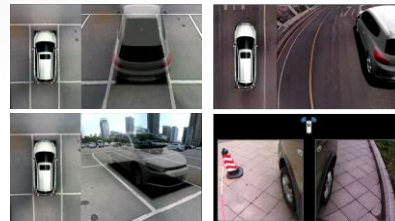
In-cabin Monitoring Camera

DMS	OMS	TOF
1M	2M	QVGA
2M		VGA



Sensing/Viewing Camera

CMS
1M
2M
2.8M

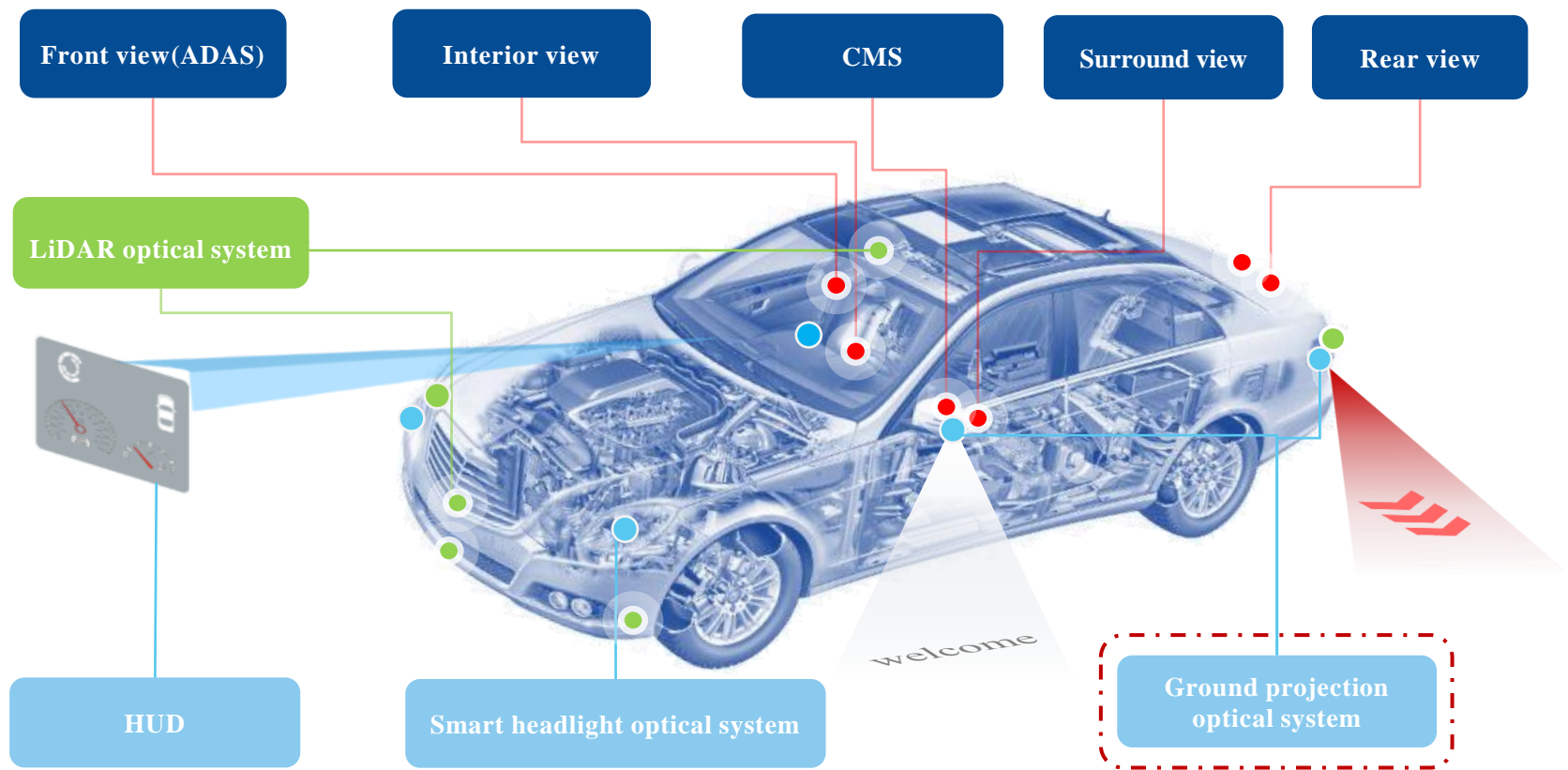




Thanks!



