



**TELEDYNE e2V**  
Everywhereyoulook™

Part of the Teledyne Imaging Group



# Digital Imaging Solutions for Medical Applications

**FIND OUT MORE!**



# Supporting the Medical Market

**Teledyne e2v** supports medical devices companies facing socioeconomic challenges such as aging populations and the management of healthcare spending. We offer digital imaging solutions across the healthcare landscape with a good understanding of the needs of the medical market.

**Teledyne e2v** has over 35 years of experience in the medical field and offers medical device companies a range of CCD and CMOS image sensor solutions and services.

## Dental Imaging: X-ray Intraoral Sensors

Our X-ray dental sensors offer high performance imaging at low doses. This changes the way intraoral radiography is captured, stored and retrieved in dental offices and improves the workflow with no compromise on a patient's comfort.

We work closely with leading OEMs to develop customized dental imaging sensors as well as providing long-term customer specific supply. This allows them to provide a unique value proposition to the market.

Since the late 1980s, we have developed 4 generations of digital intraoral image sensors:

» CCD, CMOS, FOP, Csl/Gadox

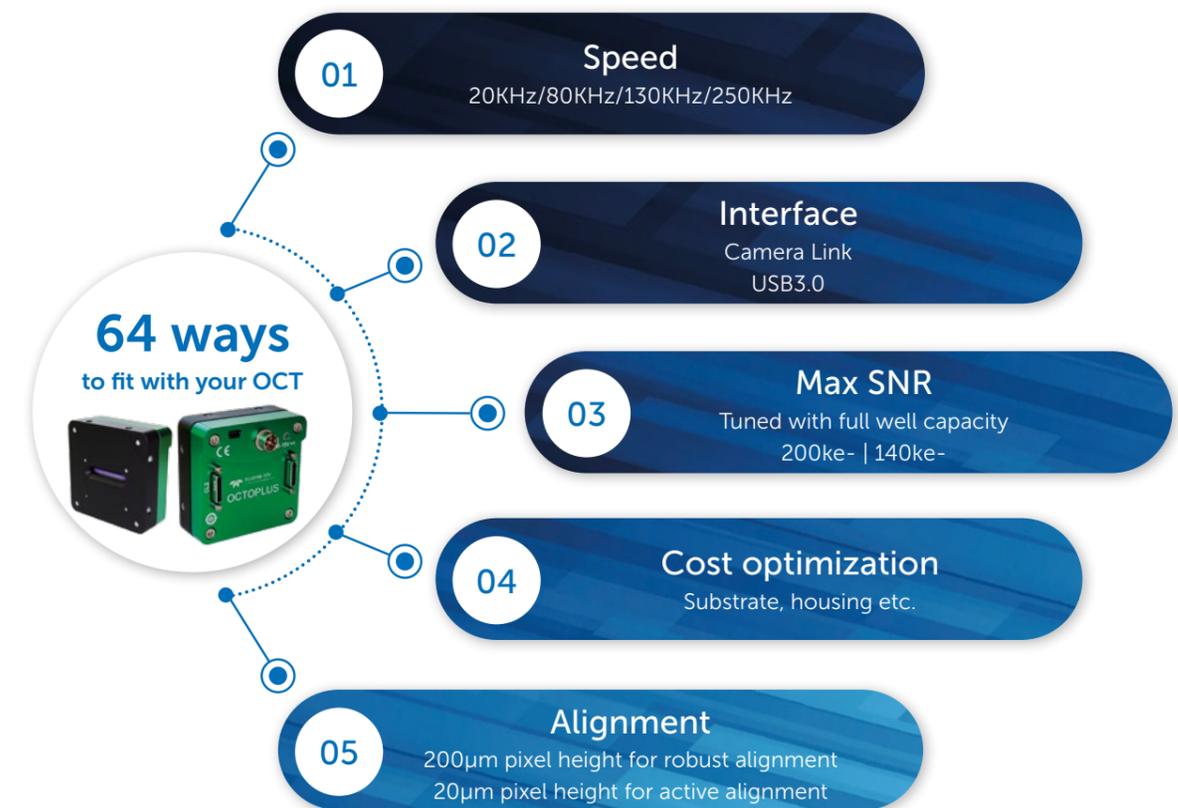


## Optical Coherence Tomography: OctoPlus Line Scan Cameras

**Teledyne e2v** has been pioneering OCT techniques in our range of line scan cameras since the early 2000s and to date, have delivered more than 35,000 cameras for a wide variety of ophthalmology applications.

