

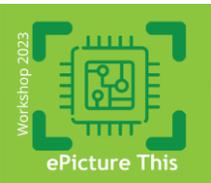
JPEG XS – Lightweight compression

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intoPIX

Delft, the Netherlands

21 June 2023



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2020005 Mantis Vision
2021004 Imagination



ABOUT INTOPIX

In a nutshell



International footprint
8 representations



Mont-Saint-Guibert (20min Brussels)
HQ in Belgium



B2B business
technology licensing
and engineering



Founded in 2006
UCLouvain spin-off



Privately Owned
Zero debt
profitable growth



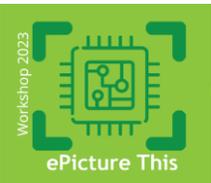
50% R&D



9+ granted patents
5+ pending patents



30+
full time equivalent



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2



ABOUT INTOPIX

We create innovative image and video compression technologies

CORES TECHNOLOGIES & CAPABILITIES

- Video & Image Compression
- Image Processing
- Security/Encryption
- AV over IP
- Algorithm Research
- FPGA/ASIC design
- Software acceleration (x86-64, GPU, ARM)

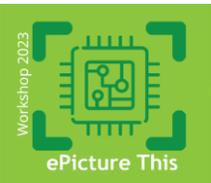
PRODUCTS

- FPGA IP-cores
- ASIC IP-cores
- SDKs for CPU / GPU
- Software (Apps, ODM/OEM)
- Reference designs
- Engineering Services

APPLICATIONS / MARKETS

- Pro AV
- Media & Entertainment
- Industrial Vision
- Automotive & Transport
- Aerospace / GIS / Avionics
- Consumer Electronics
- Digital Cinema

CUSTOMERS



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3

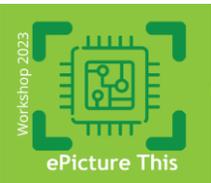


OVERVIEW OF JPEG XS STANDARD

Low-latency lightweight image coding

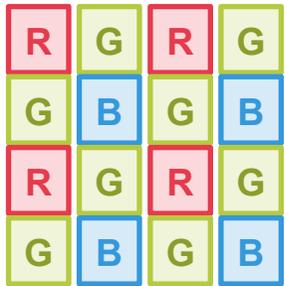
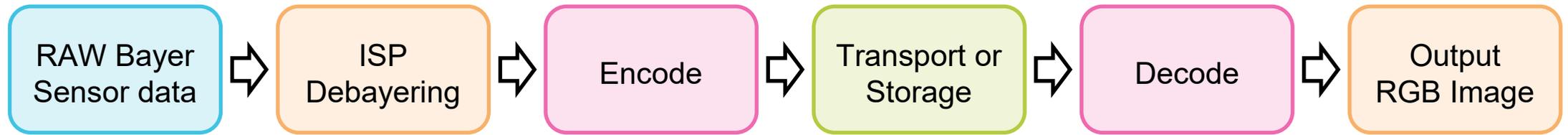


- Video bandwidth requirements are growing fast
 - Higher resolutions + Higher frame rates
 - Growing faster than the capacity of video links
- Compression is needed for the transport of video streams
- **JPEG XS standard** (ISO/IEC 21122) for image and video compression, 2nd edition published in **2022**
 - Co-created by **intoPIX** at ISO JPEG committee (evolution of the intoPIX **TICO** technology)
 - Various degree of **parallelism** for **software acceleration**
 - **Low hardware complexity** (no external memory)
 - **Low-latency** (only a few image lines) and **intraframe** coding
 - Resolution up to **8K** and beyond
 - Compression ratios up to 12:1 for 4:4:4, 4:2:2, 4:2:0 and **RAW Bayer content**
 - More information on <https://jpeg.org/jpegxs/>

