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Geolux d.o.o.

Founded in 2007, Geolux specializes in research, development and manufacturing of sensors and instruments based on radar technology. Geolux products are used in industrial sensing applications, for environmental monitoring, in perimeter security and in traffic monitoring systems.

Hydrology, Security & Industry

Geolux offers complete solution for monitoring water level, flow and discharge of rivers, channels and lakes. The product line includes instruments for water level measurement, surface velocity measurement, data logger and cloud-based software for real time data collection and analysis.

Advanced security systems with Geolux ground surveillance FMCW radars enhance perimeter security for industrial complexes, critical infrastructure, airports and more.

Contactless industrial measurements in harsh environments with Geolux surface velocity and/or radar level sensors enable advanced controls for Industry 4.0 with input parameters almost impossible to measure with other methods.

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RSS-2-300W Radar surface velocity meter

- mounted above water with no contact with water
- SDR (Software Defined Radio) designed with advanced digital signal processing for accurate and robust measurements in all conditions
- wide measurement range from 0,02m/s to 15m/s
- high sensitivity enable mounting on distance up to 50m effective distance from radar to water surface

LX-80 Radar level meter

- MIMO digital beamforming 3x TX & 4x RX for precise peak angle measurement
- level measurement up to 35m with ±1mm accuracy• liquid and solid objects classification (detection)
- ice, snow, sand level measurement
- snow packing factor (density) measurement in R&D

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RSS-2-300WL Radar surface velocity and level meter

- mounted above water with no contact with water
- combining RSS-2-300W & LX-80 instruments
- integrated advanced CFD model for flow calculation in open channels, wastewater, industrial applications, irrigation etc.

SmartObserver Logger

- robust data logger for hydrology systems
- very low power and integrated battery charger
- advanced CFD calculation of flow with multiple sensors for complex situations

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References

• installed more than 1000 sensors and systems worldwide only in 2008
• only instruments with better than 1% error in accuracy in whole measurement range (verified in Metas institute / Switzerland)

Technology

• advanced signal processing designed specifically for the application
• SDR (software defined radio) approach combining FPGAs and DSPs with microwave frontends