Autonomous Driving Developing Rapidly & Great Potential for Optical Application



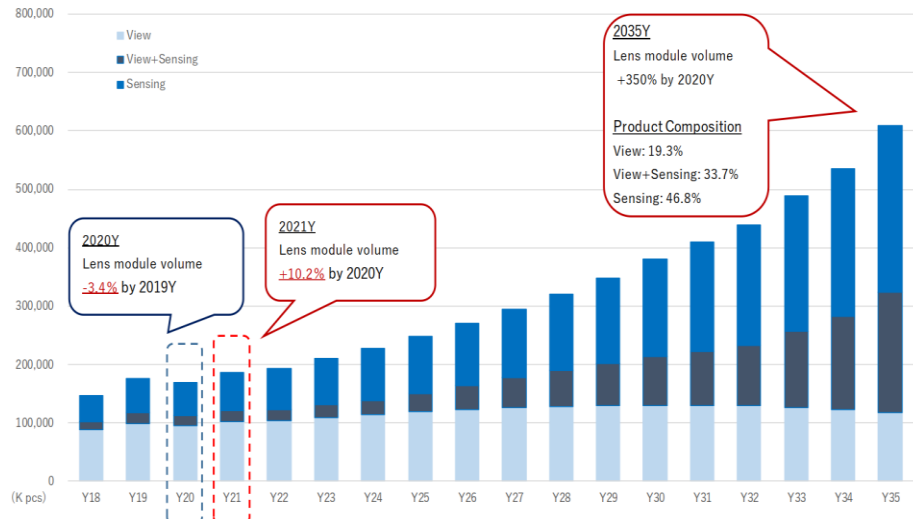
Note: New product



1. Attractive Opportunity in Global Automotive Camera Market

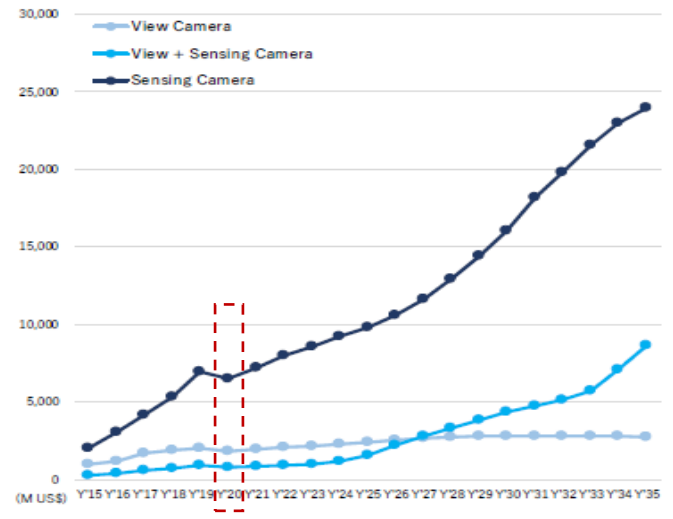
Attractive Opportunity in Automotive Camera Market(By application)

Volume Trend (K unit)



(Source: 2021Y TSR Report)

Revenue Trend (M US\$)



