

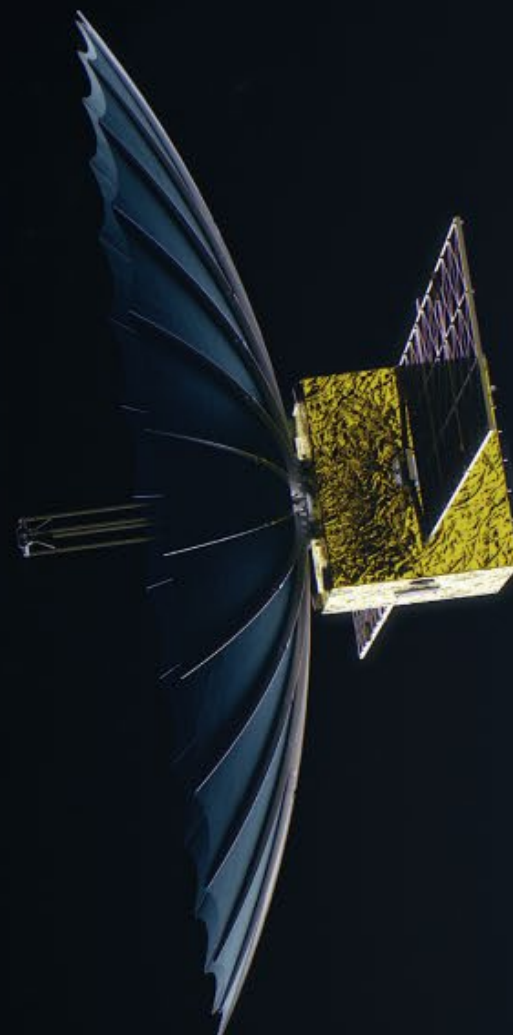


creotech

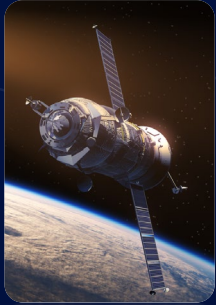


About the company

Creotech Instruments is a Polish company in the Deep Tech sector established in 2012. Since 2022 the company's shares have been listed at **the Warsaw Stock Exchange Main Market (CRI)**.



BUSINESS AREAS



▶ SPACE

We design, manufacture and integrate space systems and subsystems that operate reliably from the first launch. We offer own satellites and implementations of entire missions – from design through production to in-orbit service.



▶ SCIENCE

We design, manufacture and integrate advanced **control and measurement and time synchronisation systems** as well as **quantum subsystems for research** institutes and technology companies around the world.



▶ GEOSPACE

We design, manufacture and integrate systems and subsystems (devices and software) for managing unmanned aerial vehicle missions and processing data during missions.



▶ CONTRACT PRODUCTION

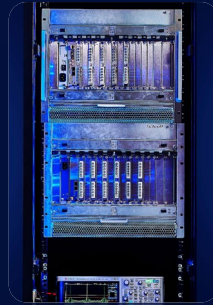
We handle demanding orders in the contract electronics manufacturing sector based on unique competences acquired for the needs of space and scientific industries.

SCIENTIFIC INSTRUMENTATION



▶ White Rabbit

White Rabbit technology, developed at CERN and rigorously tested in the challenging environment of the world's largest hadron collider, enables the building and development of a highly precise Ethernet-based network time synchronization with sub-nanosecond accuracy across large distances.



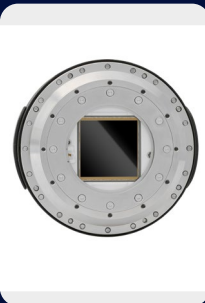
▶ MTCA

MicroTCA (MTCA) is a proven modular standard for measurement and control systems, offering specialized casings and modules for laboratory, high-frequency RF applications, especially in particle accelerators, radio, telecommunications, and radar.



▶ SINARA & ARTIQ

Sinara hardware solutions, designed to work seamlessly with ARTIQ software, are customized for quantum technologies research and development labs.



▶ CAMERAS

We design, manufacture and integrate advanced cameras and optical systems with **sCMOS and CCD sensors**, which **process data during image acquisition**. Among others used to **monitor near-Earth objects and in quantum experiments**.



