



# 2026年第一季法人說明會

2026年06月08日



ELAN Microelectronics Corporation

# 產品線業績比例（合併營收）



- 人工智慧產品：車用ADAS、智慧交通AICCTV、AI影像辨識演算法...
- 觸控產品：觸控板,觸控螢幕晶片,生物辨識晶片
- 非觸控產品：指向裝置,微控制器&其他

# 合併損益表 - 2026年第1季 vs. 2025年第1季

單位:新台幣佰萬元

|            | 2026年第1季 | %     | 2025年第1季 | %     | YoY(%) |
|------------|----------|-------|----------|-------|--------|
| 營業收入淨額     | 3,225    | 100.0 | 3,119    | 100.0 | 3.4    |
| 營業毛利       | 1,537    | 47.7  | 1,564    | 50.1  | (1.7)  |
| 銷售費用       | 83       | 2.6   | 83       | 2.7   |        |
| 管理費用       | 129      | 4.0   | 118      | 3.8   |        |
| 研發費用       | 546      | 16.9  | 578      | 18.5  |        |
| 營業費用       | 758      | 23.5  | 779      | 25.0  | (2.7)  |
| 營業淨利       | 779      | 24.2  | 785      | 25.1  | (0.8)  |
| 業外收入及支出    | 61       | 1.8   | (66)     | (2.0) |        |
| 稅前淨利       | 840      | 26.0  | 719      | 23.1  | 16.8   |
| 稅後淨利       | 676      | 21.0  | 515      | 16.5  |        |
|            |          |       |          |       |        |
| 本期淨利歸屬於    |          |       |          |       |        |
| 母公司業主      | 705      | 21.9  | 549      | 17.6  | 28.4   |
| 非控制權益      | (29)     |       | (34)     |       |        |
|            |          |       |          |       |        |
| * 每股盈餘 (元) | 2.46     |       | 1.92     |       | 28.1   |

\* 期末發行股數: 3.04億股; 流通在外股數: 2.863億股 (2026年3月底)、2.862億股 (2025年3月底)

\* 財務資料來源:會計師核閱報告

# 合併損益表 - 2026年第1季 vs. 2025年第4季

單位:新台幣佰萬元

|            | 2026年第1季 | %     | 2025年第4季 | %     | QoQ(%) |
|------------|----------|-------|----------|-------|--------|
| 營業收入淨額     | 3,225    | 100.0 | 2,859    | 100.0 | 12.8   |
| 營業毛利       | 1,537    | 47.7  | 1,410    | 49.3  | 9.0    |
| 銷售費用       | 83       | 2.6   | 86       | 3.0   |        |
| 管理費用       | 129      | 4.0   | 117      | 4.1   |        |
| 研發費用       | 546      | 16.9  | 546      | 19.1  |        |
| 營業費用       | 758      | 23.5  | 749      | 26.2  | 1.2    |
| 營業淨利       | 779      | 24.2  | 661      | 23.1  | 17.9   |
| 業外收入及支出    | 61       | 1.8   | 107      | 3.8   |        |
| 稅前淨利       | 840      | 26.0  | 768      | 26.9  | 9.4    |
| 稅後淨利       | 676      | 21.0  | 712      | 24.9  |        |
|            |          |       |          |       |        |
| 本期淨利歸屬於    |          |       |          |       |        |
| 母公司業主      | 705      | 21.9  | 735      | 25.7  | (4.1)  |
| 非控制權益      | (29)     |       | (23)     |       |        |
|            |          |       |          |       |        |
| * 每股盈餘 (元) | 2.46     |       | 2.57     |       | (4.3)  |

\* 期末發行股數: 3.04億股; 流通在外股數: 2.863億股

\* 財務資料來源:會計師核閱報告



# 合併資產負債表

(2026年03月31日)

單位:新台幣佰萬元

|               |               |
|---------------|---------------|
| 流動資產          | 8,628         |
| 現金及約當現金       | 3,790         |
| 金融資產-流動       | 389           |
| 應收票據及帳款淨額     | 2,310         |
| 存貨淨額          | 1,682         |
| 其他流動資產        | 41            |
| 其他金融資產-流動     | 416           |
| 金融資產-非流動      | 1,882         |
| 固定資產          | 4,698         |
| 其他非流動資產       | 1,503         |
| <b>資產總計</b>   | <b>16,711</b> |
| 流動負債          | 4,974         |
| 非流動負債         | 1,939         |
| <b>負債合計</b>   | <b>6,913</b>  |
| 股本            | 3,039         |
| 資本公積          | 1,182         |
| 保留盈餘          | 6,379         |
| 其他權益          | (94)          |
| 庫藏股           | (833)         |
| 非控制權益         | 125           |
| <b>股東權益合計</b> | <b>9,798</b>  |

\*財務資料來源:會計師核閱報告

# 合併現金流量表

(2026年03月31日)

單位:新台幣佰萬元

|                   |            |
|-------------------|------------|
| 本期稅前淨利            | 840        |
| 折舊及各項攤銷           | 79         |
| 存貨跌價及報廢損失         | 38         |
| 應收票據及帳款增加         | (208)      |
| 存貨增加              | (122)      |
| 其他應收款減少           | 85         |
| 應付票據及帳款增加         | 51         |
| 其他流動負債增加          | 174        |
| 其他                | (9)        |
| <b>營業活動之淨現金流入</b> | <b>928</b> |
| 三個月以上之定期存款減少數     | 1,003      |
| 因合併產生之現金流入        | 37         |
| 購置固定資產            | (323)      |
| 取得無形資產            | (286)      |
| 其他                | 10         |
| <b>投資活動之淨現金流入</b> | <b>441</b> |
| 短期借款增加            | 30         |
| 其他                | (10)       |
| <b>融資活動之淨現金流入</b> | <b>20</b>  |
| 本期現金及約當現金增加數      | 1,390      |
| 期初現金及約當現金餘額       | 2,400      |
| 期末現金及約當現金餘額       | 3,790      |

\*財務資料來源:會計師核閱報告

# 2026年第2季業績展望

基於目前對未來營運展望之假設，義隆公司預期：

★合併營收約介於新台幣32億~ 新台幣34億之間

★銷貨毛利率約於46.5% ~ 49.5%之間

★營業利益率約介於21.4% ~ 25.9%之間

- 簡報內所含之前瞻性敘述將受各項風險與不確定因子影響而與本公司之表示有所差異。
- 除受法令要求外，本公司並無義務於日後情況變動時更新簡報內所為之前瞻性敘述。

# AI Agent Will Accelerate the Penetration of AI PC



## The Important Input Interfaces of AI PC

1. Copilot Key
2. Data Security  $\Rightarrow$  Fingerprint Reader
3. Advance Haptic Touchpad
4. Circle to Search Touchscreen & Pen

# 4-in-1 Copilot Key Won 2026 COMPUTEX BC Awards

AI-ENHANCED BIOMETRIC INTERACTION

## ELAN Fingerprint Solution

### Multi-Finger Shortcut

Custom Gestures for Productivity



### Cursor Control

Precise & Seamless  
High Resolution Cursor



### Handwriting Shortcut

Write & Trigger  
Smarter Workflow



### Haptic Feedback

Instant Vibration Response  
You Can Feel



### On Device AI Security

AI Anti-Spoofing



### ELAN Fingerprint Peripherals



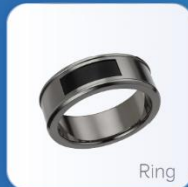
Mouse



Keyboard



Game Console



Ring



Glasses



Dongle



2026 Best Peripherals & Accessories

## 4 in 1 Copilot Key





# ELAN Solution inside Newly Released Microsoft Surface Laptop

Surface Laptop Business 13-inch

## Surface Laptop for Business

13-inch | Intel Core Ultra Series 3



Copilot+PC



Microsoft Surface



### Touchpad

Total Solution

### Fingerprint

Total Solution



### 22 hrs

All-day Battery Life

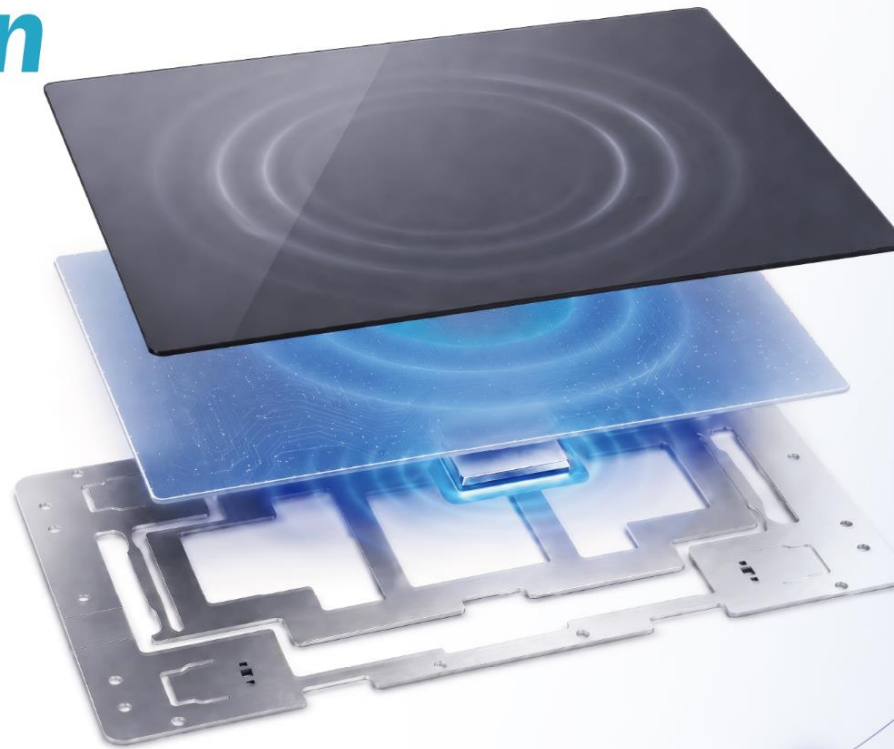


# Advanced Haptics

DESIGNED FOR SUPERIOR TOUCH EXPERIENCE

## ELAN Touchpad Solution

**Precision Touch.  
Intelligent Interaction**



**AI Adaptive**  
Best Recognition for  
Accessibility Mode



**Advanced Haptics**  
Instant Feedback with  
Action Confirmation



**Stylus Support**

Microsoft MPP Wacom AES



**Dual Bank FW**

Enhanced Reliability  
& Safe Updates



**High Report Rate**

Real 240Hz Cursor  
Responsiveness



**Water Resistance**

Stable Cursor Control  
with Wet Finger



**Ultra Low Power**

Up to 56% Power  
Consumption Saving

# ELAN Solution inside Newly Released Microsoft Surface Laptop

Surface Laptop 8 Business 13.8 / 15-inch

## Surface Laptop for Business

13.8 /15-inch | Intel Core Ultra Series 3



Copilot+PC



Microsoft Surface

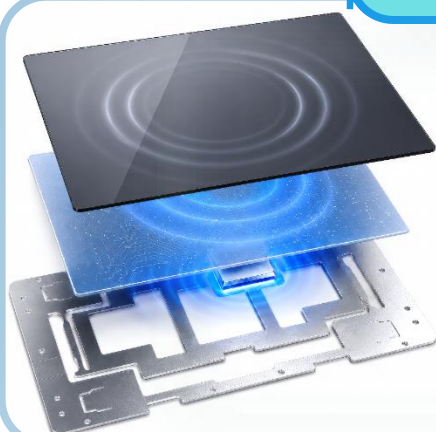
World's First Vendor Supporting Windows 11 Native Advanced Haptics



### Hapticpad

Total Solution

Advanced Haptics



### Control and comfort you can feel

Every click, drag, and snap has its own tactile response with Surface's new precision haptics on the touchpad, for responsive feedback you can feel. It's designed to give you more control with every gesture and click—paired with the backlit keyboard built for quiet and comfortable typing.



