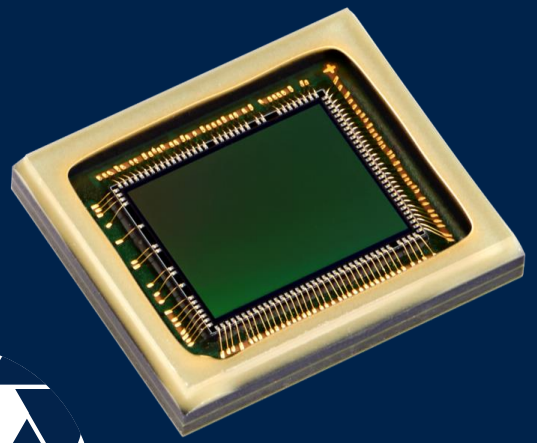
Introducing VD1943, VB1943, VD5943, VB5943

5-megapixel CMOS image sensors
designed to accelerate new applications
and simplify innovation



ST Bright Sense

A powerful addition to the ST BrightSense portfolio

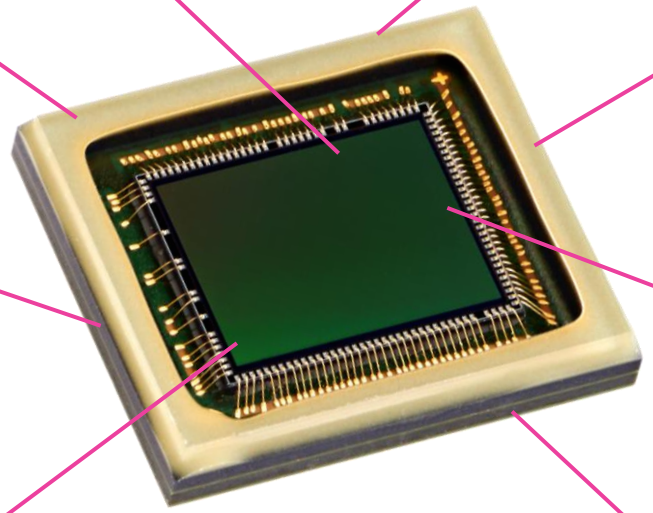
Explore a pioneering 5 MP imaging product

Cutting-edge 2.25 µm pixels with dual global & rolling shutter

On-chip single-frame HDR for enhanced image quality

Low power and MIPI CSI-2 output ideal for edge AI vision systems

Available as bare die and packaged sensor



Superior sensitivity and sharpness for accurate imaging

Industry-leading footprint enabled by advanced pixel technologies

Smart built-in features including embedded RGB-IR separation

Available in monochrome and RGB-IR versions

Expanding ST BrightSense portfolio

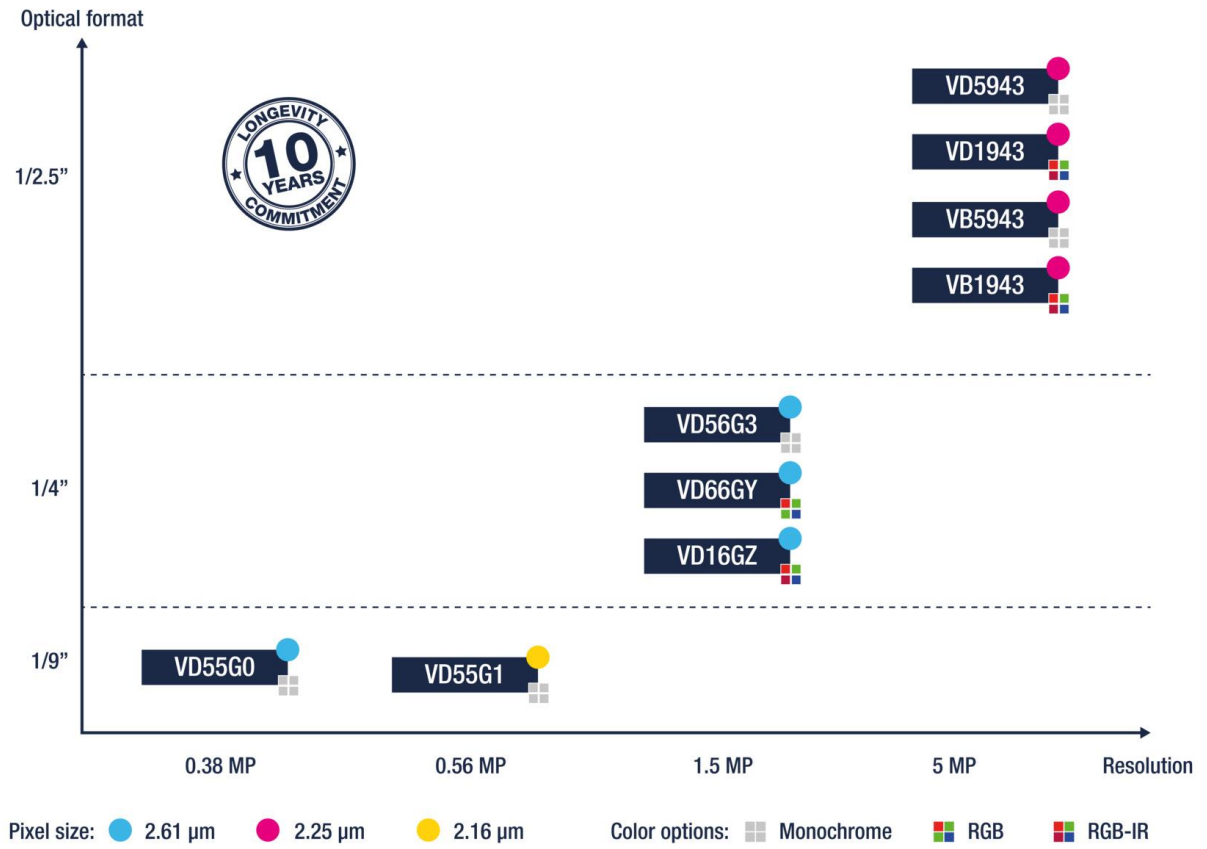
A broad and growing CMOS image sensors offer

