

# Summary of the benefit statement of the presentation

1. Introduction for DLP 3D scanning and DLP 3D SDK
2. Advance features for existing DLP 3D SDK
3. How to optimize the scanning performance by using DLP technology
4. Why DLP is good solution for 3D Machine Vision technology in industrial application

# Advance features for existing DLP 3D scanning SDK

TW DLP FSE

Frank

# Frank Liu

## Taiwan DLP FSE, MGTS

- **Career**
  - Taiwan Tsinghua University
  - FSE for DLP, Taiwan region
- **Expertise**
  - 15 year+ for DLP projector
    - EE engineer(4+)
    - SW engineer(4+)
    - DLP FSE(6+)
  - Taiwan DLP non display application business develop engineer(3+)

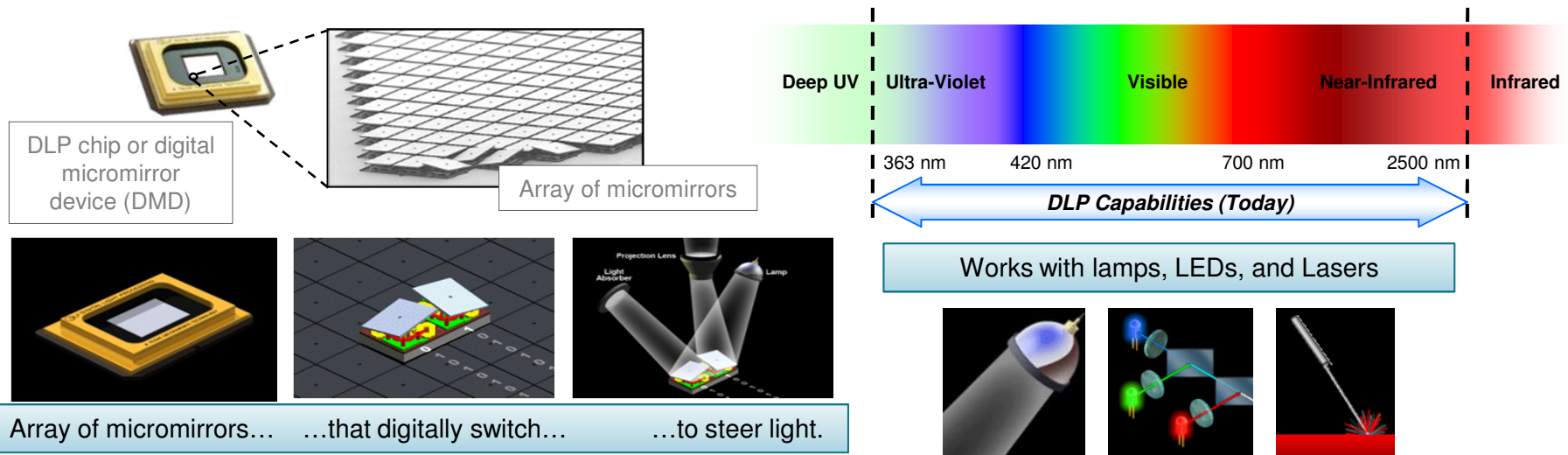


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# Agenda

- **DLP 3D scanning Introduction**
- DLP 3D scanning SDK Introduction
- Advance features for existing SDK
  - Increasing scanning speed from 20Hz to 400Hz
  - Improve the lost point cloud
- 3D Machine Vision Applications: Performance of adaptive patterns
- DMD Performance and Stability for 3D Machine Vision Applications

# DLP MEMS technology for industrial

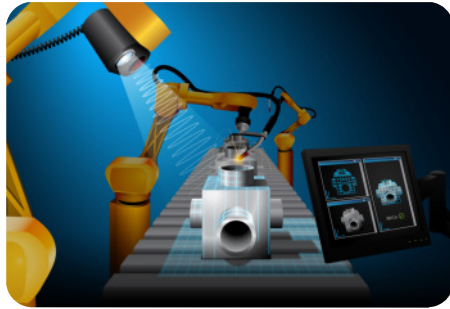


**The DMD is a fast, efficient, and reliable spatial light modulator (SLM) offering:**

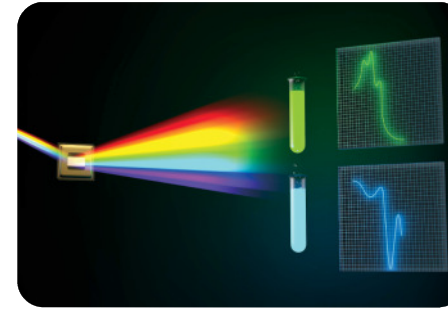
- 1) High Speed Switching – Switching of the mirrors at up to 32kHz
- 2) Extended Wavelength – Supporting UV and near-infrared (NIR) in addition to visual spectrum
- 3) Wavelength Selection – Direct and modulate specific wavelengths of light through programmable pixel mapping