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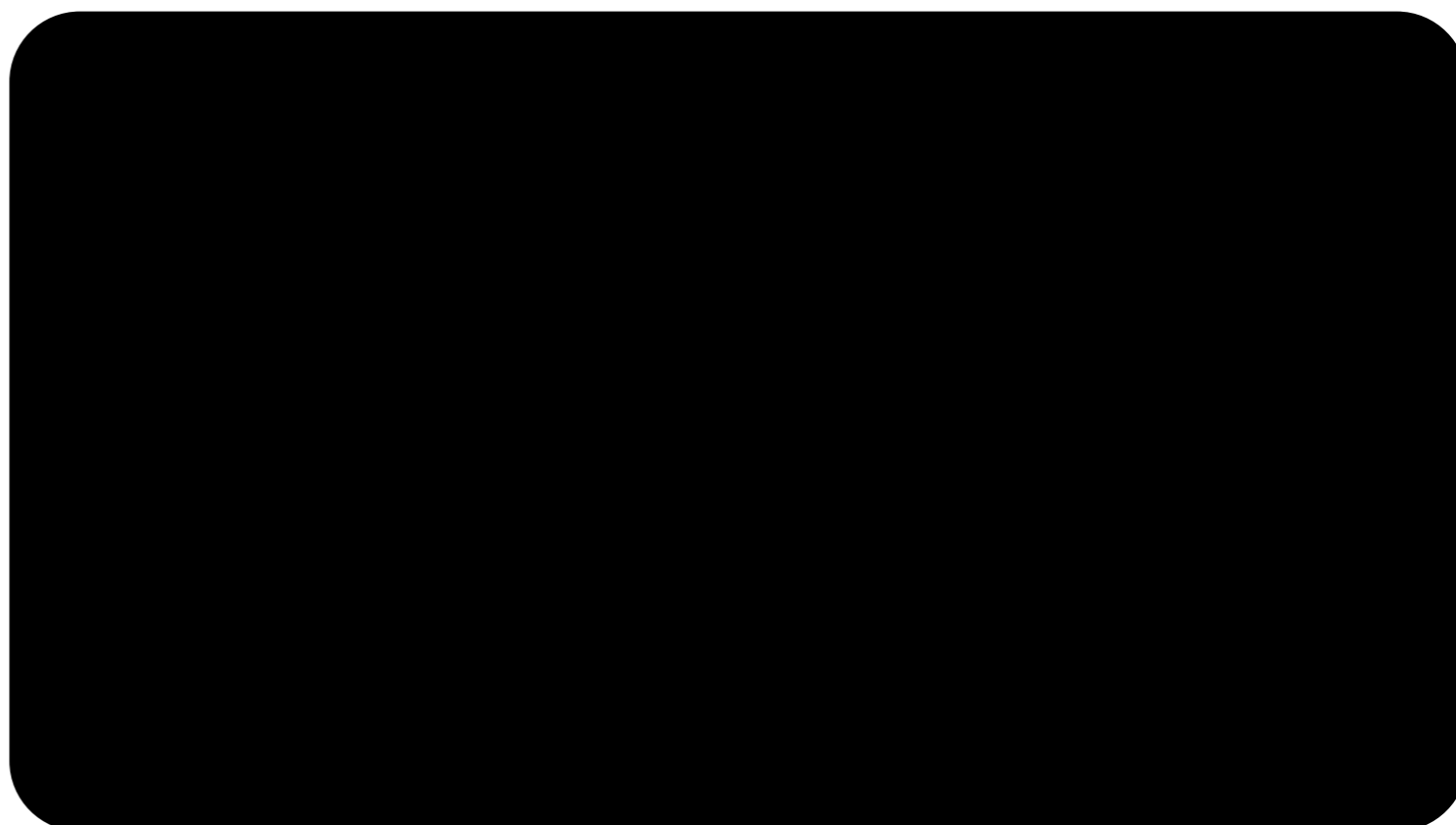
- High temperature (~1800°C)
- Low temperature (<-100°C)
- Aggressive atmosphere
- High pressure
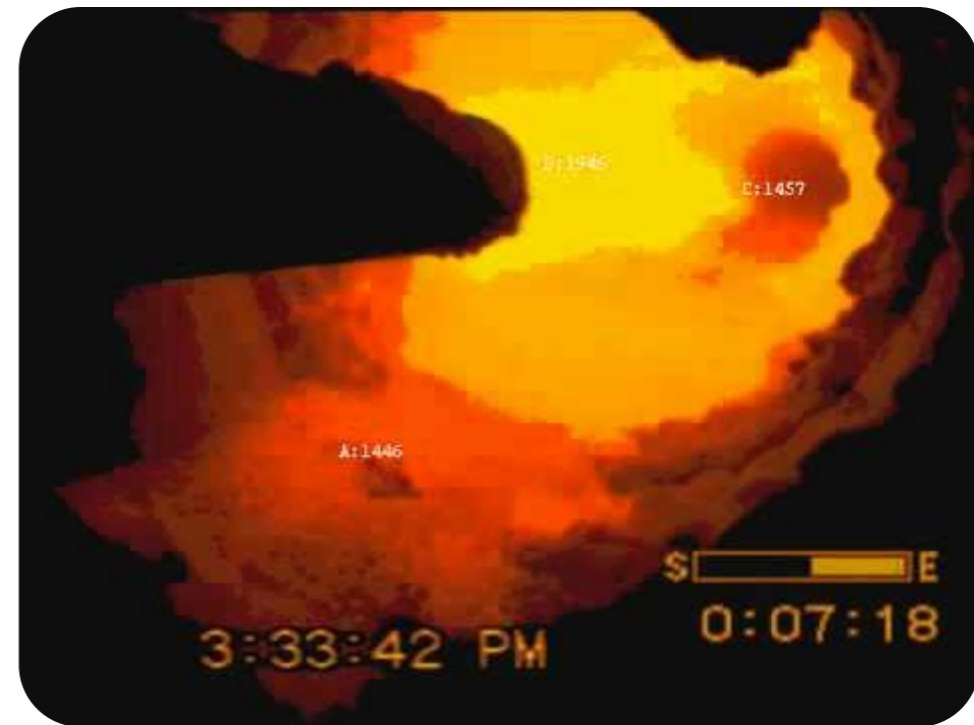

- Measurement of velocity and direction (0,02m/s to 15m/s)
- Resolution of 5mm/s
- Measurement of level (15m / ±1mm or 5m / ±0,1mm)
- IP68 robust design – possible air and water cooling

