

ADVANCED IMAGE CAPTURE, ACQUISITION, AND PROCESSING

# MACHINE VISION



SENSORS | CAMERAS | FRAME GRABBERS | PROCESSORS | SOFTWARE | VISION SYSTEMS



# IMAGINE THE POSSIBILITIES

There are two sides to every innovation: engineering and imagination. As an international leader in high performance digital imaging technology Teledyne DALSA is dedicated to working with customers to imagine advanced capabilities that are engineered for real world applications. It's in the space between engineering and imagination where possibility takes shape and it's where we call home.



- PEOPLE**  
1024 employees worldwide
- PARTNERS**  
95 sales partners in 25 countries
- R&D**  
296 engineers in Research & Development
- RESOURCES**  
39 PhDs, 150 patents

A HISTORY OF SUCCESS

## AN IMMENSE TECHNOLOGY PORTFOLIO

The purpose of this publication is to offer a comprehensive overview of our machine vision products and capabilities. We also hope that it serves as a starting point for an on-going dialogue. We understand that technology is just a tool and that real success lies in our ability to partner with you to combine our state-of-the-art imaging technology with passion and imagination to find the innovative imaging and vision solutions you require.



### CONTENTS

Line Scan Cameras	2
Area Scan Cameras	8
Image Acquisition/Processing	14
Vision Software	18
Vision Systems	20
Custom Solutions	24



Check out stories that showcase truly innovative vision applications  
[possibility.teledynedalsa.com](http://possibility.teledynedalsa.com)

# LINE SCAN IMAGING

Standard resolutions from 512 to 16384 pixels, TDI, single or multiple lines, monochrome or color models.



Linea

## MAXIMUM THROUGHPUT WITH CMOS

Our wide selection of multi-featured line scan cameras offer high speed, high responsivity, programmable pixel-to-pixel correction, reduced integration time, and a host of other features along with a choice of Camera Link®, Camera Link HS™ or GigE Vision® interfaces to deliver high speed and high throughput inspections.

### SPEED

Net higher throughput  
(parallelism in analog)

### NOISE

Net lower noise  
(slow speed analog)

### POWER

Net lower power  
(slow speed analog, low V)

### SIZE

Small body improves  
integration in tighter spaces

### NEED TO KNOW



#### Linea™

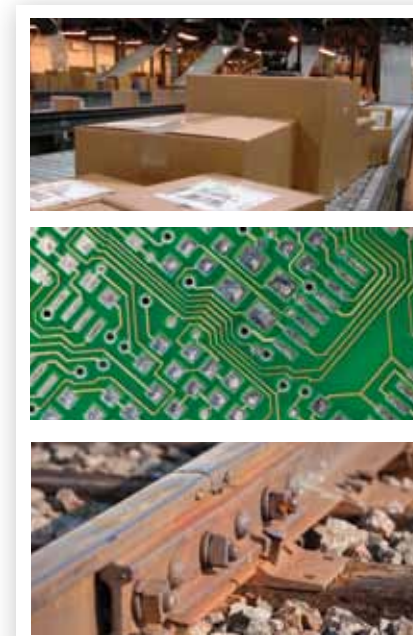
- » Up to 80 kHz
- » 2048 or 4096 pixel resolution
- » Multiple ROI

#### Spyder™

- » Resolutions from 512 to 4k
- » Line rates to 68 kHz
- » Selectable high or low sensitivity mode

#### Piranha™

- » Resolutions from 1k to 16k
- » Line rates to 140 kHz
- » Time Delay & Integration (TDI)
- » Low-light imaging

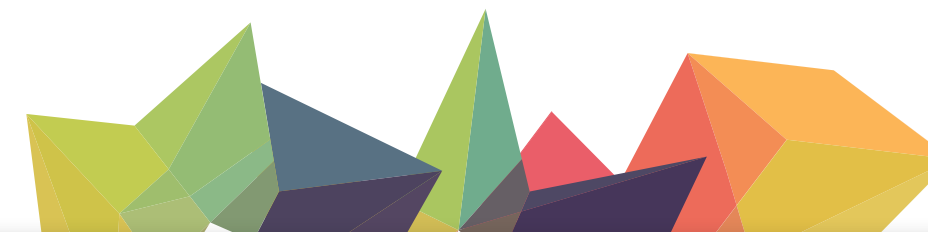


Check out stories that showcase truly innovative vision applications  
[possibility.teledynedalsa.com](http://possibility.teledynedalsa.com)





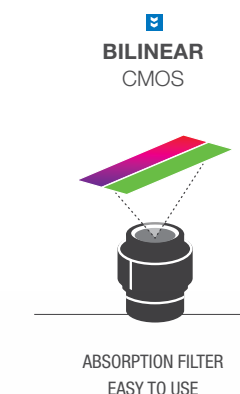
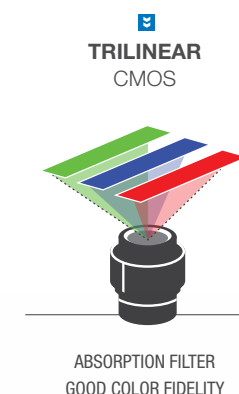
# NEW! PIRANHA4™ CMOS LINE SCAN – COLOR & MONOCHROME IMAGING

High speed and high responsivity imaging in a range of resolutions — from 1k to 8k, with the fastest line rates in the industry.



