



ASIC technology

SRON Netherlands Institute for Space Research is the Dutch expertise center for space research. The institute develops and uses innovative technology for groundbreaking scientific research in space, focusing on astrophysical research, Earth science and planetary research. In addition to this, SRON has a line of research into new sensitive sensors for X-rays and infrared radiation which now rank among the most sensitive in the world. SRON is part of the Netherlands Organisation for Scientific Research (NWO).

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Netherlands Space Office (NSO) has made a financial contribution to the ASIC development at SRON.

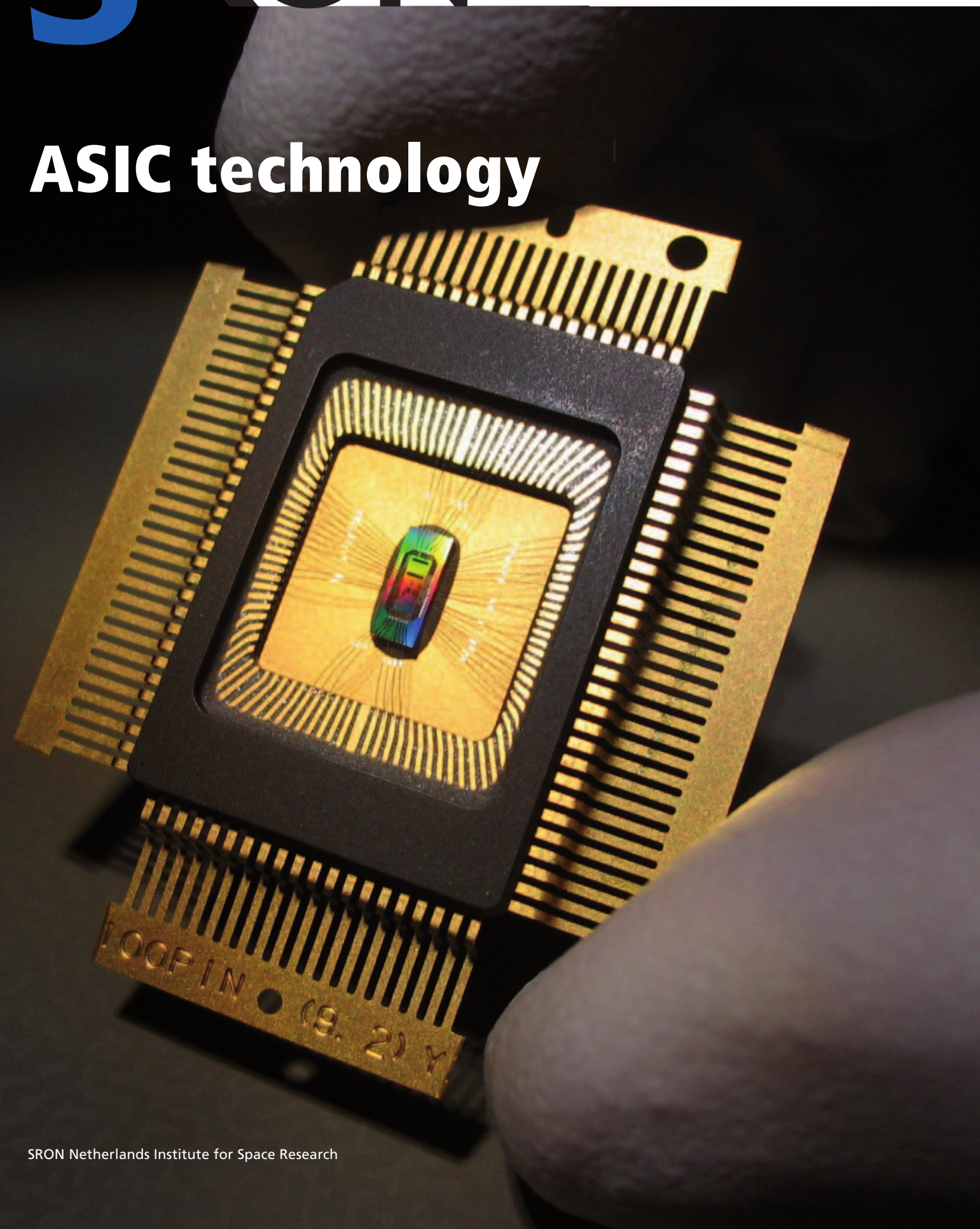


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Images: SRON

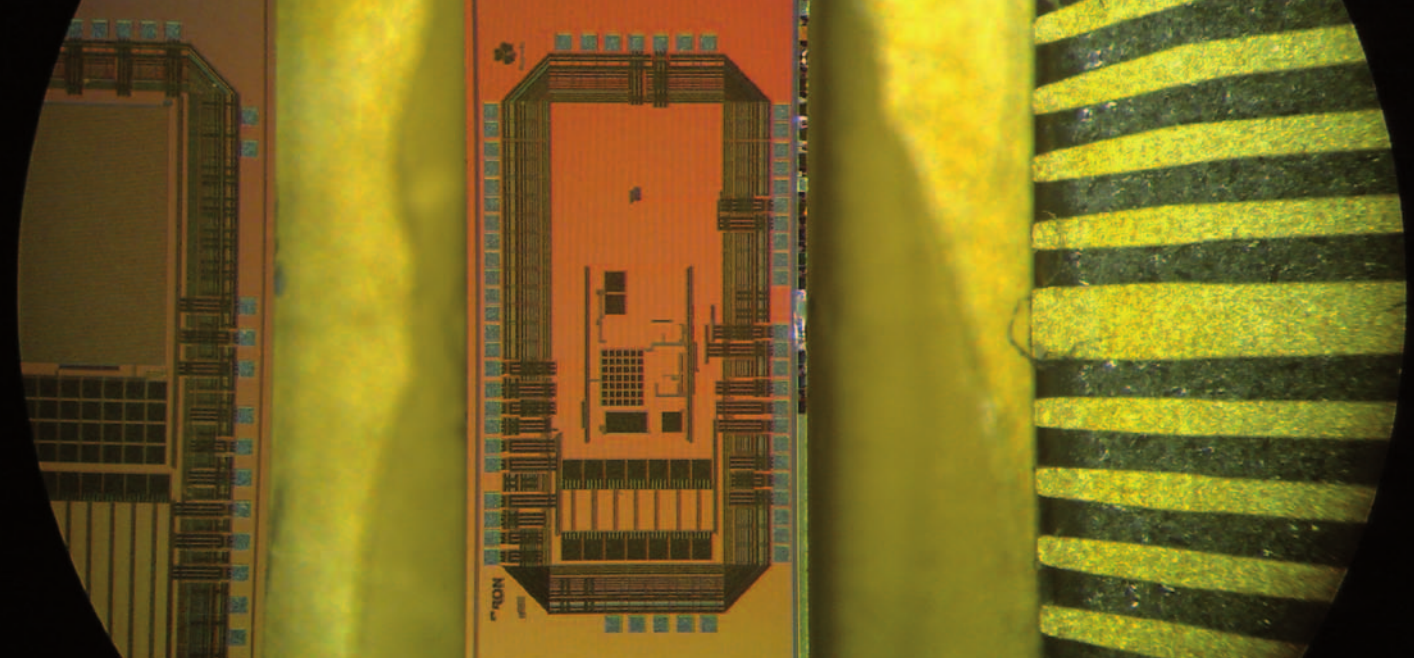
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SRON Netherlands Institute for Space Research started working on the development of Application Specific Integrated Circuits in 2003. Space research is placing increasing demands on the performance of electronic circuitry, whereas the maximum weight for space missions is decreasing. The solution to this problem is the development of complex integrated circuits that can withstand the harsh environment of space while still meeting the required performance.

Some of these integrated circuits can be used outside the area of space research. This is the case with the chips that SRON has developed for the read-out of a seismometer instrument for the ExoMars mission: a high-resolution Analog-to-Digital Converter (ADC), a high-resolution Digital-to-Analog Converter (DAC) and a temperature sensor.



