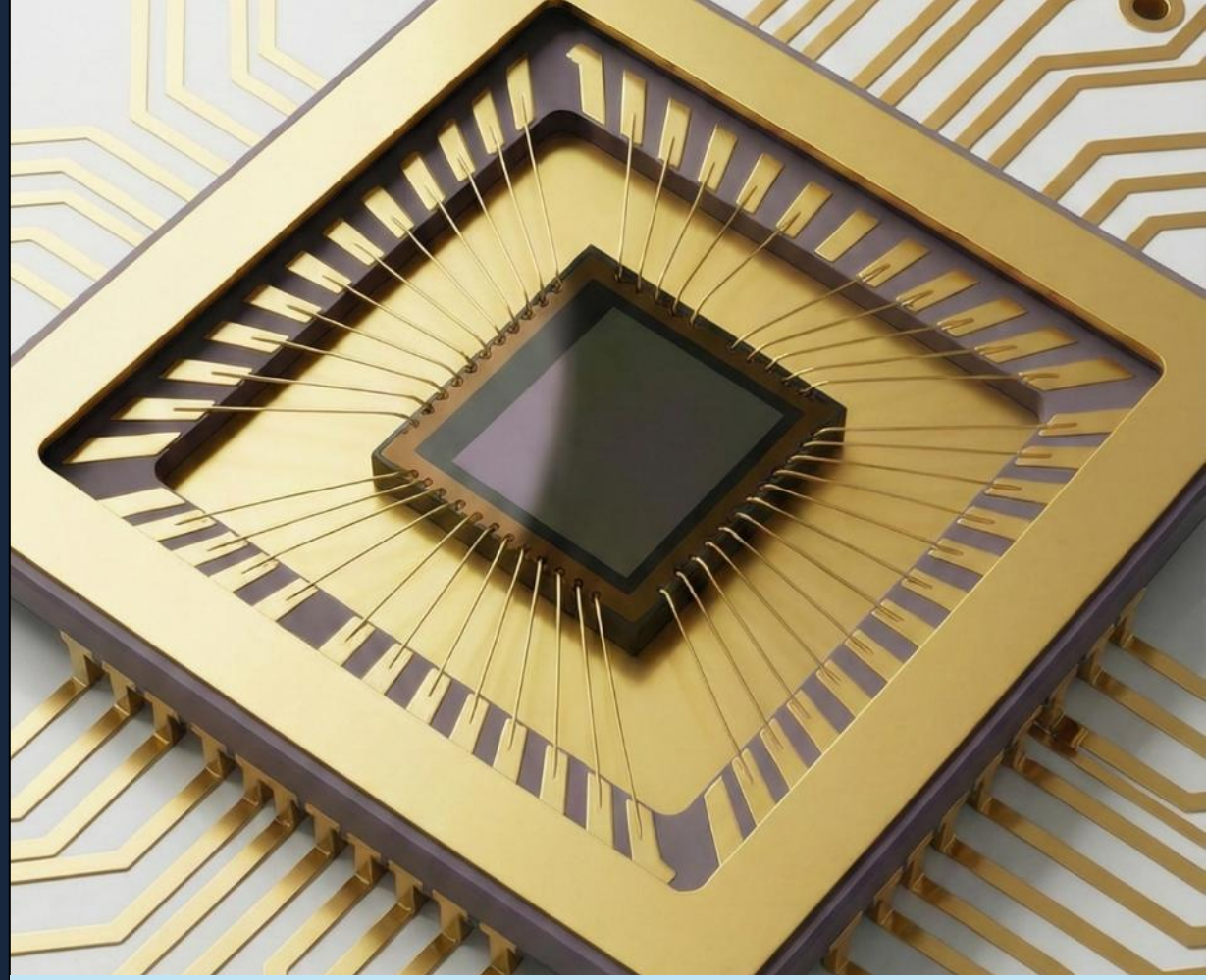
INSPIRED BY THE HUMAN EYE

EYE2DRIVE



ADVANCED ADAPTIVE CMOS SENSOR FOR AUTONOMOUS VISION

THE PROBLEM:
THE ALGORITHMS BLINDSPOT

Intelligent imaging systems that make use of video feeds and other sensors modalities must be extremely reliable.

It is important to provide these systems with all the necessary information from the environment in order to make proper decisions.

Today imaging technology frequently fails, especially if subject to high light variability because of