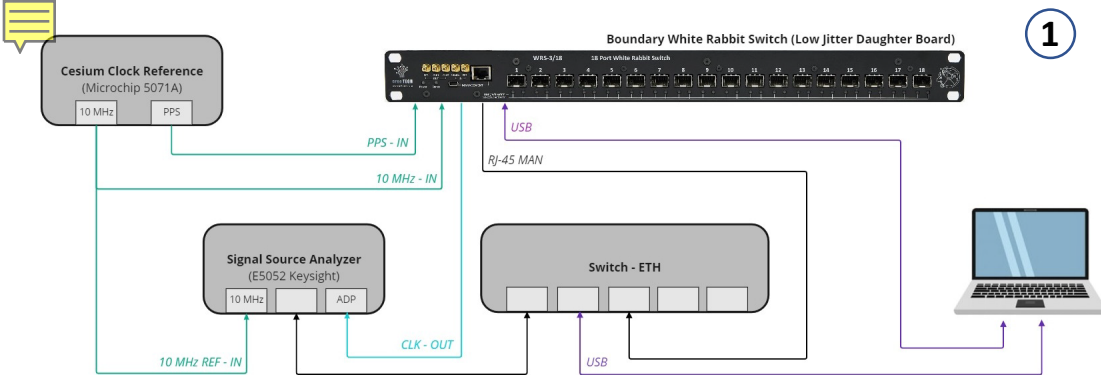
▶ DI/OT

Distributed I/O level - a standard designed for electronics operating in the vicinity of a particle accelerator in radiation-exposed or radiation-free areas controlled by a master in the front-end layer via the Fieldbus.

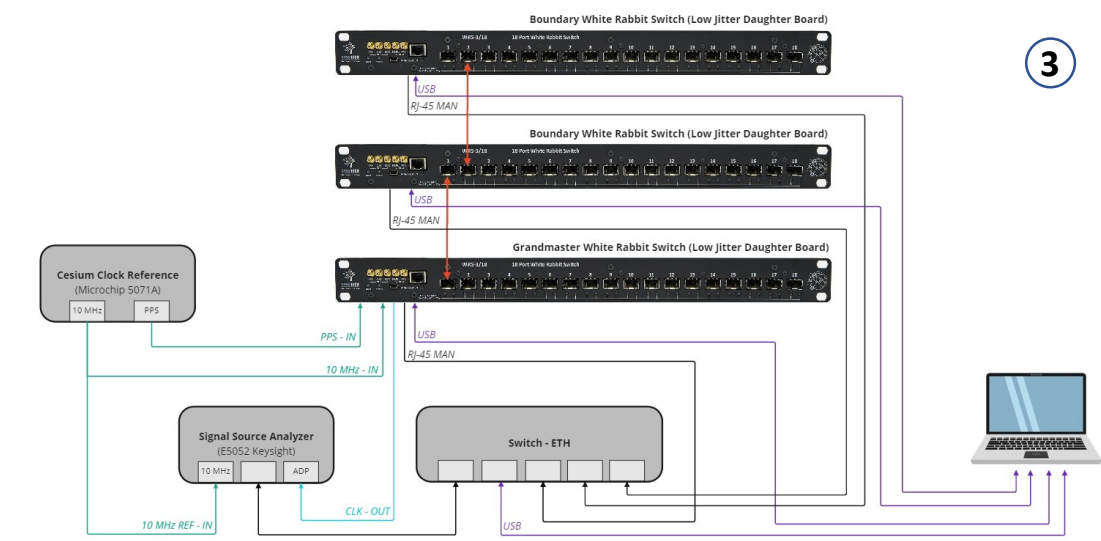
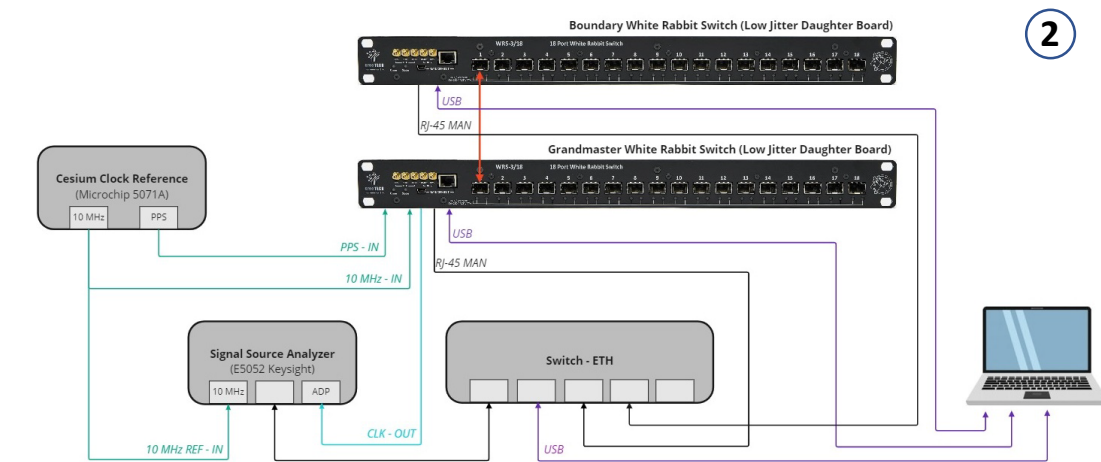
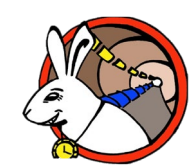