Partner with an experienced and reliable industry leader

- Patented technologies awarded by top players
- Proven supply chain with billions of units shipped
- Comprehensive imaging portfolio (CIS, ALS, dTOF, iTOF)

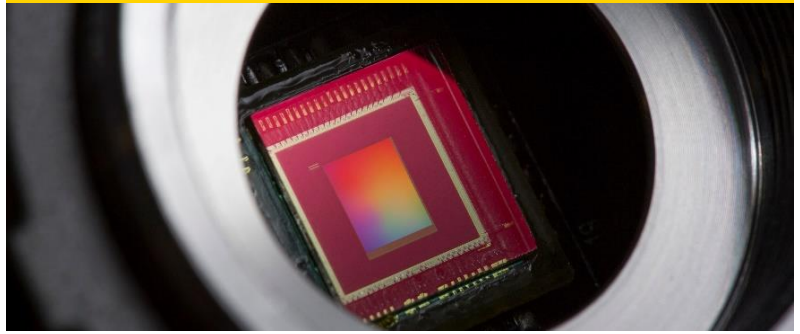
Build smart and power-efficient vision systems

- Extend battery time with low power & auto-wake up
- Optimize processing through smart in-sensor features
- Maximize ergonomics and size with slim sensor designs



ST BrightSense overview

Bring computer vision to the next level



Build up precise and responsive systems
Capture high-quality images in any condition with our advanced pixel technologies and features

Reveal the unseen with near infrared
Benefit from sensors superior NIR sensitivity for face ID, low-light imaging, or bio sign monitoring

Stay at the forefront of innovation
Benefit from state-of-the-art patented technologies from ST's proprietary wafer fab

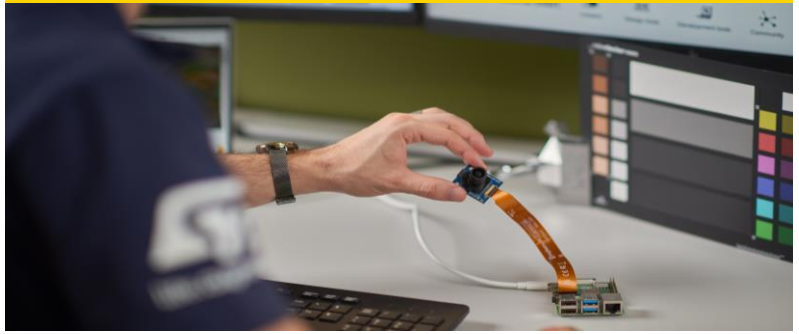
Create smart & power-efficient vision solutions

Develop new smart functionalities
Leverage smart on-chip features to develop new functions and save processing resources

Vision systems designed to fit everywhere
Rely on ultra-compact sensors to build tiny and discrete embedded vision systems

Extend battery life in mobile systems
Leverage low operating power and auto-wake up feature to get rid of inefficient 24/7 operation