Through the development of three generations of cameras, we have continuously worked to improve practitioner diagnosis, ease of access and the comfort of the patient.

Our success is based on the flexibility of our products and services and the close interaction we maintain with our customers.



# Development and Design of Innovative Solutions

Teledyne e2v's unique approach involves collaborating with our partners to provide innovative standard, semi-customized or fully customized imaging solutions through our **Teledyne e2v** and **Teledyne AnaFocus** brands. With more than 400 patents we are able to offer different levels of integration.

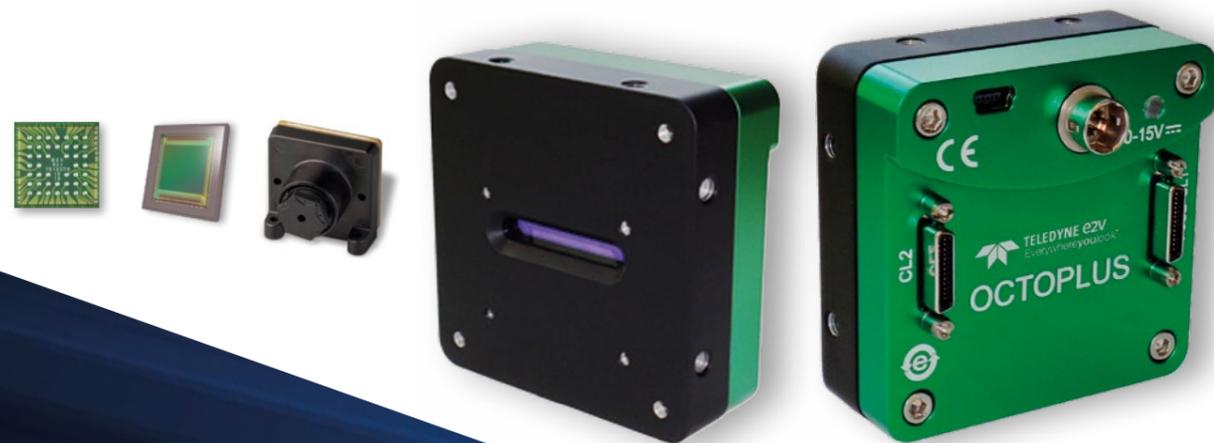
## A Complete CMOS Imaging Expertise

### CMOS Image Sensor Design

- » A team of more than 80 specialist design engineers
- » **Strong relationships with partner foundries, creating state-of-the-art performance, and having access to new technologies**
- » **Large silicon proven standard block and IP, enabling customer differentiation, starting from the pixel design**

### CMOS Image Systems Design

- » **Mechanics:** Plastic molding, machining, substrates (ceramics or PCB)
- » **Hardware:** Electronic board development or ASIC
- » **Software:**
  - » Embedded software to control and stream the image sensor (FPGA, micro controller)
  - » SDK for various platforms (Windows, Linux, Mac)
- » **Testing:**
  - » Electro optical measurement: QE, MTF, noise
  - » Reliability test: Temperature cycling, temperature storage, humidity