Snap Assist



Windowing



Drag & Drop





## Haptic Touchpad Today



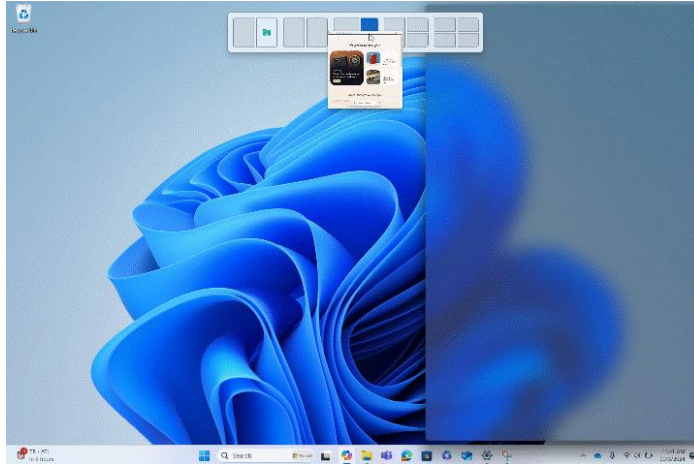
## Advanced Haptic Touchpad



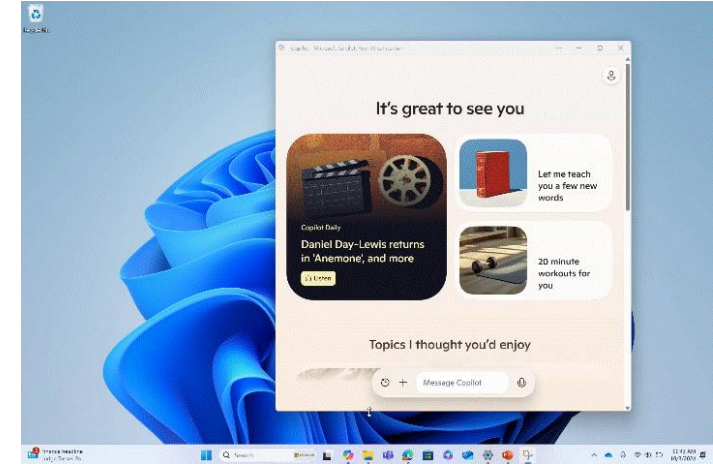
# Instant Feedback for Action Confirmation



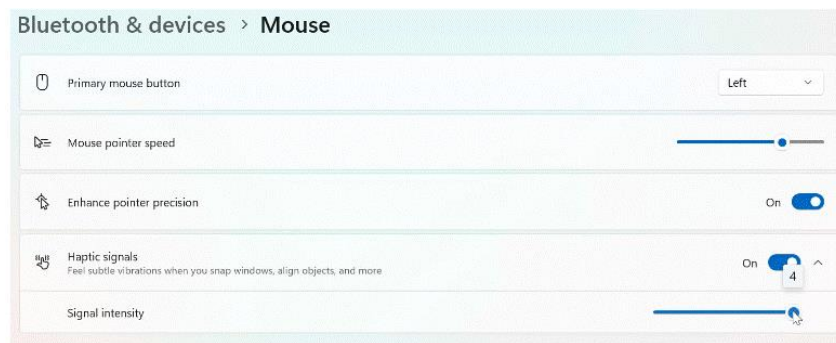
**Snap Assist Bar**  
Waveform: Hover



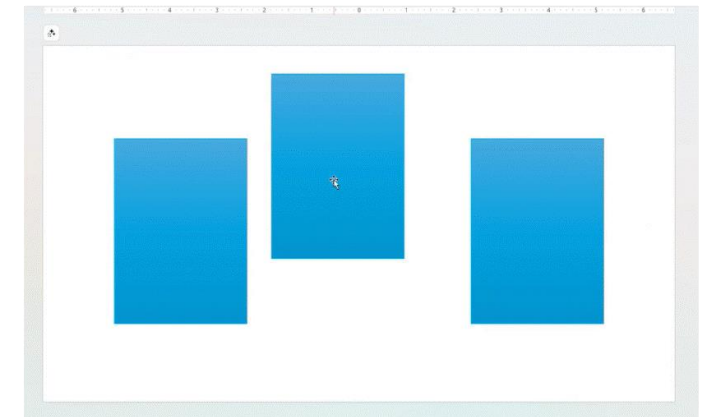
**Resizing Window**  
Waveform: Collide



**Slider Detents**  
Waveform: Step



**Canvas Objects Alignment (Power Point)**  
Waveform: Align



# Yoga Pro 9i Aura Edition: Pen on Haptic Touchpad

With ELAN Touchpad Solution

Lenovo



Copilot+PC



Yoga Pen Gen2 Support



# ELAN Solution inside Newly Released Microsoft Surface Laptop

Surface Pro for Business (12<sup>th</sup> Edition) 13-inch

## Surface Pro for Business(12<sup>th</sup>)

13-inch | Intel Core Ultra Series 3

 Microsoft Surface



Copilot+PC

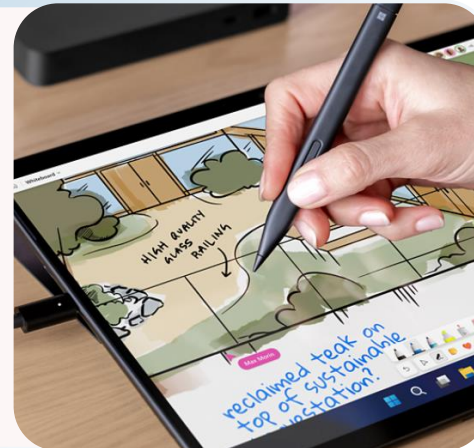


### ELAN TSP

Gen8 Inside

**Navigate your way—pen, touch, or voice**

Switch seamlessly between a natural digital inking experience and a touchscreen responsive to intuitive gestures like drag and drop.



**Slim Pen 2**  
MPP 2.6 Support





# EPD with ELAN Capacitive Active Pen application

## Our Shipping Record

reMarkable

**R** kobo

**Bigme**

ONYX  
BOOX

掌阅  
引领品质阅读

科大讯飞  
IFLYTEK

小猿

moolnk

**Eink**



**ELAN**

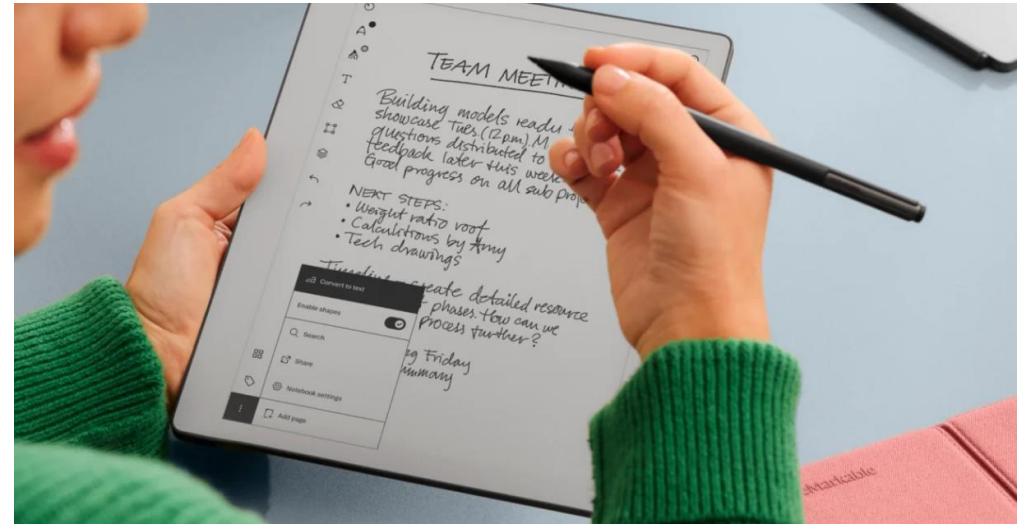


# reMarkable Latest Product with ELAN Inside



228.1 x 187.1 mm

## reMarkable Paper Pure €399



AI-ENHANCED  
STYLUS



LOW  
LATENCY

- Support **Palm Rejection**
- **AI Prediction**
- **Low Latency(<12ms)**





# Google Book (Aluminium) Revealed at Google I/O 2026

Five Major OEMs Preparing Fall 2026 Launches



# ELAN's Edge AI Strategy for Image Recognition Applications

## Self-Developed Edge AI Algorithm



Co-Developed by



中央研究院  
ACADEMIA SINICA



## On Device AI Core Across Multiple Domains



# Academia Sinica × ELAN World-Leading Image Recognition AI Models

ELAN's Proprietary On-Device AI Algorithm – **GElanNet** Requires Only Half the Computing Power of Open-Source Models

## Server-based (open Source)

CSPNet (2019)  
Google Citation: 5,311  
FWCI: 334.30

YOLOv4 (2020)  
Google Citation: 21,487  
FWCI: 無

Scaled-YOLOv4 (2021)  
Google Citation: 2,064  
FWCI: 67.96

YOLOR (2023)  
Google Citation: 811  
FWCI: 8.14

YOLOv7 (2023)  
Google Citation: 11,238  
FWCI: 988.33

YOLOv9 (2025)  
Google Citation: 2,173  
FWCI: 1138.67

## Edge AI

### Edge Module

Jetson TX2: 1.33  
TFLOPS (7.5W)

Jetson Xavier NX:  
21 TOPS (15W)  
ElaNetv2

AI-SOC:  
- 4-TOPS (<4W)  
**GElanNetv2-T**

Related paper has been cited more than 10,000 times!

