

Personalia

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Born May, 31 1963 at Brasschaat, Belgium.

Married to Karin De Wulf since 2007.

Two children.: Walter (born July, 27 1989) and Karen (born January, 18 1991).

Education

Master (industriël ingenieur) in Electronics Engineering, computer-engineering at the IHAM, Antwerp (graduated in 1987 with distinction)

Full-year specialisation course mathematics at the Sint Jan Berchmanscollege, Antwerp, Belgium.

Extra courses on :

- DSP techniques
- Control Systems
- Android kernel and application development
- C++ programming
- Digital communications, wireless design
- Solaris 2.x internals & Solaris 2.x device drivers
- Presentation and meeting techniques, people management training, project management
- VHDL design, Synopsys tools
- Networking, TCP/IP, LAN switching and troubleshooting (former Certified CISCO engineer / CCNA)
- ...

Technical Qualifications

Quick, creative problem solver; capable of learning new systems and techniques in short time

Good complete, high-level system overview, system architecture design

Embedded real-time critical software design experience

ASIC system design, ASIC system testing, FPGA programming

Hands-on programming experience in several programming languages (both assemblers and high-level)

In-depth knowledge of network (WAN and TCP/IP) operations

Design of microprocessor, digital and analog circuits

Hands-on experience in high-precision control systems (digital servo motor loops)

Knowledge of and experience in digital signal processing and DSP

Wireless communications, base band and MAC layer; hands-on satellite communications, Ultra-Wide-Band experience

Good knowledge of modem and decoder DSP algorithms, error correction, digital modulation schemes

Basic working knowledge of RF design and antennas

Project management and team leader experience (including recruitment and evaluation processes)

Languages

Dutch : native

English : fluent in conversation, reading and writing good

French : fluent in conversation, reading good, writing good

German : sufficient for conversation, reading good, writing limited

Italian : basic knowledge, lacks exercise (2 years of evening classes)

Keywords

- Ultra-Wide Band modulation, ultra-low power design, ASIC development, Radio Energy Harvesting
- Android, Linux, FreeRTOS, device drivers, kernel modules, MAC OS X, SUN, Unix, Solaris 2.x
- embedded SW, firmware, C, C++, Python, GoLang, Tcl, Fort, Perl, HTML, PHP, Modula, occam, Pascal, assembler
- Hardware, digital design, STM32, ARM, PIC, Microchip, 68k, QUICC, Z80, microcontrollers, transputer
- DSP, TI TMS320, Analog Devices Blackfin, Visual DSP, VDK
- MyHDL, VHDL, FPGA, Xilinx, Altera, Celoxica, Matlab, pylab, Synopsys, numpy, jupyter, SWIG
- OFDM, CDMA, spread-spectrum, DSSS, wireless communications, satellite communications, modem, Viterbi, GPS
- Wireless MAC layer, wireless streaming video, OmNet++, network simulations
- Hard real-time, digital signal processing, parallel processing, data-flow algorithms
- System architecture, team selection, team leader, high-level customer interaction, venture capital meetings
- Project management, customer and supplier interaction, customer training
- Patents on OFDM PHY layer, dedicated MAC processor and streaming video protocol, spread-spectrum codes, indoor location systems, decoding algorithms , UWB modulation, location algorithms, radio energy harvesting

Experience as employee

enjenyè (2022 - now) – Independent Contractor – see next page

- Restarted my own business in consulting and design services, focusing on wireless communications, but accepting all design work around DSP and embedded real-time software.
- Customers range from satellite communication businesses to fuel cell control designers — see next page for examples.

UWINLOC (2015 - 2022) – co-founder / CSO / CTO

- UWINLOC developed a new technology for indoor location based on passive tags using radio harvesting and UWB.
- I was the technical co-founder and driving force behind the original idea and on for the related research, on UWB transmitters, radio energy harvesting, modulation, error correction, receiver architecture, and location algorithms.
- As a cofounder I was interacting with customers, development partners (a.o. universities), investors and acquirers.
- I was the system architect of the whole system as well as both full-custom ASICs, and developed the receiver FPGA, and parts of TAG and receiver embedded software, mainly focussing on the signal processing and real-time aspects.
- I also co-designed the first hardware of the ultra-low power transmitter TAG and sensitive low cost UWB receiver.

Davidson (2012 - 2014) – Consultant

- ELTA : for a wide-band satellite receiver development, I ported Linux on an in-house developed QorIQ processor board, including hardware debugging and device driver development. I also designed the main controller software architecture.
- Intel : follow-up and debugging of Intel-specific platform device drivers for Android, cooperating with an international development team. This includes software tool development and low-level kernel debugging.

DCIM (2006 - 2012) – Independent Contractor – see next page

- Started my own business in consulting and design services — this company was restarted in 2022.

Telindus (2005 - 2006) – Firmware Engineer

- I was responsible for some of the embedded firmware for the LAN based products of the Telindus Access products,.
- I also designed and developed their new in-house firmware testing platform, based on Tcl/Expect.

SpaceChecker (2003 - 2005) – System Architect / Senior SatCom Engineer

- SpaceChecker developed and marketed a system for remote asset tracking, based on geo-stationary satellite and GPS .
- I developed the complete modem digital hardware (Blackfin DSP and PIC micro controller), the complete satellite network protocol, the satellite communication system and the ground station architecture and implementation.
- I was also involved in the modem series production (production level automated test definition and implementation), modem certification (EMC testing follow-up), modem and ground station RF design (system specification, link budget verification, level plans and integration testing) and ESA project follow-up (documentation, presentations).
- I guided the modem software development team (2 people) and interfaced with external partners for RF design.