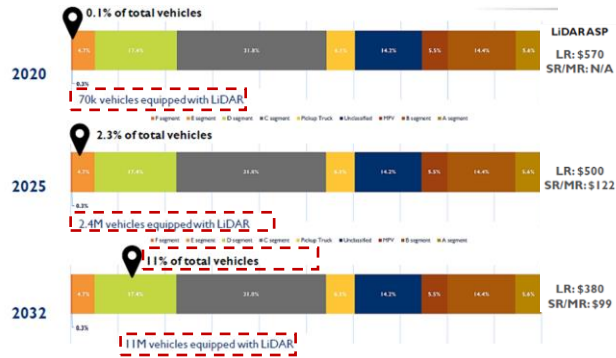
- Due to the impact of the COVID-19, the global automotive camera market in 2020Y declines by 3.4% compared with 2019Y. However, Sunny is still **achieving growth against the trend**. The main reason is that customers choose to give priority to high-end products due to limited production capacity during the epidemic and Sunny has always focused on mid-to-high-end products with a high proportion of mid-to-high-end products. Sunny seizes the opportunities in high-profile products and achieve high-quality development.
- Due to the impact of the COVID-19 is weakening, the global automotive camera market in 2021Y will grow by 10.2% compared with 2020Y. **Sunny's growth is expected to far exceed the market's average growth rate and will keep No.1 in the automotive lens field and rise further.**



2. Attractive Opportunity in Global Automotive LiDAR Market

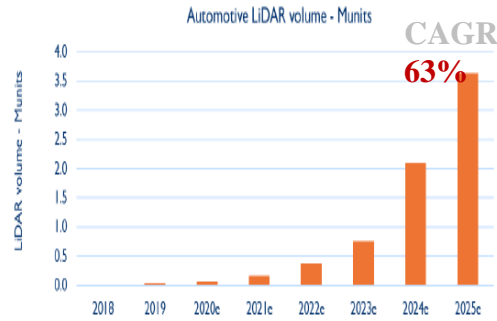
Attractive Opportunity in Automotive LiDAR Market

LiDAR adoption rate in ADAS cars (%)

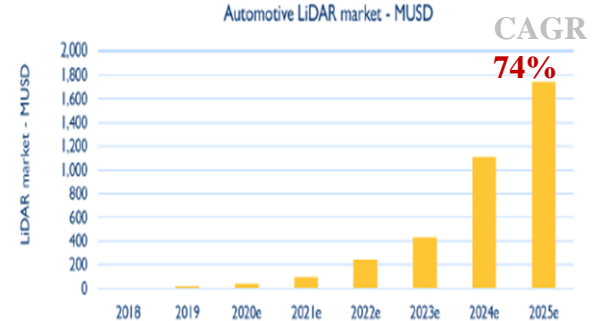


(Source: 2020 Yole Report)

Volume Trend (KK unit)



Revenue Trend (M US\$)



- Thanks to several projects between OEM and LiDAR manufacturers, LiDAR volumes are expected to increase from 2021Y.
- LiDAR mass production will enter a hot period in 2022Y-2025Y and LiDAR market size (number and amount) will show a steady upward trend in the next five years.
- Sunny supports more than 20 global leading LiDAR players and Tier-1 customers and provides core components for typical representative enterprises with obtaining multiple mass production projects in 2020Y.
- Sunny will achieve more than 10 projects for mass production and supply more than 7 international well-known auto brands to realize commercial use in 2021Y-2022Y.

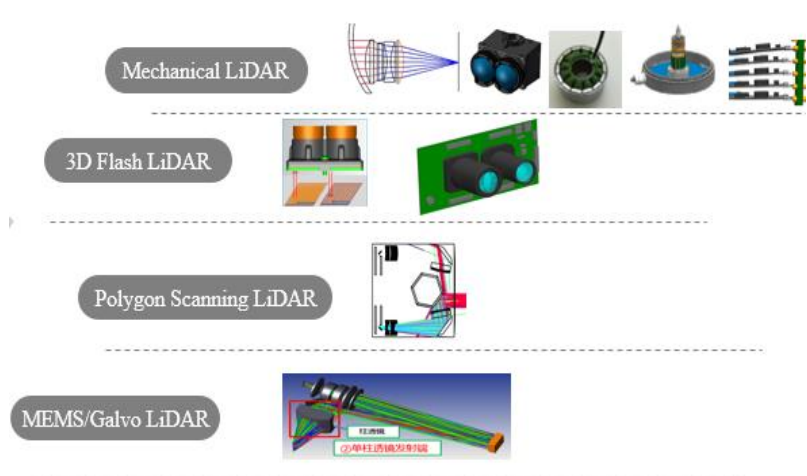


2. Improving LiDAR Product Layout & Maximizing Customer Satisfaction

- Providing optical solutions based on customer needs, including but not limited to optical components, lens components, optomechanical modules, etc.