Computer Science > Computer Vision and Pattern Recognition

[Submitted on 27 Nov 2019]

### CSPNet: A New Backbone that can Enhance Learning Capability

Chien-Yao Wang, Hong-Yuan Mark Liao, **I-Hau Yeh**, Yueh-Hua Wu, Ping-Yang Chen, Jun-Wei Hsieh

Neural networks have enabled state-of-the-art approaches to achieve incredible results on computer vision tasks such as with cheap devices from appreciating the advanced technology. In this paper, we propose Cross Stage Partial Network architecture perspective. We attribute the problem to the duplicate gradient information within network optimization. the end of a network stage, which, in our experiments, reduces computations by 20% with equivalent or even superior the MS COCO object detection dataset. The CSPNet is easy to implement and general enough to cope with architecture

Computer Science > Computer Vision and Pattern Recognition

[Submitted on 21 Feb 2024 (v1), last revised 29 Feb 2024 (this version, v2)]

### YOLOv9: Learning What You Want to Learn

Chien-Yao Wang, **I-Hau Yeh**, Hong-Yuan Mark Liao

Today's deep learning methods focus on how to design the most appropriate acquisition of enough information for prediction has to be designed. Existing This paper will delve into the important issues of data loss when data is transferred (PGI) to cope with the various changes required by deep networks to achieve be obtained to update network weights. In addition, a new lightweight network that PGI has gained superior results on lightweight models. We verified the paper achieve better parameter utilization than the state-of-the-art methods developed train-from-scratch models can achieve better results than state-of-the-art models



陳良基的創新筆記

2021年12月13日 · 1

台灣在科技界的新世界第一！

感謝中研院、義隆電子、台大AI中心所有研究團隊的投入，也恭喜廖所長傑出優異的帶領！這是個可以改變世界的新技術。

<https://www.ithome.com.tw/article/148305>



ITHOME.COM.TW

臺灣製造！世界第一物件偵測AI

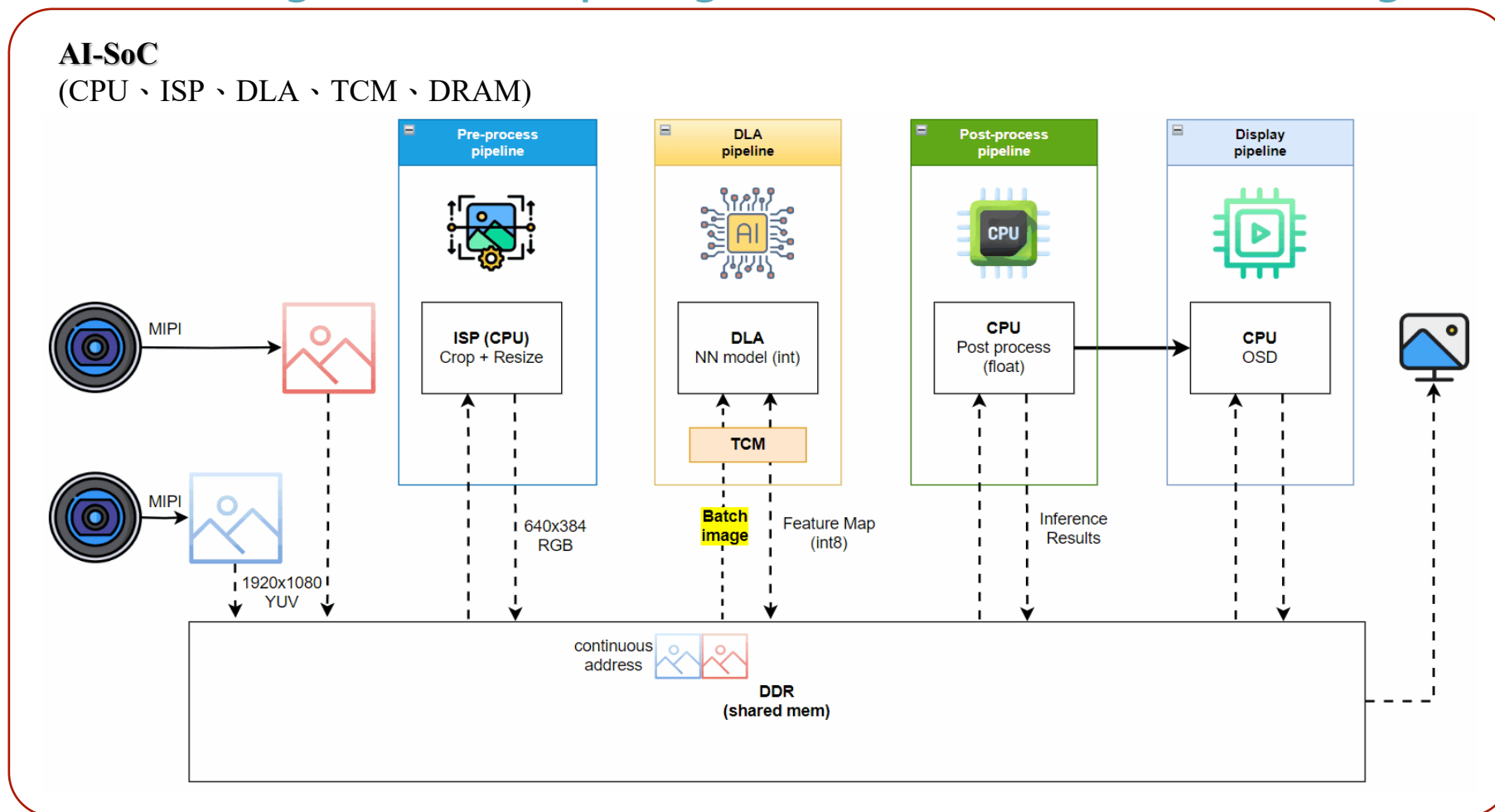
ELAN Collaboration with  
Academia Sinica



# ELAN's Model Further Overcomes the Hardware Limitations of AI Chip

ELAN Proprietary AI Algorithm only requires one-third of the Computing Power of the Open-Source Code

## Heterogeneous Computing : CPU & DLA Parallel Processing



TCM(Tightly Coupled Memory) DLA(Deep Learning Accelerator)

# GElanNet : Built for Real-World Edge AI

YOLO-Level Vision, Optimized for On-Device Deployment



Based on

YOLOv4

YOLOR

YOLOv7

YOLOv9



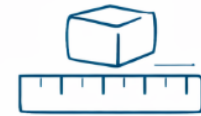
## Compute Efficiency ✓

YOLO-Level, 1/3 Compute



## Power Efficiency ✓

Low Power, Built for Edge



## Small Form Factor ✓

Fits on Device



## Low Cost ✓

Production-Ready



# ADAS – There is no Best , Only Better

More Than 50% Car Accidents  
in Taiwan had ADAS Installed



# Collecting High-Quality Datasets to Optimize AI Performance

Scenes Collection Definition , Effective Annotation Tools , Efficient Datasets Algorithms.



## Normal Case

Scenarios

Day\_time

Weather

Driving\_Scene

{ Day  
Dusk/  
Early morning  
Night  
Indoor }

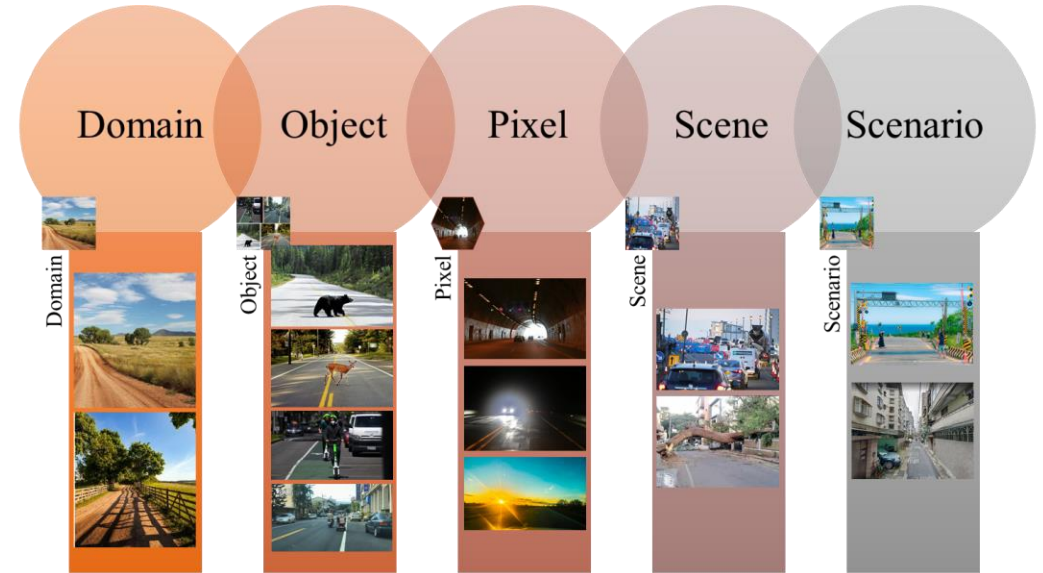
{ Sunny  
Cloudy  
Rainy }

{ Freeway/Expressway  
Rural  
Downtown  
Others }

Object Definition :  
Cars/Bus/Motorcycles (including riders)/ Bicycles  
(including riders)/Pedestrians/Motorcycles/Bicycles

Data Balance !

## Corner Case



1. Domain-level : Rural/Snowfield/Low Light Source
2. Object-level : Animal(AR)/Assistive Device
3. Pixel-level : Backlight exiting the tunnel 、 Sunset Glare 、 Oncoming Headlights at night
4. Scene-level : Rush Hour Congestion 、 Road Construction 、 Tree /Person down on the road (AR)
5. Scenario-level : Grade Crossing/Alley



# ELAN Uses AR & GenAI for Data Augmentation to Improve Dataset

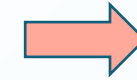
## AR for Data Augmentation



## Generative AI for Data Augmentation



GenAI-generated  
fisheye  
video



Generate special vehicles  
& change the weather



GenAI-generated  
video





# AI × Drone

Intelligent Unmanned  
Aircraft Systems

## AI Vision & Tracking

The image shows a detailed view of an AI vision module with a camera lens and a circuit board labeled 'AI'. In the background, a drone is shown tracking a target, with a trophy labeled 'BC ELAN' in the foreground.