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- Ground surveillance 3D FMCW radar
- 100mW K-band (24GHz) with range up to 300m   for single walking human (0,75m^2 RCS)
- MIMO digital beamforming - no moving parts
- combined FPGA & DSP architecture
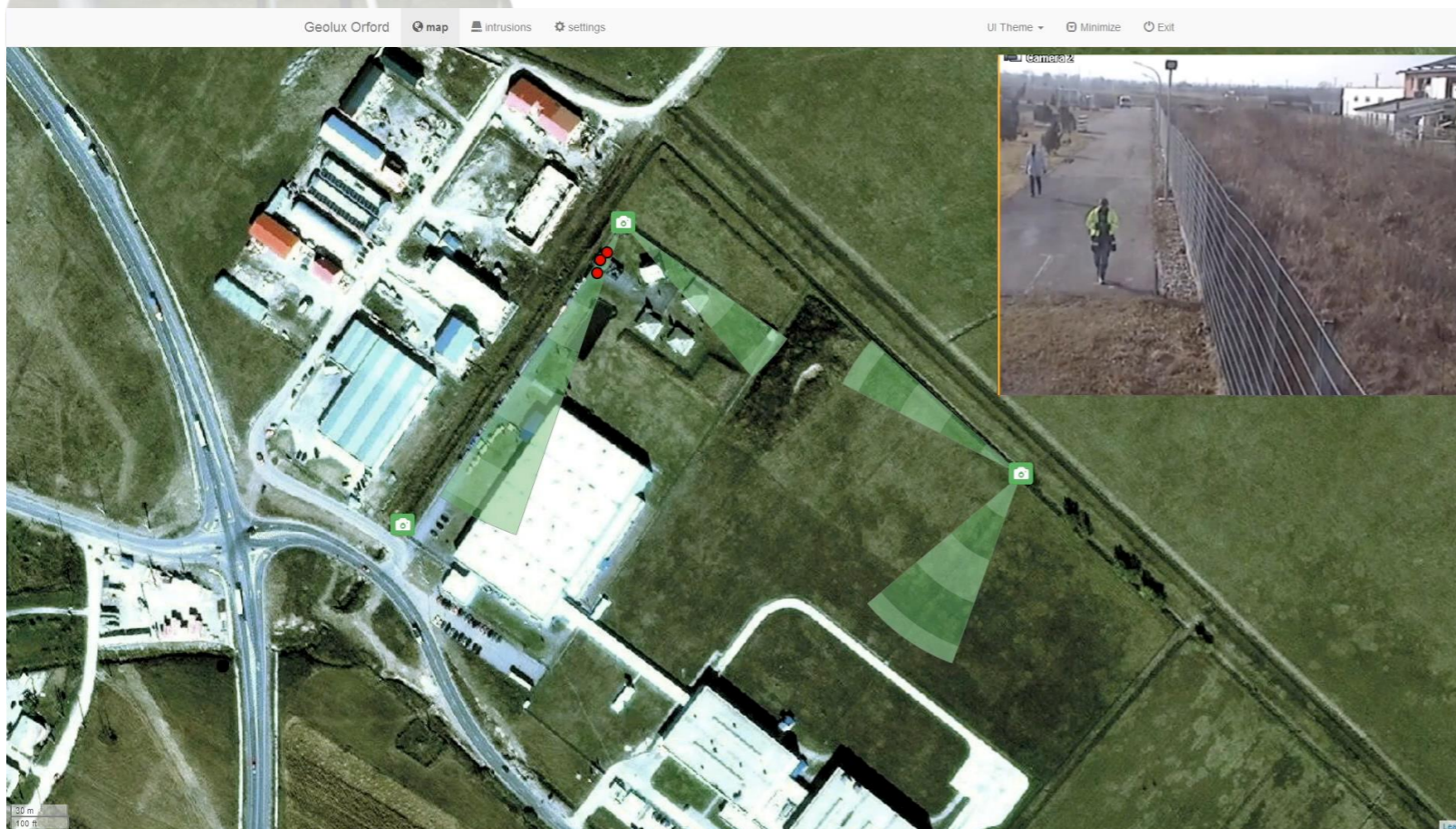
**Detection, location and countermeasures control**