Wide range of product types(lens, windows, scanning components)

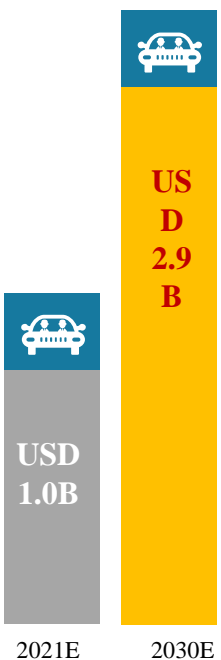


Wide range of product forms

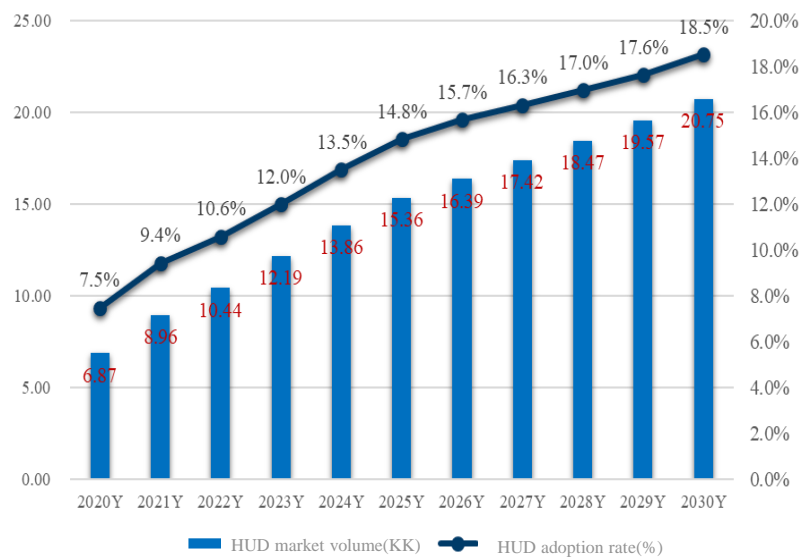


3. Global Automotive HUD Market Opportunity

Attractive Opportunity in Automotive HUD Market



2020Y-2030Y HUD Market (volume & adoption rate)



- During the period of 2020Y-2030Y, HUD market capacity and adoption rate will increase especially after 2020Y. This growth is driven by the improvement in the level of automated driving and the introduction of EV as well as the continued expansion of HUD installations by OEM.
- Sunny breaks through a new HUD technology route in 2020Y and cooperates with the world's leading HUD manufacturers to develop holographic/optical waveguide products and obtain orders from a number of leading global customers.

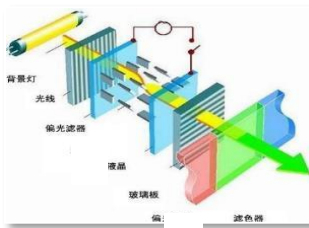
(Source: 2020 TSR Report)



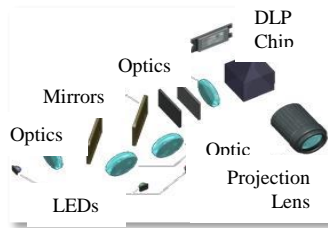
3. Advanced HUD Product Layout & Maximizing Customer Satisfaction

Providing optical solutions based on customer needs, including but not limited to PGU, freeform mirror, optical components, etc., to maximize customer satisfaction.