- Edge Computing & Real-Time Decision Making
- AI-Calculated High-Precision Mission Execution
- High-Speed Tracking & AI Surveillance
- Seamless Image MIPI/CVBS Integration

Auto-Navigation Drone

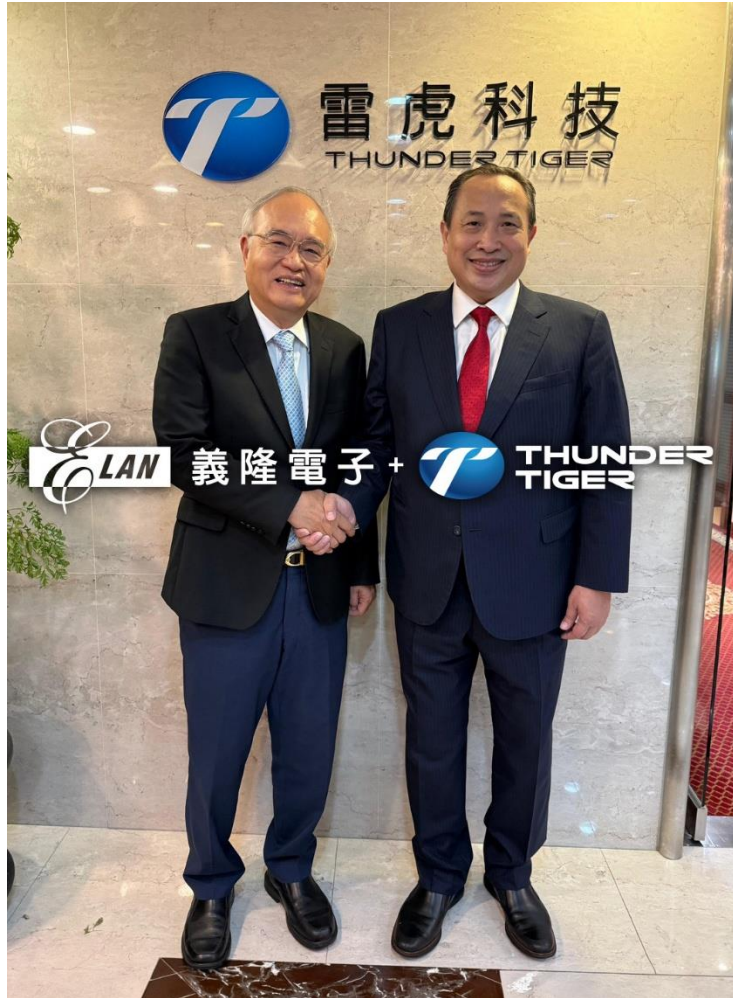
High-Speed Defense Drone

Fiber Optic Drone



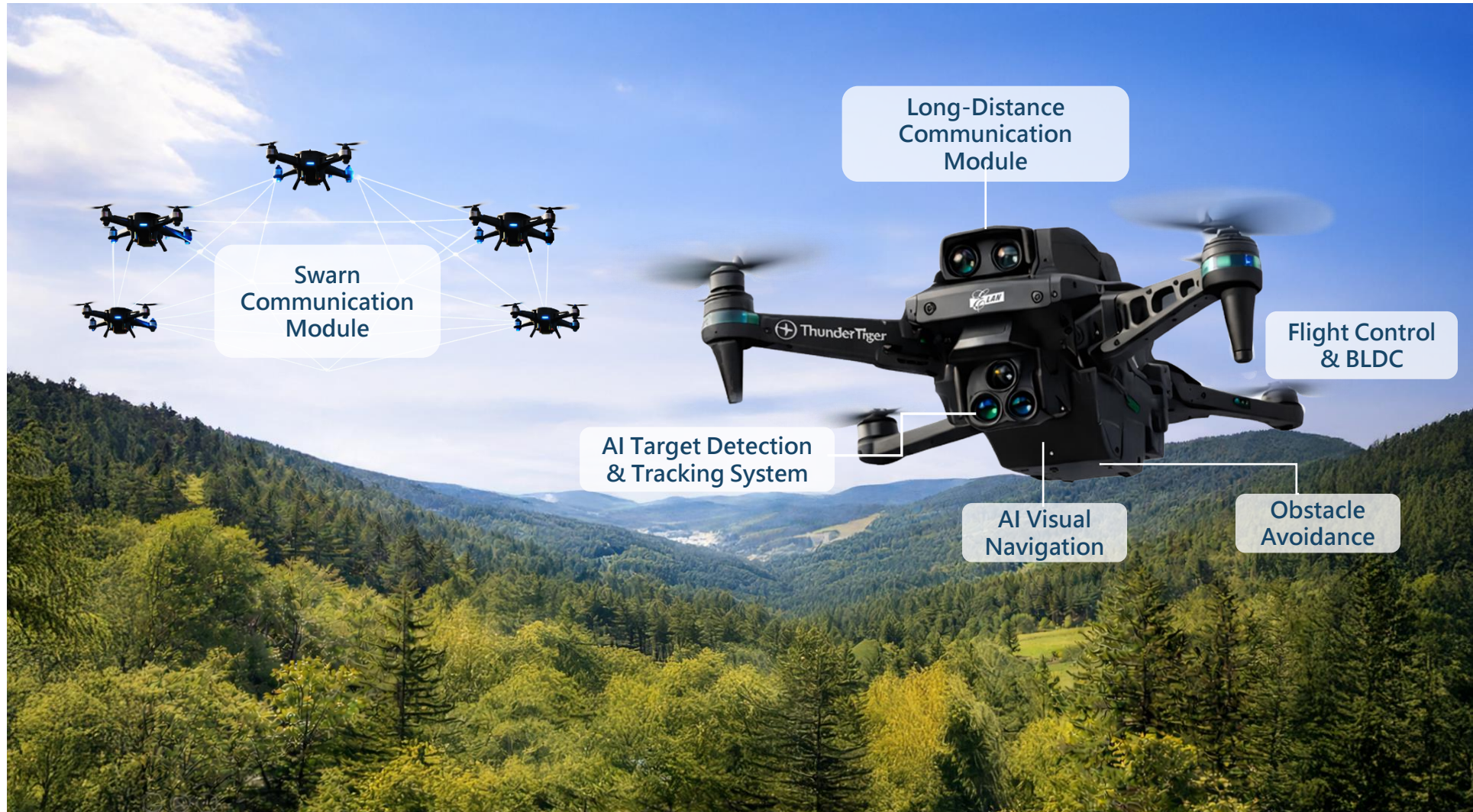


# ELAN Provides Drone & GCS Total Solutions for Thunder Tiger





# ELAN Drone Product Portfolio





# ELAN Ground Control Station (GCS) Product Portfolio

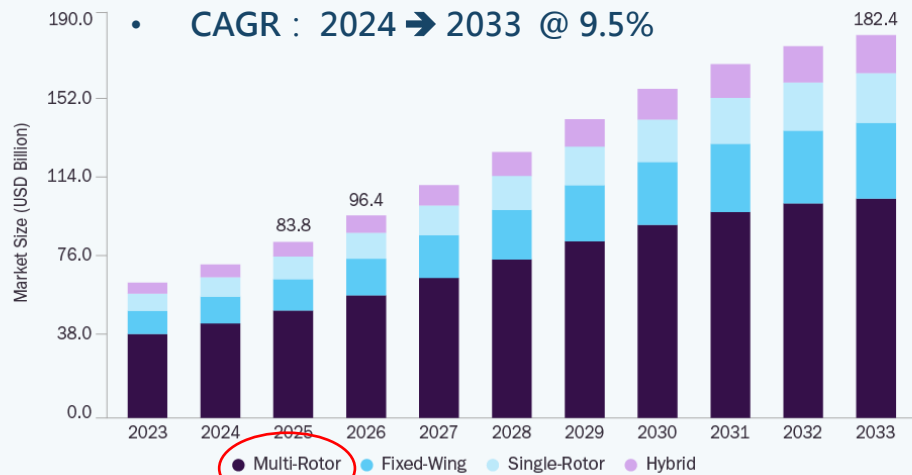


# Global Drone Market Major Drone Market in Military & Commercial Usage

## Grand View Research

### Drone Market

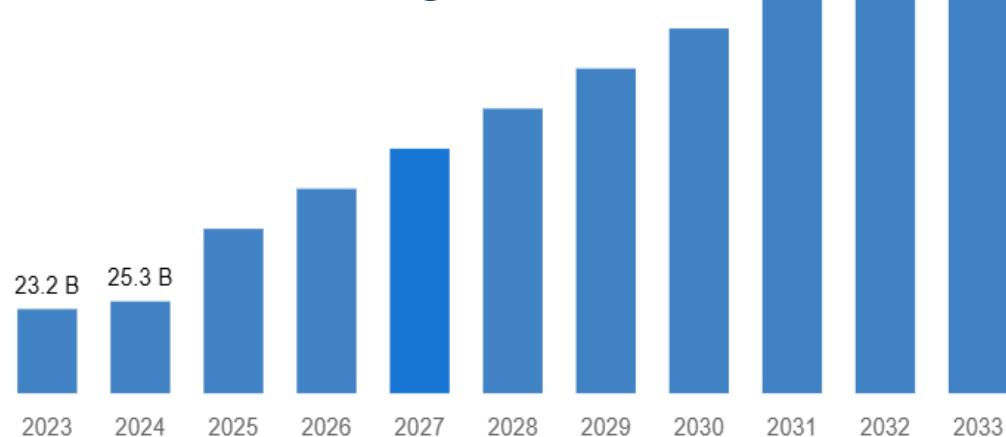
Size, by Product, 2023 - 2033 (USD Billion)



## CMI

Global Drone Market 2024–2033 (By Billion)

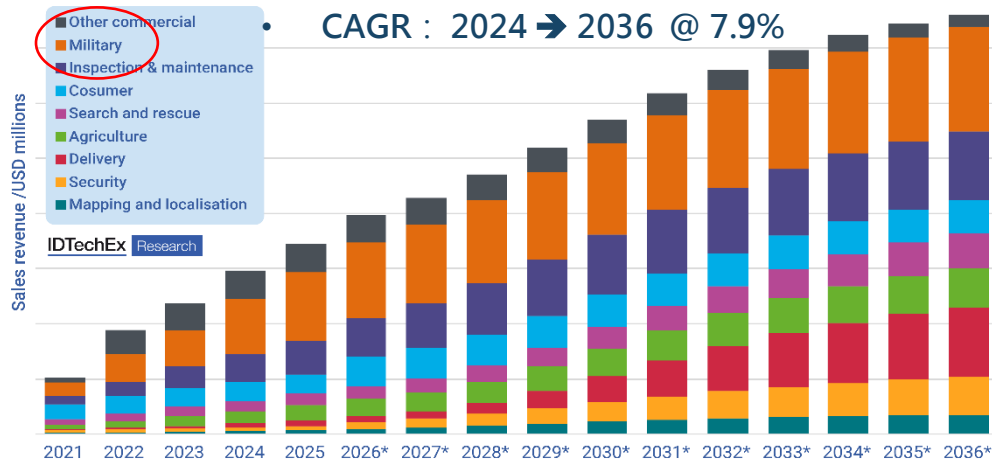
• CAGR : 2024 → 2033 @ 13.4%



## IDTechEx

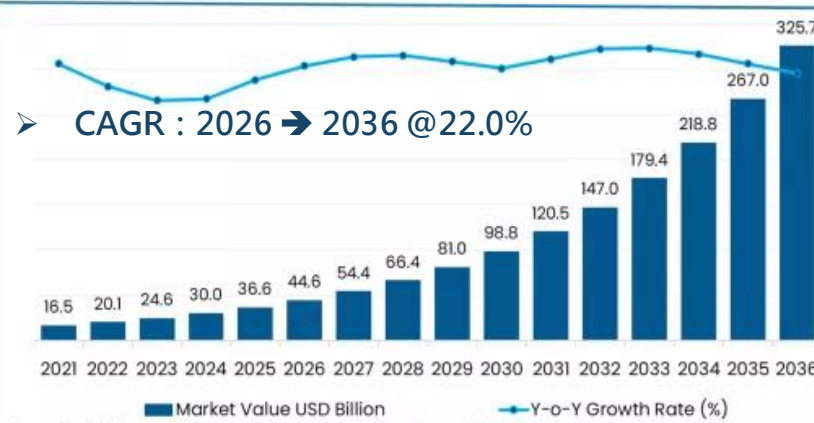
Global Drones Market Size Forecast by Scenarios 2021-2036