## COLOR LINE SCAN IMAGING TECHNOLOGY

	PART NO.	RESOLUTION	LINE RATE	PIXEL SIZE	BIT DEPTH	INTERFACE	MEASUREMENT	COMPLIANCE	DYNAMIC RANGE	OPERATING TEMP
	P4-CM-08k070-00-R	8kx2	100 kHz/70 kHz	7.04 µm	8/10/12 bit	Camera Link	62 x 62 x 48 mm	CE, FCC, and RoHS	60 dB	0 ~ 65 °C
	P4-CM-04k10D-00-R	4kx2	100 kHz/70 kHz	10.56 µm	8/10/12 bit	Camera Link	62 x 62 x 48 mm	CE, FCC, and RoHS	60 dB	0 ~ 65 °C
	P4-CM-04k05D-00-R	4kx2	100 kHz/50 kHz	10.56 µm	8/10/12 bit	Camera Link	62 x 62 x 48 mm	CE, FCC, and RoHS	60 dB	0 ~ 65 °C
	P4-CM-02k10D-00-R	2kx2	200 kHz/100 kHz	10.56 µm	8/10/12 bit	Camera Link	62 x 62 x 48 mm	CE, FCC, and RoHS	60 dB	0 ~ 65 °C
	P4-CM-02k05D-00-R	2kx2	100 kHz/50 kHz	10.56 µm	8/10/12 bit	Camera Link	62 x 62 x 48 mm	CE, FCC, and RoHS	60 dB	0 ~ 65 °C
	P4-CC-08k050-00-R	8kx2	50kHz	7.04 µm	8 bit	Camera Link	62 x 62 x 48 mm	CE, FCC, and RoHS	60 dB	0 ~ 65 °C
	P4-CC-04k07T-00-R	4kx3	70kHz	10.56 µm	8/10/12 bit	Camera Link	62 x 62 x 48 mm	CE, FCC, and RoHS	60 dB	0 ~ 65 °C
	P4-CC-04k04T-00-R	4kx3	40kHz	10.56 µm	8/10/12 bit	Camera Link	62 x 62 x 48 mm	CE, FCC, and RoHS	60 dB	0 ~ 65 °C
	P4-CC-02k07T-00-R	2kx3	70kHz	14.08 µm	8/10/12 bit	Camera Link	62 x 62 x 48 mm	CE, FCC, and RoHS	60 dB	0 ~ 65 °C
	P4-CC-02k04T-00-R	2kx3	40kHz	14.08 µm	8/10/12 bit	Camera Link	62 x 62 x 48 mm	CE, FCC, and RoHS	60 dB	0 ~ 65 °C
MULTI-SPECTRAL	P4-CC-02k07Q-00-R	2kx4	70 kHz	14.08 µm	8/10/12 bit	Camera Link	62 x 62 x 48 mm	CE, FCC, and RoHS	60 dB	0 ~ 65 °C
	P4-CC-02k07N-00-R	2kx4	70 kHz	14.08 µm	8/10/12 bit	Camera Link	62 x 62 x 48 mm	CE, FCC, and RoHS	60 dB	0 ~ 65 °C



Based on Teledyne DALSA's optimized CMOS line scan sensor architecture, the **Piranha4** cameras provide outstanding signal-to-noise ratio for high speed imaging. The P4-4k delivers 4k resolution with a 10.5 x 10.5 µm or 7 x 7 µm pixel size for optimized optical design and delivers a maximum line rate of 100 kHz in TDI mode and 200 kHz in area mode. The Piranha-4k's trilinear CMOS sensor provides native red, green and blue color output at 70 kHz line rate with minimum spatial separation for the maximum in color accuracy and performance.

Subpixel spatial correction allows precise color registration for any sampling scenario. An advanced GenICam™ compliant interface makes the camera easier to setup, control, and integrate. Programmability includes exposure control, flat field correction, and gain settings.



**CAMERA LINK HS (CLHS)** Next generation line scan cameras will include CLHS and be supported by our Xtium frame grabber series.



PIRANHA4 FEATURE PAGE  
[www.teledynedalsa.com/piranha4](http://www.teledynedalsa.com/piranha4)

Access more Line Scan solutions and resources  
[www.teledynedalsa.com/mv](http://www.teledynedalsa.com/mv)





# INTRODUCING LINEA™

Teledyne DALSA's Linea line scan camera series sets a new pace in the race to deliver a low cost camera that does not compromise image quality or responsivity. The Linea series combines the best of our advanced CMOS line scan sensor technology in a compact form factor for Camera Link deployment today and GigE Vision connectivity in the near future.

Available in both 2K and 4K resolution the Linea monochrome cameras employ Teledyne DALSA's single line, 7 µm x 7 µm pixel array, delivering both speed and responsivity at a competitive price. These small, affordable, low power cameras are designed for applications such as materials grading and inspection, transportation safety, automated optical inspection and general purpose machine vision.



### Key Features

- High speed: up to 80 kHz
- 2048 or 4096 pixel resolution
- Compact and affordable
- Multiple Regions of Interest for calibration and data reduction
- Selectable output, 8 or 12 bit
- Smart Flat Field Correction and lens shading correction
- 4 programmable coefficient sets
- GenICam or ASCII compliant interfacing

### Typical Applications

- Automated optical inspection
- Security systems
- High performance sorting systems
- Materials grading and inspection systems
- Web inspection
- General purpose machine vision

