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IOxOS TECHNOLOGIES
RELIABILITY BY DESIGN

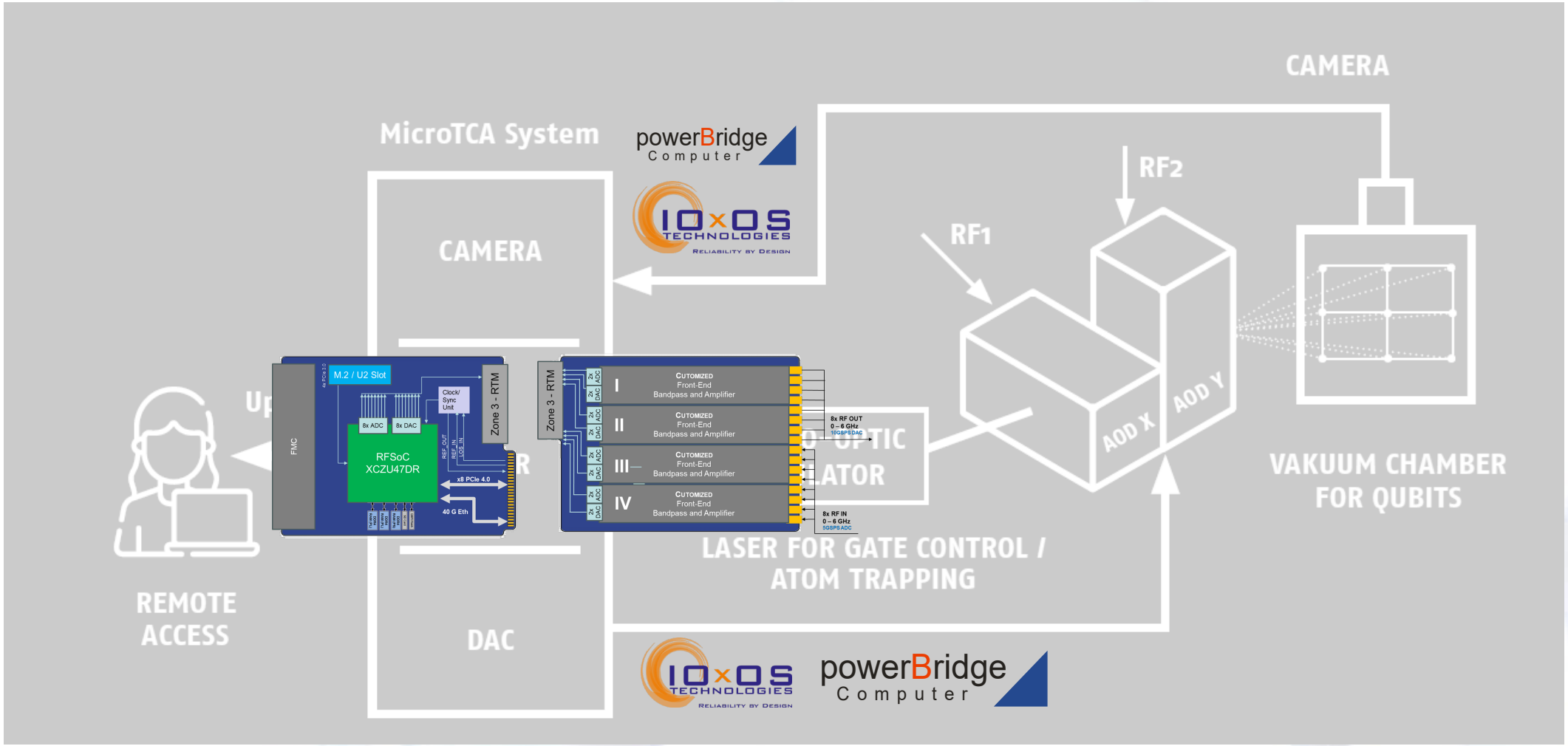



Vision on CoaXPress 2.0 for MTCA DDS (Direct Digital Synthesizer)