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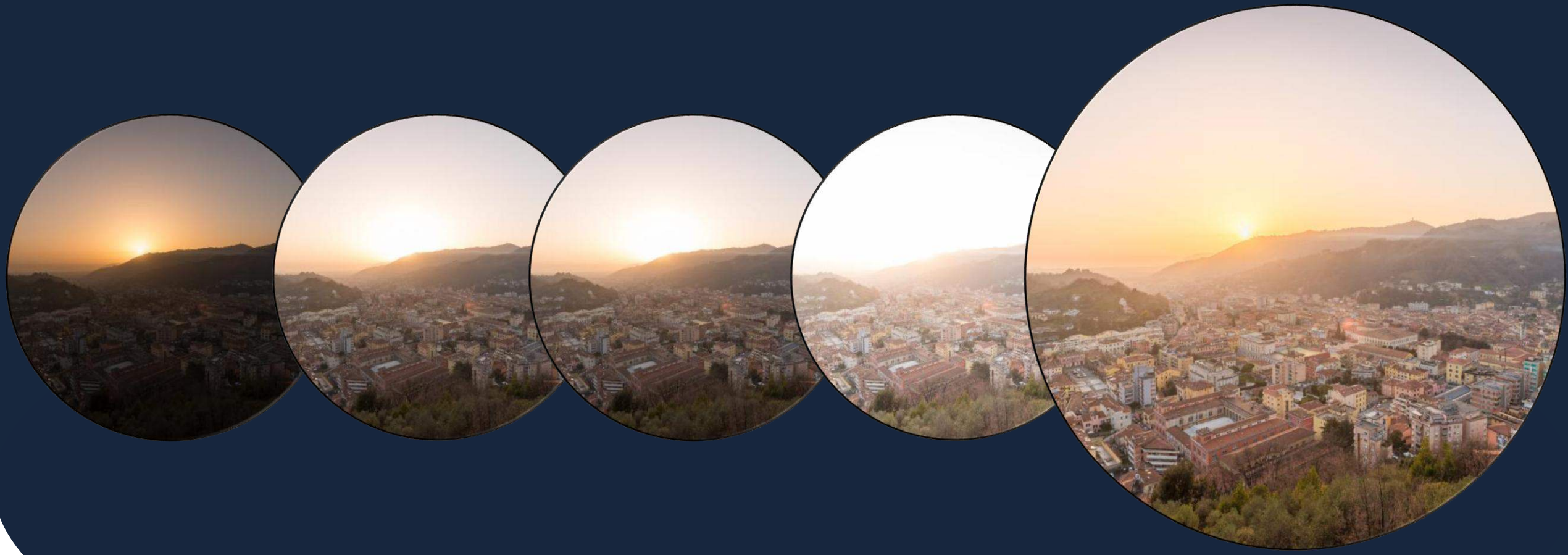
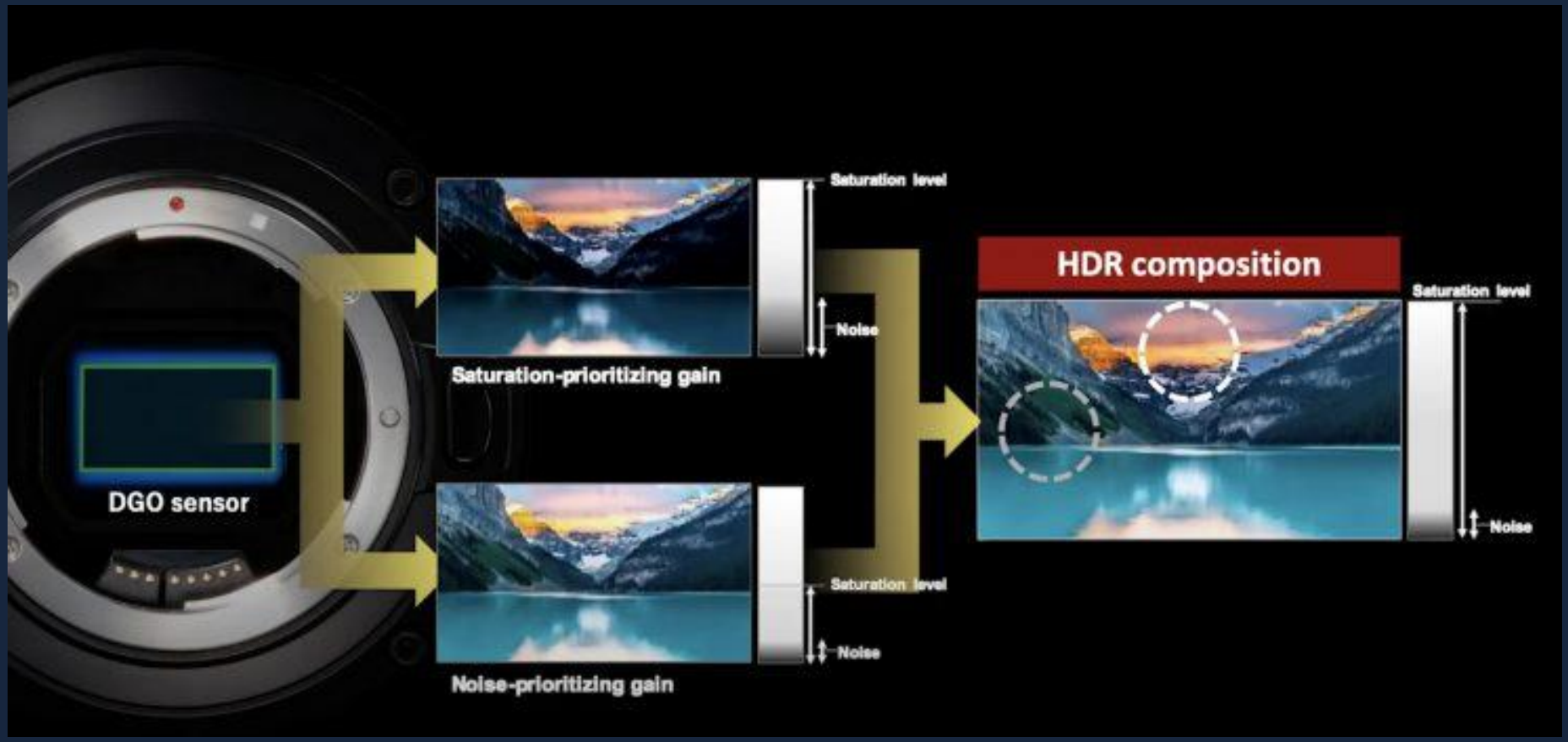
STATE-OF-THE-ART FOR HDR: MULTI-EXPOSURE