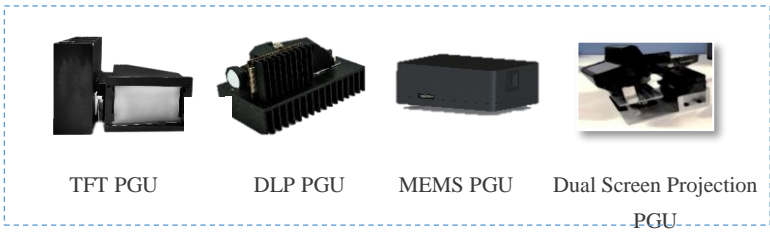
TFT Solution



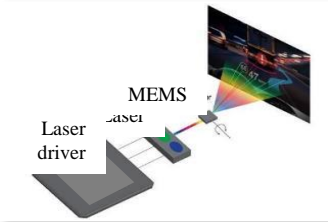
DLP Solution



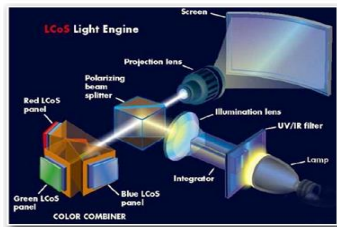
PGU



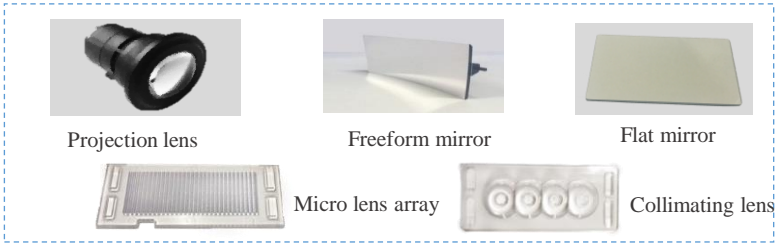
Laser MEMS Solution



LCOS Solution



Core Optical Components



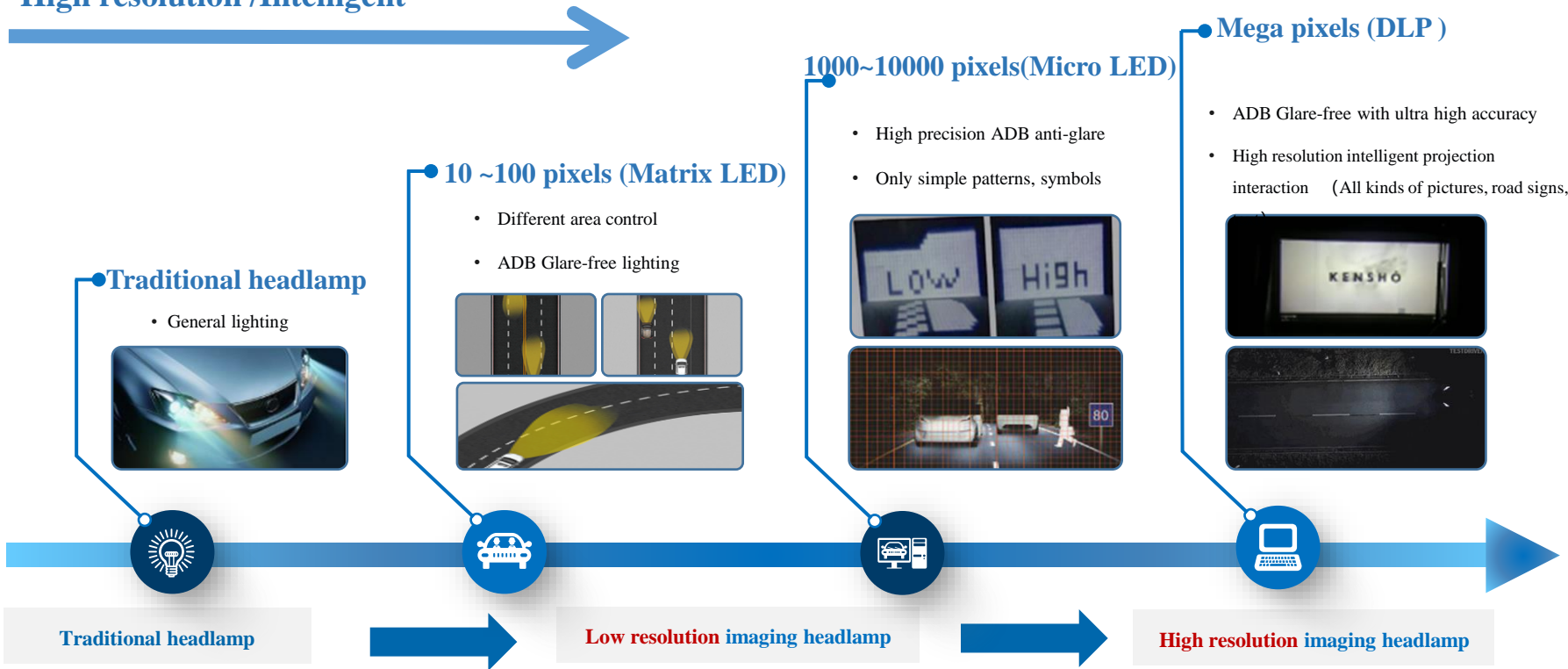
Wide range of product forms

Wide range of product types