White Rabbit Switch

- Sub-nanosecond synchronization and picoseconds precision
- Connecting thousands of nodes
- Ethernet-based gigabit rate reliable data transfer
- Precision time-tagging of measured data
- Easy triggering of data acquisition in large installations
- Compatibility with end-nodes offered as Creotech products

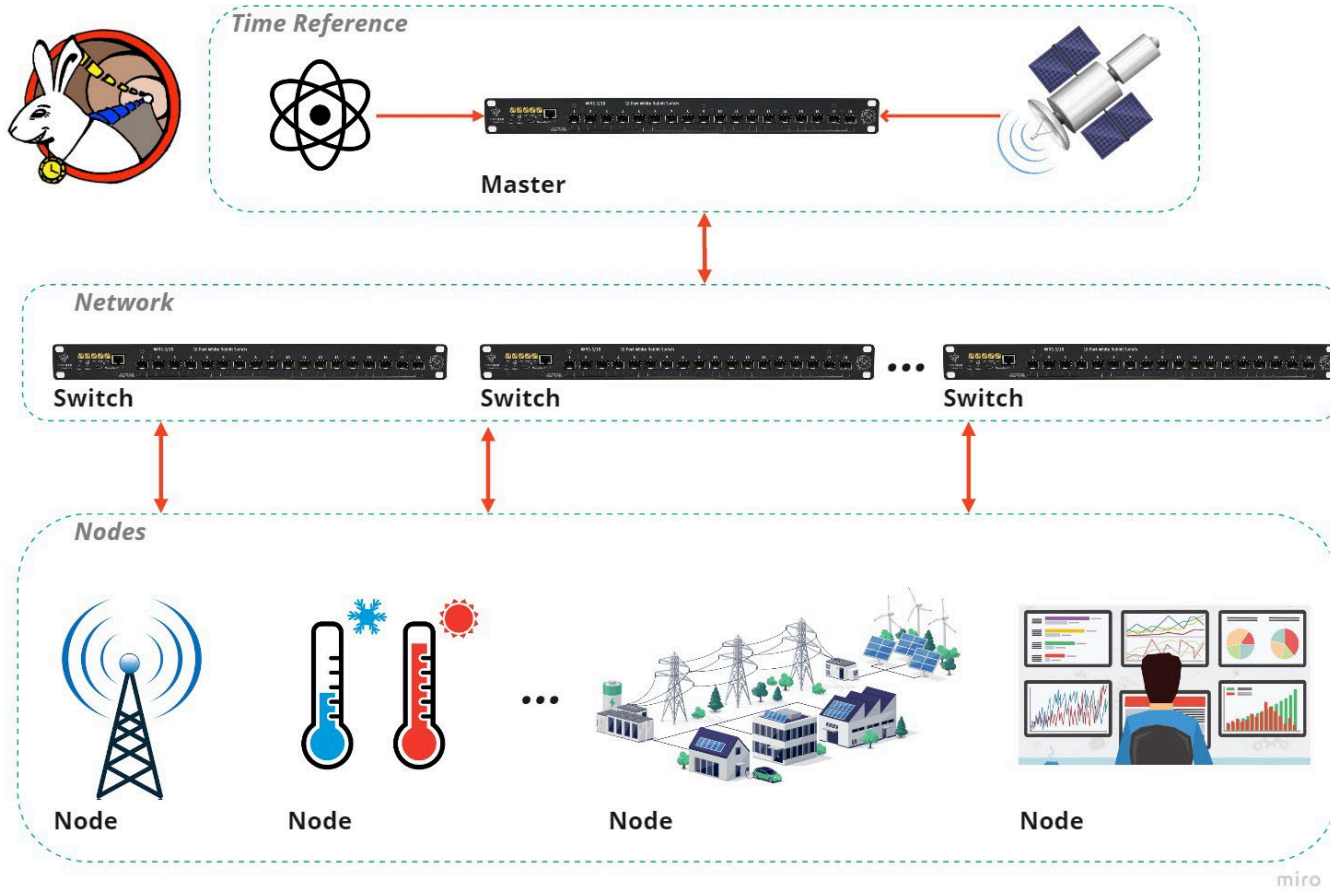


White Rabbit Switch



No.	Configuration type	Clock Reference type	Grand Master	First stage slave	Second stage slave	Number of averages	Jitter RMS [ps]	
							from 10Hz	from 1Hz
1	1	Cs	WRS	-	-	16	6.37	9.29
2	1	Cs	WRS-LJ	-	-	16	1.23	1.80
3	2	Cs	WRS	WRS-LJ	-	16	5.36	8.73
4	2	Cs	WRS-LJ	WRS	-	16	3.49	5.29
5	2	Cs	WRS-LJ	WRS-LJ	-	16	1.40	2.03
6	3	Cs	WRS-LJ	WRS-LJ	WRS-LJ	16	1.63	2.12

