Instrumentation Technologies and EDF project

Instrumentation Technologies

- → Est. 1998
- → Data acquisition and signal processing
- → 50+ employees
- → Work with more than 70 research institutes and other companies around the world
- → Delivered more than high-tech 7000 instruments
- → Off-the-shelf products and customizations, co-development of electronics and tenders.

INSTRUMENTATION TECHNOLOGIES

Providing innovations in high-speed data acquisition market

Sensorics	Data acquisition & processing	Communication

Acquiring high-speed or low amplitude signals in range of 4 GS/s
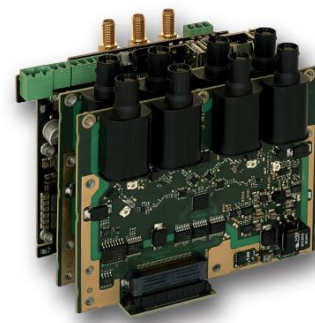
Processing those signals into meaningful data

Transmitting the data towards the end systems

… resulting in products like:
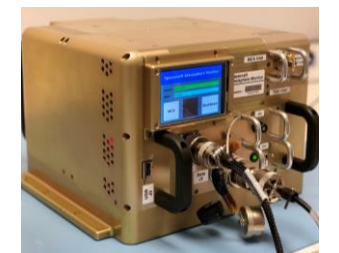

Synchrotrons: LIBERA Digit 500

Railways: Ruggedized high-speed DAQ

Energy sector: Digital power network analizer

Space: Ruggedized DAQ and processing unit for a gas detection

INSTRUMENTATION TECHNOLOGIES

EDF Defense project ARCHYTAS

→ **Purpose**

The project focuses on developing advanced technologies, including **optoelectronic-based accelerators**, volatile and non-volatile processing-in-memory, and neuromorphic devices.

Development of **photonic computing accelerator** that utilizes photons, instead of electrons, **to perform calculations** to have massive parallelism, enabling faster computations and reduced latency.

Enhancement of energy efficiency, speed, and cost-effectiveness in defense operations.

→ **Project ARCHYTAS highlights**

- Research project with 20 mio € budget
- Consortium with 25 members
- Seven work packages
- Project timeline: from December 2024 till the end of 2027

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Commission. Neither the European Union nor the granting authority can be held responsible for them.

ARCHitectures based on unconventional accelerators for dependable/energY efficienT AI Systems

SELECTED PROJECTS EUROPEAN DEFENCE FUND (EDF) 2023

CALL TITLE:	Research actions on digital transformation
TOPIC TITLE:	Dedicated hardware architectures for energy-efficient AI
DURATION OF THE PROJECT:	36 months
TYPE(S) OF ACTIVITIES:	Integrating knowledge, Studies, Design
ESTIMATED TOTAL COST:	€ 19,976,637.23
MAXIMUM EU CONTRIBUTION :	€ 19,976,637.23

SHORT DESCRIPTION OF THE PROJECT:
The goal of ARCHYTAS is to investigate non-conventional Artificial Intelligence (AI) accelerators for defence applications, using novel technologies at the device and package level.
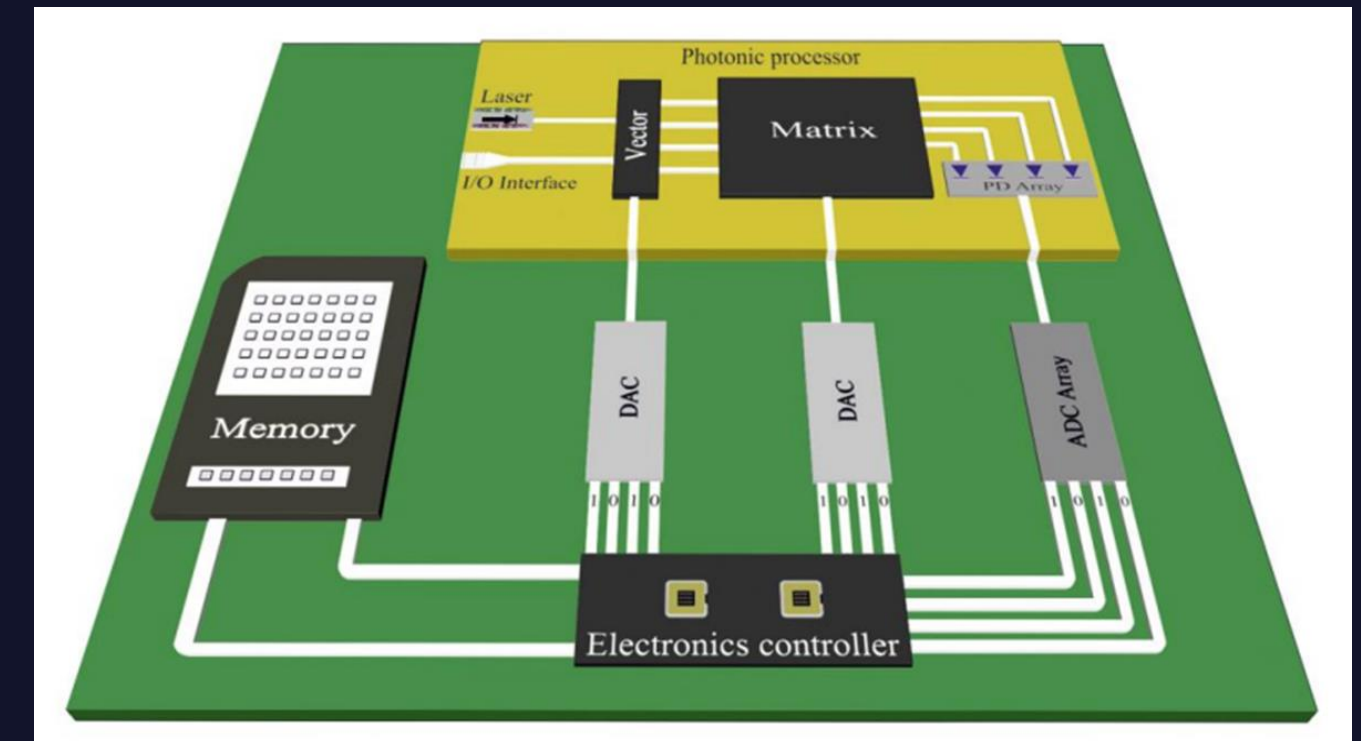
INSTRUMENTATION TECHNOLOGIES