M-TEC WIRELESS (2000 - 2003) – System Architect / CTO

- M-TEC WIRELESS was developing IP for a wireless in-building 5 GHz OFDM link for high-bandwidth, low latency streaming video. This IP concentrated on the MAC layer and a proprietary streaming video protocol.
- I was the technical responsible, first as system architect, and later as CTO. I hired, coached and guided a small design team of highly specialised engineers. I maintained a link with our technical partners (e.g. XILINX and IMEC).
- I gave high-level presentations to customers such as Sony and LG, and interacted with potential venture capitalists.

Telepolis (1999 - 2000) -- Project Manager

- Telepolis is the IT center for the city of Antwerp, taking care of the city-wide network MANAP As a project manager
- I was mainly concerned with infrastructure projects and the evaluation and introduction of new software tools.

Sirius Communications (1997 - 1999) -- CDMA Application Engineer

- At Sirius Communications, a company specialising in CDMA satellite communications, I developed hardware and embedded software as well as doing the supervision and follow-up. These projects included the basic development board, test equipment and customer-specific projects, based on a proprietary ASIC and a TI DSP running code in C.
- I gave presentations and on-site customer training, and managed the contacts with several suppliers.

Alcatel-Bell (1993 - 1997) -- Development Engineer

- At Alcatel-Bell I started in the Defence Department as a design engineer for a tactical network. I developed two communication boards, both hardware and software with military-grade documentation and methodology.
- Afterwards, I joined the Space Department Ground Segment, where I was responsible for the Baseband project. This included top-level system design, interfacing with the customer and project follow-up, as well as signal processing algorithm design and test. I also was responsible for the FPGA-based digital hardware front-end design.

Grafitroniks (1987 - 1993) -- Development Engineer

- Grafitroniks was a small (10 people) company specialised in complete computer-systems for sign-making.
- I developed a multiple vinyl cutting machines based on the 68K processor with software in C / assembler / Modula-2 and a complete routing machine with 3 servo-motors (transputer hardware and control software in Occam)
- I was responsible for external production, customer service, exhibitions, installing machines, and customer education.

Sample projects as independent contractor

Radar Test Equipment (duration : 2 years)

- Design new architecture for radar test equipment, from the ground up. High speed embedded Application Specific Instruction Processor (ASIP), including compiler, assembler, debugger and software runtime libraries.
- Novel low-overhead, high code-density DSP architecture design in FPGA using MyHDL/VHDL for specific secondary radar modulation schemes (under NDA).
- Implement the required radar test algorithms in the processor, and design the hardware interface blocks in FPGA, including the low-latency, low-jitter inter-processor communication links and protocols.
- Assist and partially implement the overall system simulation and test strategy and tooling.

Borehole Inspection System (duration : 1.5 months)

- A company specialised in geology borehole inspection systems (used in surveying for petroleum and minerals) needed an upgrade for their probe communication link. Due to improvements in sensor quality, the existing 20 kbps (worst-case) did no longer suffice.
- Together with the customer, we decided to do some basic research on possible solutions.
- After redesigning the modulation scheme and network protocol, the resulting link speed was 45 kbps in worst-case.

Optical tracking equipment (duration : 1 week)

- The client was experiencing problems with an externally developed optical tracking unit (NDA).
- We did the assessment of the design and architectural problems (including a small test-setup for verification), and suggested possible solutions.

Sodium Meter software porting (duration : 2 months)

- The hardware of an existing sodium meter solution was end-of life, and the old software had to be ported under MS-DOS to the new hardware platform.
- We ported the Turbo-Pascal code, wrote new hardware drivers, and rewrote most of the old Borland graphics library to support the new hardware while satisfying stringent performance requirements.

Magnetic Card Reader (duration : 6 months)

- The customer wanted to replace the existing magnetic card reader solution with an IP block on board of a new custom ASIC (NDA). Requirements included better decoding and interference robustness.
- After some testing, we specified the hardware block for embedding in the ASIC.
- We developed a high-performance, ultra-robust, low-overhead decoder algorithm for the on-board ARM processor.
- We aided the ASIC testing and the porting and integration of the final decoder SW into the complete system.

Satellite Modem (duration : 2 years)

- For a track-and-trace system, the customer needed a redesign of his satellite modem system, both the terminal and the base-station.
- We developed the terminal and base-station architecture, defined the satellite link protocol, developed and verified the modulation scheme.
- We supported a small team (5 people) for design decisions in HW, SW and system design.

Fuel Cell Measurement System (duration : 3 weeks)

- An existing fuel cell measurement system lacked sufficient storage for long-term stand-alone operation.
- We ported an open-source FAT file system for an SD-CARD on the free SPI interface, and developed a 1-to-3 data-compression algorithm on the existing PIC based hardware.

TinyOS driver (duration : 1 week)

- For a demo, the customer needed quickly a driver for his off-the-shelf wireless TinyOS based development system.
- Within two weeks after the request, we developed the driver, based on TinyOS sample code.

BlackFin DSP USB driver (duration : 2 months)

- As a feasibility study for a new development (NDA), the customer needed a very fast (> 20 MBps) USB 2.0 link between an Analog Devices BlackFin DSP and a PC.
- Requirements were a high SW flexibility, cross platform, and the best possible data-rate.
- We debugged the experimental Analog Devices USB stack, created a high-throughput USB protocol, and wrote the PC-side SW using libusb. Final data-rate was 25 MBps.

Radar Controller (duration : 3 months)

- For a specific application (NDA), the customer needed a short-range 24 GHz radar.
- As a subcontractor for the RF design company, we designed the digital part that controlled the RF, filtered and extracted the measurement, and maintained the link to the back-end over a proprietary bus.

GPS receiver production test-bed (duration : 6 months)

- The customer is one of the leading manufacturers of high-end professional GPS receivers.
- We were part of the production testing team using on-board software and JTAG boundary scan techniques.