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CURRICULUM VITAE

Michael is a very passionate and very broad systems development engineer, experienced from areas as vast apart as electronics HW-design to SW-cloud services via mechatronics robotics and distributed controller systems.

Where he's most comfortable however is in deeply embedded and/or distributed microcontroller RT-systems or embedded Linux using classic GNU/UNIX tool-chains. Michael is also very comfortable with kernels internals and low-level drives, which his 3:rd RTOS *Tinker* spare time developed since 1999 is a good example of.

Broadness comes with long experience from the many areas he's worked in, but also from starting very young and from a sincere personal interest in physics, technology and engineering. *"Toys should have cogs and stuff."* he says.

He started with electronics as a child and 9 years of age he was annoying his mother, wiring up the apartment with alarm-systems and radio-transmitter's (PCB:s etched and manufactured by hand). Not until the teens did he first come into contact with computers. His first program was "hello world" on a PDP11, but the second was skipping everything and aiming for assembly-code with the motivation to be able to inspect binaries for hacking games for Z80 and 6502. *"Hacking games was for fun, never for money. The reward was actually playing them."* he says.

A three decades long career and many MPU:s later Michael is now an entrepreneur and a one-man SW/HW design house, covering an area from high-volume consumer products to *"one off"* scientific lab-equipment. Different product designs require very different technologies and experience from many different areas and the ability to cover a big area from different angles is one of Michaels most valued trades. I.e. the ability to make the better choices based on robust knowledge of "what works".

"Everything in engineering is a compromise. Unless you are experienced enough you don't realize that, but that is also what makes a better product." What drives Michael and gives him energy to invest the amount of time necessary to become as skilled as he is, is passion. Passion is having fun and technology are his toys. That being said, he's also not afraid of taking a lot of responsibility when needed, as during his career as specialist for life-critical R&D.

Michael is also a passionate sailor and teamplayer.

*In 2015 as part of celebrating his 50'th birthday, he joined **Team Pixel** in Atlantic Rally for Cruisers, Las Palmas Spain - St. Lucia The Caribbean's, who came in second place at 16 days, 8 hours and 3400 nautical miles.*

***Personal motto:** Focus, commitment and willpower
For Fun: CAN/RF based distributed systems & IoT*



Happy ARC:ers: St. Lucia 17 Dec 2015

CAREER HISTORY

Senior Software Engineer

Medius AB, Helsingborg – 2017 - current

In Feb 2017 Michael decided to investigate IT and the hype about Azure clouds, specifically *Service Fabric*. At medius he developed Distributed Domain Metrics, a load measuring system utilizing SF Actors, which is a take on the **actor model** as described by Carl Hewitt et.al 1976 for distributed process calculi.

Key words: C#, Azure Service Fabric, Actors

Embedded Systems Specialist

Sigma Connectivity AB, Lund – 2015 - 2017

Michael joined Sigma Connectivity for the purpose of exploring IoT. Here he contributed into development of the *Sirin* phone, in a fashion very much like Kaitum/Kalix. Albeit with more people, but still far less than was considered normal at Sony.

During this period Michaels 50th birthday was upcoming and he took a leave of absence crossing the Atlantic with *Team Pixel*. where experienced extreme team-play in a form very suitable to his personality..

Upon return he was offered to *architect* and *lead* a small team to develop a very constrained resources but still advanced BLE IoT wristlet. This wristlet, albeit very small, was in fact a complete programmable computer system. The purpose was to be able to create visual and acoustic effects in large numbers during big social events utilizing 10 thousand or more users at the same time and on que. This was quite a technological challenge, considering the power and physical constraints, which has not been done before.

Key words: nrf52832, BLE, Lua, architect, leadership

Systems Engineer - MIB

Sony Mobile Communications AB, Lund - 2008 - 2015

Michael started his company *Helsinova AB* and as a freelance consultant, started for the MIB at SonyEricsson (later Sony Mobile Communications) working with incredibly varied but fun tasks.

MIB whose name was inspired by the movie *Men In Black* was an elite organization within SonyEricsson whose sole purpose was to fix what nobody else could.

People were recruited from all over the world but

only the very best. No-one was envisaged without undergoing difficult trials. When he started he didn't know, but soon realized how prestigious working for MiB actually was.