	PART NO.	RESOLUTION	LINE RATE	PIXEL SIZE	BIT DEPTH	INTERFACE	DIMENSIONS	COMPLIANCE	DYNAMIC RANGE	OPERATING TEMP
● LINEA	LA-CM-02K08A-00-R	2048 x 1 pixels	80 kHz	7 µm	8, 12 bit selectable	CameraLink	62 x 62 x 30.9 mm	CE and ROHS	> 60 db	0 ~65 °C
	LA-CM-04K08A-00-R	4096 x 1 pixels	80 kHz	7 µm	8, 12 bit selectable	CameraLink	62 x 62 x 30.9 mm	CE and ROHS	> 60 db	0 ~65 °C
● SPYDER 3	SC-34-02K80-00-R	2048 x 2 pixels	18 kHz	14 µm	8, 12 bit selectable	Camera Link	60 x 72 x 60 mm	CE and RoHS	> 64 dB	0 ~ 65 °C
	SG-34-02K80-00-R	2048 x 2 pixels	18 kHz	14 µm	8 bit	GigE Vision	72 x 60 x 65 mm	CE and RoHS	> 64 dB	0 ~ 65 °C
	SC-34-04K80-00-R	4096 x 2 pixels	9 kHz	10 µm	8, 12 bit selectable	Camera Link	60 x 72 x 60 mm	CE and RoHS	> 64 dB	0 ~ 65 °C
	SG-34-04K80-00-R	4096 x 2 pixels	9 kHz	10 µm	8 bit	GigE Vision	72 x 60 x 65 mm	CE and RoHS	> 64 dB	0 ~ 65 °C
● SPYDER 3	S3-14-01K40-00-R	1024 x 2 pixels	36 kHz	14 µm	8, 12 bit selectable	Camera Link	60 x 72 x 60 mm	CE and RoHS	> 64 dB	0 ~ 65 °C
	SG-14-01K40-00-R	1024 x 2 pixels	36 kHz	14 µm	8, 12 bit selectable	GigE Vision	60 x 72 x 65 mm	CE and RoHS	> 64 dB	0 ~ 65 °C
	S3-24-01K40-00-R	1024 x 2 pixels	68 kHz	14 µm	8, 12 bit selectable	Camera Link	60 x 72 x 60 mm	CE and RoHS	> 64 dB	0 ~ 65 °C
	SG-14-01K80-00-R	1024 x 2 pixels	68 kHz	14 µm	8, 12 bit selectable	GigE Vision	60 x 72 x 65 mm	CE and RoHS	> 64 dB	0 ~ 65 °C
	S3-14-02K40-00-R	2048 x 2 pixels	18 kHz	14 µm	8, 12 bit selectable	Camera Link	60 x 72 x 60 mm	CE and RoHS	> 64 dB	0 ~ 65 °C
	SG-14-02K40-00-R	2048 x 2 pixels	18 kHz	14 µm	8, 12 bit selectable	GigE Vision	60 x 72 x 65 mm	CE and RoHS	> 64 dB	0 ~ 65 °C
	S3-24-02K40-00-R	2048 x 2 pixels	36 kHz	14 µm	8, 12 bit selectable	Camera Link	60 x 72 x 60 mm	CE and RoHS	> 64 dB	0 ~ 65 °C
	SG-14-02K80-00-R	2048 x 2 pixels	36 kHz	14 µm	8, 12 bit selectable	GigE Vision	60 x 72 x 65 mm	CE and RoHS	> 64 dB	0 ~ 65 °C
	S3-24-04K40-00-R	4096 x 2 pixels	18 kHz	10 µm	8, 12 bit selectable	Camera Link	72 x 60 x 65 mm	CE and RoHS	> 64 dB	0 ~ 50 °C
	SG-14-04K80-00-R	4096 x 2 pixels	18 kHz	10 µm	8, 12 bit selectable	GigE Vision	72 x 60 x 65 mm	CE and RoHS	> 64 dB	0 ~ 50 °C
● PIRANHA ES	ES-80-04K40-00-R	4096 x 32 pixels	68 kHz	7 µm	8, 12 bit selectable	Camera Link	150 x 80 x 65 mm	CE and RoHS	> 56 dB	0 ~ 50 °C
	ES-82-04K80-00-R	4096 x 16 pixels	110 kHz	14 µm	8, 12 bit selectable	Camera Link	150 x 80 x 65 mm	CE and RoHS	> 56 dB	0 ~ 50 °C
	ES-80-08K80-00-R	8192 x 32 pixels	68 kHz	7 µm	8, 12 bit selectable	Camera Link	150 x 80 x 65 mm	CE and RoHS	> 56 dB	0 ~ 50 °C
	ES-80-08K40-00-R	8192 x 32 pixels	34 kHz	7 µm	8, 12 bit selectable	Camera Link	150 x 80 x 65 mm	CE and RoHS	> 56 dB	0 ~ 50 °C
	ES-S0-12K40-00-R	12000 x 64 pixels	90 kHz	5.2 µm	8, 10, 12 bit selectable	HS Link	180 x 90 x 92 mm	CE and RoHS	> 56 dB	0 ~ 50 °C
● PIRANHA HS	HS-4x-02K30-00-R	2048 x 64 pixels	52 kHz	13 µm	8, 10 bit selectable	Camera Link	85 x 85 x 55 mm	CE	> 54 dB	0 ~ 50 °C
	HS-40-04K40-00-R	4096 x 96 pixels	36 kHz	7 µm	8, 12 bit selectable	Camera Link	85 x 85 x 55 mm	CE	> 63 dB	0 ~ 50 °C
	HS-80-04K40-00-R	4096 x 96 pixels	68 kHz	7 µm	8, 10 bit selectable	Camera Link	80 x 150 x 65 mm	CE and RoHS	> 56 dB	0 ~ 50 °C
	HS-82-04K80-00-R	4096 x 48 pixels	110 kHz	14 µm	8, 12 bit selectable	Camera Link	80 x 150 x 65 mm	CE and RoHS	> 56 dB	0 ~ 50 °C
	HS-80-08K80-00-R	8192 x 96 pixels	68 kHz	7 µm	8, 12 bit selectable	Camera Link	80 x 150 x 65 mm	CE and RoHS	> 56 dB	0 ~ 50 °C
	HS-80-08K40-00-R	8192 x 96 pixels	34 kHz	7 µm	8, 12 bit selectable	Camera Link	80 x 150 x 65 mm	CE and RoHS	> 56 dB	0 ~ 50 °C
	HS-S0-12K40-00-R	12000 x 256 pixels	90 kHz	5.2 µm	8, 10, 12 bit selectable	HS Link	90 x 180 x 92.5 mm	CE and RoHS	> 54 dB	0 ~ 50 °C
PIRANHA HS NIR	HN-80-08K40-00-R	8192 x 256 pixels	34 kHz	7 µm	8, 12 bit selectable	Camera Link	80 x 150 x 65 mm	CE and RoHS	> 62 dB	0 ~ 50 °C

## TIME DELAY AND INTEGRATION

### How Does TDI Work?

TDI is based on the concept of accumulating multiple exposures of the same (moving) object, effectively increasing the integration time available to collect incident light. The object motion must be synchronized with the exposures to ensure a crisp image.

### Benefits

- **More speed** - With more effective integration time, you can increase the speed of the target object or inspection web.
- **Less light, less expense** - Instead of high-powered, high-cost, high-temperature halogen lighting with DC power, you can use high-frequency AC or even LED lighting, profoundly lowering your system maintenance costs. TDI operation effectively averages out fluctuations in light intensity to represent a DC light source. This factor alone can justify the increased cost of a TDI sensor versus the cost of using DC regulated light source and a line scan image sensor



Check out our comprehensive TDI Technology Primer

# AREA SCAN IMAGING

From cost-efficient, lower resolution **GigE Genies** to higher resolution and feature-rich **Genie TS** cameras to multi-megapixel high speed **Falcon2** models, we offer an area scan camera for nearly every inspection need.



Falcon2

## MULTI-MEGAPIXEL, HIGH SPEED IMAGING

Our cameras are built around the industry's most innovative image sensor technology - our own proprietary CMOS architectures as well as other recognized and proven advanced technologies.

### HASS/HALT TESTING

All camera models undergo HALT testing as part of the design process and HASS testing during manufacturing to to screen for early life failure and to further improve camera design and development

### OPTICAL TESTING

All cameras are optically tested in our class-100 clean room, then vacuum sealed before shipment.

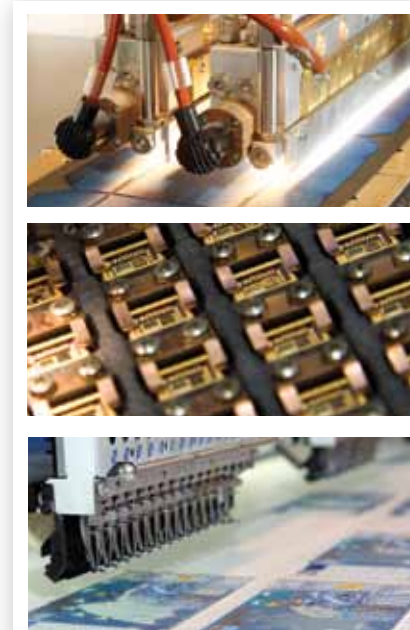
### NEED TO KNOW

#### Falcon™2

- » Resolutions from 4Mpixel to 12Mpixel
- » Frame rates to 168 fps
- » Camera Link

#### Genie™ and Genie™TS

- » Resolutions from VGA up to 12Mpixel
- » Frame rates to 300 fps
- » GigE Vision and Power over Ethernet (PoE)



GenieTS





Check out stories that showcase truly innovative vision applications  
[possibility.teledynedalsa.com](http://possibility.teledynedalsa.com)



# FALCON™2 4M/8M/12M

Falcon2 cameras deliver high quality images of fast-moving objects without smear or distortion. Falcon2 models feature our latest CMOS image sensor technology for high speed and high resolution imaging.