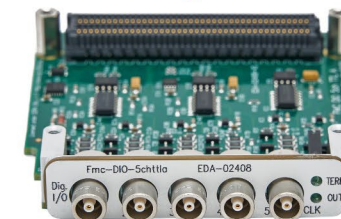
Applications



White Rabbit Switch Low Jitter



SPEC - Simple PCIe FMC Carrier



FMC DIO 5CH

Any configuration

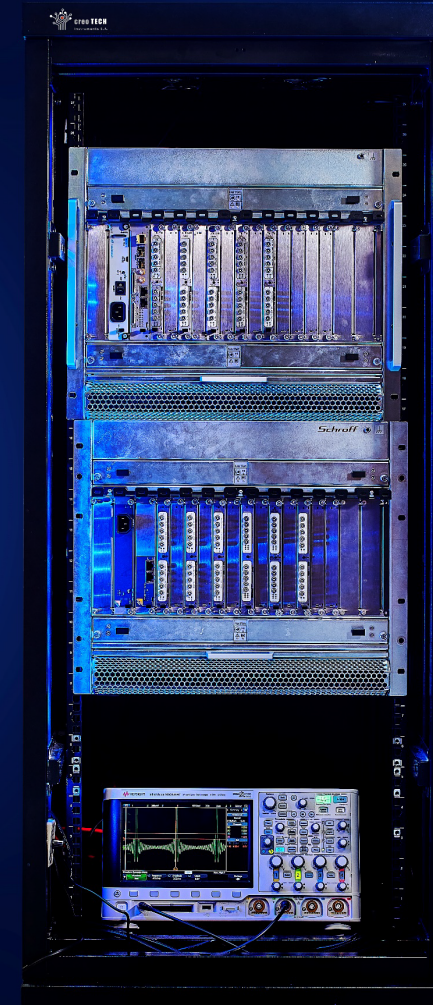
Example:

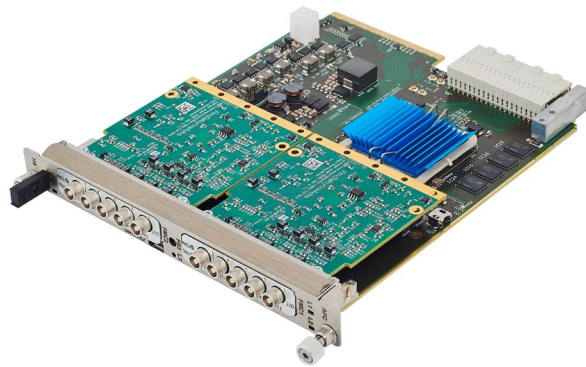
- 5x 1 PPS
- 4x 1 PPS + 1 Trigger
- 2x 10 MHz + 2x 1 PPS + 1 Trigger



Our Scientific Instrumentation group specializes in MTCA hard real time control systems, where an external event-to-system response time is guaranteed within a few microseconds. This feature is crucial in applications where failing to react in time can cause system failure or damage, e.g.:

- industrial robotics and manufacturing
- particle accelerators subsystems control
- safety systems for tokamaks
- qubits control in quantum technologies
- hardware-software co-simulation (EGSE for satellites)

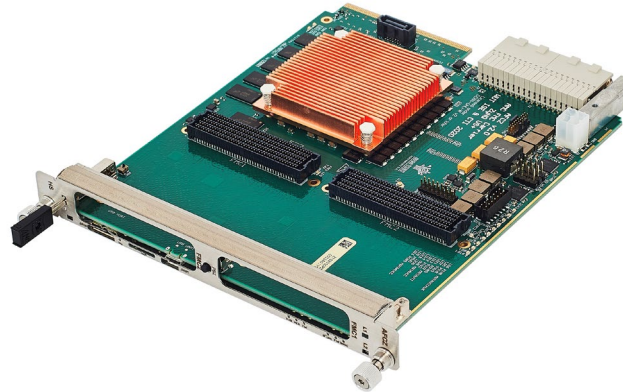




AMC FMC CARRIER
AFC

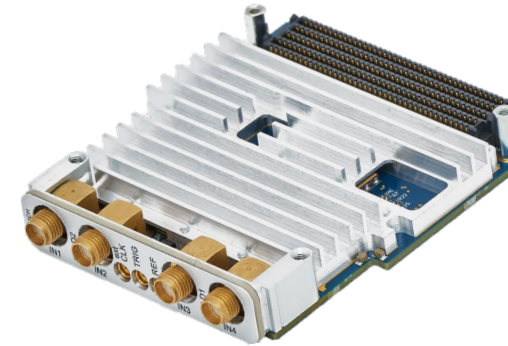
The AMC FMC CARRIER – AFC is partially based on SPEC design (supply, WR clocks), primarily designed to support quad 16-bit ADC FMC boards for Sirius BPM electronics.