4. Attractive Opportunity in Global Automotive Smart Headlamp Market

High resolution /Intelligent

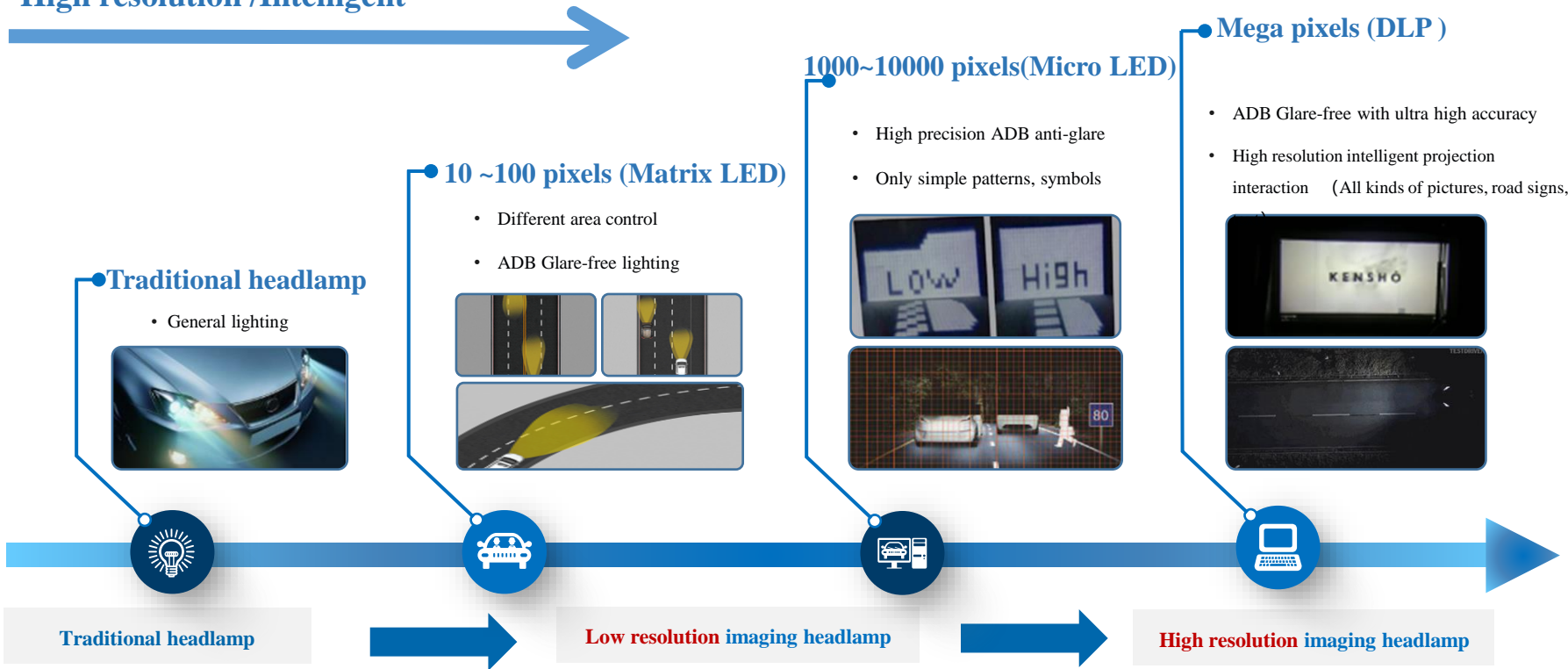


- Sunny supports global well-known headlamp players and provides a variety of projection optical solutions with obtaining multiple orders in 2020Y.
- Sunny has successfully developed smart headlamp products covering mega pixels, 10000 pixels and 1000 pixels to achieve diversified layout.