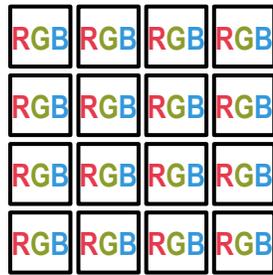


RAW IMAGE COMPRESSION

Classic RAW Bayer processing pipeline

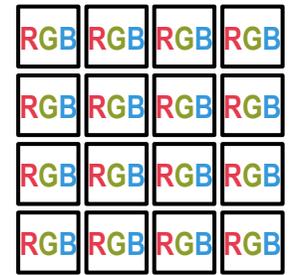


RAW Bayer data



RGB data

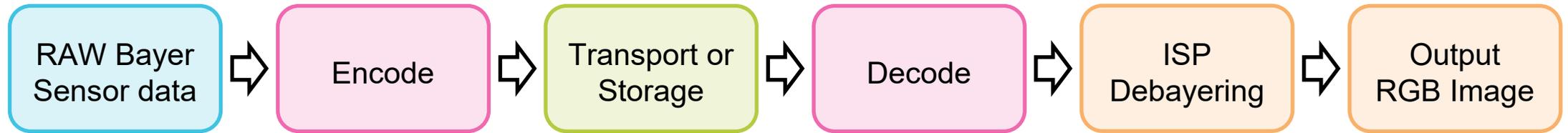
- Loss of quality
- Increased bandwidth
- High latency