AFC is based on **Xilinx Artix-7 200T FFG1156 FPGA**



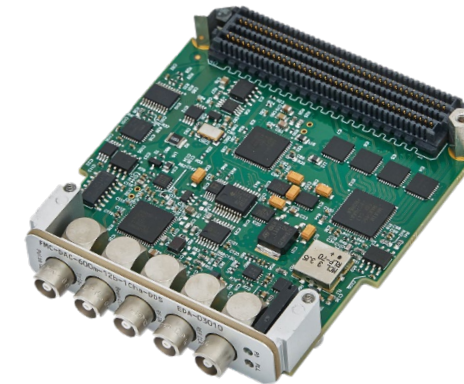
AMC FMC CARRIER
Zynq – AFCZ

AFCZ is flexible dual FMC carrier in MTCA standard, based **on Xilinx Zynq UltraScale+ ZU7EV SoC FPGA**



FMC ADC 250M 16B
4CHA

4-channel 16-bit ADC capable of read-out at 130 MS/s or 250 MS/s



FMC DAC 600M 12B
1CHA DDS

1-channel 12-bit DAC

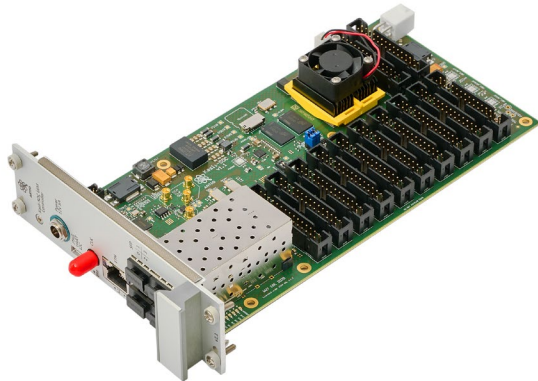
Sinara & ARTIQ Ecosystem

- Bottom-up initiative of the ion trap community
- Leading control and measurement hardware ecosystem, tailored to the needs of ion-trap experiments
- Compatibility with ARTIQ open software
- Used worldwide, i.e. by AQT, Innsbruck, Oxford