FALCON2	PART NO.	RESOLUTION	LINE/ FRAME RATE	PIXEL SIZE	BIT DEPTH	INTERFACE	DIMENSIONS	COMPLIANCE	DYNAMIC RANGE	OPERATING TEMP
	FA-80-4M180	1:1: 2048 x 2048	168 fps	6 µm	8, 10 bit	Camera Link	60 x 60 x 80.5 mm	RoHS, CE	58 dB	0 ~ 50 °C
	FA-80-8M100	4:3: 2432 x 1728	90 fps	6 µm	8, 10 bit	Camera Link	60 x 60 x 80.5 mm	RoHS, CE	58 dB	0 ~ 50 °C
	FA-80-12M1H	1:1: 2816 x 2816 4:3: 3328 x 2502 4096 x 3072	58 fps	6 µm	8, 10 bit	Camera Link	60 x 60 x 80.5 mm	RoHS, CE	58 dB	0 ~ 50 °C
	FA-81-4M180	1:1: 2048 x 2048	168 fps	6 µm	8, 10 bit	Camera Link	60 x 60 x 80.5 mm	RoHS, CE	54.5 dB	0 ~ 50 °C
	FA-81-8M100	4:3 2432 x 1728	90 fps	6 µm	8, 10 bit	Camera Link	60 x 60 x 80.5 mm	RoHS, CE	54.5 dB	0 ~ 50 °C
	FA-81-12M1H	1:1 2816 x 2816 4:3: 3328 x 2502 4096 x 3072	58 fps	6 µm	8, 10 bit	Camera Link	60 x 60 x 80.5 mm	RoHS, CE	54.5 dB	0 ~ 50 °C

\*Falcon2 cameras feature a flexible aspect ratio, 1:1 or 4:3



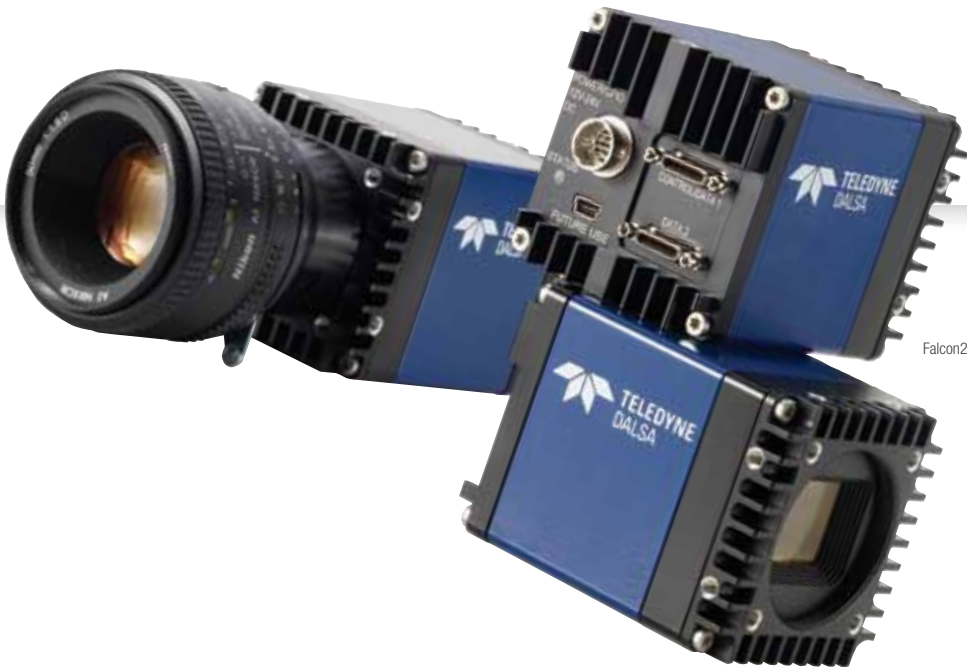
GLOBAL SHUTTER PRIMER  
[www.teledynedalsa.com/globalshutter](http://www.teledynedalsa.com/globalshutter)



Access more Falcon2 camera solutions and resources  
[www.teledynedalsa.com/mv](http://www.teledynedalsa.com/mv)

Falcon2 cameras deliver an extensive feature set that includes programmable exposure time via Camera Link or by external hardware signals, and selectable aspect ratios (4:3 and 1:1). Wrapped in a compact, rugged, thermally efficient body optimized for industrial applications, Falcon2 cameras deliver outstanding performance and value.

- » Reduced dark noise levels and improved dark offset
- » Improved sensitivity
- » In-camera image pre-processing (flat field, pixel correction)
- » Customizable user settings



# GENIE™ POWERFUL, VERSATILE GIGE CAMERA

An incredible feature set unmatched in the industry.

### The World's Most Versatile GigE Vision Camera

Our own advanced CMOS technology and a newly optimized platform deliver the widest, most powerful feature set ever in a GigE Vision camera.

- VGA to 12 megapixel resolution
- Monochrome and color
- Multiple exposure times/ multiple gain levels
- Moving ROI / Cycling feature mode

### 40+ image optimization and processing features including

- VGA, 1.2M, 1.4M, 2M, 4M, 5M, 8M, 12M
- Up to 300 fps in full resolution
- Class-leading quantum efficiency
- Exposure time: User Programmable or External
- Pixel size: 4.65µm to 7.4 µm
- Auto-brightness
- Multiple exposure and gain
- Moving ROI
- Flat field correction
- Pixel correction
- Color correction
- Color space conversion
- Image Filtering
- JPEG compression
- Image-on-demand
- Image multicasting

All **Genie cameras** combine gigabit ethernet technology with our **Trigger-to-Image Reliability** framework to reliably capture and transfer images from camera to host PC. Models are based on high quality image sensors and available in resolutions from VGA to 12 Megapixels, color and monochrome.