MTCA Workshop 2023

December 2023

MTCA for Quantumcomputing



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The Journey –

PART 2

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Existing System / Demo

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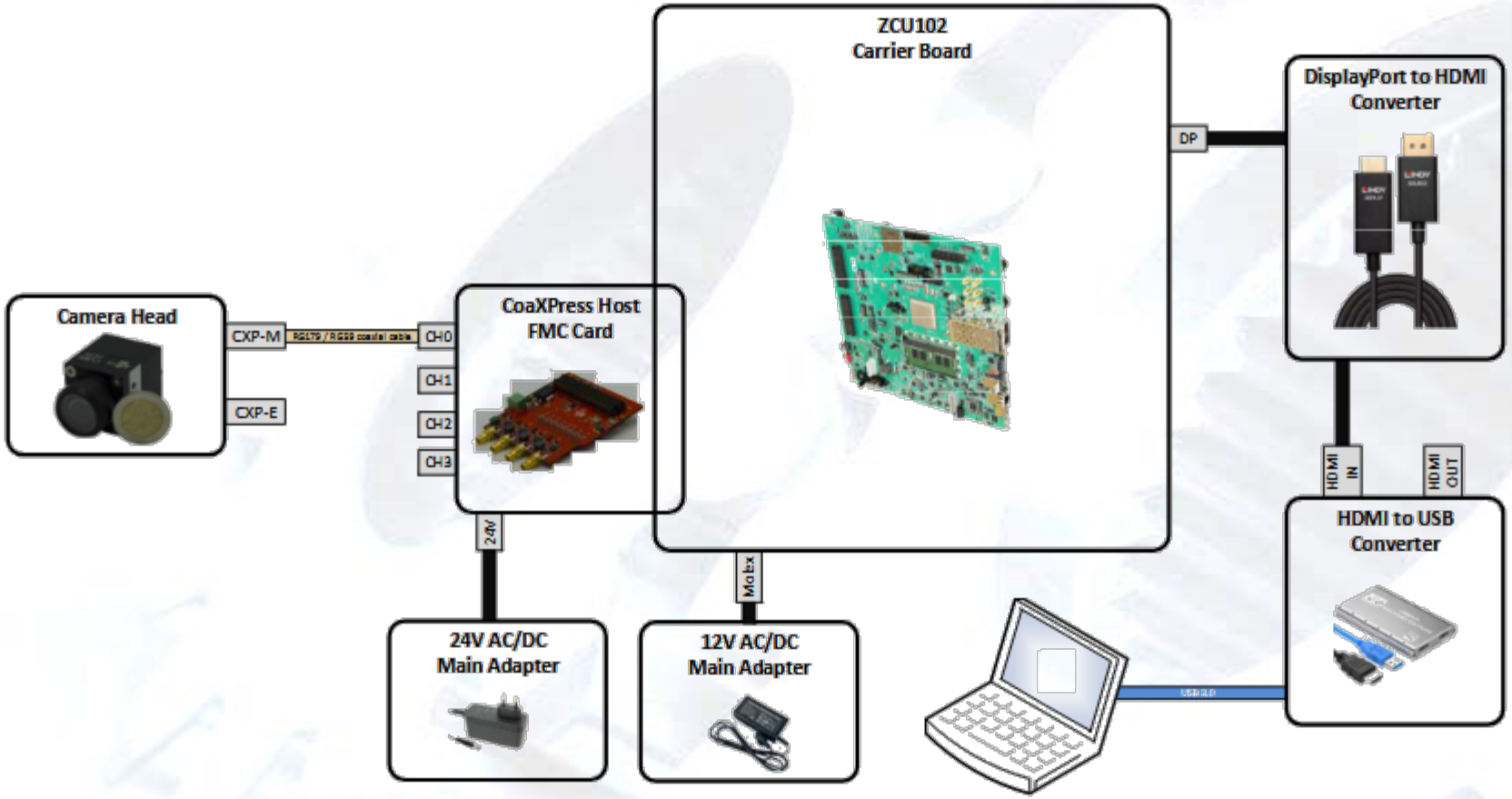