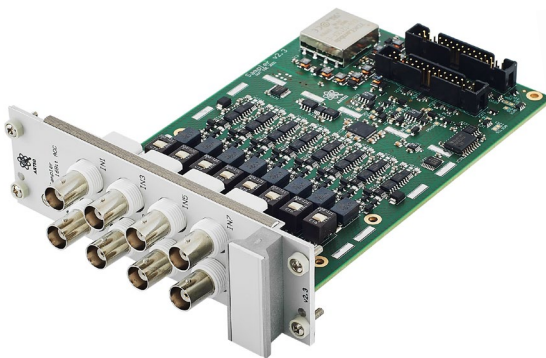


Sinara & ARTIQ Ecosystem



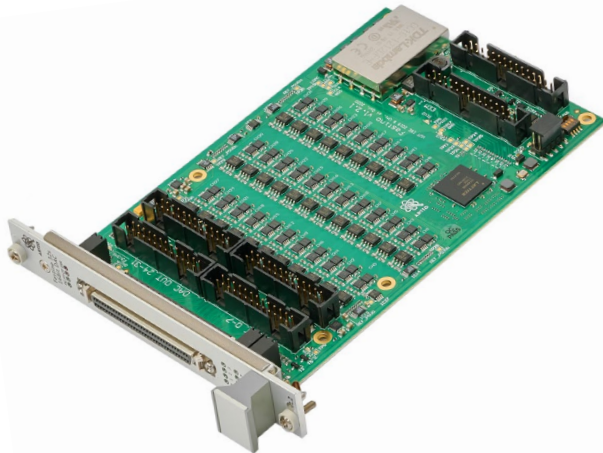
KASLI SOC

SoC Controller



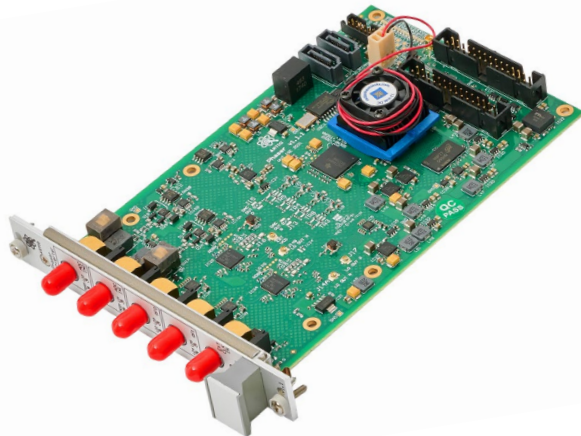
SAMPLER

8-channel, 16-bit ADC EEM



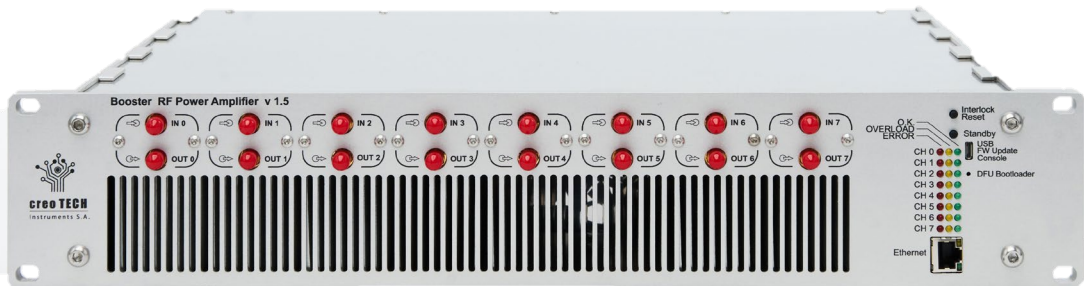
FASTINO

Fast 32-channel, 2.55 MS/s per channel, 16bit DAC EEM card



PHASER

Quad channel 1GS/s SAWG generator card



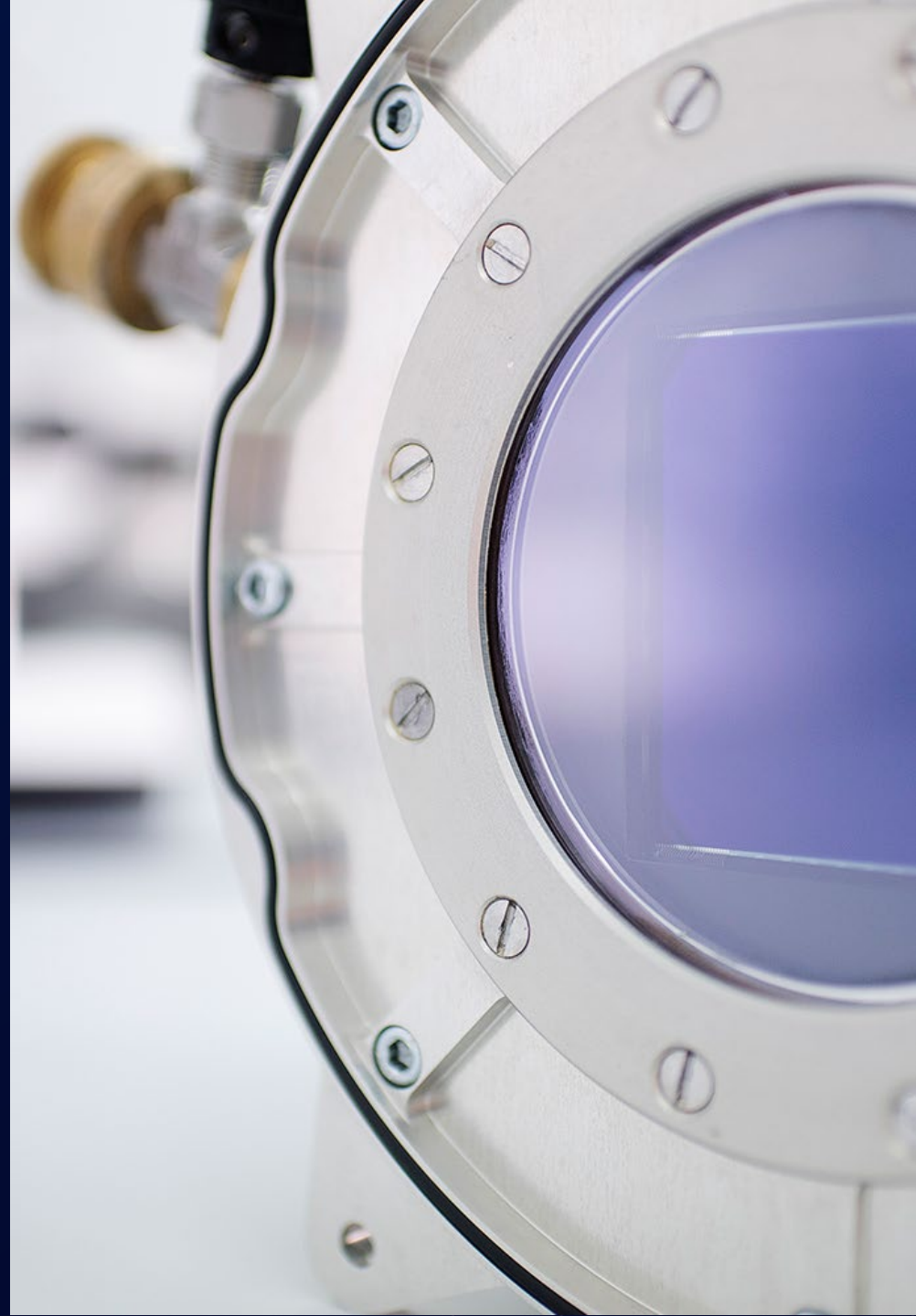
BOOSTER

Booster is an eight channel RF power amplifier