Based on standard linear pixel acquisition, a set of images is taken with different exposure times and combined by software/hardware engines

STATE-OF-THE-ART FOR HDR: DUAL-GAIN



Two different gain are set at different levels in the sensor HDR can be created by dual or alternative acquisition

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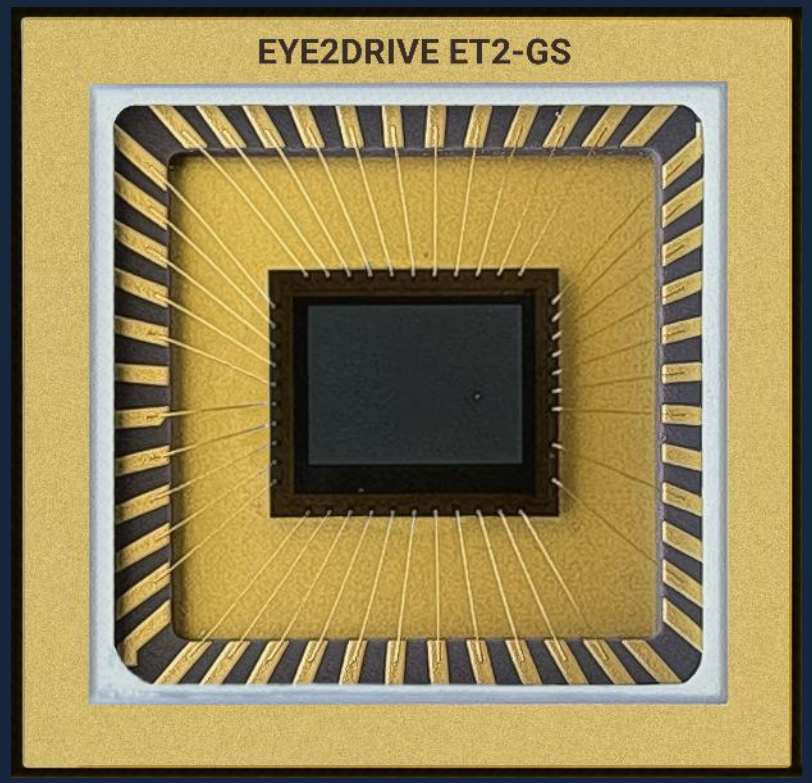
EYE2DRIVE: THE SOLUTION

A unique On-Chip sensing technology that enable:

- Reliable vision in *any lighting* – from pitch dark to direct sunlight.
- Each pixel adjusts *autonomously*, in real time, within a single frame.
- Works on *existing* chip designs – no exotic manufacturing required.



We give cameras the adaptability of a human eye — on standard silicon.

EYE2DRIVE TECHNOLOGY IS PROCESS AND ARCHITECTURE AGNOSTIC

- Can be applied to **any global shutter pixel architecture and process** based on capacitive detectors

- It operates at **photodiode level** by conditioning its discharge by setting a **Conditioning Curve**



- The final dynamic range of the sensor can go from standard linear to high dynamic range (over 120dB) with **hundreds of possible configurations** of the conditioning curve that correspond to **hundreds of shapes for the pixel/sensor response**

EYE2DRIVE INTELLECTUAL PROPERTY

Patents	**Publication n°**	**Priority**	**Status**
Photo-detector device for electro-optical sensors with variable light dynamics	EP2761657 US9918026	29/09/2011	Granted in US and EU (IT, UK, FR, DE)
Pixel Charge Control Circuit in Digital Devices for Images Acquisition	EP3639512 US11184568	14/06/2017	Granted in US and EU (IT, UK, FR, DE)
Multi dynamics vision sensor	EP4154517A1	18/05/2020	Pending in Europe (application 12/2022)
Metodo di controllo della scarica di un elemento fotosensibile in un fotorivelatore e relativo fotorivelatore	IT102024000011512 PCT/IB2025/055256	21/05/2024	PCT application

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EYE2DRIVE SENSOR FAMILY

	ET21080	ET2-GS	ET2-GS -FC
Resolution	1080 × 1080, BGGR Bayer filter	800 × 600, BGGR Bayer filter	1920 × 1080, BGGR Bayer filter
Pixel size	3.0 µm	4.8 µm	4.8 µm
Shutter type	Rolling shutter – global with light sync	Global shutter	Global shutter
Color option	Color and B&W	Color and B&W	Color and B&W
Frame rate (max – full frame)	24 fps	40 fps	45 fps
Input interface	I2C-like	External	I^2C-like
Output format	Analog diff, 4-lane	Analog sing, 2-lane	10-bit MIPI
Supply voltages	1.8 V / 3.3 V	1.8 V / 3.3 V	1.8 V / 3.3 V
Power consumption (typ)	~50 mW	~100 mW	<750 mW
Dynamic range	65->120 dB	65->120 dB	65->120 dB