4. Attractive Opportunity in Global Automotive Smart Headlamp Market

High resolution /Intelligent



- Sunny supports global well-known headlamp players and provides a variety of projection optical solutions with obtaining multiple orders in 2020Y.
- Sunny has successfully developed smart headlamp products covering mega pixels, 10000 pixels and 1000 pixels to achieve diversified layout.

Thanks

www.sunnyoptical.com



2021 Overall Smartphone Market Key Words and Countermeasures

- Affected by the overseas pandemic rebound, the overall smartphone demand has declined compared with the original forecast. The Company expected that 2021 global smartphone shipment will reach **1.3 billion**, with **1.5% YoY slight growth, 5.8% decline** with the original forecast.
- 2021 China smartphone shipment will reach **340 million**, similar with last year; Indian market is affected by the second pandemic, its smartphone shipment will reach **130 million, decreased by 13% YoY.**
- 5G phone model with homogenization, focus more on the **image quality and video**; China smartphone vendors focus on **building high-end brand**, to compete for the market share Huawei left.
- High-end models are with weak shipment, middle-to-low end ones are with fierce competition, with the increasing cost pressure, smartphone camera with **configuration degrade**, and the camera coefficient declines gradually.



Target: Continue to Improve Core Competence

- Give full play to technical advantages and increase customer stickiness
- Establish the capacity for R&D and MP of core actuator component , and strengthen the ability of systematic product integration
- Give full play to the advantages of scale, and continuously improve the cost competitiveness of products
- Continue to promote the construction of factory digitalization and intelligentization
- Accelerate the construction of Vietnam Production Base and enhance global supply capacity



Upgrade Trend on Next Generation Camera

1 inch Sensor



1/2" Sensor

1" Sensor

Chip performance improves with higher signal-to-noise ratio and dynamic range. Product upgrades towards APS-C and full frames

Pop-out Camera

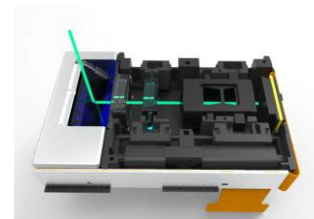


Pop-out Camera

Normal Camera

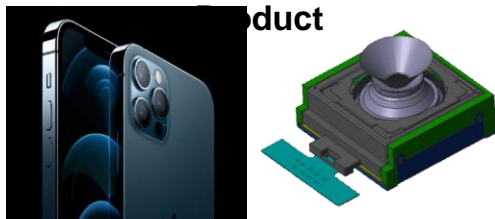
Ultra large aperture, enhance light input with image clarity improvement
Differentiated products open a new product track

Continuous Zoom Periscope



Optical zoom develops towards continuous zoom, large image size started to be applied
Smartphone camera replaces digital camera

Sensor Shift



Increasing demand for better OIS performance, higher OIS accuracy and video application
Gimbal Stabilization, sensor shift, dual OIS

3D Application Development



More focuses on 3D, with A's D-TOF product in mass production. Integration of AR and 3D reach the depth information capture and interaction applications

Hybrid Lens

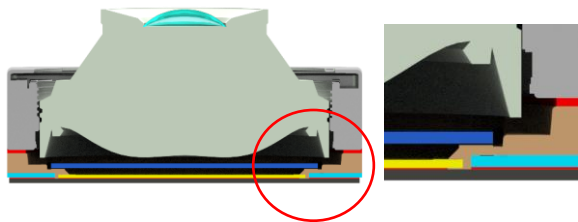


Liquid lens, G+P lens set, freeform lens technology launched fast
Optimize camera image quality