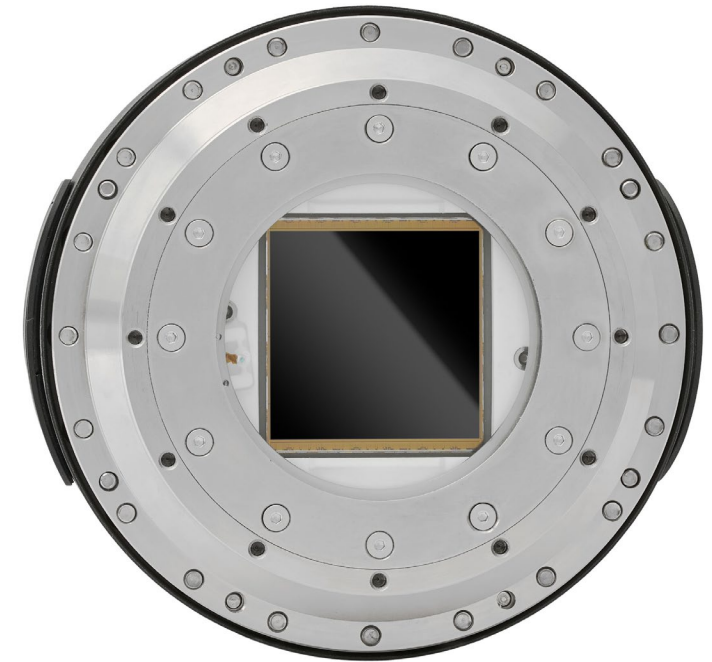
Cameras

- First Polish advanced astronomical sCMOS camera, in-house production capabilities
- Built-in independent Linux operating system, allowing for stand-alone camera operation
- Initial data post-processing in camera module SoC: frame stacking in FPGA, other predefined data processing algorithms implemented in camera module
- Possibility of implementation of user-defined algorithms on the camera computing resources