• CAGR : 2024 → 2036 @ 7.9%



## Fact.MR

Value (USD Billion) Analysis, 2026-2036



Fact.MR

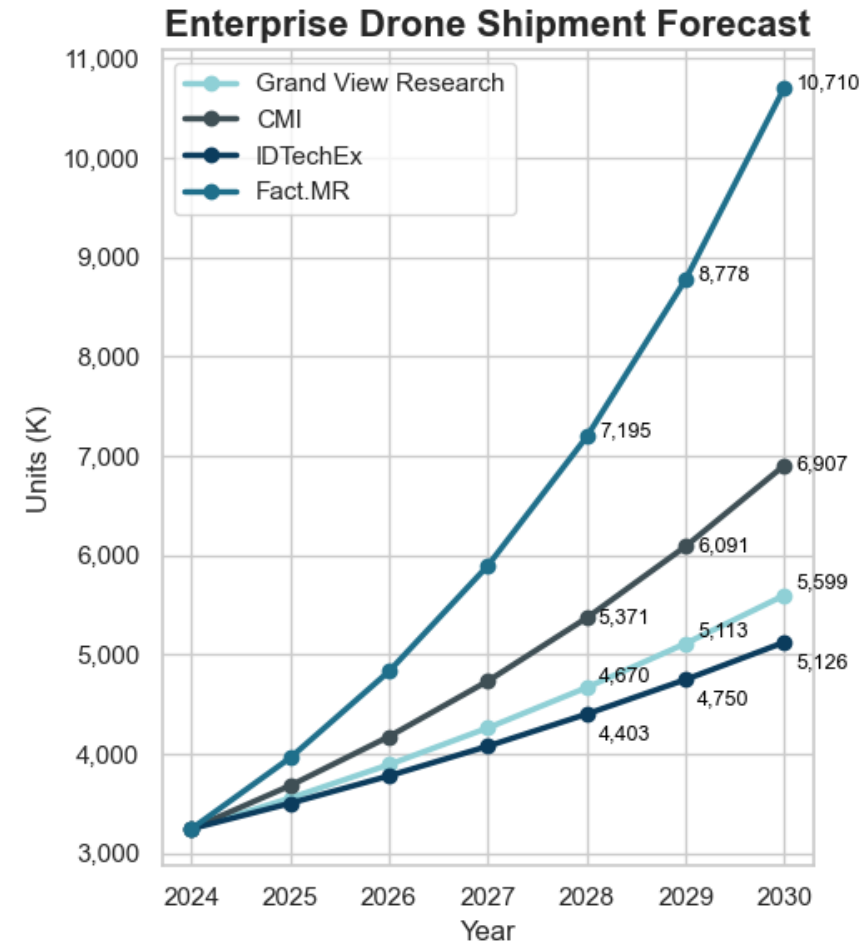
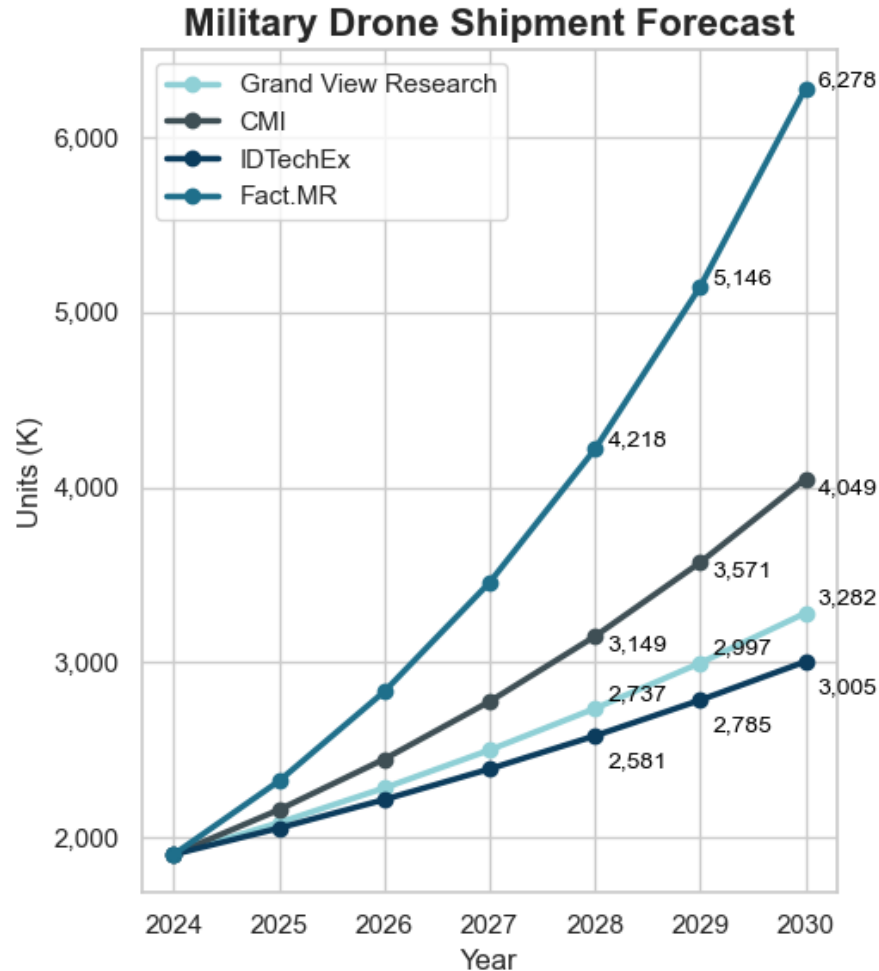
22.0%

Global Market,  
CAGR 2026 - 2036

www.factmr.com

# Military & Commercial Drone Shipment Forecast

The UAV Drones Industry Report shows that global drone shipments exceeded 11.2 million units in 2024, with 54% of them being consumer drones, 29% enterprise drones, and 17% military UAVs.



Asia-Pacific leads with 38% market share, North America follows with 33%, Europe holds 21%, and remaining regions capture 8% of the global UAV deployment base.