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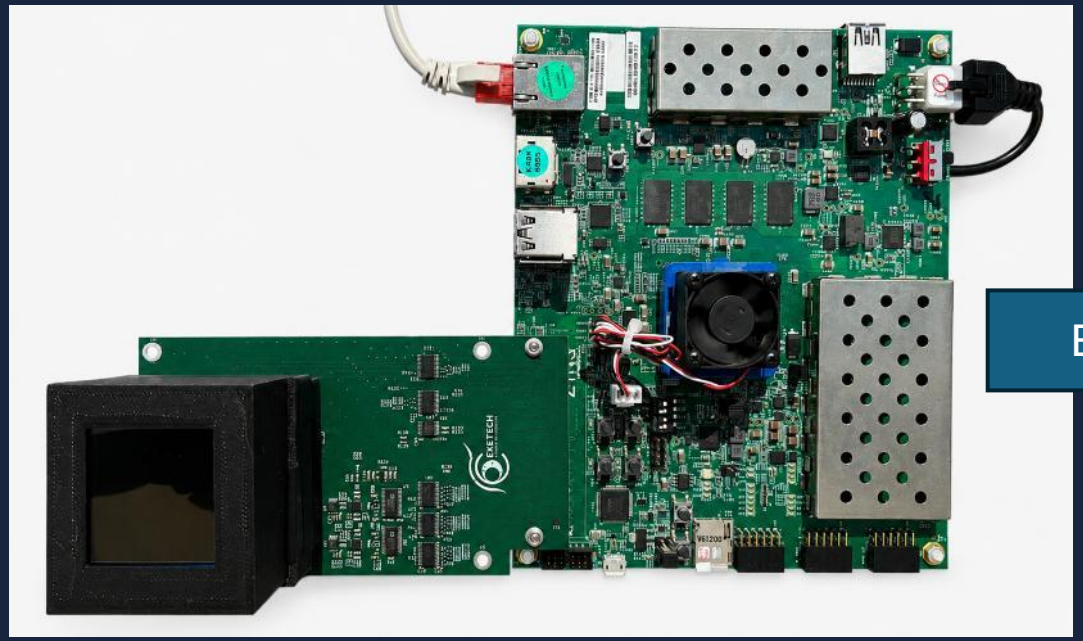
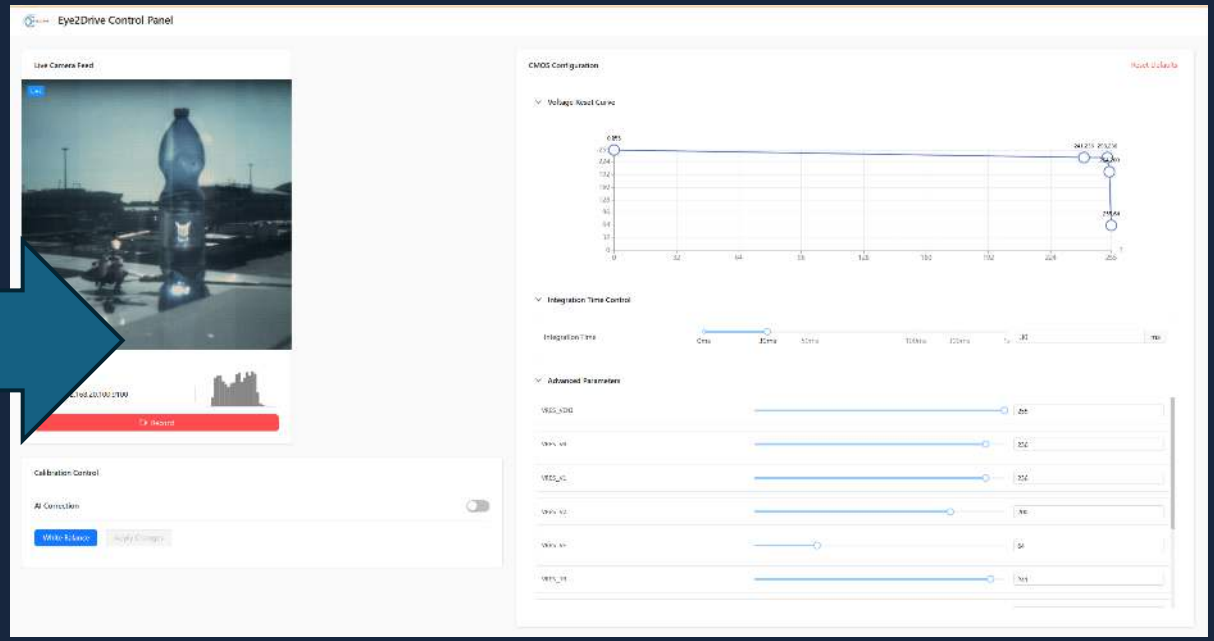
EYE2DRIVE DEMO PLATFORM

ET1080 is integrated in an embedded system used for sensor characterization and testing and PoC