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Facts

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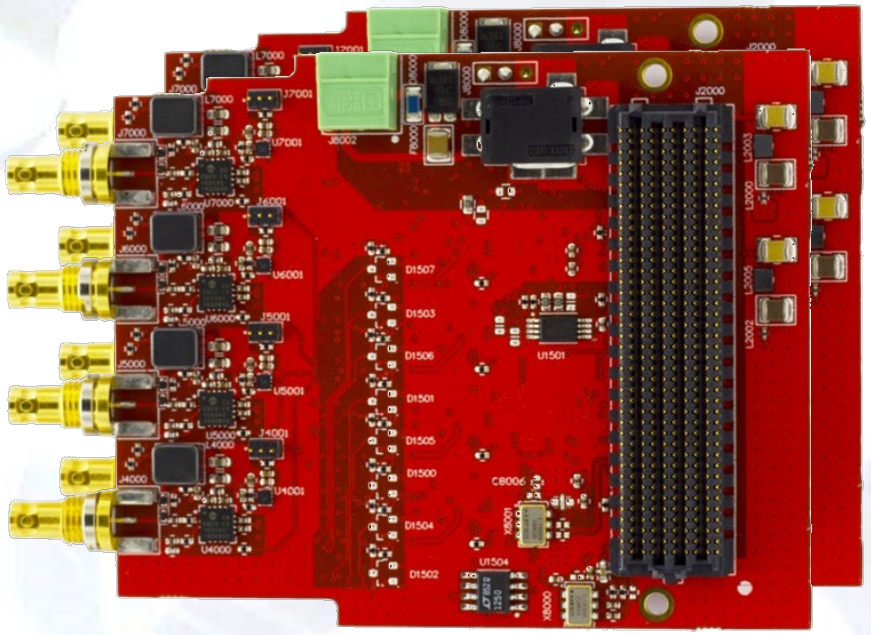
- CoaXPress 2.0 / 1.1.1
- 4-connection, stackable to 8-connection,
- FPGA Mezzanine Card (FMC) standard.
- operating at up to 12.5 Gbps.
- Two boards can be stacked to provide up to 8 ports



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MTCA Solution

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IFC_1414 Single Board Computer FMC

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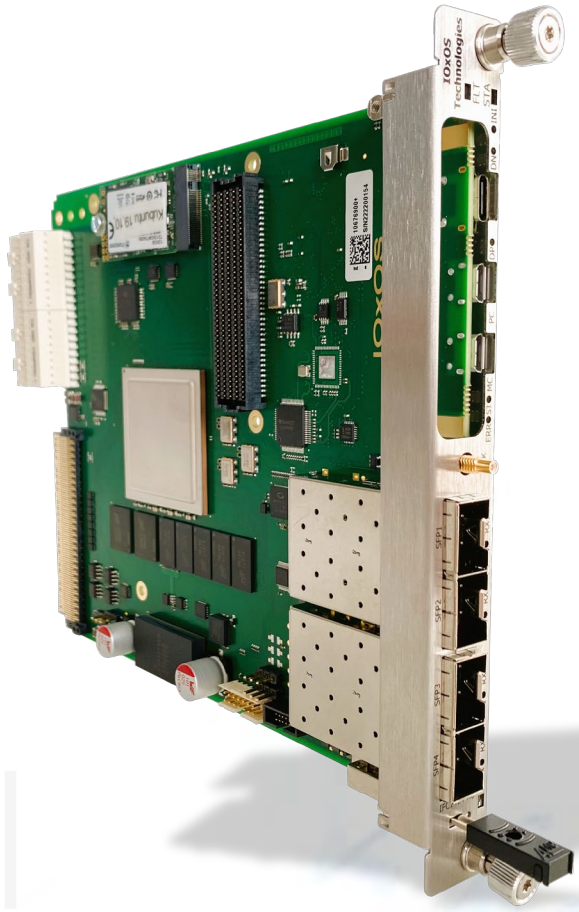

- Key Features
  - Xilinx Zynq UltraScale+ MPSoC (ZU7EG/ZU11EG)
    - PS: 2 GB DDR4 with ECC
    - PL: 2 GB GDDR6 at 16 GB/s
  - Single HPC VITA57.1 FMC Slot
  - Fast I/O Interfaces
    - Quad SFP+ (10 Gbps) or
    - Dual SFP+ (10 Gbps) + QSFP+ (40 Gbps)
  - Local and remote configuration
  - Support for White Rabbit PTP
  - DESY D1.2 and D1.3 compliant uRTM interface