# Empowering Drones with ELAN GElanNet Solutions



AI-Powered Drone Vision  
Recognition System

AI Target Detection & Tracking

Obstacle Avoidance



Power Saving



Compact Size



Ultra-Lightweight



Lower Cost



Extended Flight Range



# Comparison of Skydio X10 & ELAN in UAV Solutions

## Skydio X10

NVIDIA Jetson Orin (275 TOPS)  
**Obstacle Avoidance**



6 Cameras

Qualcomm QRB5165 (15 TOPS)  
**Gimbal**



3 Cameras

**Obstacle Avoidance** (8 TOPS)

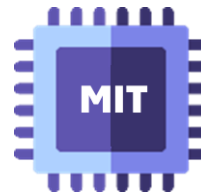


4 Cameras

## ELAN Solutions



4/12 Cameras



**Gimbal** (2 TOPS)



3 Cameras



# AI-Powered Drone Vision Recognition System

AI Target Detection & Tracking



Drone Image Processing &  
AI Object Detection/Tracking



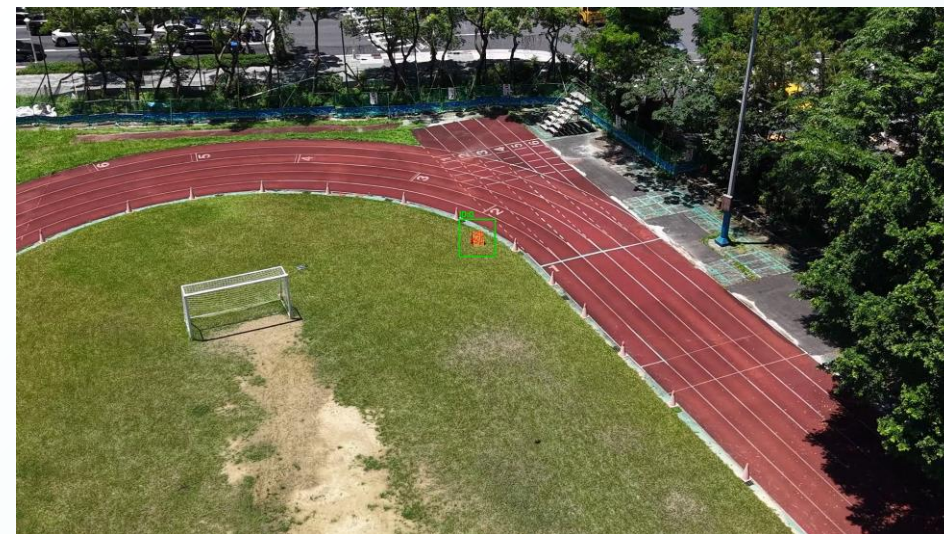


# AI-Powered Drone Vision Recognition System

## High-Accuracy AI Object Detection & Tracking

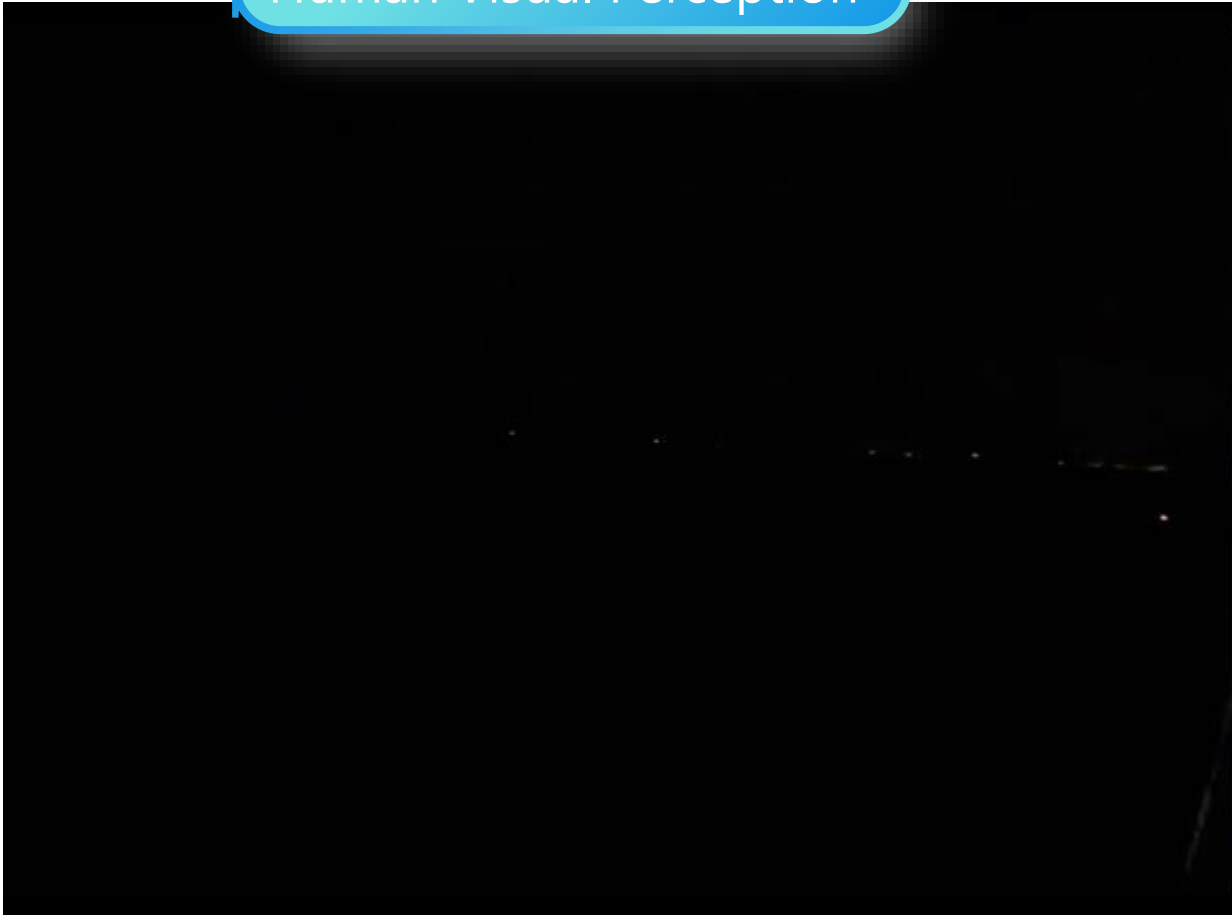


## Optical Flow-Based Lock-On for Unknown Object Tracking



# Drone Night Vision AI Target Detection & Tracking System

Human Visual Perception



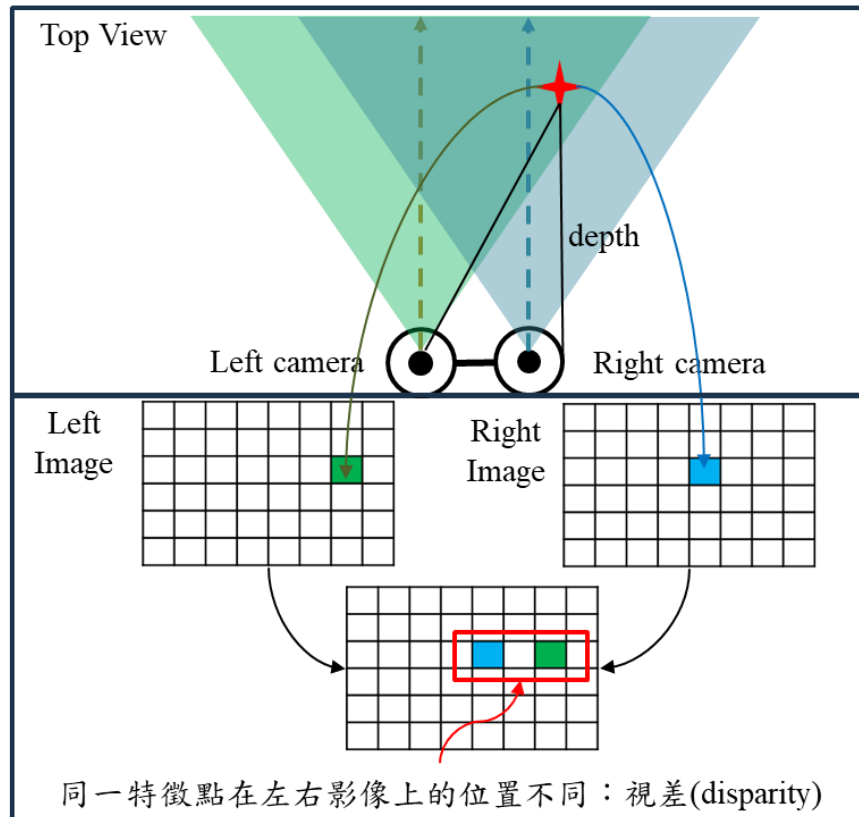
Sensor=0.001 Lux



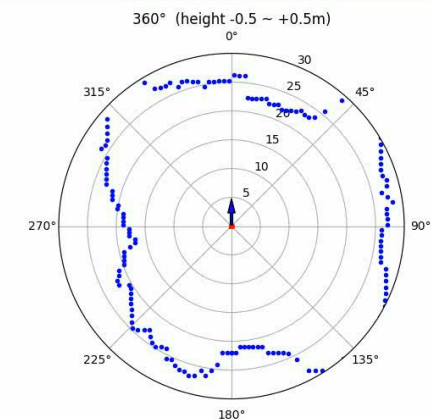
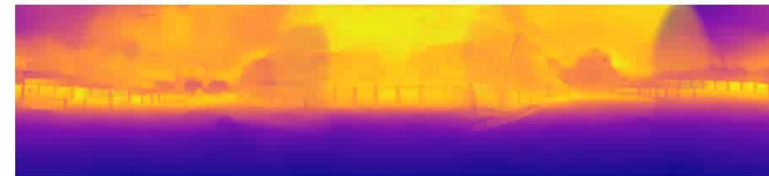


# ELAN Drone Obstacle Avoidance Solutions

## Stereo Depth Estimation



## Surround View Depth Estimation





# ELAN Image Signal Processor (ISP) for Drone Applications

Wide-Angle Correction and HDR for FPV-Class Drones (甲類無人機)



- Wide Horizontal FOV 150°
- Lens Distortion Correction
- Analog Output Clarity
- Enhanced Dark Detail
- Full-Color Night Vision

## ISP Image Signal Processor Chip

### Lens Distortion Correction



**Before** Distortion  
Correction



**After** Distortion Correction

### Lens Defogging



**Before** Processing



**After** Processing

# ELAN Mini LED Local Dimming w/ISP & Smart Touch for GCS

High Brightness for Drones in Outdoor Scenarios

Image Signal Processing

## Mini-LED Local Dimming



**>4000nits**  
High Brightness



**>20000:1**  
High Contrast

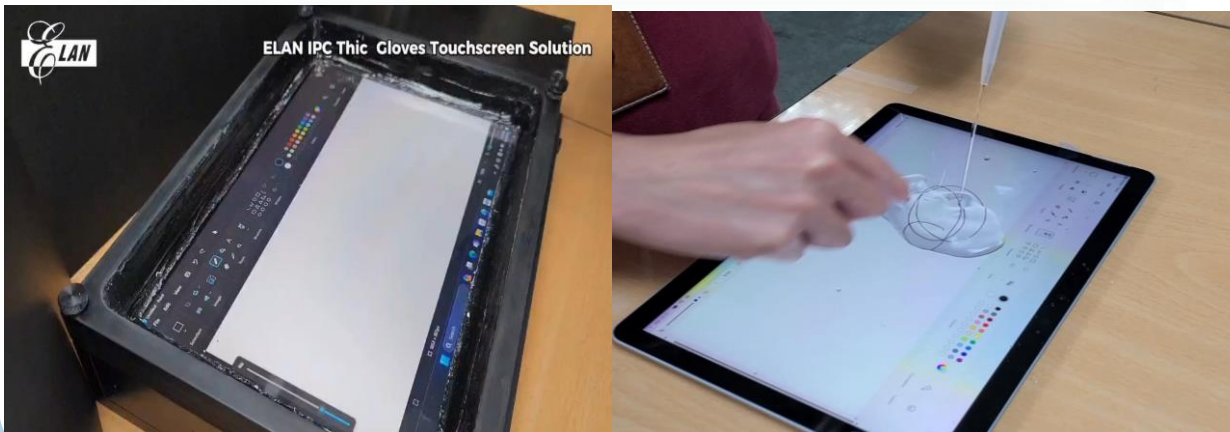


**>600**  
HDR



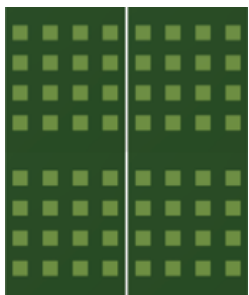
**Power Saving**  
Extended Battery Life

## Waterproof & Glove Operation Solutions





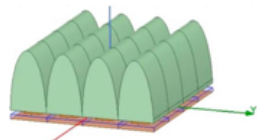
# ELAN Smart Antennas for GEO/LEO & Drone Communications



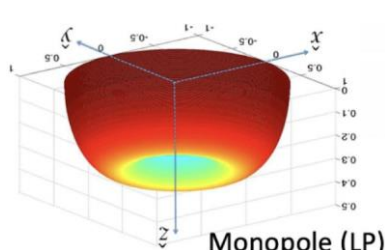
> 40 Km (21.5 dBi)



> 20 Km (16 dBi)

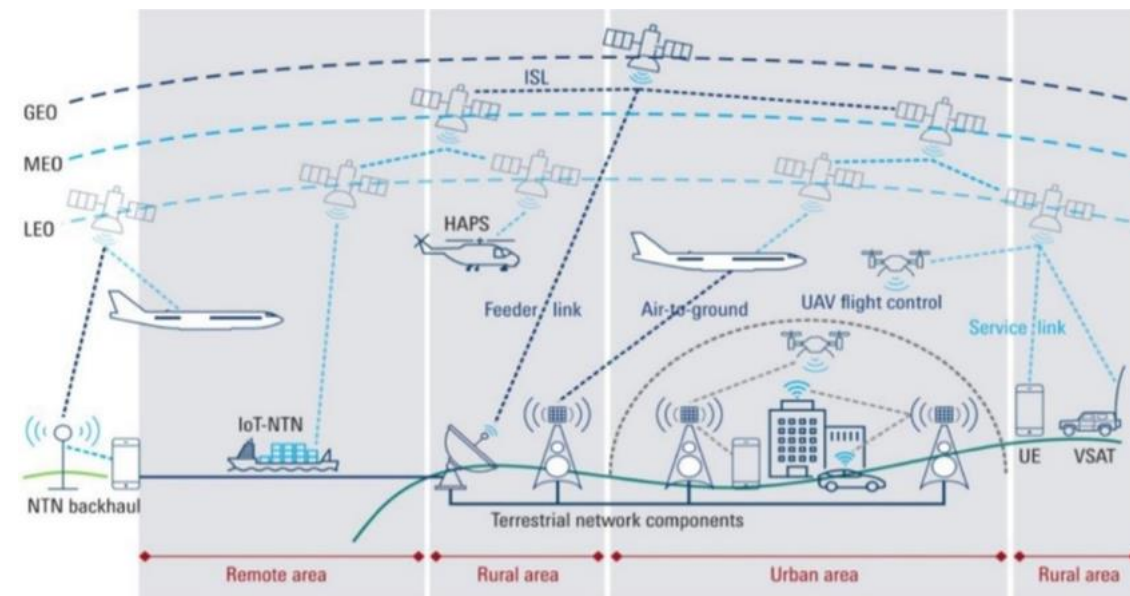
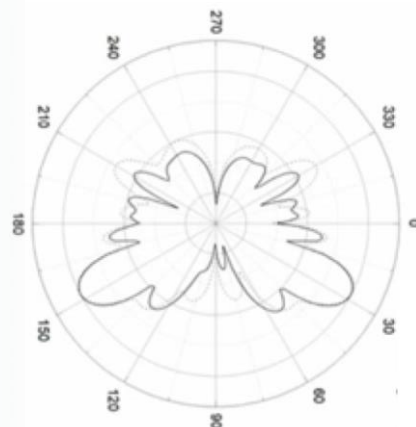


~ 8 Km (6.5dBi)



> 3.5 dBi

45° slant  
Dual-Linear Polarized Array



戰爭替代方案  
(如俄烏戰爭)



人口稀少區域  
(如山區、沙漠、極地...)