# DLP Industrial & Sensing fast growing areas

## 3D Sensing



## Spectral Sensing



## Lithography

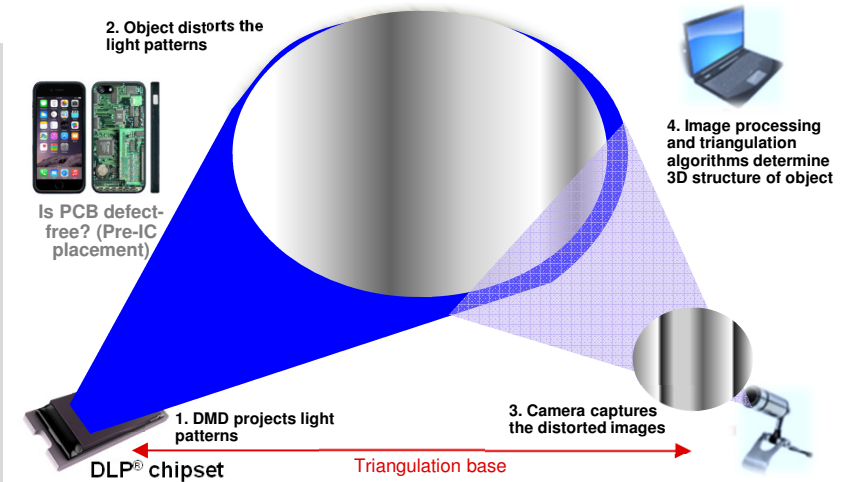


## 3D Printing



# 3D Scanning with DLP technology

## 3D Sensing: Look in-3D



### End Equipment Examples

3D Biometric

Factory Automation

Dental/Medical Scanners

Industrial/Metrology

## Why choose DLP technology?

DLP Feature	Design Benefit
Optical MEMS device	Generating reliable and precise structured light patterns with superior image quality
<b>High speed</b> pattern rates up to 32kHz with $\sim 2\mu\text{s}$ optical switching	Real-time light processing and/or display for instant information
External triggers	Enables easy synchronization to external cameras and sensors
High bit-depth	Higher accuracy and resolution
<b>Extended wavelength</b> support 363-2500nm	Enabling applications that require UV, visible, or NIR light sources or light detection
Small form factor	Portable, lower cost solutions when combined with TI's embedded processors
Strong DLP ecosystem	Quicker time-to-market with lower investment

# DLP 3D Scanning market opportunities

## Inline Automated Optical Inspection

### Use Cases

- PCB Solder Paste & assembly Inspection
- Advanced IC Packaging
- Machined Parts Inspection



## Medical 3D Scanner

### Use Cases

- Implant Surgery
- Mouth Rehabilitation
- Bridge and Crowns
- Hearing Aid
- Live Cell Imaging

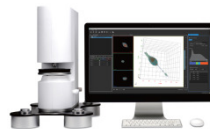


image © Tomocube



image © Carestream

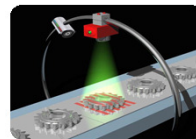
## Industrial/Metrology Scanner

### Use Cases

- Quality Control
- Factory Automation
- Tool Inspection
- In-Process Inspection
- Reverse Engineering



image © Zividlabs



## Prosumer 3D Scanner

### Use Cases

- 3D Modeling
- Scan-to-Print
- 3D Animation
- E-commerce



image © Shining3D

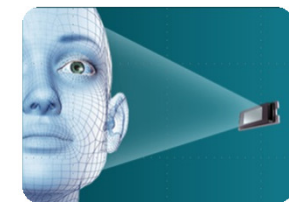


image © eSun

## 3D Camera

### Use Cases

- Facial Recognition
- Mixed Reality
- AR/VR
- Gaming
- Drone & Robots





# DLP 3D Scanning leveraging the ecosystem