- Doppler aircraft vertical speed meter
- Measurement range 20mm/s to 15m/s (1 ft/s to 50ft/s)
- 20Hz measurement update rate
- Integrated simplified INS for attitude correction
- CAN2.0B communication interface (verified for connection to Boeing instrument bus by Boeing engineers)
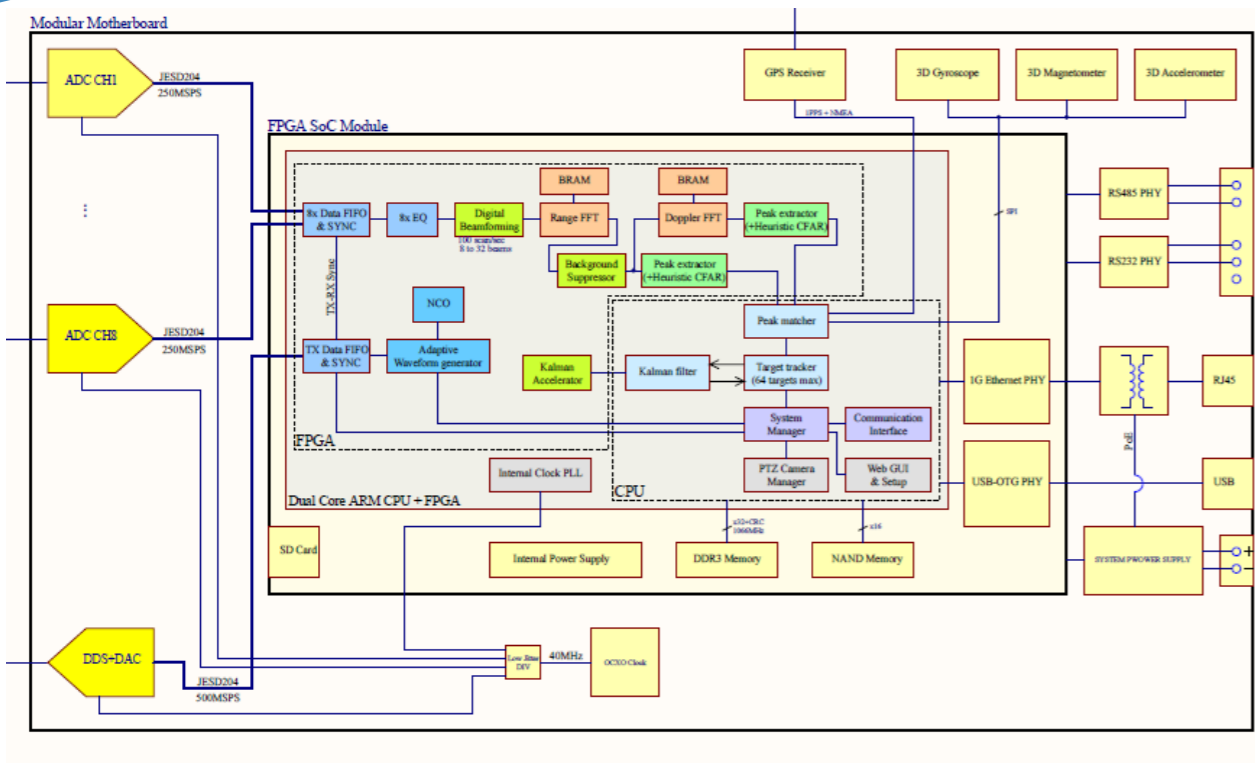- Developed as customization of standard Geolux radar for Boeing