GENIE TS FEATURE PAGE  
[www.teledynedalsa.com/geniets](http://www.teledynedalsa.com/geniets)



Genie TS



	MODEL	PART NO.	RESOLUTION	FRAME RATE	PIXEL SIZE	SENSOR	POWER SUPPLY	LENS MOUNT OPTION
TS SERIES ●●●	TS-M1920	G2-GM10-T1921	2048 x 1088	70 fps	5.5 x 5.5 µm	CMOSIS CMV2000 (5EPI)	12 - 24 Volt DC with PoE	CS-Mount STD
	TS-M1920-NIR	G2-GM12-T1921	2048 x 1088	70 fps	5.5 x 5.5 µm	CMOSIS CMV2000 (12EPI)	12 - 24 Volt DC with PoE	CS-Mount STD
	TS-M2048	G2-GM10-T2041	2048 x 2048	35 fps	5.5 x 5.5 µm	CMOSIS CMV4000 (5EPI)	12 - 24 Volt DC with PoE	CS-Mount STD
	TS-M2048-NIR	G2-GM12-T2041	2048 x 2048	35 fps	5.5 x 5.5 µm	CMOSIS CMV4000 (12EPI)	12 - 24 Volt DC with PoE	CS-Mount STD
	TS-M2500	G2-GM10-T2505	2560 x 2048	29 fps	6 x 6 µm	TELEDYNE DALSA CMOS	12 - 24 Volt DC with PoE	M42 x 1 thread
	TS-M2560	G2-GM10-T2561	2560 x 2048	51 fps	5 x 5 µm	ANAFOCUS LINC 5M	12 - 24 Volt DC with PoE	CS-Mount STD
	TS-M3500	G2-GM10-T3505	3520 x 2200	19 fps	6 x 6 µm	TELEDYNE DALSA CMOS	12 - 24 Volt DC with PoE	M42 x 1 thread
	TS-M4096	G2-GM10-T4095	4096 x 3072	12 fps	6 x 6 µm	TELEDYNE DALSA CMOS	12 - 24 Volt DC with PoE	M42 x 1 thread
●●●	TS-C1920	G2-GC10-T1921	2048 x 1088	70 fps	5.5 x 5.5 µm	CMOSIS CMV2000 (5EPI)	12 - 24 Volt DC with PoE	CS-Mount STD
	TS-C2048	G2-GC10-T2041	2048 x 2048	35 fps	5.5 x 5.5 µm	CMOSIS CMV4000 (5EPI)	12 - 24 Volt DC with PoE	CS-Mount STD
	TS-C2500	G2-GC10-T2505	2560 x 2048	29 fps	6 x 6 µm	TELEDYNE DALSA CMOS	12 - 24 Volt DC with PoE	M42 x 1 thread
	TS-C3500	G2-GC10-T3505	3520 x 2200	19 fps	6 x 6 µm	TELEDYNE DALSA CMOS	12 - 24 Volt DC with PoE	M42 x 1 thread
	TS-C4096	G2-GC10-T4095	4096 x 3072	12 fps	6 x 6 µm	TELEDYNE DALSA CMOS	12 - 24 Volt DC with PoE	M42 x 1 thread

There are over 30 models in the Genie series to fit your application  
[www.teledynedalsa.com/mv](http://www.teledynedalsa.com/mv)





# FRAME GRABBERS

High performance frame grabbers combine reliable acquisition with powerful on-board processing and programmability.



Xtium-CL PX4

## ACQUISITION/PROCESSING

The workhorse of our high performance imaging systems, Teledyne DALSA image processors and frame grabbers are designed to optimize the camera interface, accelerate host bus transfers, and operate in diverse development environments.

### **Xtium™**

» PCIe Gen2, 1.7 Gb/second throughput

### **Xcelera™**

» Camera Link Base, Medium, or Full PCIe

### **X64™**

» Universal PCI compliant

### NEED TO KNOW

## TRIGGER-TO-IMAGE RELIABILITY

Trigger-to-Image Reliability benefits OEMs and end users in the development of high speed, high-volume applications where systems must detect defective objects and reject them from a production line quickly and reliably. OEMs gain peace of mind knowing that the frame grabber they've selected will play a significant role in making their systems more robust and reliable. In addition, development is greatly simplified, since OEMs don't need to invest time and effort trying to understand why a system failed or will fail – the frame grabber/ GigE camera will detect problems and take corrective action. In addition, Trigger-to-Image Reliability reduces maintenance and support once the equipment is in the field, helping to lower total system costs.



TRIGGER-TO-IMAGE  
RELIABILITY



Check out stories that showcase truly innovative vision applications  
[possibility.teledynedalsa.com](http://possibility.teledynedalsa.com)

# XTIUM™, XCELERA™ AND X64™

## PCIe Gen2, PCIe, AND PCI IMAGE ACQUISITION AND PROCESSING

We deliver the industry’s most reliable and versatile family of frame grabbers, combining unparalleled performance with innovative feature sets, great value and extensive camera support.

### Xtium Series

The Xtium-CL PX4, is the first in a new series of frame grabbers based on the latest PCI Express™ Rev 2.0 host interface, to deliver bandwidth greater than 1.7 GB/s. The Xtium frame grabber series is backwards compatible with a PCIe Rev 1.0 slot to deliver 850 MB/s and designed to support Camera Link, Camera Link HS and other emerging interface standards.

### Xcelera Series

Xcelera Series leverages the PCI Express (PCIe) platform to bring traditional image acquisition and processing technology to new levels of performance and flexibility. The PCIe point to point host interface allows simultaneous image acquisition and transfer without loading the system bus and involves little intervention from the host CPU. The X64 Xcelera-CL PX4 Dual is a highly versatile PCIe frame grabber capable of acquiring images from two independent Camera Link Base cameras and performing image transfers at rates up to 1024MB/s.

### NEED TO KNOW

#### CAMERA LINK HS (CLHS)

- » Scalable bandwidth from 300MB/s to 16000MB/s
  - Single compact copper CX4 cable provides 2100MB/s bandwidth
  - Fiber optic cables for long distance, immune to radiated emissions, enables robotic applications
- » Proven off-the-shelf, high volume components from multiple sources
- » Trigger frequencies into the 100's of kHz supported with low jitter
- » Distributed image processing