Save resources and accelerate time-to-market

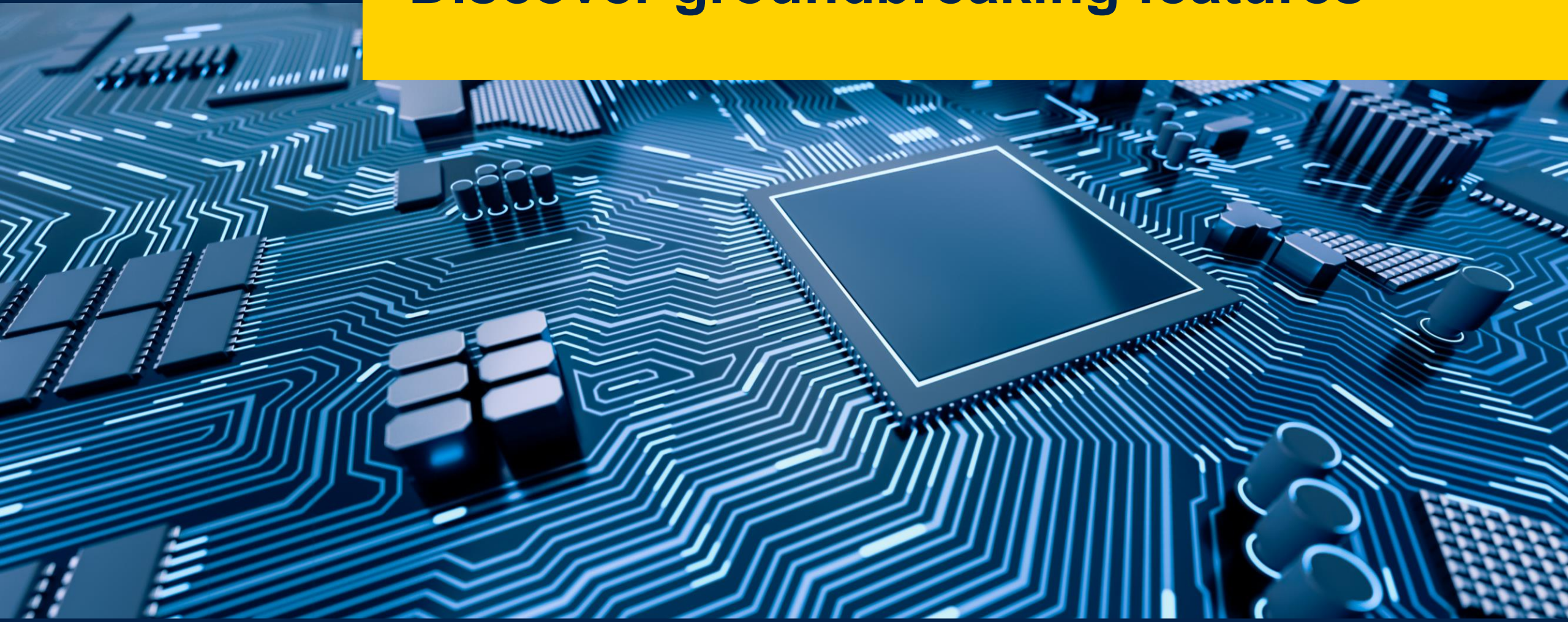


Everything you need in a few clicks
Documentation, reference designs & turnkey hardware to operate with various platforms

Effortless evaluation & development
Use turnkey drivers with optimized ISP configuration to maximize image quality

Support from prototype to production
Wide range of evaluation camera modules available then in production from various partners