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Small SDR FMCW radar
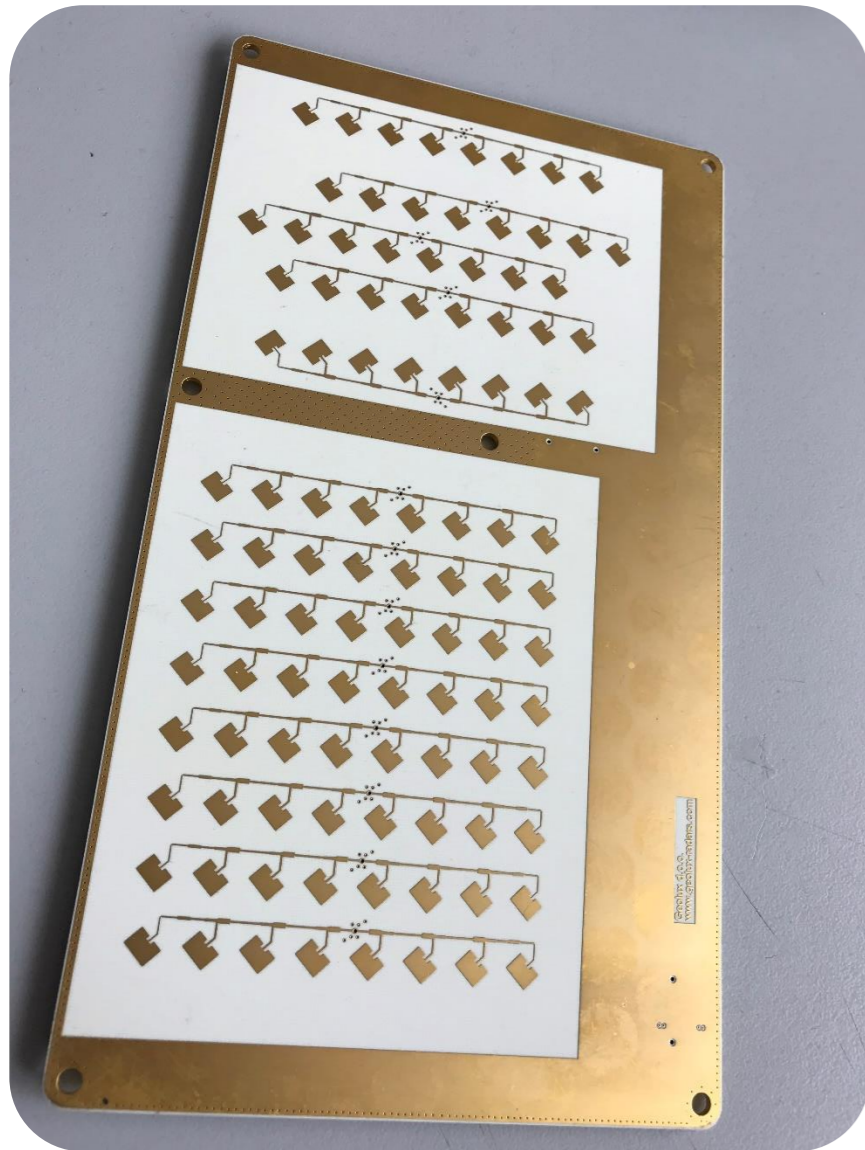
- 5x TX antenna
- 8x RX antenna
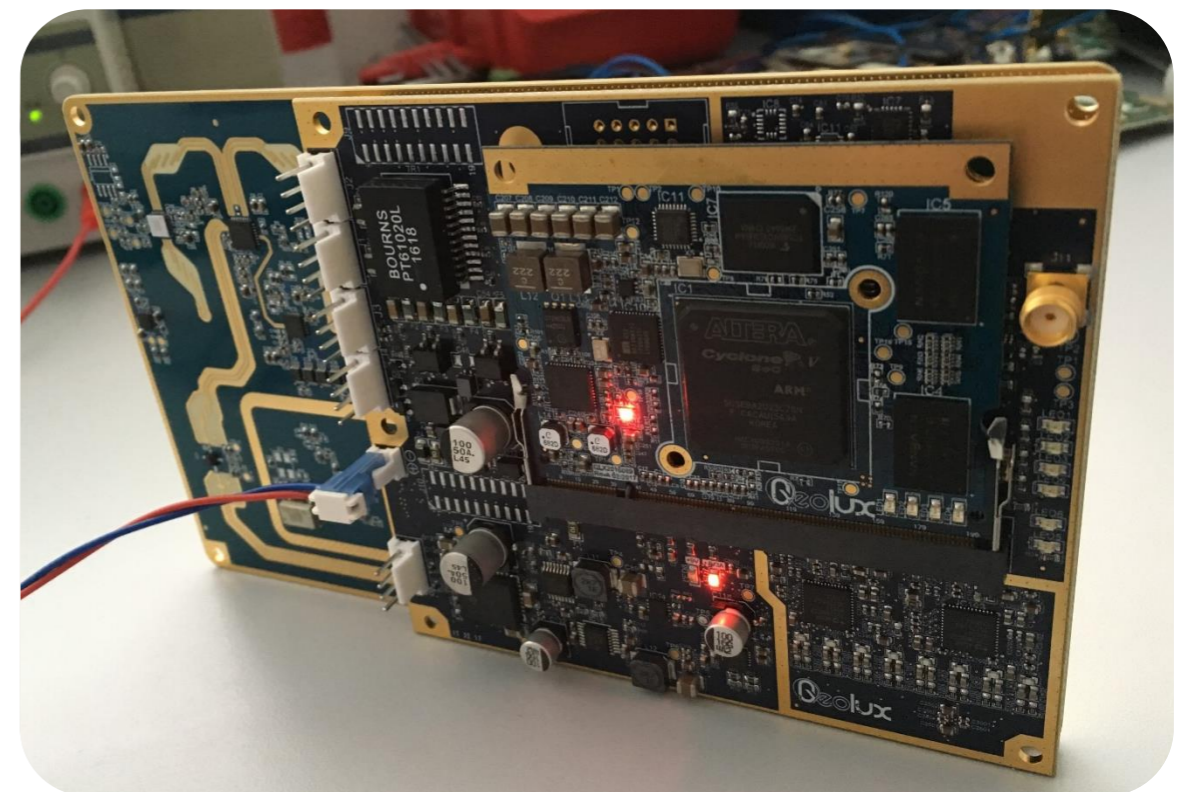- MIMO digital beamforming