	PRODUCT	CAMERA INTERFACE	CAMERA INPUT	PIXEL CLOCK	BITS/PIXEL	HOST INTERFACE	IMAGE PROCESSING	OS SUPPORT	GPIO
PCIe GEN2	Xtium-CL PX4	Camera Link	SDR26 (mini CL): One 80-bit, Full, Medium PoCL, or Base PoCL	20 to 85MHz	8, 10, 12, 14 & 16 Mono 8, 10, 12 RGB	PCIe x4 Gen2	FFC/FLC, Bayer	32/64-bit: Windows 7 & Windows 8	On-board 4-in/4-out (Shared, Reconfigurable)
	Xcelera-CL LX1 Base	Camera Link	MDR26: One Base PoCL	20 to 85 MHz	8, 10, 12, 14 & 16 Mono 8-bit RGB	PCIe x1 Gen1	Image Flip	32/64-bit: Windows XP & Windows 7, Windows 8	N/A
PCIe	X64 CL Express	Camera Link	MDR26: Two Base or One Medium	20 to 85 MHz	8, 10, 12, 14 & 16 Mono 8-bit RGB	PCIe x1 Gen1	Image Flip	32/64-bit: Windows XP & Windows 7, Windows 8	N/A
	Xcelera-HS PX8	HS Link	CX4: HSLink	Independent	8, 10 & 12 Mono	PCIe x8 Gen1	ILUTs	32/64-bit: Windows XP, Windows 7, Windows 8 and Linux**	On-board 4-in/4-out
PCI	X64-CL Full	Digital - Camera Link	MDR26: One Full, Medium or Base	20 to 85MHz	8, 10, 12, 14 & 16	PCI-64/PCI-X 66*	ILUTs	32/64-bit: Windows 7, Windows 8, Windows XP & Linux**	N/A
	X64-CL iPro	Digital - Camera Link	MDR26: Two Base or One Medium	20 to 85MHz	8, 10, 12, 14 & 16 Mono 8-bit RGB	PCI-64/PCI-X 66*	ILUTs	32/64-bit: Windows 7, Windows 8, Windows XP & Linux**	XIO module (optional)

### XTIUM-CL PX4

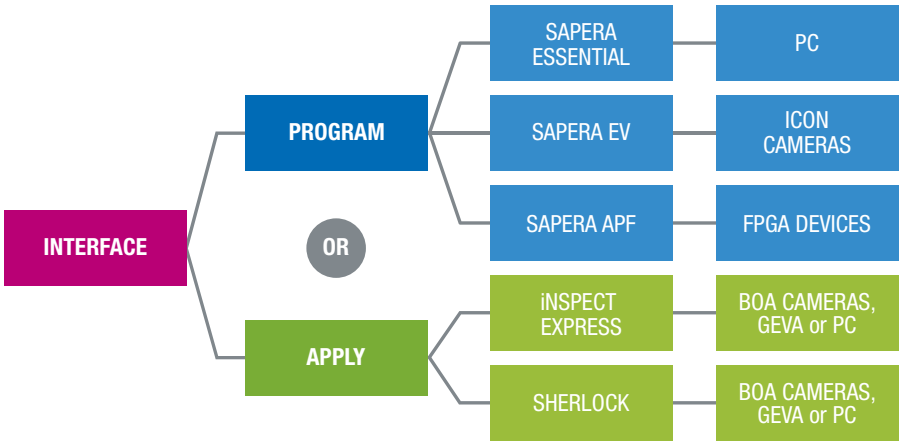
- » Supports PCI Express Rev 2.0 x4 or higher, backwards compatible
- » Camera Link Rev 2.0 (one Base PoCL, Medium or Full PoCL cameras)
- » Delivers 2x performance on host transfers
- » Single slot solution with reconfigurable I/Os
- » Supported by Sopera Vision SDK and Sopera CamExpert





# SAPERA, SHERLOCK, INSPECT™ VISION SOFTWARE FOR ALL USERS

Teledyne DALSA provides all of the software ingredients necessary to create the right machine vision recipe for your application. Our interconnected collection of software tools and capabilities cater to the needs of all users, from OEM machine builders to End User operators on the factory floor. Whether you are looking to Interface, Program or Apply machine vision components or solutions, Teledyne DALSA has the software expertise and industry knowledge to help.



## INTERFACE

**Sapera LT software** provides fast, reliable image capture from Teledyne DALSA cameras and frame grabbers, as well as hundreds of 3rd party camera models that support common interface formats like GigE Vision and Camera Link. Sapera LT is supplied with a camera configuration tool called “CamExpert” that allows users to tune camera parameters for their application. Personalized camera configuration files can be loaded for each application recipe.

Sapera LT supports all types of image capture for monochrome, color, area scan and line scan cameras and offers select image processing functions when combined with Teledyne DALSA hardware products.



## NEED TO KNOW

# SAPERA OPTIONS

- Sapera Essential**
  - » Image acquisition and processing SDK for PC applications
- Sapera APF**
  - » FPGA development package for the Xcelera-CL VX4 frame grabber
- Sapera Embedded**
  - » Image acquisition and processing SDK



## PROGRAM

Our **Sapera tool kit** provides an extensive library of image processing, algorithm and control functions for vision engineers who design and program their own applications. Compatible with standard development tools and conventional programming languages, Sapera libraries support development on Win32 platforms as well as Teledyne DALSA programmable cameras (ICON) and frame grabbers (FPGA code).

- Features**
- » Hardware independent – includes Sapera LT
  - » Over 400 image processing primitives and image analysis tools
  - » Includes: 1D, 2D, blob, calibration, classification, color, measurement, pattern matching and more
  - » Optimized for multi core technologies
  - » Compatible with C/C++, C# and Visual Basic programming languages using Microsoft Visual Studio, .NET or Borland compilers
  - » Provided with easy-to-use application wizards, demo programs and **Architect**, a graphical point and click assistant for rapid prototyping



- » Graphical FPGA development environment
- » Enables real-time embedded image processing
- » Over 150 supported imaging functions
- » Seamless interface to Xilinx FPGA tools
- » Compatible with Xcelera-CL VX4 frame grabber with Xilinx Virtex 5 FPGA

## APPLY

Our **iNspecT Express** and **Sherlock** application packages are ideal for customers looking for a configurable off-the-shelf software solution. Built from our Sapera libraries, these applications can be applied to a wide range of machine vision tasks without requiring traditional programming. iNspecT Express and Sherlock applications are embedded in Teledyne DALSA's BOA smart cameras and GEVA vision systems.

- Features**
- » Quick to setup and apply – much shorter design cycle for vision applications
  - » Graphical design interface with scripting for advanced control
  - » Field proven set of tools and capabilities
  - » Supports factory protocols to communicate with complementary and enterprise equipment
  - » Customizable operator interface
  - » Offers solution flexibility from smart cameras to multi camera systems



- » Fully featured machine vision application for PC deployment
- » No programming required
- » Proven tools and capabilities suitable for most industries
- » Flexible acquisition interface supports choice and number of cameras.

» Access more vision software solutions and resources  
[www.teledynedalsa.com/mv](http://www.teledynedalsa.com/mv)

# VISION SYSTEMS

Designed for factory floor deployment, our innovative multi-camera vision systems and smart cameras offer scalable solutions to satisfy a wide range of application needs, from positioning robotic handlers to complete assembly verification.



## INNOVATIVE VISION CAPABILITIES

We offer a wide range of cost-effective solutions for automated optical inspection solutions, from smart cameras to high performance multi-camera controllers that support both area and line scan applications.

**01. POSITIONING**  
Guide robotic handlers or adjust vision tools for part movement

**02. IDENTIFYING**  
Identify product for verification or traceability

**03. VERIFYING**  
Verify parts for correctness, assembly or packaging

**04. MEASURING**  
Measure parts for dimensional accuracy

**05. FLAW DETECTING**  
Check part surfaces for scratches and other defects

### NEED TO KNOW

## READY TO APPLY SOFTWARE

» **iInspect Express** offers a suite of commonly used tools that can be quickly setup and deployed.

