zhaw School of Engineering

ISC Institute of Signal Processing
and Wireless Communications

Institute of Signal Processing and Wireless Communications (ISC)

Product innovation in sensor signal-based information processing

Main focus:

Electronics - High frequency technology

Design of adequate hardware for analog signal
signal processing up to highest frequencies:

- Sensor electronics
- low-power, low-noise electronics
- RFID and energy harvesting
- RF transmitters and receivers
- antenna design, RF measurements
- Optoelectronics (with IAMP)

ADC for Multifrequency-GNSS-Rx (BP-Sampling).

Telecommunications - Wireless Communication

with focus on data transmission for:

- RFID, BLE, WiFi, LoRa, UWB for IoT/I4.0
- DAB and DVB-T
- Avionics (e.g. ADS-B)
- Mobile Communication (3G, 4G, [5G] IoT)
- mm-wave FMCW radar
- GNSS (GPS/Galileo, RTK)

Avionics-Receiver (ADS-B).

Digital signal- and image processing

with efficient algorithms in hardware (FPGA),
firmware (MCU/DSP), software (GPU, CPU, App):

- classical DSV (FFT, filter, multirate)
- stochastic DSV (LMS, RLS, Kalman filtering)
- digital image processing
- computer vision (stereo vision,
    3D-profilometry, SLAM)
- DNN-based classification
- Matlab/Python simulations
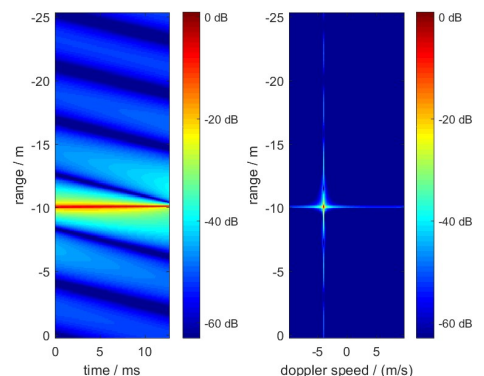
Radar signal evaluation (range-time/Doppler-map).

Team

- Lecturers: 9 (full time) und 2 (part-time)
- Research associates and assistants
  (with Bachelor or Master degree): 19
- Master students 5 + 3 (extern)
- Technical Personal: 2

Equipment

- Digital oscilloscopes up to 80 GS/s, 4 CH, 4 GHz
- Real-time spectrum analyzers up to 26 GHz
- Network analyzers up to 20 GHz
- Field strength meters 9 kHz- 3 GHz
- Signal generators up to 32 GHz
- Arbitrary Waveform Generator 14 bit / 2 GS/s
- multi-channel PCI ADC card 14 bit / 200 MS/s
- SMD soldering workstation with reflow and steam
-       phase soldering oven for prototypes
- GPS simulator/generator
- climatic cabinet 37l, -40 - 180°C
- thermal imaging camera
- various DSP and FPGA boards
- various SW tools (e.g. CST Studio, Altium,
-       Matlab, various MCU/DSP IDEs)
- antenna measurement hall / absorber chamber
  (LxWxH inside: 3.7 x 1.9 x 1.8 m)
- frequency range: 500 MHz - 110 GHz)

Location

TN-Building
Technikumstrasse 71
CH-8401 Winterthur

Contact

ZHAW School of Engineering

Institute of Signal Processing and
Wireless Communications (ISC)

Technikumstrasse 71

CH-8401 Winterthur

Switzerland
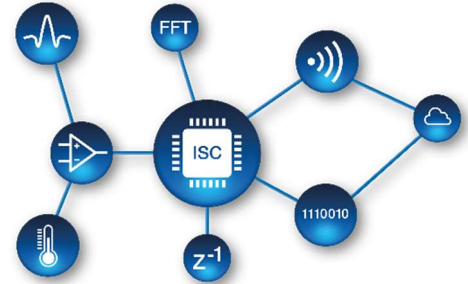
Prof. Dr. M. Rupf, TN O4.24
phone: +41 (0) 58 934 71 29
e-mail: marcel.rupf@zhaw.ch

www.zhaw.ch/isc