## Advanced Technologies Embedded in Our Sensors, Modules and Systems

<h3>Dimensions</h3> <p>1D      2D      3D</p>	<h3>Spectral range</h3> <p>From X-ray, visible to NIR*</p> <p>Wavelength (nanometers)</p> <p><small>*NIR: a unique photodiode and process exclusive to Teledyne e2v</small></p>
<h3>Design and production capabilities</h3> <p>From wafers to integrated systems 65nm to 180nm fab processes</p>	<h3>Shuttering modes</h3> <p>3T, 4T, 5T, 6T and more Rolling or global shutter</p>
<h3>Supply chain</h3> <p>From hundreds to &gt; 2 million units / year</p>	<h3>Sensor packaging options</h3> <p>CLCC, PGA, COB, Wafer Level Packaging (CSP, Fan-out)</p>
<h3>Image sensor size</h3> <p>Linear up to 32K Area up to 67M</p>	<h3>Interfaces: from sensor to sub-system</h3>
<h3>Pixel pitch</h3> <p>From 1.12 μm to 10x 200 μm</p>	<h3>Other functionalities</h3> <ul style="list-style-type: none"> <li style="width: 33%;">» Multiple ROI</li> <li style="width: 33%;">» FPN &amp; defective pixel correction</li> <li style="width: 33%;">» HDR mode</li> <li style="width: 33%;">» Binning</li> <li style="width: 33%;">» Gating for ToF or range gating</li> <li style="width: 33%;">» Stitching</li> <li style="width: 33%;">» Subsampling</li> <li style="width: 33%;">» Single photon sensitivity</li> <li style="width: 33%;">» Ultra low noise</li> <li style="width: 33%;">» Low light, BSI</li> </ul>



# Solutions for your Medical Imaging Applications

**Teledyne e2v** is committed to innovation, bringing your medical imaging applications to the next level with our range of new technologies.

Our expertise in medical, life science, aerospace, defense and industrial imaging, enables us to also provide high-performance solutions to address new medical markets. This includes delivering high reliability products with long life cycles, which are essential for medical devices. Applications we can address include:

- » Endoscopy
- » Surgical tool tracking
- » Minimally invasive surgery
- » Dermatology
- » Alignment systems for radiotherapy
- » Point of care diagnosis system

**Teledyne e2v** understands that every single imaging solution is unique. Therefore, our medical imaging team works in close partnership with our customers to propose innovative and differentiated solutions that fulfil their needs.

## Teledyne e2v – Your Partner from the Design to Manufacture

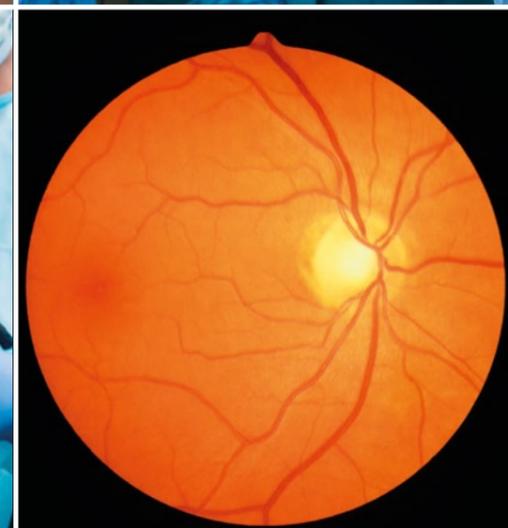
### of Standard to Fully Custom Solutions for Medical Applications

**Teledyne e2v's** assembling chain begins at wafer level and ends with the final testing of the products, which allows for the production of small to large volumes. The assembly is operated under a rigorously clean process to avoid contamination and to ensure our customers receive high-quality products.

A part of our assembly chain uses a fully automatic process, called  $\mu$ -Factory. **Teledyne e2v** has received the Price of Productivity 2019 award by the French business and technology magazine "Usine Nouvelle" for this innovative process. We also have expertise in driving external scalable imaging supply chains.

## Quality Management – ISO 13485 Standard for Medical Devices

- » Our approach to quality involves everyone in our team focusing on prevention as well as correction. Our team works with a continuous improvement mindset
- » Risk management, traceability of changes, 100% test of all critical parameters as well as full traceability of products are included
- » An 8D methodology, including CAPA (Corrective Action and Preventative Action) is used with customers considered the key stakeholder
- » We comply with ISO 13485 standard for medical devices



# Technical Support

Our Field Application Engineers work alongside Sales and Account Managers with strong links to Designers, Application Specialists and to one another.

- » Technical experts for **Teledyne e2v/Teledyne AnaFocus** cameras, CMOS sensors and subsystems
- » Understanding, reproducing and solving customers' technical issues
- » A point of contact for customers on all technical support matters

Technical support is available in each region:

- » **Grenoble, France**
- » **Seville, Spain**
- » **Shenzhen, China**
- » **Tokyo, Japan**
- » **California, USA**



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