» **Sherlock** provides advanced features for applications that require more flexibility and control.



Check out stories that showcase truly innovative vision applications  
[possibility.teledynedalsa.com](http://possibility.teledynedalsa.com)



# BOA™ SMART VISION FOR AUTOMATION

Easy to setup and deploy, Teledyne DALSA's BOA products are highly integrated vision systems in a tiny smart camera package specifically designed for industrial use. Complete with choice of embedded application software, BOA offers manufacturers a robust and flexible automated inspection system that is easy to integrate and deploy on the factory floor.



BOA Vision Systems

### COMPLETE VISION SYSTEM

Teledyne DALSA's BOA products are highly integrated vision systems in a tiny smart camera package specifically designed for industrial use. Complete with choice of application software embedded, BOA offers manufacturers a robust and flexible automated inspection system that is easy to integrate and deploy on the factory floor.

### BOA VISION SYSTEMS COMPRISE ALL OF THE ELEMENTS OF AN INDUSTRIAL MACHINE VISION SOLUTION:

- Sensor
- Light Control
- Multiple Processors
- I/O – Expandable via PL-200
- Factory Communications
- Developer and Operator interfaces

### EXCEPTIONAL PRICE/PERFORMANCE

BOA vision systems are available in a range of resolution and performance models for monochrome and color applications. The BOA 200 model offers the highest performance.

### CHOICE OF APPLICATION SOFTWARE

BOA vision systems are available with 3 different software applications:

#### BOA INS

The standard product is offered with our iNspect Express software. Ideal for both new and experienced users alike, iNspect Express can be quickly set-up to satisfy a multitude of common inspection tasks

#### BOA IDR

The IDR version is offered with a subset of iNspect Express tools that apply only to Identification, Tracking and associated Verification applications. BOA IDR is a good choice for manufacturers who need to identify product markings for correctness or traceability.

#### BOA Pro

The PRO version is offered with our coveted Sherlock application software. Ideal for vision integrators, Sherlock provides the flexibility and tools to tackle the diverse range of applications across all industrial segments.

SENSOR PERFORMANCE MONO/COLOR	640 x 480						1024 x 768						1280 x 960						1600 x 1200					
	BOA		BOA50		BOA200		BOA		BOA50		BOA200		BOA		BOA50		BOA200		BOA		BOA50		BOA200	
	M	C	M	C	M	C	M	C	M	C	M	C	M	C	M	C	M	C	M	C	M	C	M	C
BOA INS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓
BOA IDR	✓		✓		✓		✓		✓		✓		✓		✓		✓				✓		✓	
BOA PRO			✓	✓	✓	✓			✓	✓	✓	✓			✓	✓	✓	✓			✓	✓	✓	✓



# GEVA™ MULTI CAMERA VISION SYSTEMS

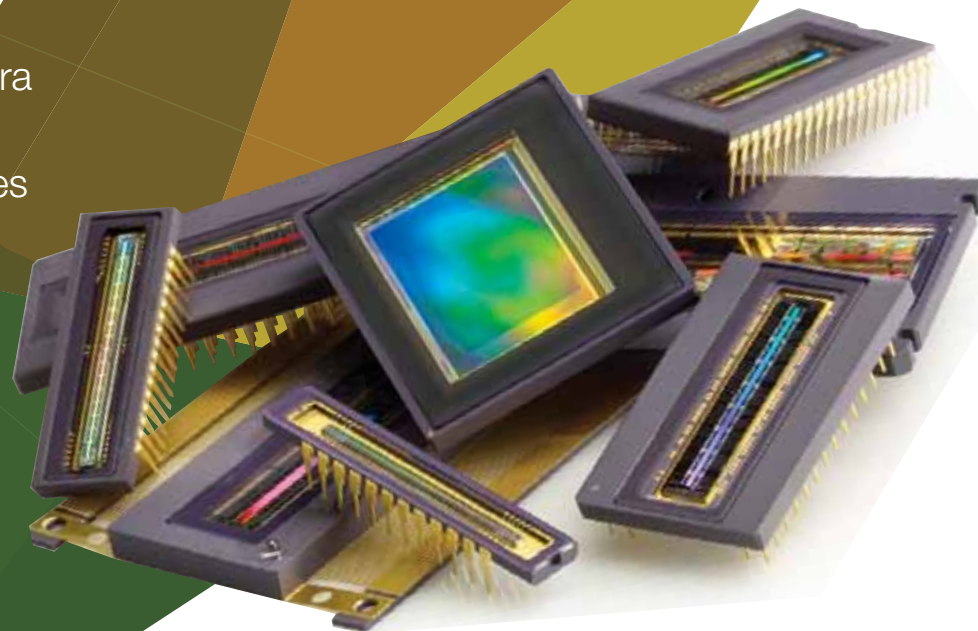
Teledyne DALSA's GEVA vision platform provides the performance and flexibility to meet the challenging requirements of multi-camera applications. GEVA offers a centralized processing model that supports low cost camera expansion.



APPLICATION		GV-300	GV-312T	GV-1000	GV-3000	GV-3000CL
PROCESSING SCALE	Relative	1X	1X	3-4X	6-8X	6-8X
	Program	2 GB	2 GB	2 GB	8 GB	8 GB
	Storage	40 GB SS	32 GB CFAST	40 GB SS	60 GB SS	60 GB SS
IMAGE	Sensor Type	GigE	GigE	GigE	GigE	Camera Link
	Max. # Sensors	Expandable	Expandable	Expandable	Expandable	2
	Sensor Format	Area	Area	Area	Area/Line	Line/Area
	Color Support	Yes	Yes	Yes	Yes	Yes
	Sensor Size Min.	640 x 480	640 x 480	640 x 480	640 x 480	1024 x 1
	Sensor Size Max.	Variable	Variable	Variable	Variable	Variable
COMMUNICATION	USB	3 (2.0)	5 (2.0)	2 (2.0)	6 (2.0)	6 (2.0)
	Ethernet (Mbps)	6 x 1000	2 x 1000	3 x 1000	6 x 1000	2 x 1000
	Serial (RS232)	1	4	1	2	2
	Visual (LEDs)	3	1	3	2	2
DISPLAY OPTIONS	Display	External	Embedded Touch	External	External	External
	Setup GUI	Local	Local	Local	Local	Local
	Operator	Local	Local	Local	Local	Local
I/O	Access	Breakout	Breakout	Local	Breakout	Breakout
	Type	24V Opto	24V Opto	24V Opto	24V Opto	24V Opto
	# Inputs (configurable)	8	8	8 + 2 triggers	8	4 + 2 triggers
	# Outputs (configurable)	12	12	8 + 2 strobes	12	4 + 2 strobes
SOFTWARE	Application	iNspect Express	iNspect Express	iNspect Express	iNspect Express	iNspect Express
		Sherlock	Sherlock	Sherlock	Sherlock	Sherlock
POWER		24V @ 2.5A	24V @ 2.5A	24V @ 2.5A	24V @ 2.5A	24V @ 2.5A

# IMAGING THE VISIBLE AND BEYOND

With more than 30 years of image sensor and camera technology development, design and engineering knowledge, combined with manufacturing capabilities and a commitment to service and support, we are uniquely suited to deliver customer-driven solutions for the most challenging vision applications.