Ethernet



Embedded platform with sensor and processing onboard

Web interface for sensor control and image/video download

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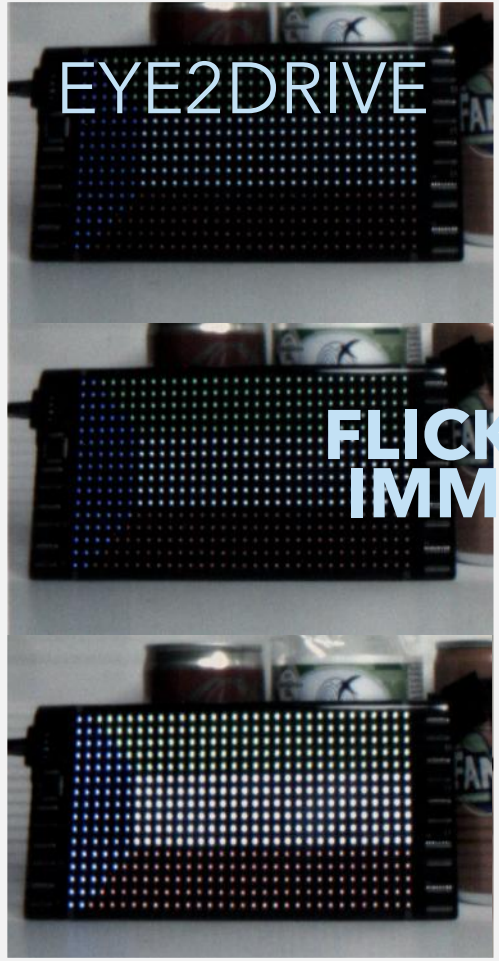
WORKING PROTOTYPE IN EMBEDDED DEMO & IMAGES