Discover groundbreaking features

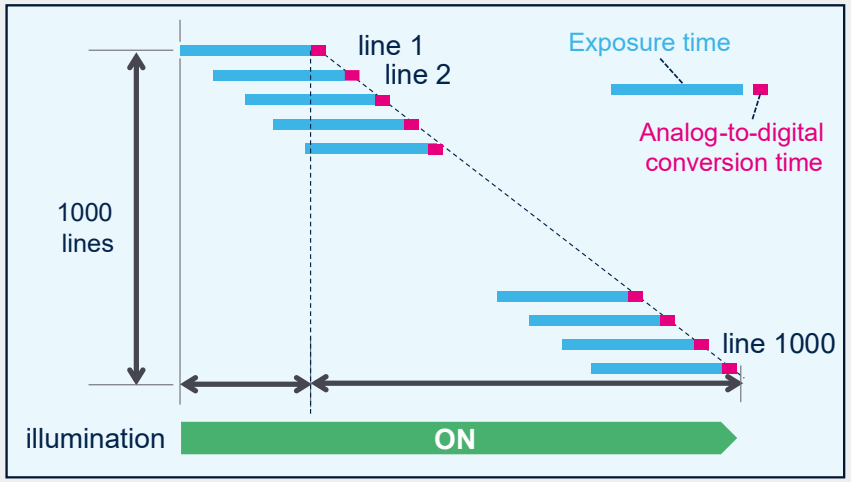


Innovative dual global / rolling shutter

No more compromises — Harness the best of both worlds

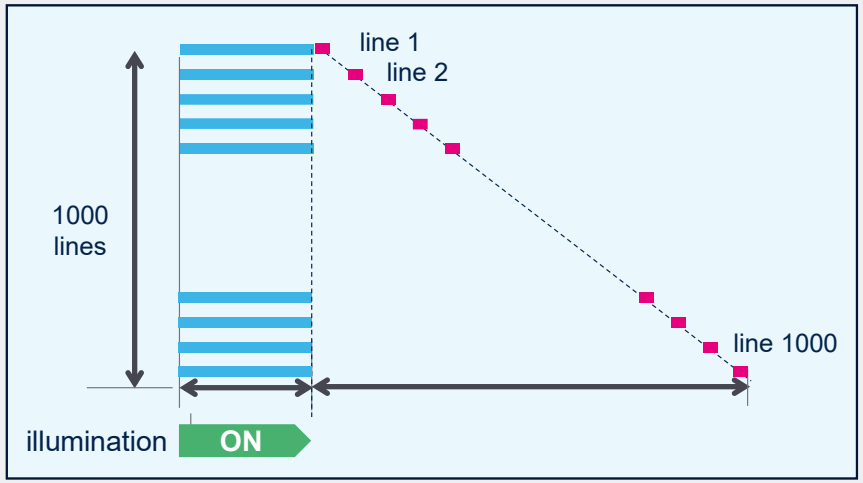
Rolling shutter

Exposure to light is “rolling”:
Pixel rows are exposed to light one after the other with a delay.



Global shutter

Exposure to light is “global”:
Pixel rows are all exposed at the same time.



Innovative dual global / rolling shutter

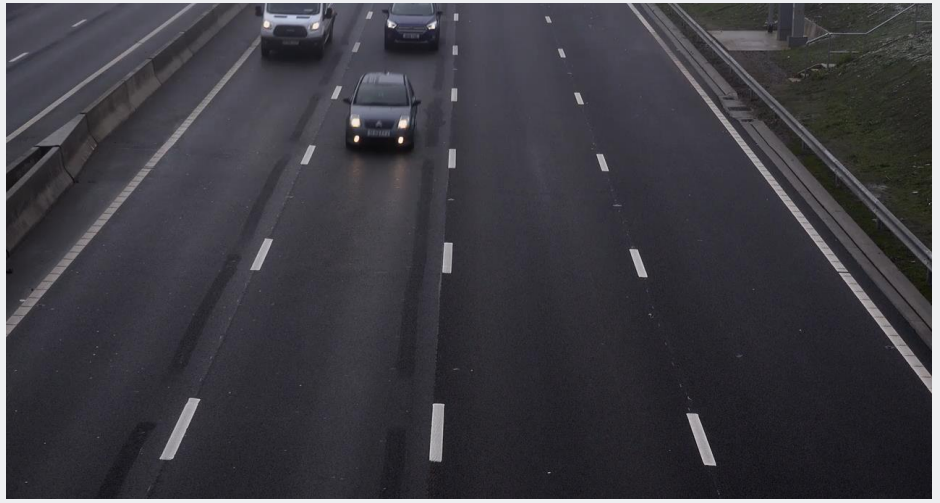
No more compromises — Harness the best of both worlds