Instrumentation Technologies in ARCHYTAS

Source: University Trento

Focus on signal conditioning circuitry, ADC/DAC selection, and **ADC/DAC interfacing** to the FPGA (electrical and logical), memory for photonic computing engine controller (ECPCE).
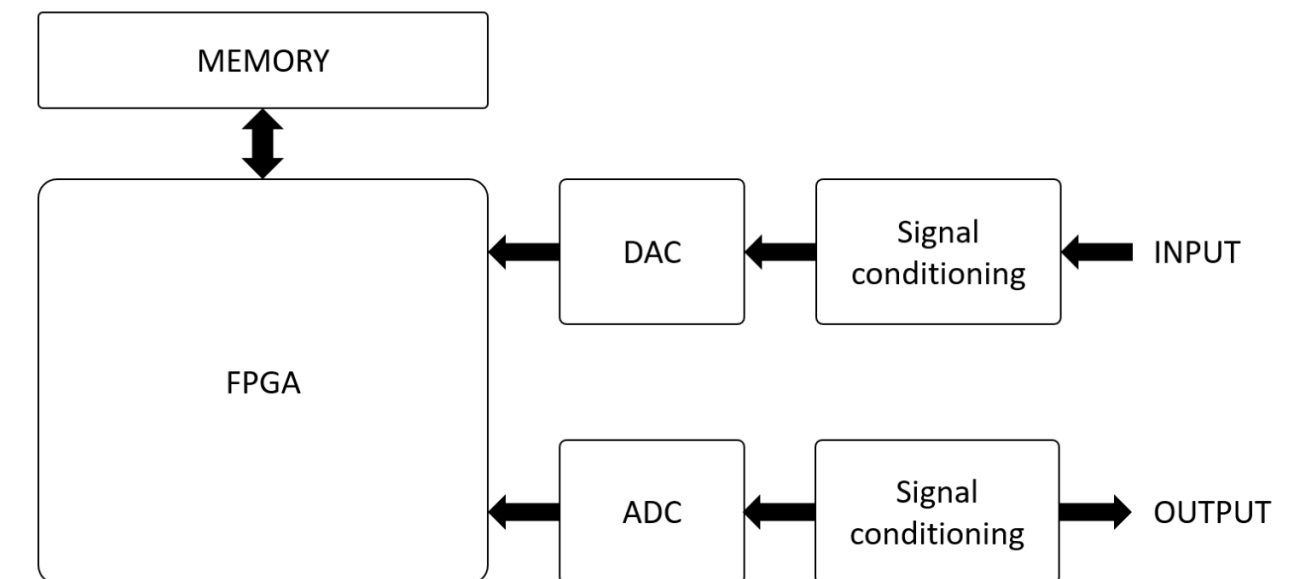**Parallel processing techniques** within the FPGA will be evaluated.

Several important aspects of system characteristics, such as **power consumption, overall size, performance, and technology maturity**, will be examined.

Study of implementing the **dynamic non-linear quantization** to reduce the number of bits.

INSTRUMENTATION TECHNOLOGIES

Advanced solutions for defence

- 1: Back up communication system
- 2: Generation of encrypted keys using quantum technology
- 3: Communication earth-satellite
- 4: Communication between satellites
- 5: Quantum antenna (quantum radar)
- 6: wireless sensors and monitoring systems for military camps (SWICSSY)

Nizkozemeljska orbita (LEO)

01100 10010 00101

01100 10010 00101

Pametni Kamp

Senzorika

Legenda:

Šifrirana komunikacija   Pomožni kom. sistem   Kom. Sistem s sateliti   Premični generator ključev   programirljivi radio

INSTRUMENTATION TECHNOLOGIES