特殊應用場景  
與災難備援  
(如地震、海嘯...)



經濟海域  
(如海洋漁船通訊)





# ELAN AI Vision Solutions Business Model Transformation

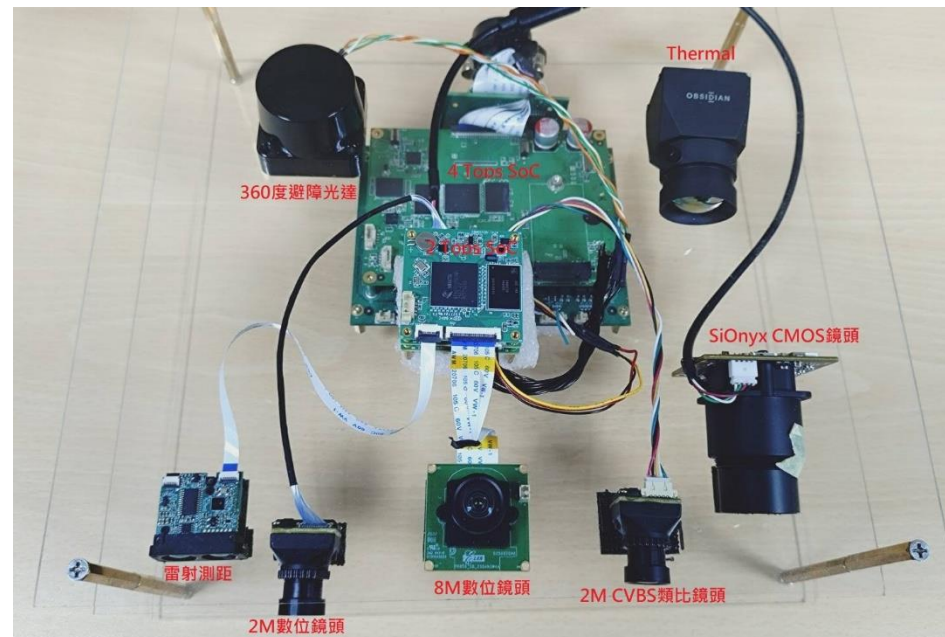
## ISP IC



## Camera Module

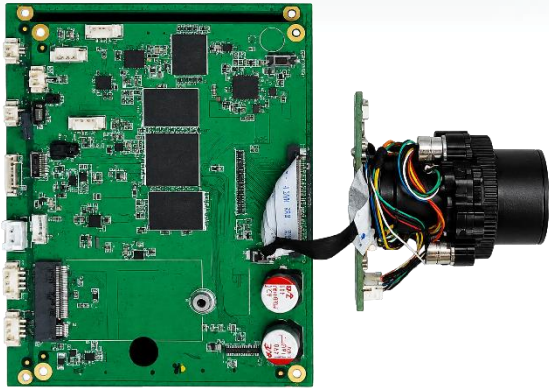


## Camera Module + AI Box



# ELAN AI Vision Solutions Support Wide Range of UAV Platforms

8M 4TOPS  
w/Zoom Capability



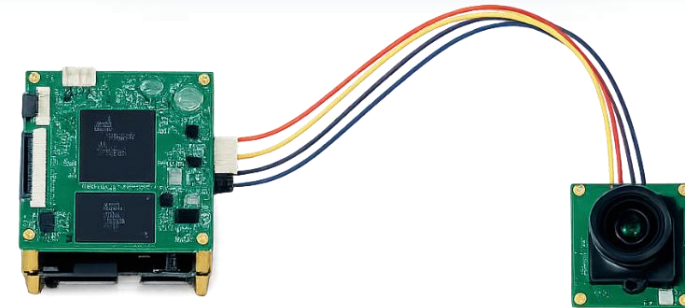
2M MIPI 2TOPS  
w/Fixed Focus



8M 2TOPS  
w/Fixed Focus



2M CVBS 2TOPS  
w/Fixed Focus



# ELAN Solutions Enable Diverse Drone Applications



Multi-Function UAV



FPV Loitering Munition



Tethered UAV



High-Speed Counter-UAS (C-UAS)