Core Platform Technology

MOC II Packaging



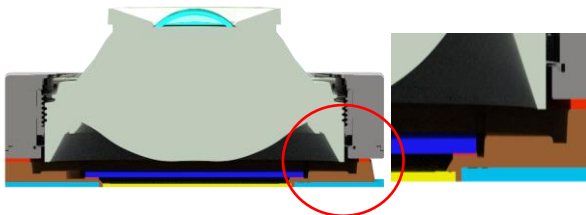
Advantage:

1. Module height reduction $> 0.2\text{mm}$
2. Better module strength and reliability
3. Better heat dissipation, 3°C cooler than COB

Sunny Ability

Pioneer developed highly reliable camera started mass production

MOC III Packaging



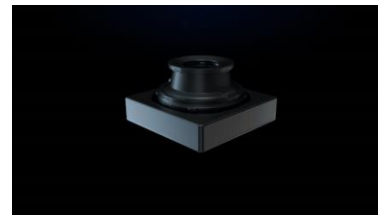
Advantage:

1. Module height reduction $> 0.37\text{mm}$
2. Especially for sensor format $> 1/1.3''$, to reach module height reduction, beneficial for smartphone thickness

Sunny Ability

Pioneer developed the thinnest camera are available for mass production

High-precision Optical Assembly



Advantage:

Contemporary Adjustment: Peak, Tilt, Field Curve etc. optical performance, makes breakthrough in the bottleneck of optical system assembly and improves mass production of camera with complex optical system

Sunny Ability:

1. Built-in liquid lens, G+P hybrid lens set with MP
2. $1/1.28''$ and larger image size with MP
3. FNo1.4 and larger aperture with MP
4. Multi-piece, multi-group with high-precision assembly ability to achieve continuous zoom periscope camera in MP



Process Capability

OLA

(On-line Assembly)

- ① Fully automatic loading & unloading and material transfer to achieve **automatic production from COB to AA**
- ② **Reduce** labor costs and fewer single-line personnel
- ③ **Reduce** production cycle
- ④ **Reduce** WIP (Work in progress)
- ⑤ Pioneer developed all **in-line** assembly line
- ⑥ **Coverage rate $\geq 8X\%$**

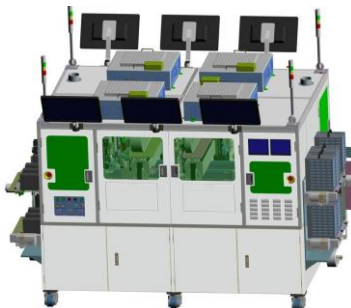
Carrier transfer



OLW-mini

(Online Welding)

- ① **Online automatic welding device, higher process integration (N \rightarrow 1)**
- ② Self-developed visual inspection algorithm, Industry leading inspection capabilities.
- ③ Mature MP capability



WLT-mini

(Wafer Level Test)

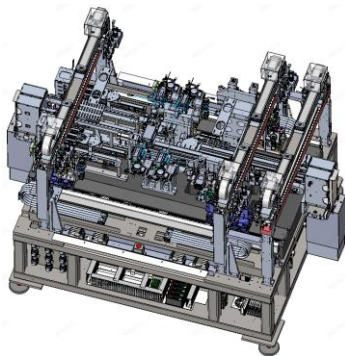
- ① Fully automatic loading & unloading, 32 modules simultaneous testing
- ② Industry leader in output per unit area
- ③ Industry leaders in output per capita
- ④ **Widely applied in mass production, coverage rate $\geq 6X\%$**





SAA (Sensor Active Alignment)

- ① **Unique multi-component AA capacity with sensor, prism, mirror, etc.**
- ② **FOV & BFL** adjustment of high zoom periscope camera
- ③ **MTF adjustment** of high zoom periscope camera, improve module MTF test yield rate
- ④ Industry-leading mature MP capability



SV-AOI (Automated Optical Inspection)

- ① Fully automatic loading & unloading to reach module **full appearance inspection**
- ② Self-developed visual inspection algorithms, industry leading inspection capabilities.
- ③ **Widely applied in mass production, coverage rate $\geq 8X\%$ in process inspection.**