Radiation-hardened, on-chip temperature sensor

This temperature sensor measures the on-chip temperature. Using these measurements the accuracy of an Analog-to-Digital Converter (ADC) can be improved by correcting for any temperature dependence.

Key points

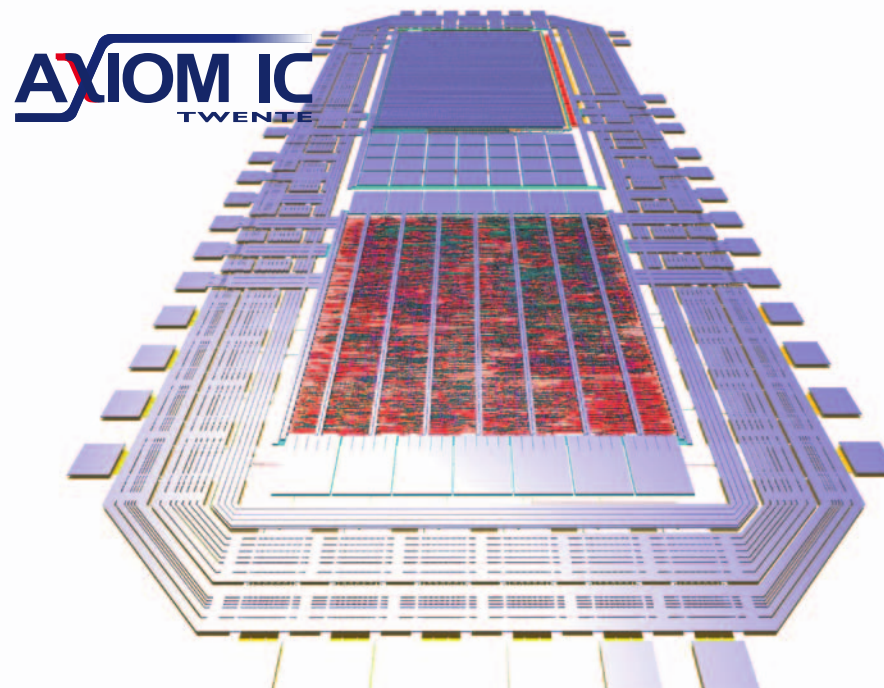
- Temperature range from -120 °C up to 120 °C
- Resolution: 0.06 °C
- Active area: 0.29 mm²
- Radiation-hardened up to 133 krad
- UMC CMOS IC process with 0.18 µm minimum feature size

Applications

- Thermometers with a large range
- Accurately measuring temperatures down to -120 °C
- High-energy physics (radiation-hardened)

Market opportunities

- The circuit can be manufactured as a separate chip, but can also be added as an IP block to an existing chip design



High-resolution, radiation-hardened ADC

SRON, in cooperation with Sensixs Design, has developed a high-resolution, Analog-to-Digital Converter (24 bits ADC). The ADC can be used for the read-out of extremely sensitive sensors and very low frequency signals.

Key points

- ADC with high output resolution of 24 bits
- Sample frequency: 100 Hz
- Low noise level
- Low power consumption
- Radiation hardened up to 133 krad
- UMC CMOS IC process with 0.18 µm minimum feature size

Applications

- The ADC can be used to read out (with high resolution) sensors with a maximum signal frequency of 40 Hz, for example:
 - Seismometers or accelerometers
 - Biomedical applications
 - Measurement or instrumentation applications
- Due to the low noise levels at low frequencies, this ADC is ideal for the read-out of extremely low frequency signals.

High-resolution, radiation-hardened DAC

Together with Axiom IC, SRON has developed a high-resolution Digital-to-Analog Converter (DAC). The DAC is robust against extreme external conditions, such as large temperature variations and radiation.

Key points

- DAC with high output resolution of 18 bits
- Low noise levels
- Low power
- High temperature stability
- Bandwidth up to 20 kHz
- Radiation-hardened up to 133 krad
- UMC CMOS IC-process with 0.18 µm minimum feature size

Applications

- Low-speed control applications such as:
 - actuator/servosystems
 - gain/offset calibration
- Biomedical applications
- High-end audio