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MTCA Solution for Vision

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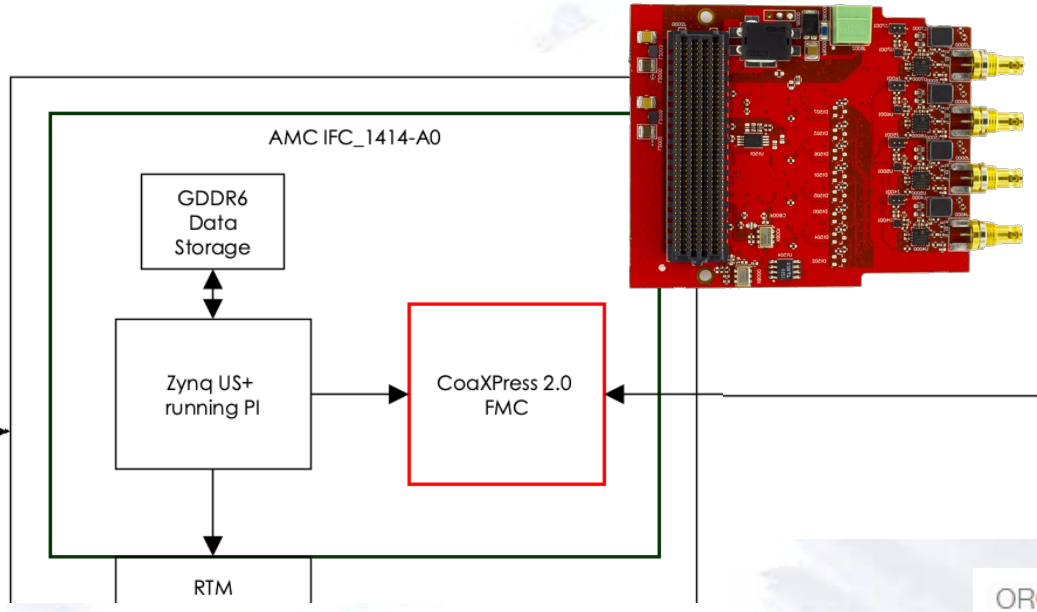
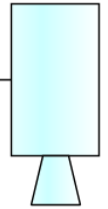
Remote Access



CoaXPress 2.0 Camera



ORCA-Quest qCMOS camera

C15550-20UP

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DDS (Direct Digital Synthesizer)

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DDS uRTM

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- DDS on uRTM form factor
- Based on Analog Devices DDS AD99xx solution
- Up to 20 channels
  - DAC resolution ranging from 10 to 14 bits
  - DAC speed ranging from 500 Msps up to 2.5 Gsps

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MTCA Solution

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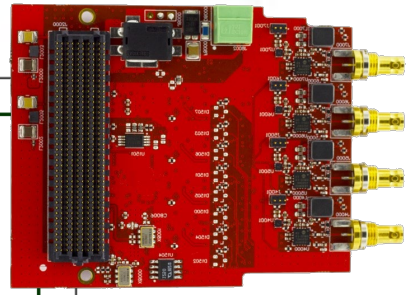
Remote Access



AMC IFC_1414-A0

GDDR6 Data Storage

Zynq US+ running PI

CoaXPress 2.0 FMC

RTM

DDS uRTM

MicroTCA Camera & DAC System

20 x DDS

Laser

Ion Trap Vacuum Chamber

CoaXPress 2.0 Camera

ORCA-Quest qCMOS camera

C15550-20UP

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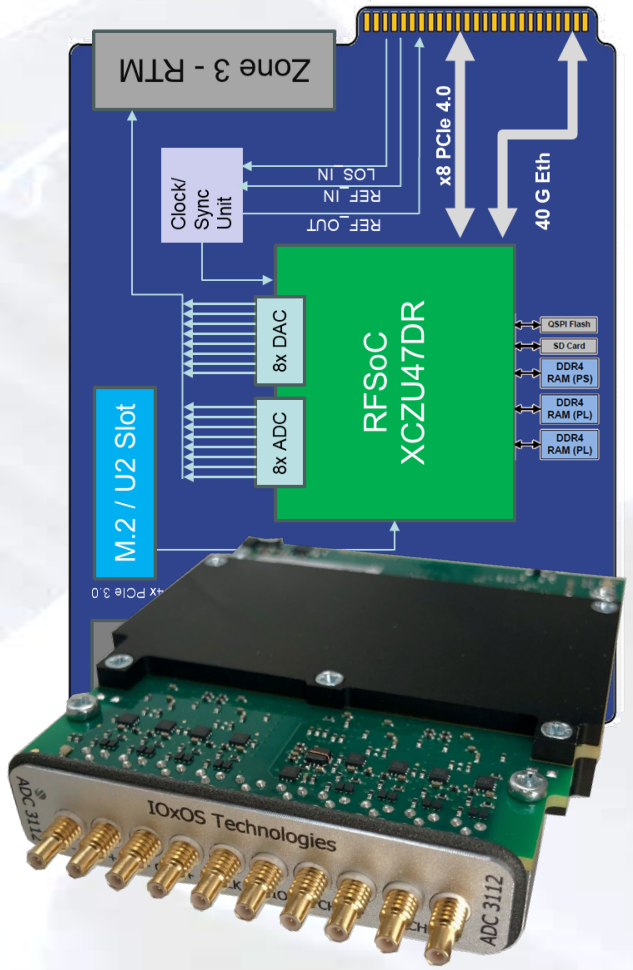
DDS (Direct Digital Synthesizer)
Variant 2