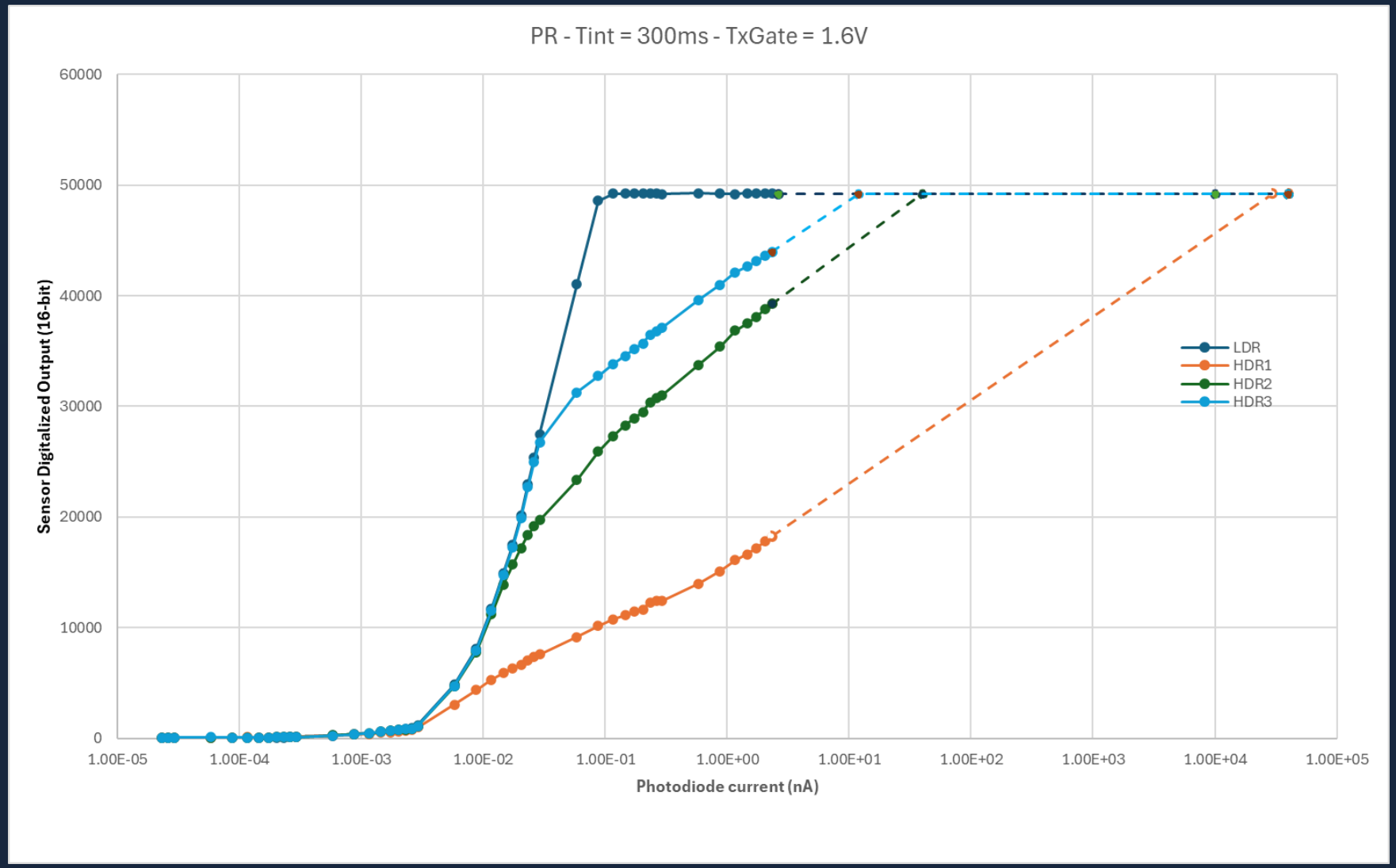






ET1080 – Power responsivity

- 103 dB measured
- >120dB expected

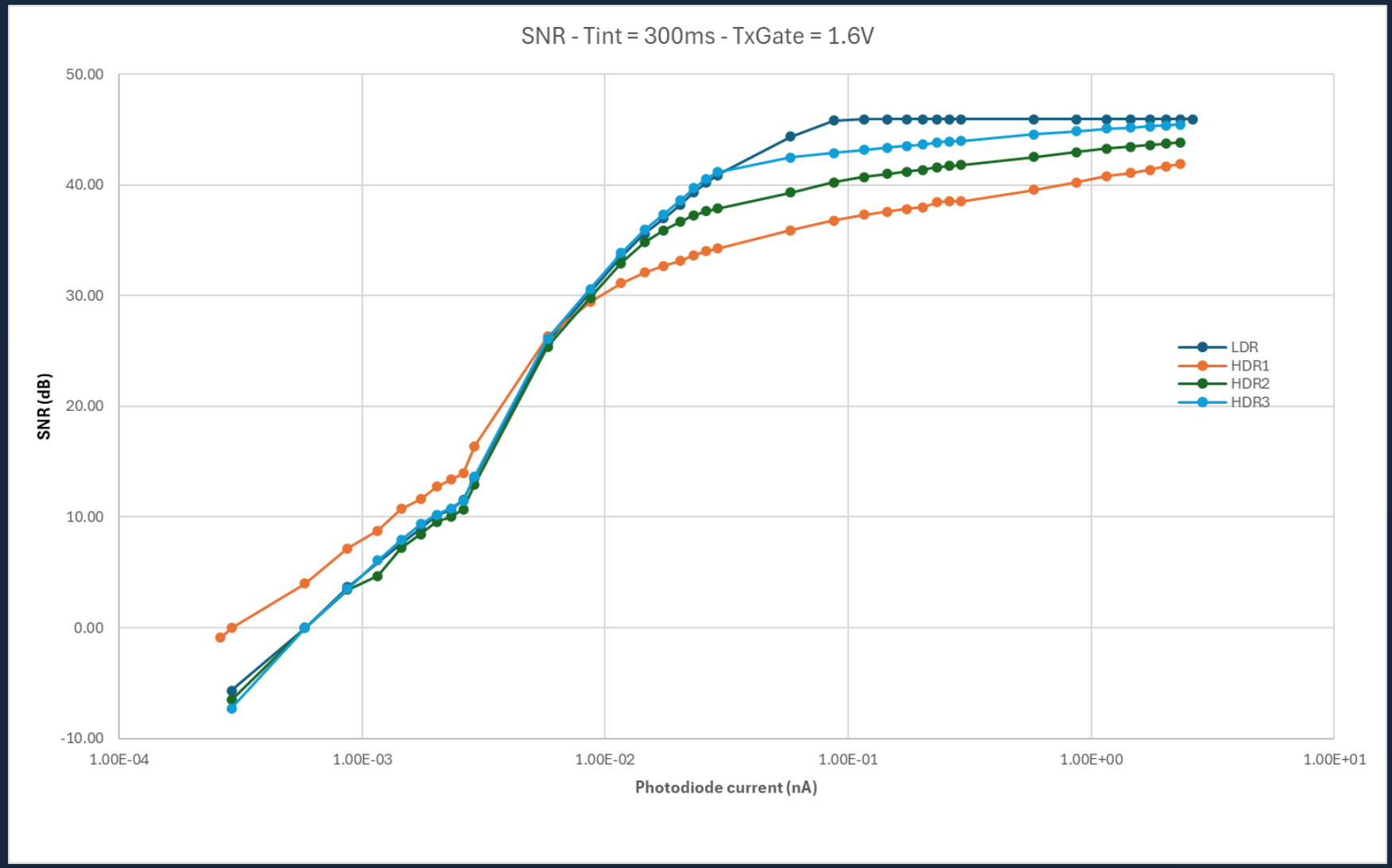


Green1 channel, TxGate=1.6V, Tint=300ms

CONFIDENTIAL

ET1080 – Signal To noise Ratio

- Max SNR = 54dB
- No SNR drops



Green1 channel, TxGate=1.6V, Tint=300ms

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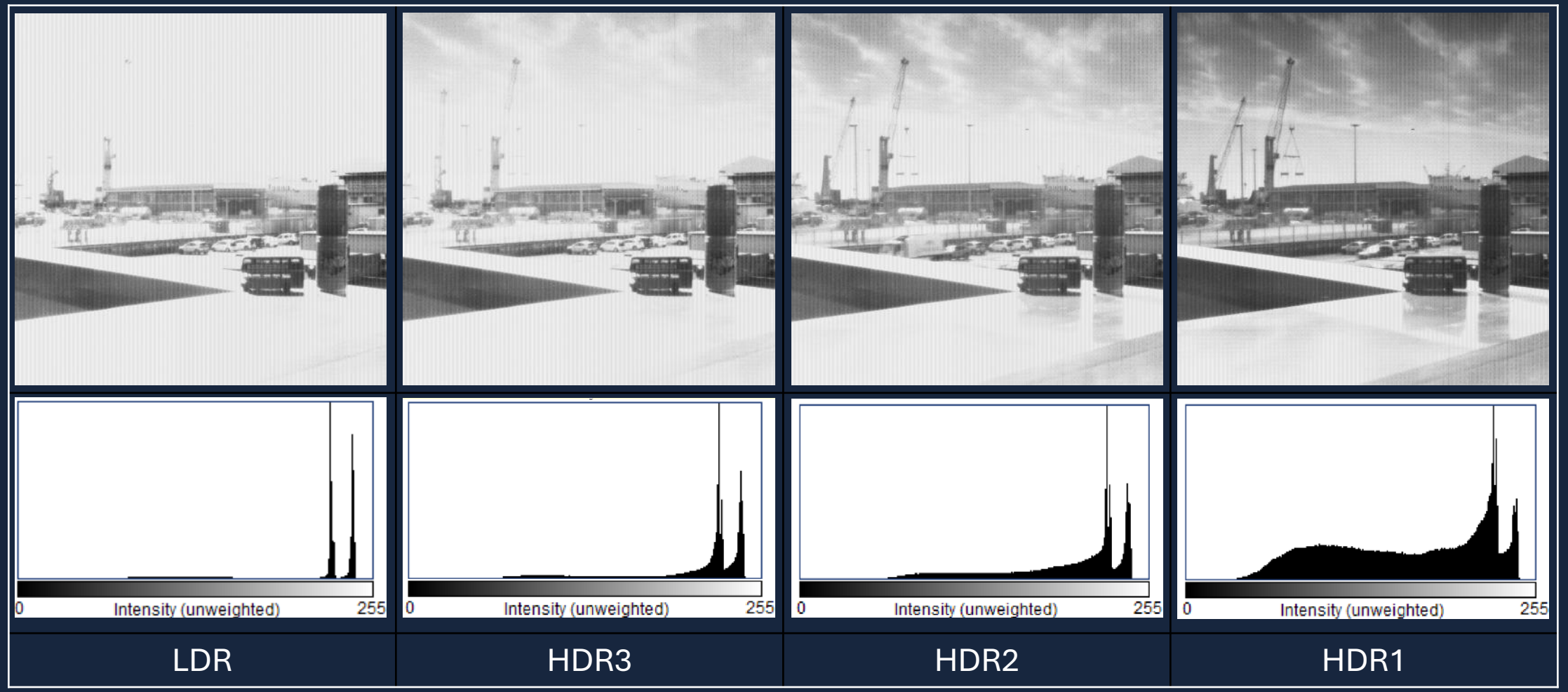
ET1080 – acquired images