- Phase polarimetry
- Compact design
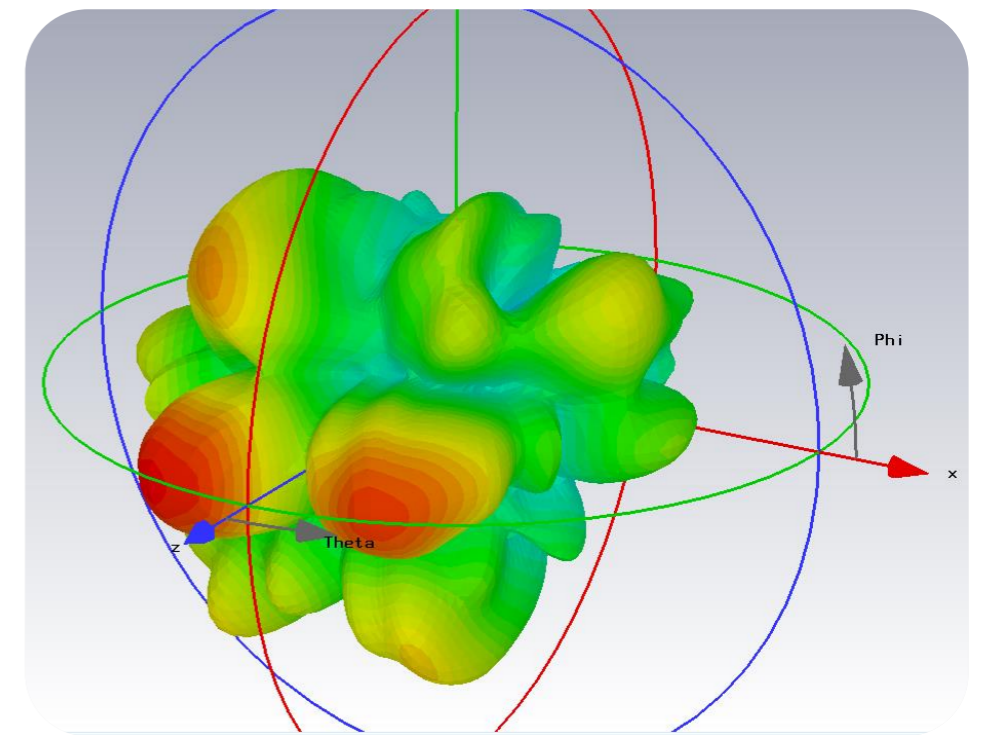
- In-house patch antenna array design
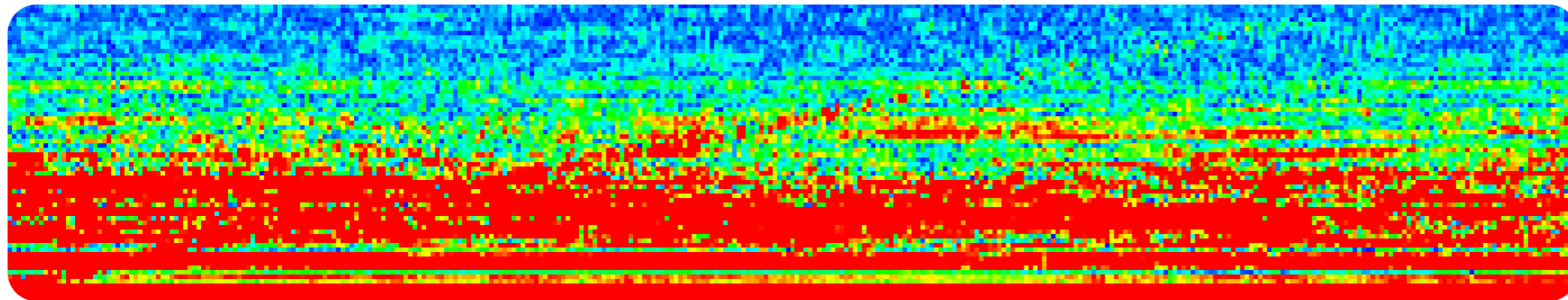- Frequency band 23.9 – 24.4 GHz S_{11}<-15 dB