DDS on FMC

- DDS on FMC form factor
- Based on Analog Devices DDS AD99xx solution
- Up to 4-8 channels
  - DAC resolution ranging from 10 to 14 bits
  - DAC speed ranging from 500 Msps up to 2.5 Gsps



Cooperation pBC and IOXOS

Development, VHDL programming and integration on the FPGA-Board

Sales, product management and integration in complete system

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Applications

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MTCA for Quantumcomputing

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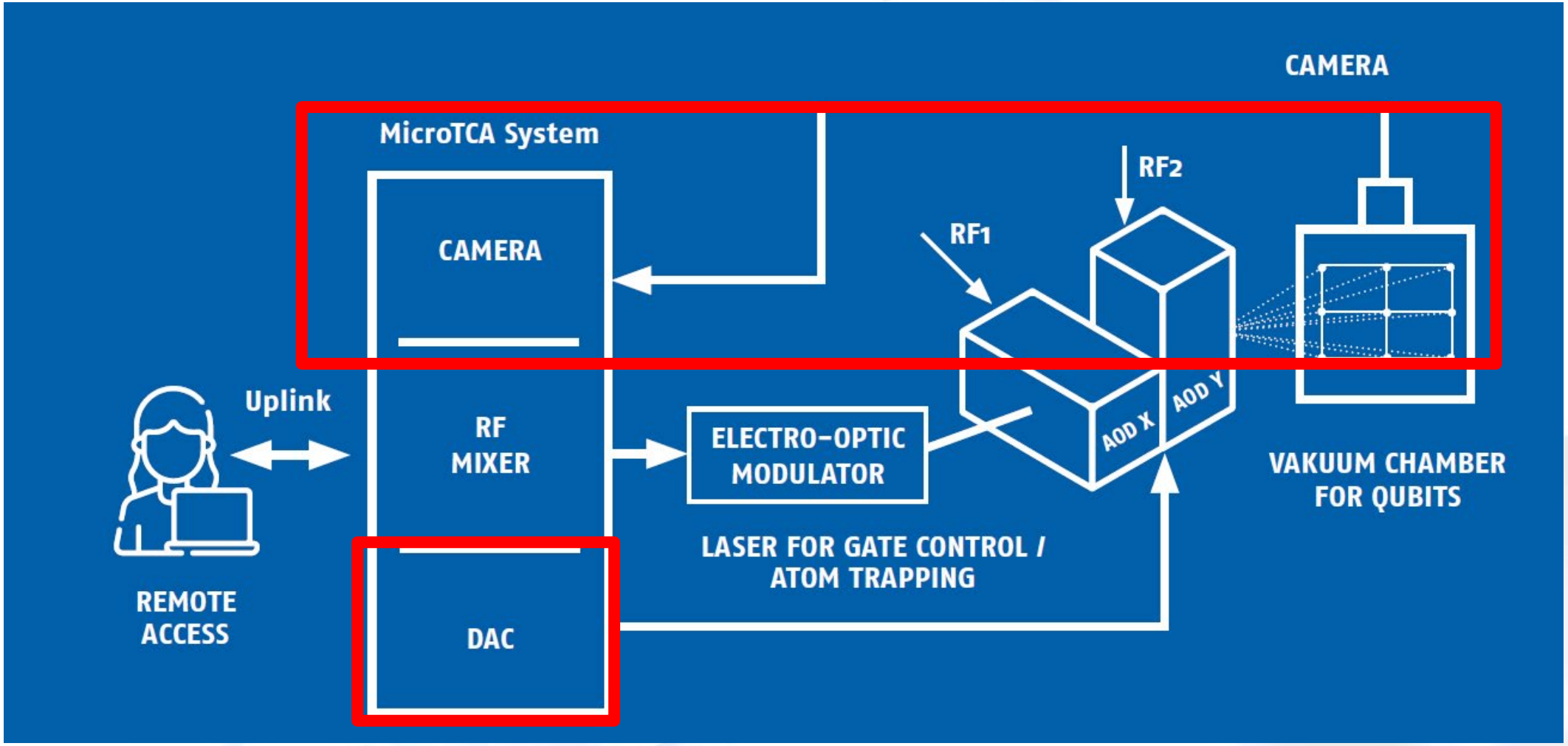