Rolling shutter

Enhance image contrast
through extended dynamic range capabilities

Improve signal-to-noise ratio
for superior performance in low-light environments

Global shutter

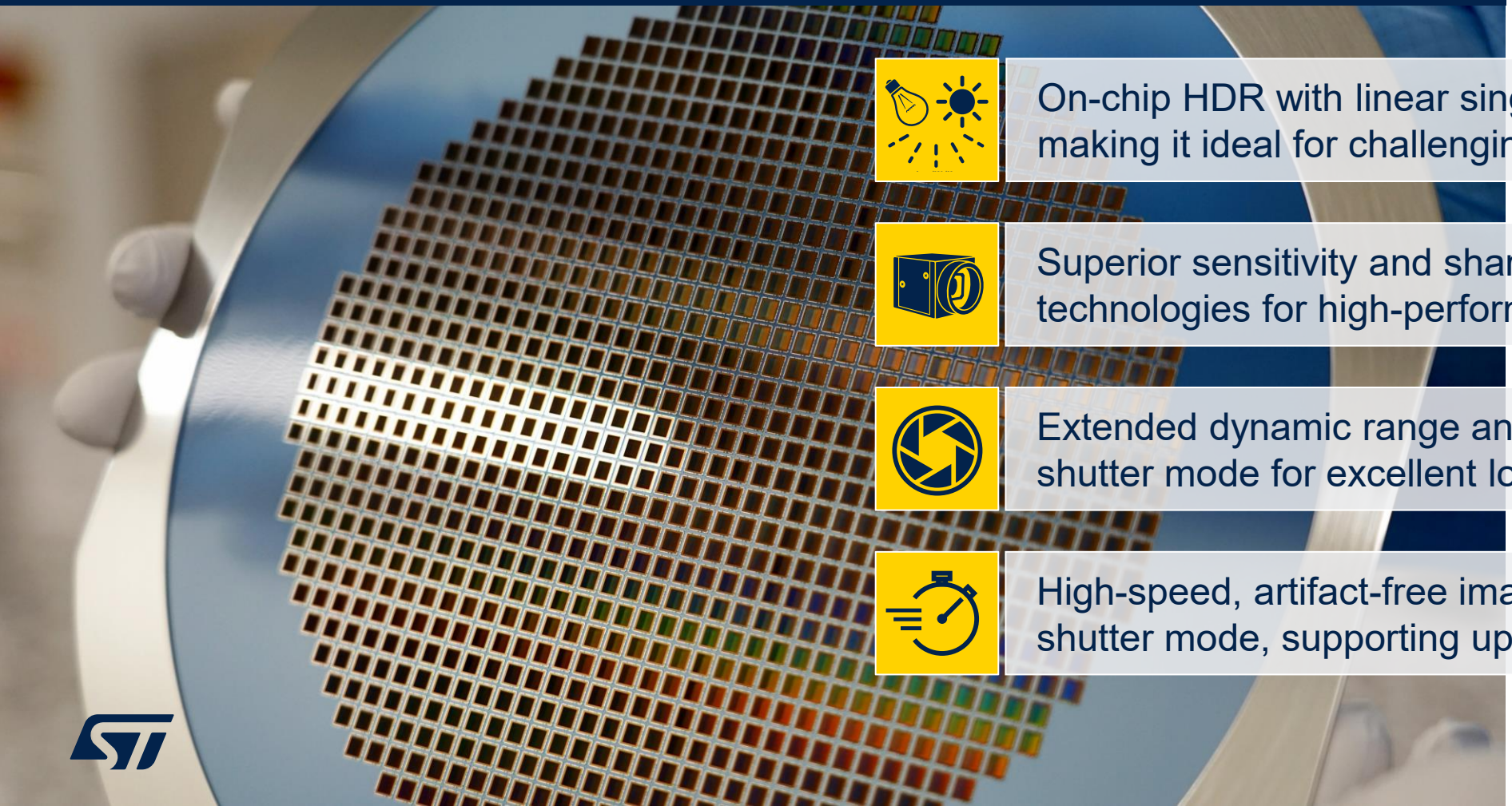


Eliminate motion blur and lighting artifacts
for high-speed image and video capture

Reduce power consumption and illumination needs
with ultra-short exposure times

Experience superior 5 MP image quality

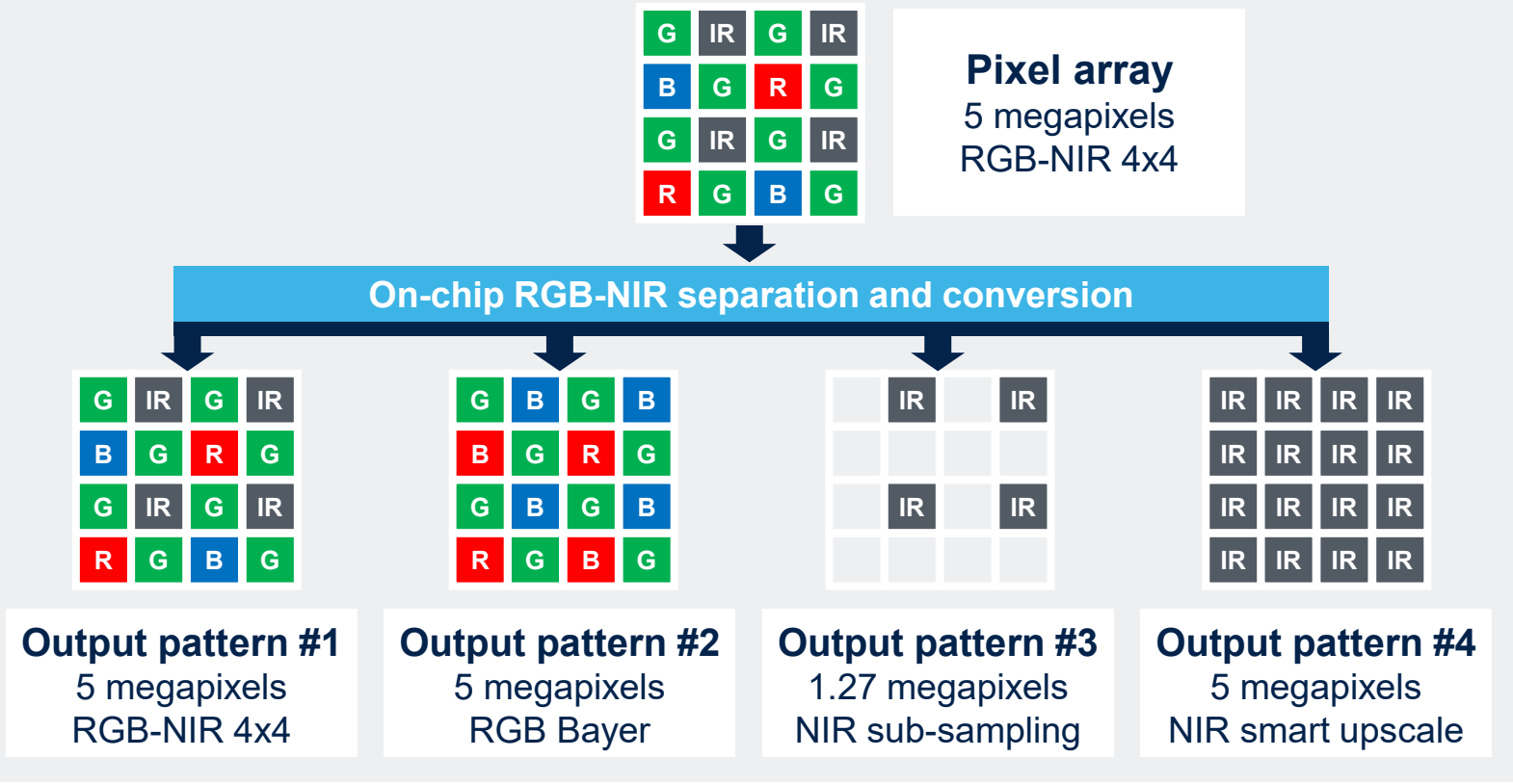
Powered by ST's proprietary 2.25 µm pixel technology & advanced wafer fabrication



