

## Unleash image sensor dataflows

Engineered at intoPIX, TicoRAW is an innovative, lossless quality, low-power, low-memory and line-based image processing and compression technology created to unleash image sensor dataflows.

Thanks to its innovative processing and coding, the full power of the image sensor is preserved while reducing the bandwidth and storage needs. It offers high image quality and the capability to manage high resolution, high frame rate and high dynamic range workflows. TicoRAW is the world's first codec that can offer compression efficiency with such low complexity.

TicoRAW is a perfect solution for augmented reality, automotive (ADAS), human and machine vision, professional and consumer cameras, drones or mobiles devices. The technology is extremely low-power and tiny in ASIC or FPGA, fast and powerful in CPU or GPU, and suitable for latency-critical environments.



### Technology benefits

#### > High quality RAW

- Supports image sensors up to 16bit; with High Dynamic Range (HDR)
- Compresses down to 1bit per pixel (2:1 to 16:1)
- Perfect for human and machine vision

#### > From 1 megapixel to 200 megapixels

- Includes embedded proxy decoding mode

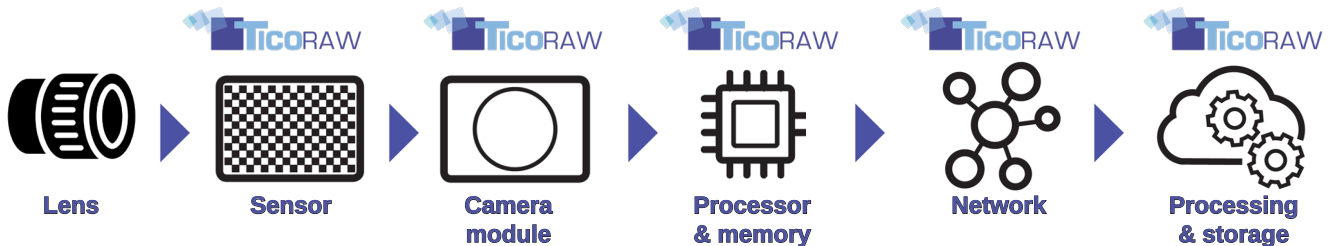
#### > FPGA & ASIC IP-cores

- Extremely low resource usage, low-memory, low-power
- Microsecond line-based latency

#### > Developer SDK for CPU & GPU

- Powerful, real-time or faster than real-time

## Where can TicoRAW be implemented?



- Reduce your power consumption. Process and manage more pixels from the sensor.
- Reduce your bandwidth during real-time transmission over network infrastructures without affecting the latency.
- Support higher resolution, high frame rate and high dynamic range easily.
- Reduce your memory bandwidth in the image processing pipeline.
- Efficiently decrease the stored RAW image data on the storage media. (RAW 10x smaller)
- Increase your decoding speed while retaining the sensor data needed for a complete control of the RAW processing pipeline.

# Specifications and implementations

TicoRAW ENCODER & DECODER		
<b>IMAGE/VIDEO</b>	<b>Color Filter Array (CFA)</b>	RGGGB and other RAW CFA such as RCCCB, RYYCY (Optional grayscale and 4:2:2 modes)
	<b>Bit depth</b>	8 / 10 / 12 / 14/ 16 bits per component
	<b>Resolution</b>	Any up to 20.480 x 10.240 pixels
	<b>Frame rates</b>	Any (depending on ASIC / FPGA IP-core or Developer SDK configuration)
<b>PROCESSING</b>	<b>Quality</b>	Mathematically lossless / Near-lossless / Visually lossless / Lossy down to 1bpp
	<b>Rate control</b>	CBR (constant bit rate) operation (optional Constant Quality mode) Adjustable down to 1bpp (~10:1)
	<b>Latency</b>	(Sub) Intra-frame: down to 0.1 millisecond
	<b>Proxy mode</b>	Downscaler in TicoRAW decoder for fast analysis, proxy viewing & editing

	TicoRAW IP-cores	FastTicoRAW SDK	
<b>IMPLEMENTATION</b>	<b>Platform</b>	Xilinx FPGA Spartan-6, Spartan-7, Artix-7, Kintex-7, Kintex and Virtex UltraScale and UltraScale Plus, Zynq Families	CPU: AMD GPU OS: Windows, Linux, macOS
	<b>Low complexity &amp; fast processing</b>	Small footprint, ultra low memory & low-power (no ext DDR) Various configurations	Highly parallelized GPU SDK processing (SSE 4.1 or newer)
	<b>Real-time operation</b>	Line-based latency (< 1 millisecond)	< 1 frame

# IP-core releases

IP-CORES -ENC / -DEC	Color sampling	Sensor bit depth	Resolutions examples	Max frames per sec.		
				at 100 MHz*	at 250 MHz*	at 300 MHz*
<b>IPX-TICO-RAW-2K</b> (Up to 2048-pixels width)	RAW CFA	8, 10, 12,	2048 X 1080	335	839	1006
	Bayer	14, 16	2048 X 2048	177	442	530
<b>IPX-TICO-RAW-4K</b> (Up to 4096-pixels width)	RAW CFA	8, 10, 12,	4096 X 2160	84	209	250
	Bayer	14, 16	4096 X 4096	44	110	132
<b>IPX-TICO-RAW-8K</b> (Up to 8192-pixels width)	RAW CFA	8, 10, 12,	7680 X 4000	60	60	72
	Bayer	14, 16	8192 X 4320	21	52	62
			8192 X 8192	11	28	33

## CONTACT INTOPIX FOR YOUR OWN CUSTOM IP-CORE & SDK CONFIGURATION

\* Max Frequency (MHz) of the IP-cores can be adjusted according to your selected pixel per clock architecture and your targeted FPGA

**HEADQUARTERS: intoPIX SA**  
Rue Emile Francqui 9  
B-1435 Mont-Saint-Guibert - Belgium  
Tel.: +32 10 23 84 70  
sales@intopix.com

**CHINA:** sales.china@intopix.com  
**JAPAN:** sales.japan@intopix.com  
**S. KOREA:** sales.korea@intopix.com  
**USA:** sales@intopix.com



TICO-RAW Sept. 2021