Different Dynamic Range SettingsTxGate=1.8V, Tint=60ms

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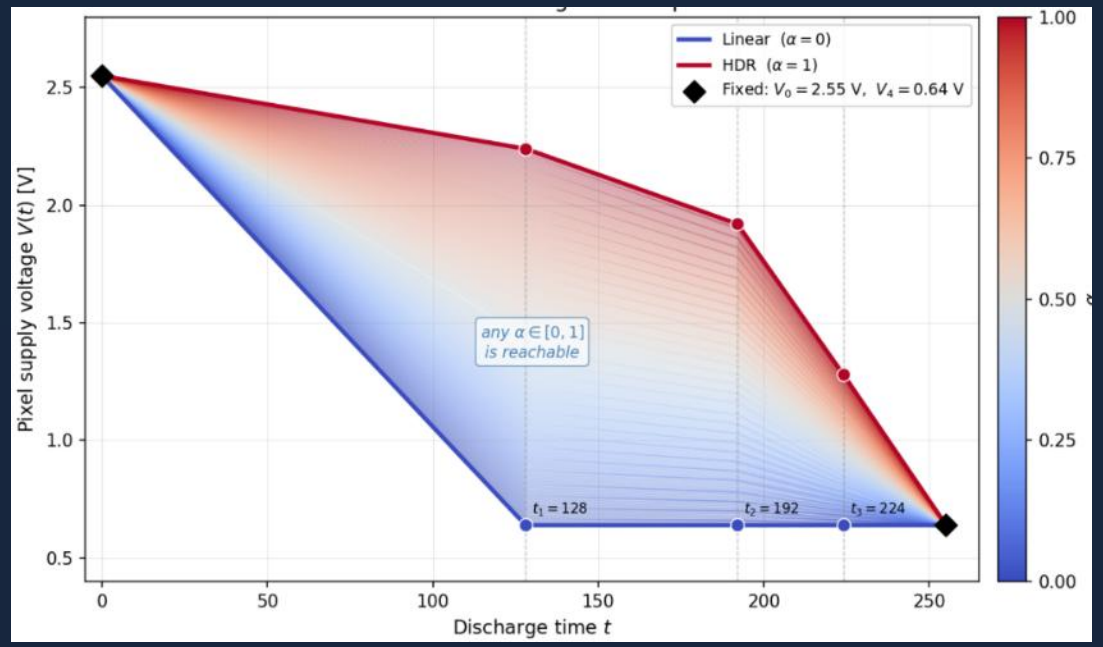
ADAPTIVE DYNAMIC RANGE TUNING

- The sensor can be configured with **hundreds of curves** that correspond to **different dynamic ranges**
- A space of curves can be selected for sensor operation
- A **real time** algorithm operate in closed loop with the sensor