- On-chip HDR with linear single-frame operation, making it ideal for challenging outdoor environments
- Superior sensitivity and sharpness with BSI and CDTI technologies for high-performance machine vision
- Extended dynamic range and low noise in rolling shutter mode for excellent low-light performance
- High-speed, artifact-free image capture in global shutter mode, supporting up to 100 fps frame rate

On-chip RGB-IR separation and conversion

From daylight to nighttime, from color to multispectral



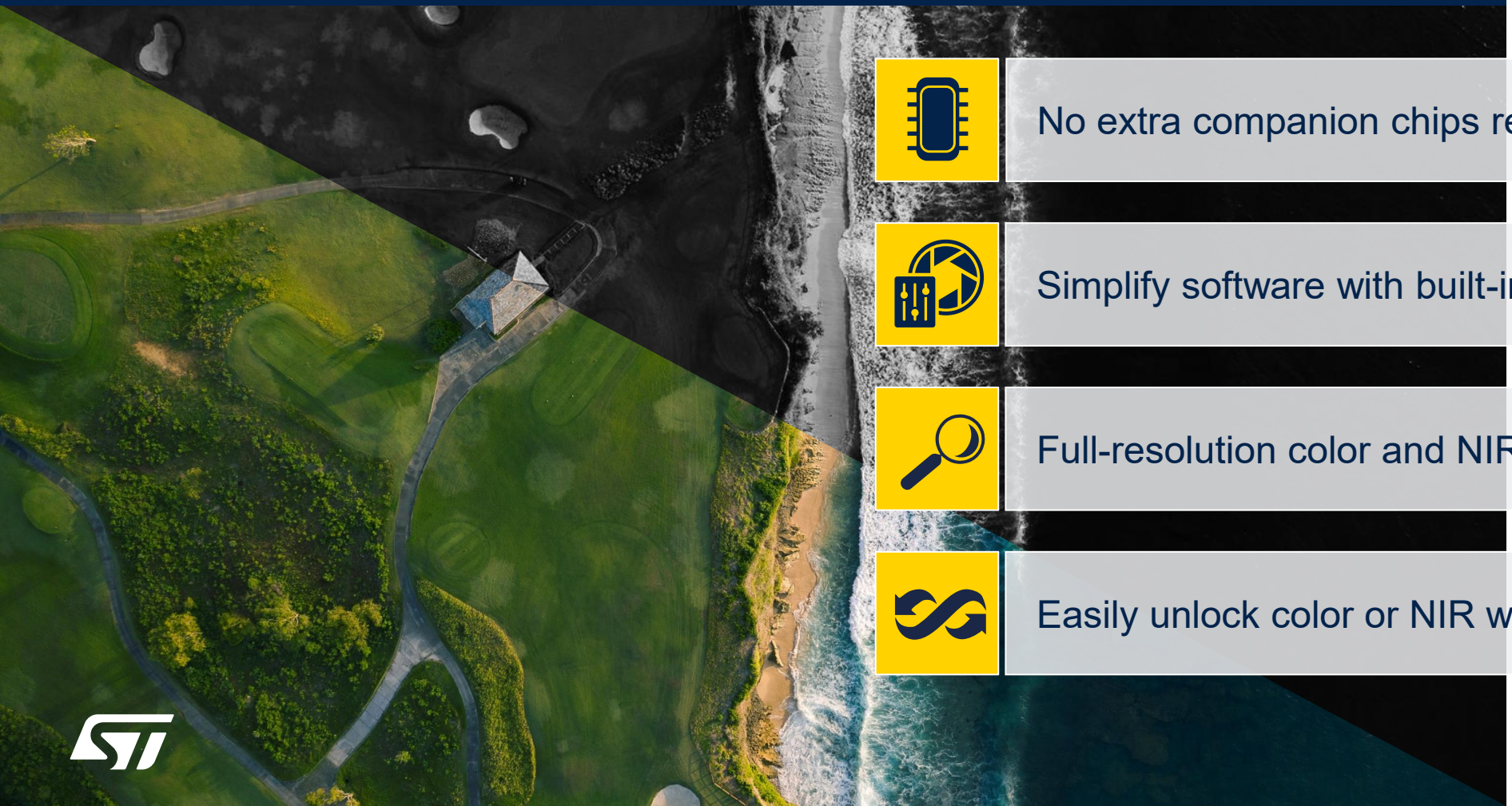
Switch the output pattern instantly at any frame with a single register change