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Hyperloop

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- Controlling trains in high vacuum pipes
- High reliable

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Applications

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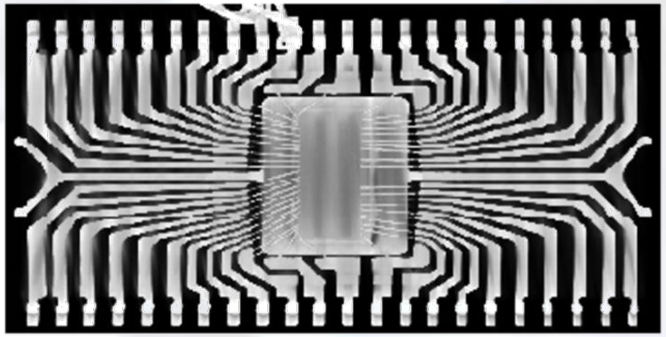
X-RAY

- X-ray microscopy / micro-computed tomography
- Quality inspection

- Frame Rate: 121 frames/s
  @ 4608×2592 pixel



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Why another Vision Solution?

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Current Market Situation

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- Many camera systems on the market
  - For SPS
  - For IPCs
  - Stand Alone
  - National Instruments
  - Etc.

➔ **Why on MTCA platform?**

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Why MTCA

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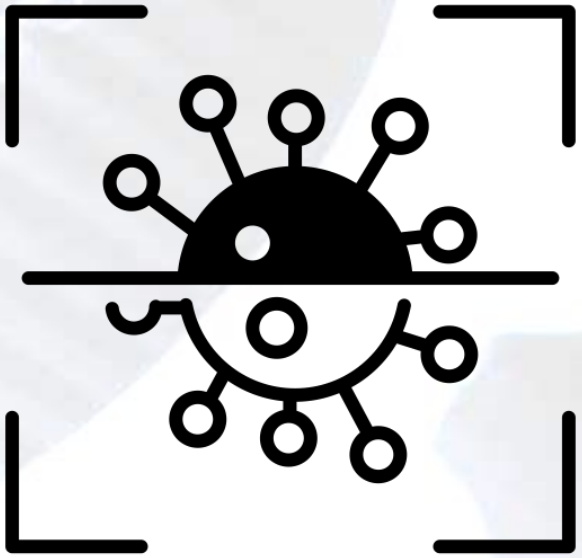
- MTCA is known for
  - High reliable
  - FPGA-Performance
  - High Data performance
  - No mainstream

➔ MTCA is used, if the customer needs highest performance systems.

➔ Probably for about 1-2 % of all Vision-applications

Conclusion

- VISION for MTCA is useful,
  - For max. 2% of all camera applications
  - Direct processing on the FPGA is required
  - High data rates are required



Created by nakals
from Noun Project

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Overview Datarates

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	Date rates
1 GigVision	1 Gbit/s
10 GigVision	10 Gbit/s
Camera Link Full (64 Bit)	5,4 Gbit/s
PCIe Gen3.0 x1	8 Gbit/s
USB 3.2 Gen 1x1	5 Gbit/s
Coaxpress 2.0 x1	12,5 Gbit/s

➔ up to 8x 12.5 Gbit/s = **100 Gbit/s**

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Advantages Coaxpress

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- High data rates
- For absolute high performance applications
- Existing Framegrabber Board available

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Let‘s see the Vision-demo on our booth