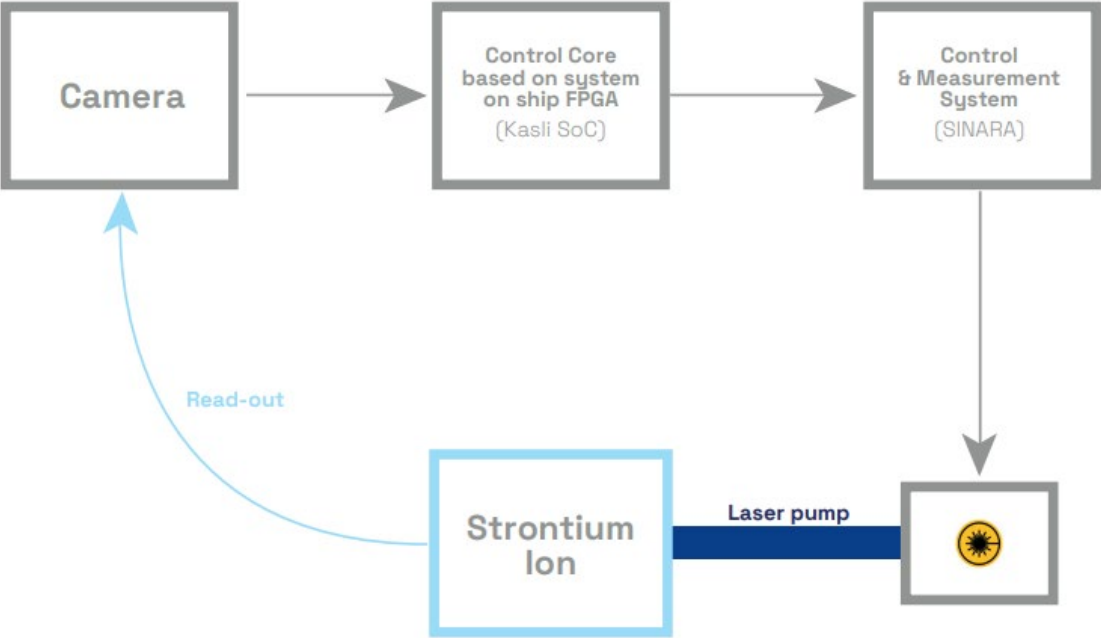




	CCD50100 ASOPEK	CCD231-84 Neostel	CreoSky 6000	FLI Kepler 6060	QHY6060
Sensor	CCD	CCD	sCMOS	sCMOS	sCMOS
Pixel	8176 x 6132px	4096x4096	6114x6114	6144x6114	6144x6114
Pixel size	6 µm	15 µm	10 µm	10 µm	10 µm
Sensor diagonal	61,3mm	86,9mm	86,9mm	86,9mm	86,9mm
Max FPS	3 fps	1 fps	22 fps (FSI)	14 fps (BSI) 11 fps (FSI)	4 fps
Quantum Efficiency	Max 60%@550nm	92%@580nm	71,6%@550nm (FSI)	71,6%@550nm (FSI)	71,6%@550nm (FSI)
			95%@580nm (BSI)	95%@580nm (BSI)	95%@580nm (BSI)
Full Well Capacity	40ke	350ke	135ke (FSI)	135ke (FSI)	70ke (FSI)
			102ke (BSI)	102ke (BSI)	
Temporal Noise	12,5e	5e	4,2e (FSI)	4,2e (FSI)	4,7e
			3e (BSI)	3e (BSI)	
Dark current	<1e/pix/sec @ -10°C	<10e/pix/sec @ 50°C	0,1e/pix/sec @ -20°C	0,1e at -20°C	0,2e at -15°C
Shutter type	External shutter required	External shutter required	Electronic Rolling Shutter, with optional external shutter controlled from camera	Electronic Rolling Shutter, with optional external shutter controlled from camera	Electronic Rolling Shutter
Sensor cooling	TEC with liquid (water/glycol, cooler required)	TEC with liquid (water/glycol, cooler required)	TEC with air by default Can be customized for TEC and water/glycol coolant	TEC with air / liquid	TEC with air / liquid
Mass	5kg +External shutter required	7kg +External shutter required	~ 5kg (without external shutter and adapters)		
Interfaces	Gigabit Ethernet, Trigger/DIO pins	Gigabit Ethernet, Trigger/DIO pins	10GbE, 1GbE, USB 3.0, Trigger/DIO	USB 3.0, optional QSFP	USB 3.0
			additional real-time data processing capability on FPGA/SoC		



Camera for quantum experiments



Technical Specification

sCMOS based Camera

Sensor	Gpixel GSENSE2020 BSI
Pixels	2048x 2048
Pixel Size	6.5 μm x 6.5 μm
Chroma	Mono
QE	95% @ 550nm
Full Well Capacity	55k e- @ Rolling shutter
Temporal Noise	1.6 e- @ Rolling HDR
Dynamic Range	90dB @ Rolling HDR
Dark current	< 0.07 e- (at -30°C)
Shutter Type:	Electronic Rolling Shutter
Frame rates	74 fps for full frame @11bit HDR windowing/row skip option to multiply speed of read-out
Sensor cooling	TEC with glycol coolant
Interfaces	4x SFP+, 1GbE, USB 3.0, Trigger and DIO pins (customizable)



DI/OT



Distributed I/O level - a standard designed for electronics operating in the vicinity of a particle accelerator in radiation-exposed or radiation-free areas controlled by a master in the front-end layer via the Fieldbus.

These are usually FPGA-based boards sampling digital and analog inputs, driving outputs and performing various safety-critical operations.



R&D services

- Assistance with your project
- Design of control and measurement systems, including hard real-time applications
- Design of test systems
- Electrical and functional tests performed in an ESD-protected lab
- Quick track prototyping – in collaboration with our Production Department



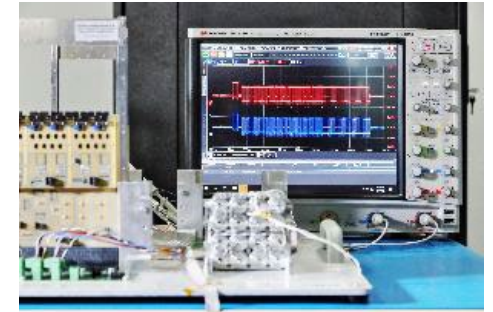
Infrastructure and production capabilities

PRODUCTION CAPABILITIES

- Clean-rooms ISO7-8
- ESD protection area, temperature, humidity and cleanliness control
- Three Surface Mount Technology (SMT) lines with Juki technology
- Through Hole Technology (THT) with Selective Soldering Machine (ERSA) and 10 stations
- Inspection with AOI MEK PowerSpector done by ESA certified inspectors
- Other: rework, cleaning, conformal coating, press-fit, electrical tests, climate chamber testing, component lead forming, cable stripping
- New investment on-going – X-ray, vacuum oven, ionic contamination tests
- Production of electronics for NewSpace, ie. ICEYE, ENPULSION, THORIUM
- Now in the process of reallocation to new premises

QUALITY MANAGEMENT SYSTEM

- QMS certified according to **ISO 9001:2015** since 2015
- Project specific qualification of electronic manufacturing according to ECSS standards
- Ongoing general qualification of electronic manufacturing for deep space missions according to ECSS standards performed by European Space Agency
- ECSS qualified assembly operators, ECSS qualified inspectors



A close-up photograph of a person's hands, wearing blue nitrile gloves, working on a complex electronic circuit board. The board is populated with various components, including a large, square, gold-colored microchip in the center. The person is using a small, thin tool to manipulate a component on the board. The background is dark and out of focus.

Thank you!

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