## CUSTOM AND SEMI-CUSTOM SOLUTIONS

Imaging solutions to meet your exacting requirements.

### CAPABILITIES

- » CMOS, CCD and TDI image sensors and cameras
- » Custom multispectral filters
- » High speed, high resolution designs
- » Back side thinning
- » UV hardening on sensors
- » High speed fibre optic interfaces
- » Active sensor cooling

### MANUFACTURING CAPABILITIES

From silicon to cameras, Teledyne DALSA's manufacturing capabilities include:

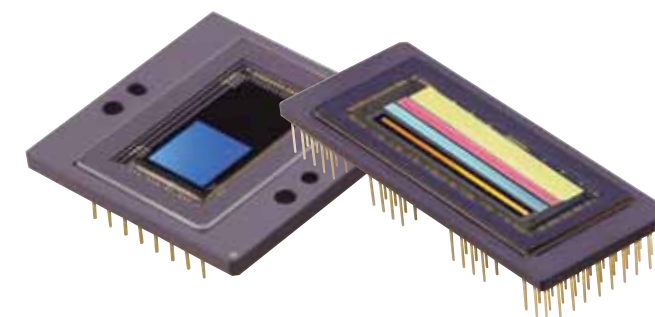
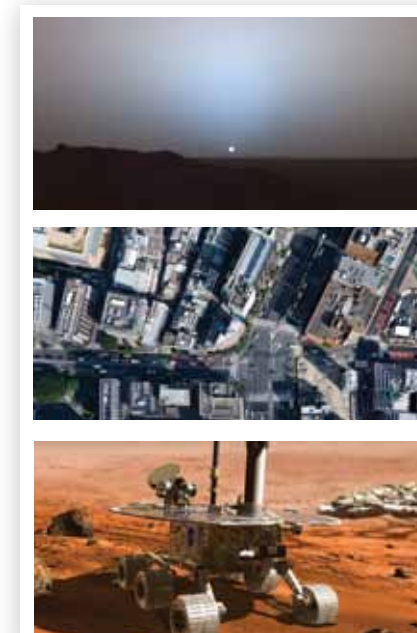
- » Color CCD manufacturing
- » Custom window attachment and sensor packaging for challenging environments
- » Backside thinning
- » Radiation tolerance
- » Fiber optic attachments
- » Extended environmental testing, including basic MIL-STD, ESA

### IMAGE SENSOR DESIGN

- » NIR and IR sensors, including Microbolometers
- » Color and multispectral filters
- » Spectrum coverage from X-ray through deep UV, visible, NIR, SWIR, MWIR, and LWIR
- » Ultra high speed (100M fps)
- » Ultra high resolution (100+ megapixels)
- » Wafer scale devices
- » Radiation hardness

### CAMERA ARCHITECTURE DESIGNS:

- » 1000-output TDI cameras with >10 Gigapixel/sec throughput
- » 40MHz, 12k-pixel line scan, stackable mechanical design
- » 256-output TDI cameras with 4 Gigapixel/sec throughput
- » 12-bit dynamic range at 1.2 Gpix/sec
- » Ultra-high speed with on-chip multi-frame storage, 100,000,000 fps burst rate
- » Remote head, stackable and single board camera designs
- » High speed serialized data interfaces up to 10 Gb/sec
- » Cooling options for low noise and long exposure



Check out stories that showcase truly innovative vision applications  
[possibility.teledynedalsa.com](http://possibility.teledynedalsa.com)



### **PRIORITY VISION SYSTEM ENGINEERING SUPPORT**

Our customers benefit from priority technical support, and are ensured of a quick response and access to an experienced technical/ applications team who understand that every machine vision application is unique.

### **FAST REPAIR AND COMPONENT REPLACEMENT**

A downed inspection system can cost thousands of dollars in production yield and lost business. We work with you to ensure back-up components are ready and waiting when you need them.

We've developed a priority delivery and order tracking program to give you 100% visibility on order fulfillment. We can also build in flexibility to modify delivery schedules, hold back or accelerate shipments to meet your needs.

### **TECHNOLOGY, SERVICE AND SUPPORT**

With rapidly evolving technology, design engineers are rightfully concerned that components they've specified for their vision system may be discontinued or supplanted by newer technology leaving them scrambling to redesign and retrofit. We are committed to supporting legacy products and providing an efficient migration path when products are discontinued.

### **LOGISTICAL SUPPORT AND TRAINING**

Our partners have 24/7 access to on-line, web-based tools for order tracking, account management, and technical support. These tools offer unprecedented visibility and control over the supply chain, allowing them a quick response to changing production demands.

We offer comprehensive training to support your front line staff. Customers can take advantage of both hardware and software training programs that can be conducted in our training facility or easily suitcased to a location of your choice.



#### **AMERICAS**

700 Technology Park Drive  
Billerica, MA 01821  
USA

**Tel:** 978.670.2000

**Fax:** 978.670.2015

[sales.americas@teledynedalsa.com](mailto:sales.americas@teledynedalsa.com)

#### **ASIA PACIFIC**

Ikebukuro East 13F  
3-4-3 Higashi Ikebukuro,  
Toshima-ku, Tokyo, Japan

**Tel:** +81.3.5960.6353

**Fax:** +81.3.5960.6354

[sales.asia@teledynedalsa.com](mailto:sales.asia@teledynedalsa.com)

#### **EUROPE**

Felix-Wankel-Str. 1  
82152 Krailling  
Germany

**Tel:** +49.8989.5457380

**Fax:** +49.8989.5457346

[sales.europe@teledynedalsa.com](mailto:sales.europe@teledynedalsa.com)

605 McMurray Road  
Waterloo, Ontario N2V 2E9  
Canada

**Tel:** 519.886.6000

**Fax:** 519.886.8023

Shanghai Industrial Investment Building  
Room G, 20F, 18 North Cao Xi Road  
Shanghai 200030  
China

**Tel:** +86.21.64279081

**Fax:** +86.21.64699430

[sales.asia@teledynedalsa.com](mailto:sales.asia@teledynedalsa.com)