Autoregulation is the result

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EYE2DRIVE VALUE PROPOSITION

Patented pixel-level adaptive HDR – on standard silicon

WHAT WE DELIVER

Proven performance gains

+15 dB
+3,000% HDR vs. state-of-the-art GS

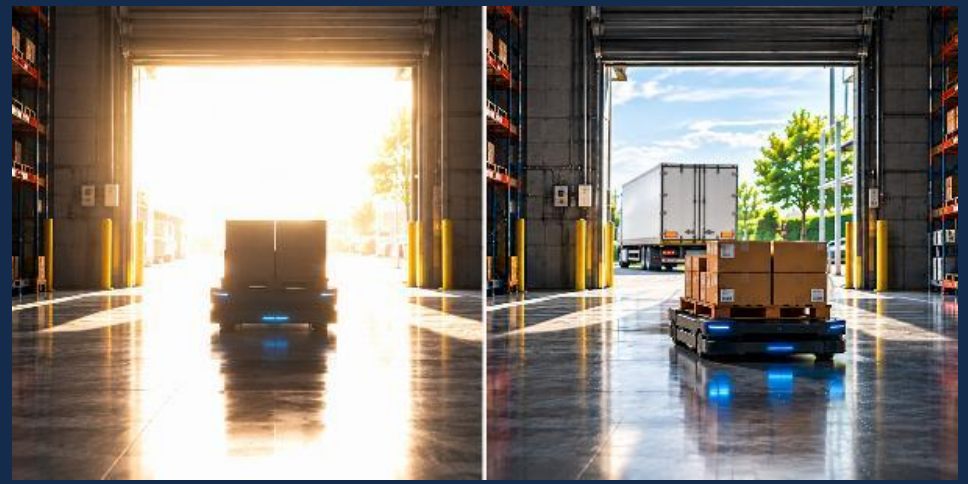
–15%
wafer cost at equivalent HDR



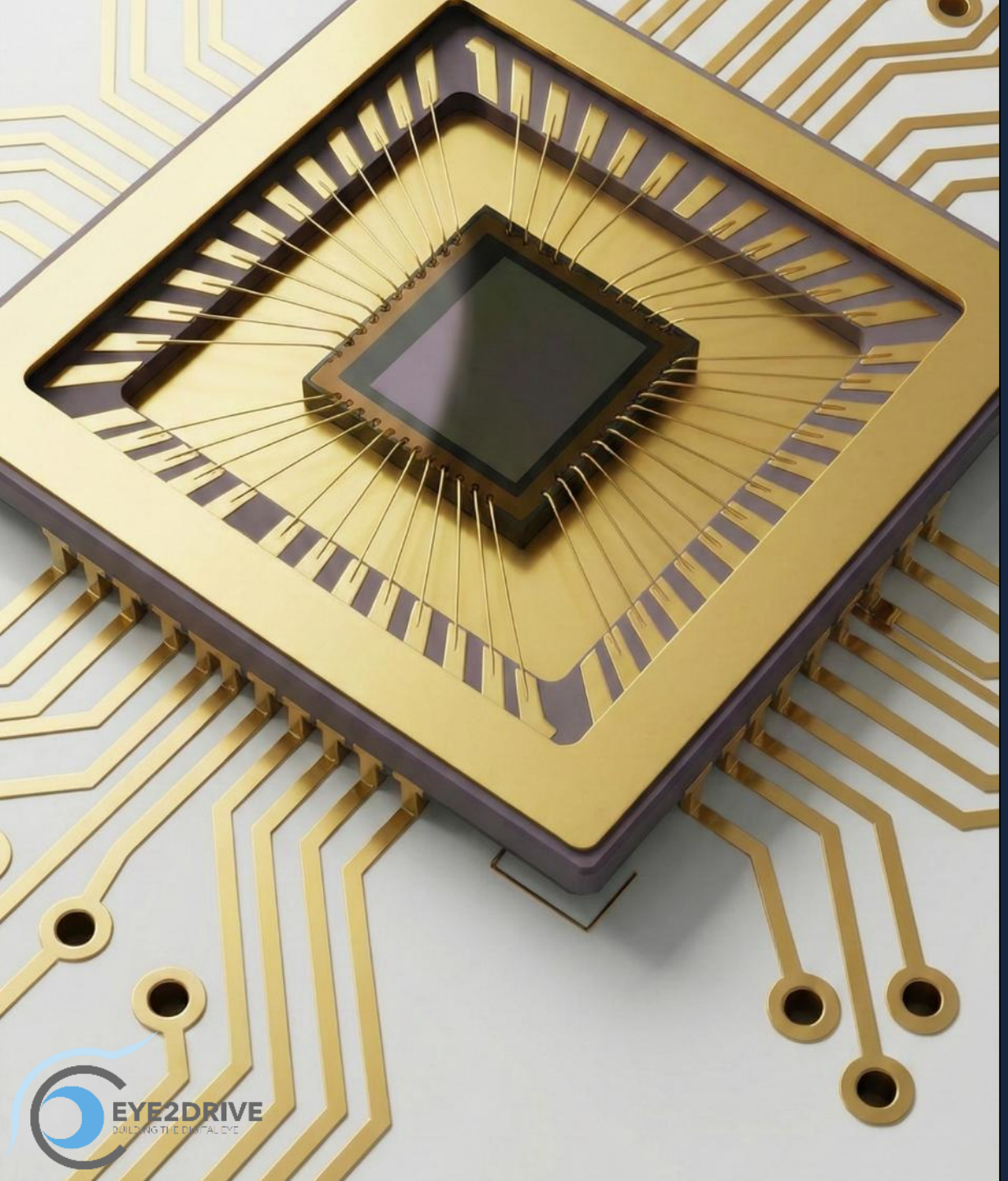
WHAT IT ENABLES

Reliable Vision

Deterministic vision in light-critical edge cases – building exits, reflecting objects with direct light



European-origin, licensable IP



TRUE VISION MEANS SEEING WHEN OTHERS ARE BLIND.

info@eye2drive.com