Benefit from balanced imaging through independent RGB & IR exposure times

Achieve full 5MP NIR resolution leveraging proprietary on-chip smart upscale

On-chip RGB-IR separation and conversion

Making RGB & IR streaming simple and affordable

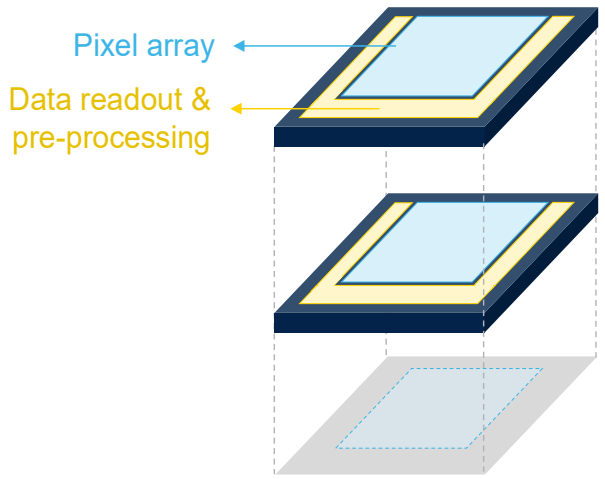


- No extra companion chips required
- Simplify software with built-in demosaicing
- Full-resolution color and NIR with smart upscale
- Easily unlock color or NIR with one register

Capture more light. Take up less space.

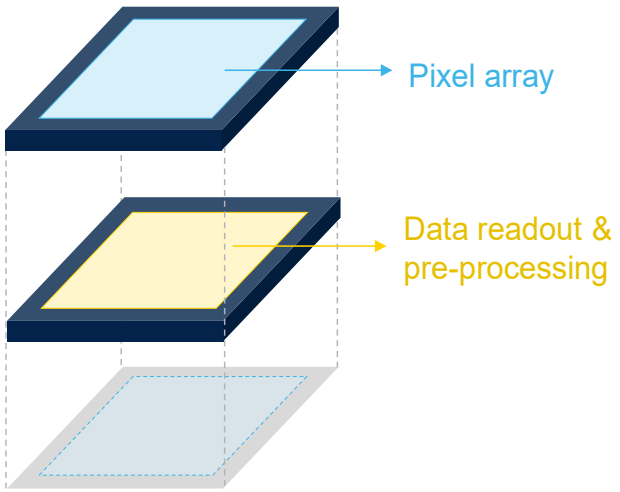
Industry-leading image array-to-die size ratio