SDR FMCW radar

- SDR (Software Defined Radio)
- High FPGA processing power
- Complex processing and detection algorithms
- Customized hardware acceleration

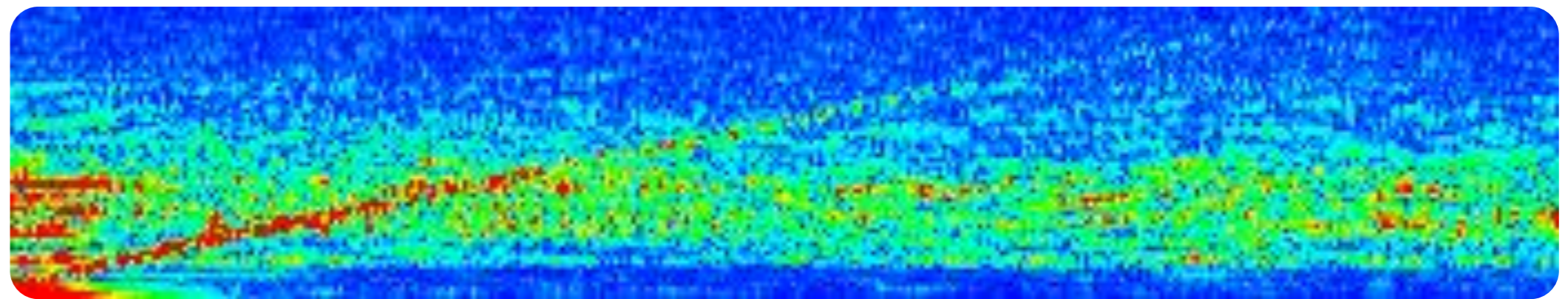- High linearity FMCW ramp <30 Hz RMS error in 250MHz range