RGB data

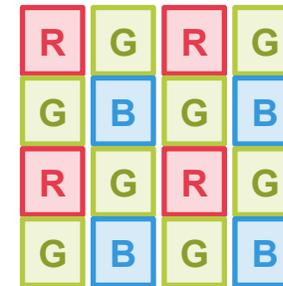
RAW IMAGE COMPRESSION

Transparent compression of RAW Bayer sensor data

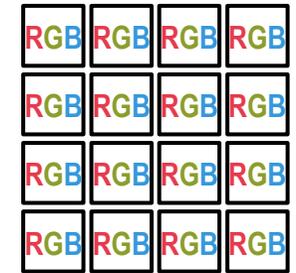


RAW Bayer data

- Full sensor information preserved
- Reduced bandwidth
- Low latency



RAW Bayer data



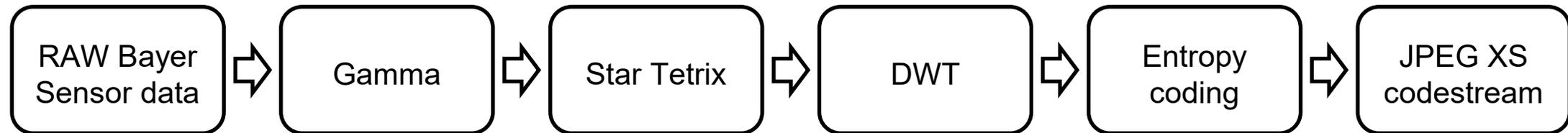
RGB data

JPEG XS RAW COMPRESSION

Compression of RAW Bayer data with JPEG XS



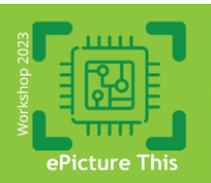
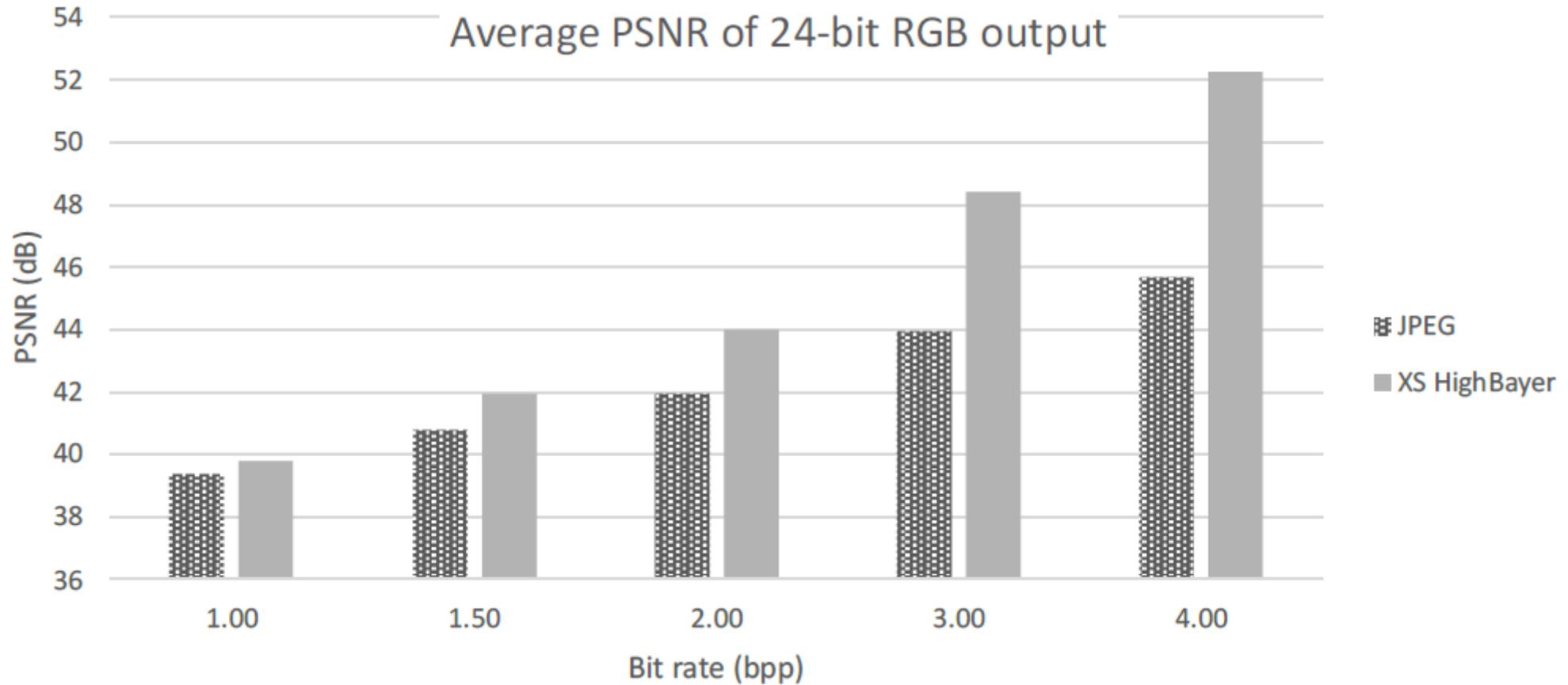
- Compression up to 12:1 for RAW Bayer data
- Sample bit depths of 10, 12, 14, and 16 bits
- JPEG XS compression with two additions:
 - Non-linear transform (gamma)
 - Star Tetrix color transform



- Light, Main and High profiles of increasing quality / compression efficiency, but also complexity