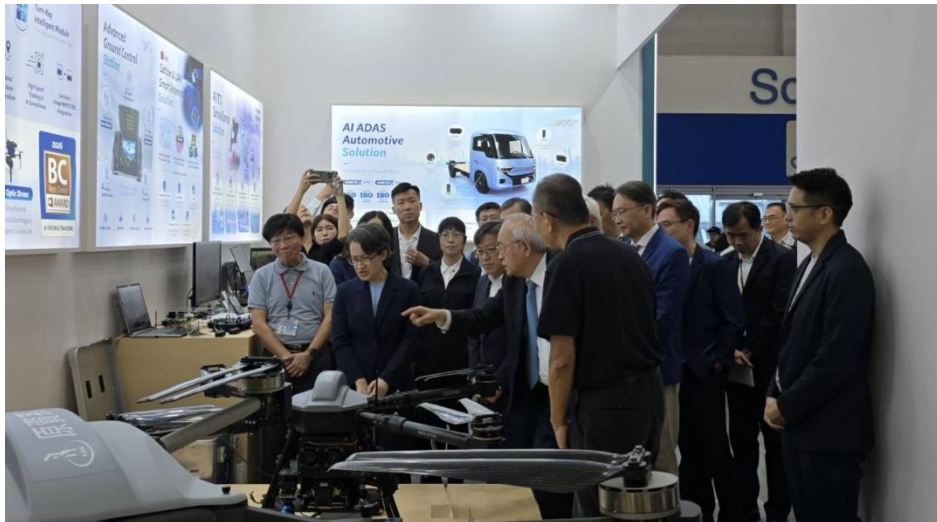


Fiber-Optic UAV





# President Lai & VP Hsiao visited the Computex Booth to See Applications of Edge AI in Drones and ITS





# AI × ITS

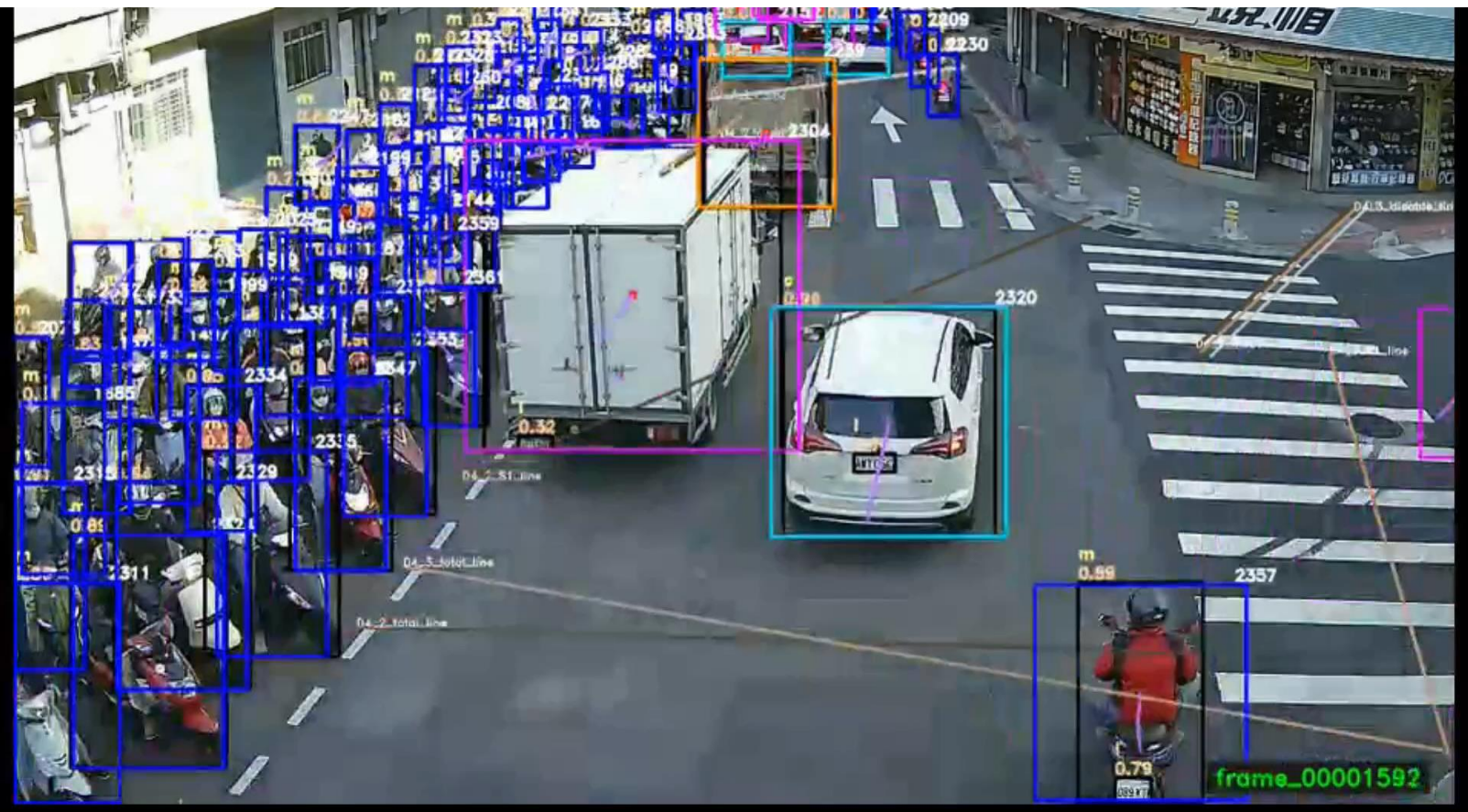
Intelligent Transportation  
System





# Real-Time Traffic Information System for Traffic Signal Control

Improving the YOLO v4/v7/v9 AI Algorithms for ITS Using GElanNet



Edge Vision AI Traffic Signal Control  
邊緣端AI感知與動態號誌控制系統



# Traffic Signal Control System - Red Light Violation Prediction

Edge AI Enables Millisecond-Level Response

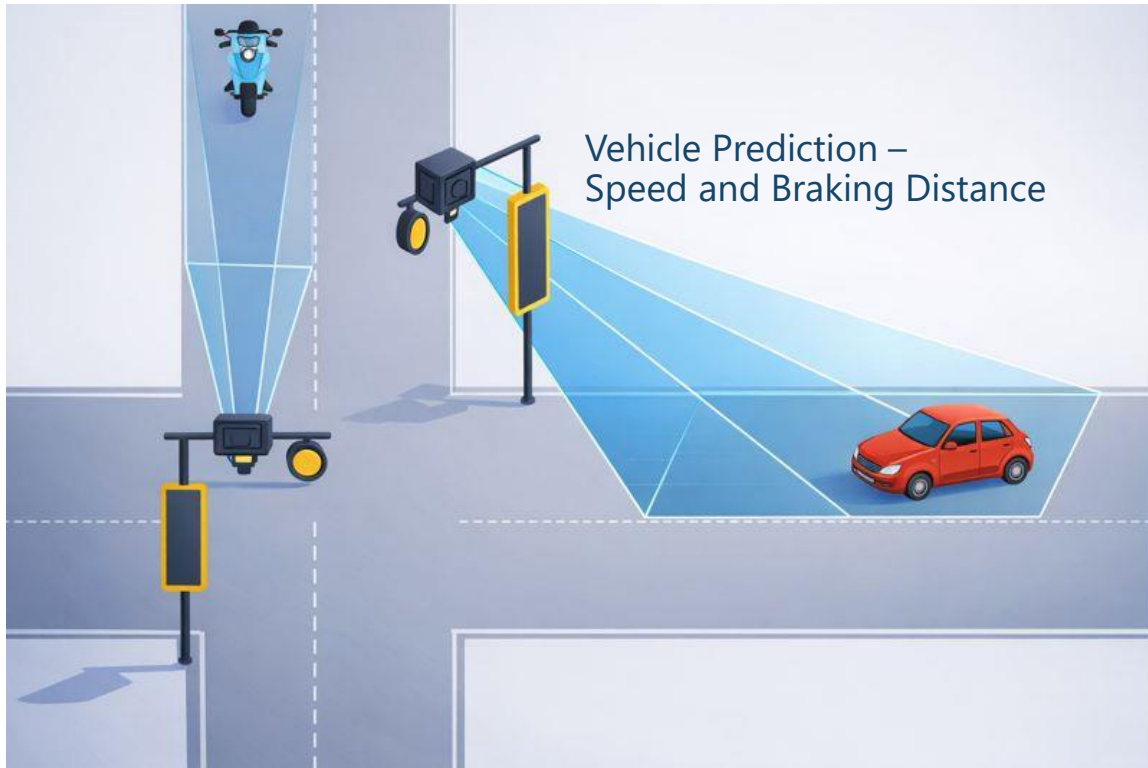
Capable of Detecting Vehicle Types & Speeds within 100 Meters in Real Time,  
Calculating Braking Distance & Predicting Red Light Violations



# Real-Time AI CCTV Application at Blind Intersections

1. Real-time Detection of Vehicle Time-to-Intersection
2. Predictive Collision Risk Alert : Trigger Yellow-to-Red Transition

## Red Light Violation Prediction



## Bridge Piers Obstruct Sight Distance



# ELAN Real-Time AI CCTV for Vulnerable Road User Safety

Safety Alert – Real-Time AI Image Recognition to Warn Pedestrians of Oncoming Vehicles  
& Alert Drivers to Pedestrians



Edge-based Pedestrian  
AI Safety System  
邊緣端行人AI安全保護系統



# ELAN was Awarded the Highest Rating in the World's first ITS Camera Evaluation.

日間晴天 日間雨天 夜間晴天 夜間雨天

## 混合車流與行人AI偵測準確度

車輛偵測  
F1 Score  
0.9302

行人偵測  
F1 Score  
0.9238

轉向量偵測：95.29%  
停等車輛數偵測96.68%

## 工業級環境耐受力



IP67  
防水防塵等級

運作溫度：  
-20°C 至 +60°C

嚴苛環境穩定運作

**99.0** /100  
綜合評分

在嚴格的測試標準下，獲得近乎滿分的卓越評價。



偵測即時性

**34.67ms**

平均延遲

15/15

反應速度極快，獲得 15/15 滿分評價。

## 絕佳的系統效能與穩定性



- ✓ 即時偵測 (滿分)
- ✓ 功耗控制 (滿分)
- ✓ 穩定性 (滿分)
- ✓ 資料格式 (滿分)



功耗

**5.88W**

實測功耗

10/10

能源效率高，低於 7W 標準，獲得 10/10 滿分。

# Machines Must See and Decide - Real Time



## Human Decision Making



## AI System at the Edge

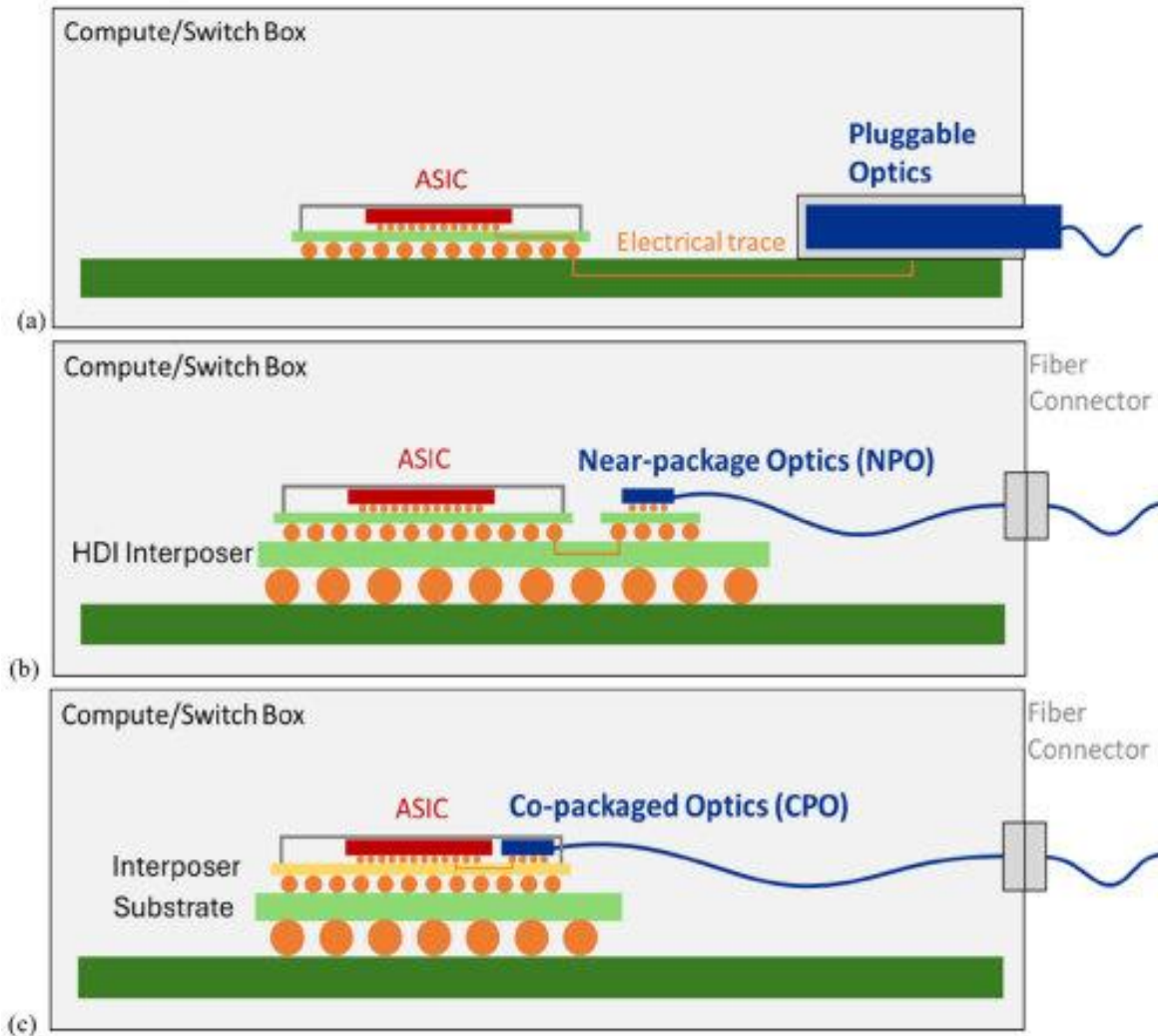


- Low Power
- Low Cost
- High Performance



## Applications

# PETA Products Portfolio (Pluggable, NPO and CPO)

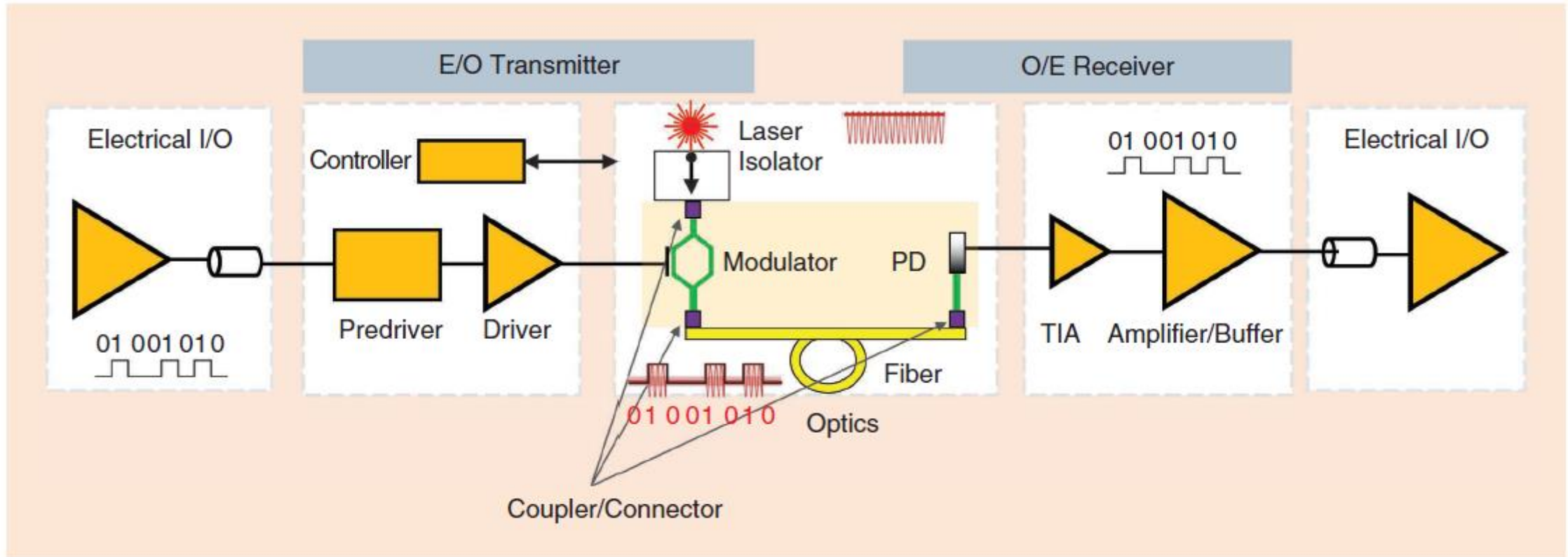


## Summary Comparison

| Feature <a href="#">🔗</a> | Pluggable Optics       | Near-Packaged Optics (NPO) | Co-Packaged Optics (CPO)           |
|---------------------------|------------------------|----------------------------|------------------------------------|
| Optics Placement          | Front panel, off-board | On-board, near processor   | Directly on processor package      |
| Electrical Trace Length   | Long                   | Short                      | Very Short (mm)                    |
| Power Efficiency          | Lowest (highest W/bit) | High                       | Highest (lowest pJ/bit)            |
| Bandwidth Density         | Lower                  | High                       | Highest (>1 Tbps/mm)               |
| Serviceability/Upgrades   | Easy (hot-swappable)   | Moderate                   | Difficult (replace entire package) |



# An Electrical & Optical Link (Optical Engine)





中央研究院  
ACADEMIA SINICA



# Q&A