Existing solutions with regular 3D stacking

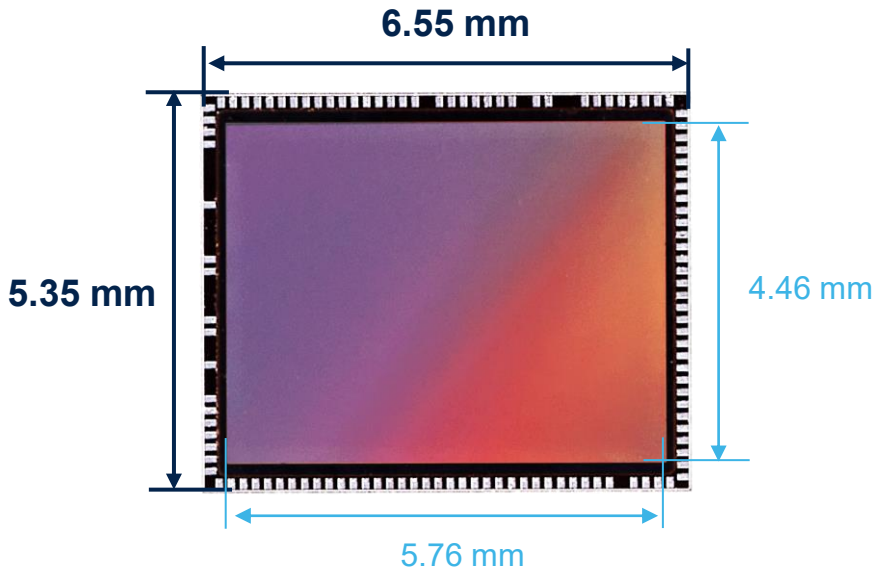


~33% of the die surface is occupied by the pixel array.

ST BrightSense solutions with advanced 3D stacking



73% of the die surface is occupied by the pixel array.



Opening new paths in computer vision

Factory automation

Barcode & logistics

Intelligent transportation

Smart building & security

Robotics

Drones

Edge AI vision

Smart retail

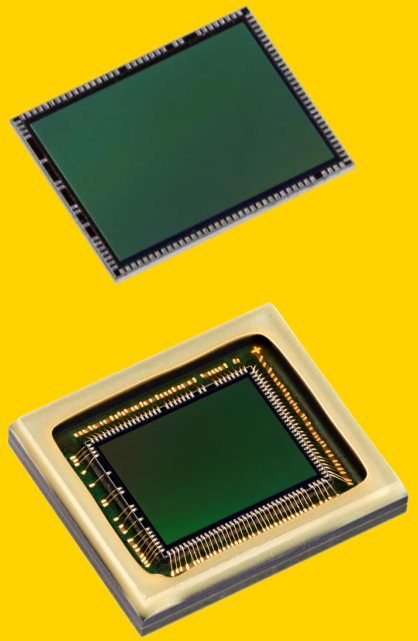
Features overview

Category	Parameters	Specifications
Optical	Resolution	5.08 MP
	Pixel array – H x V	2560 x 1984
	Aspect ratio	4 : 3
	Optical format	1/2.5” (7.29mm)
	CRA	20°
Pixel	Pixel size	2.25 µm
	Shutter type	Global (GS) & Rolling (RS)
	Technology	BSI, CDTI, 3D stacking
Electronic	Frame rate max	100fps at full resolution
	Output interface	MIPI CSI-2, up to 4 lanes
	Output format	RAW8, RAW10, RAW12
	Control interface	I²C
	Supply voltages	1.15 V – 1.8 V – 2.8 V
Mechanical	Die dimension – H x V	5.76 x 4.46 mm²
	Package dimension – H x V	10.3 x 8.9 mm²
Options	Chroma	Monochrome or RGB-IR
	Deliverable	Die or packaged sensor

Embedded features:

- Linear HDR
- Global & rolling shutter mode
- On-chip RGB-IR conversion (RGB, IR, smart upscale IR)
- Multi-exposure
- Image statistics
- Cropping
- Sub-sampling
- Noise reduction
- Dark calibration
- Defective pixel correction
- Mirror/Flip
- Context management
- GPIOs x4
- Test pattern generation
- Temperature sensor

And more

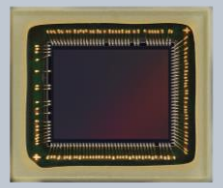


Get started with VD1943, VD5943, VB1943, VB5943

Ordering codes

The VD1943, VD5943, VB1943, and VB5943 sensors are ready for evaluation and sampling

To learn more and request detailed documentation, evaluation kits, or product samples, reach out to your local ST sales representative or an authorized distributor.

Illustration	Category	Ordering code	Description
	VD5943 Sensor die	VD5943CE/RW	Monochrome. Sensor bare die in reconstructed wafer
	VD1943 Sensor die	VD1943CE/RW	RGB-IR. Sensor bare die in reconstructed wafer
	VB5943 Packaged sensor	VB5943CAJX/1	Monochrome. OBGA packaged sensor
	VB1943 Packaged sensor	VB1943CAJX/1	RGB-IR. OBGA packaged sensor

A comprehensive ecosystem

Available soon – Stay tuned

A broad range of complementary deliverables

Open product documentation

Turnkey evaluation tools

Free software tools & drivers

Experienced ST Partners

Knowledge base and community

Everything needed to speed up your projects

Product evaluation	Hardware prototyping	Application development	Software integration	Mass production
• Open datasheet • Evaluation kit • Evaluation software	• Development kits • Camera modules • Board reference designs	• Comprehensive SDK • Example software • Software partners	• Open user manual • Software drivers • Getting started tutorials	• Camera module partners • High to low volume support • Longevity program

Our technology starts with You

Find out more at st.com/brightsense