- Very low phase noise

SDR FMCW radar
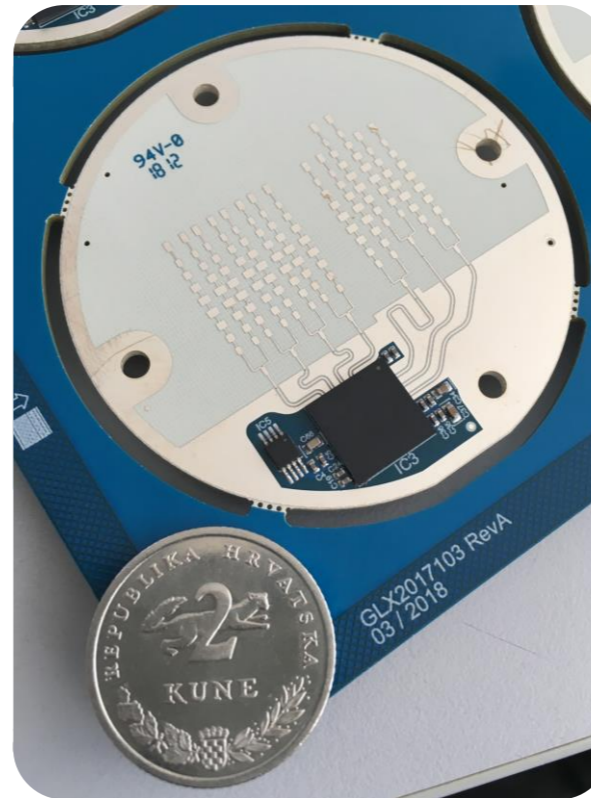

RAW signal (before processing)
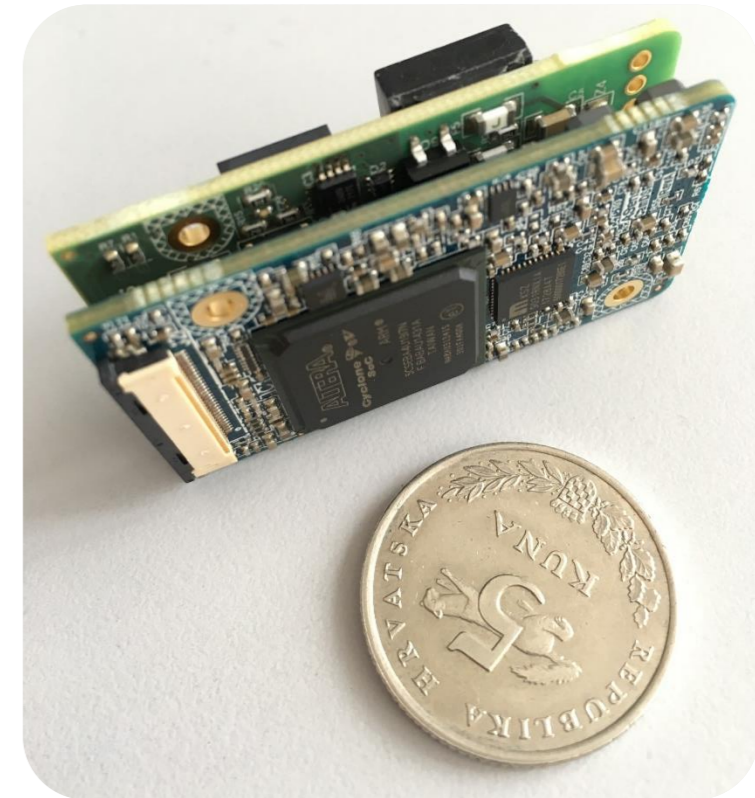

Signal after background removal algorithm

- Proprietary noise & background removal algorithm
- Target signal extraction from noise – precise detection & location
- FPGA accelerated radar cube processing

> 460TMACS + 180TFLOPS
FPGA SoC HPC for SDR and radars

Radar altimetry
77 – 81 GHz SoM

Dual image sensor
processing module

- Parallel FPGA based HPC for complex SDR signal analysis and processing
- Miniature processing modules
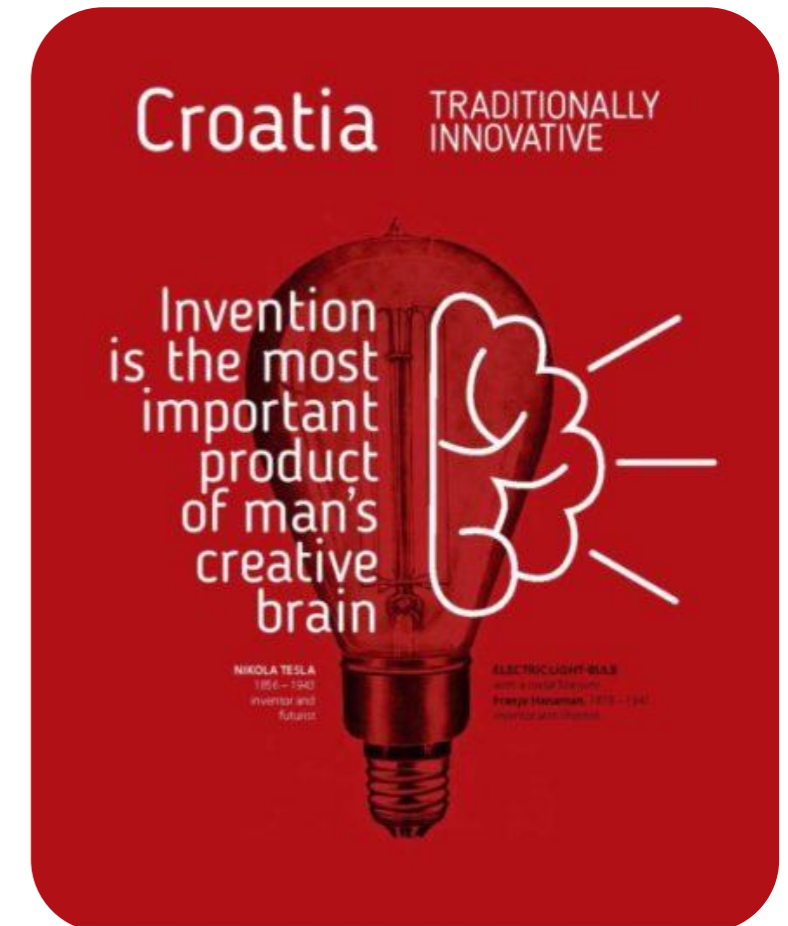- Miniature SoM (System on Module) microwave sensors

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Thank You!

Geolux success story @ Altium booth on EmbeddedWorld 2017

Geolux success story presented by European Comission in 2018

Geolux selected among most innovative companies in Croatia by Croatian SME agency HAMAG-BICRO

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