JPEG XS RAW COMPRESSION

Comparison with traditional JPEG codec



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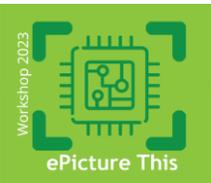
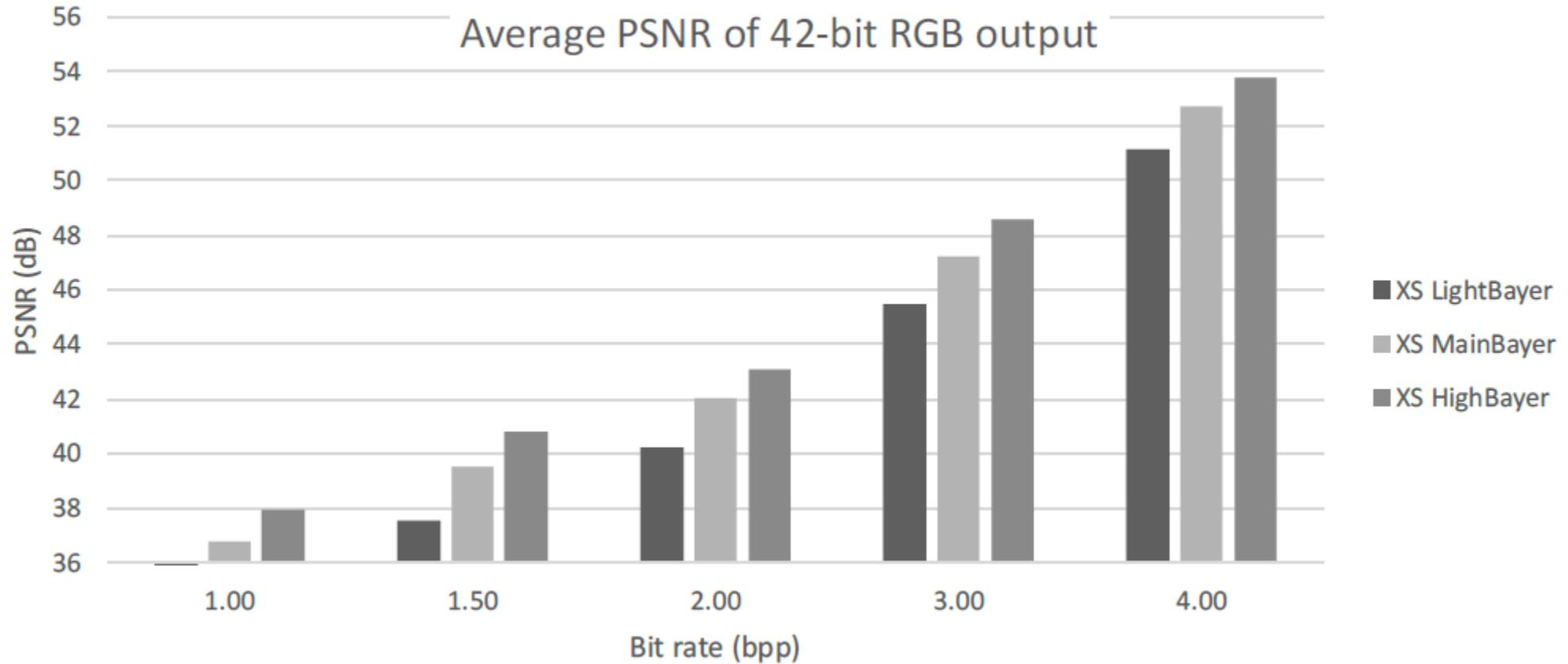
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8



JPEG XS RAW COMPRESSION

Comparison of JPEG XS RAW Bayer profiles



IMPROVING THE RAW WORKFLOWS

Applications of JPEG XS RAW compression

Broadcast



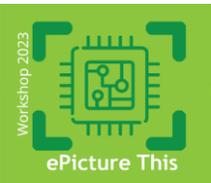
Machine vision



Mobile



Automotive



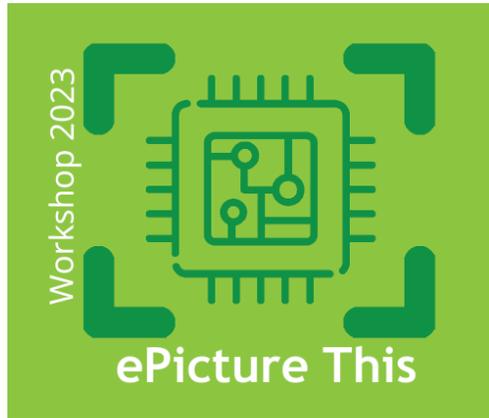
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10





an initiative by PENTA label projects
MANTIS and IMAGINATION with AENEAS support

THANK YOU



Learn more about our IP-cores & SDK:

www.intopix.com