Many times, MIB literally saved the company from the bottom of the abyss. The following are a few examples of the work:

> As one in the gang

Actively contribute to the difficult switch for *Sony Ericsson* to switch to Android from OSE. From the first stumbling steps, to handsets of the absolute highest quality and best performance on market.

Help participated in developing a variety of analysis tools of incredibly high technical level. Which no doubt contributed to that SonyEricsson as a handset brand survived when many other perished.

> As a soloist

Michael works best where he can track his own way. These tasks were such that, albeit a team, each team-member worked more or less alone.

- Kaitum / Kalix Android phones

With a hand-picked team, of which only 3 persons were from software, bring-up 2 complete alternative phones that were not based on the poorly-liked Qualcomm platform, but on nVidia's *Tegra 4* and another on TI's *OMAP 4* was made. The probably only reason this project was allowed to exist was that HQ in Japan did not think it could be done.

Politics are politics and there were not any products coming out from either Kaitum or Kalix. The satisfaction and pride was however priceless!

- System Analysis / Competitive Intelligence

In the last 2 years before the last traces of development in Lund disappears Michel was offered to work for the group "Competitive Intelligence". The task was to figure out where the competitors were, i.e. how they solved difficult things, by observing and analyzing. Some of the methods were in the gray zone. But most could be done by just carefully observe and analyze. For this purpose Michael et-al developed pristine and very advanced tools.

In this group, Michael additional developed a dedicated pico-GSM station based on *Open Source* and a generic *Software Defined Radio*. which the group used to prove how vulnerable competitor's phones were. The group also proved that Sony's own handsets were not much better.

Key words: Android system, Linux, Linux kernel, GNU tools, GNU post-mortem debugging techniques, Crash (the tool).

Senior Specialist Embedded Systems

Respironics, Critical Care Division USA, Malmö
2007 - 2008

After about 12 years in exile in Stockholm but with great successes in his luggage, both he and his beloved wife were longing home to Skåne. A former colleague at Siemens had started his own research **engineering shop** in Malmö and had managed to establish a good relationship with their former employer's worst competitor Respironics. As part of a team of three highly skilled multi-disciplinary R&D engineers, Michael develops the software for Respironics next generation gas-valve consisting of a dual core, dual architecture automotive Freescale MPU. Later redone with a corresponding TI MPU as the former was too weak. Two new custom-made kernels were developed accordingly from bare-metal and up.

Key words: Custom made RTOS, ARM Cortex-m4f, CAN, Codewarrior, medical life-critical industry, TMS570, S12, XGATE

Distributed embedded RT-systems Specialist

Maquet Critical Care (formerly Siemens Elema),
Solna 2004 - 2007

Michael was engaged in saving the Anesthesia machine KION. In record time he led a hand-picked team to develop a new patient monitor based based on embedded Linux and Qt.

Another team with Michael as mentor were later commissioned to rescue another of Getinge's efforts: The take-over the newly purchased **Jostra GmbH**, including full competence transfer. Jostra's product range were world leading heart-lung machines (**HL-30, HL-20**).

Key words: Innovation & leadership, Qt, Embedded Linux, CAN, medical life-critical industry, Corporate business

Research engineer Specialist

Maquet Critical Care (formerly Siemens Elema),
Solna 2002 - 2004

Siemens Elema Critical Care underwent an organizational change when the division was sold to the Swedish **Getinge Group** and joined the subsidiary **Maquet**. Michael was offered the role as specialist in the research group but under the development organization. Michael job was

primarily to educate and to spread competence from the research department into development.

Secondarily he participated in most of the research groups clinical research, designing and building very advanced prototypes used on animal and human trials.

Key words: Innovation & IP

Embedded development engineer

Siemens Elema, Life Support System Division
Solna, 1998- 2001

After completing his assignment at Pharmacia, Michael was offered employment with his first customer Siemens. It was still the same anesthesia machine (KION) and the project had gotten itself into serious problems as patient incidents had occurred. Michael offered trying to analyze and correct what had happened.

Tools were developed and measurement and analysis could prove not only that the machine was unsafe but how unsafe it was and which subsystem was causing issues. This proved to be extremely challenging, as the issues were intermittent and were not isolated to a specific subsystem but to the RTOS used (more specifically, how it was used) and because statistical analysis was the only way to quantify the errors.

Michael later joined the research-department under the prominent manager **Georgios Psaros**, holder of many patents and winner of the **Polhem prize 2011**. Under **Georgios** lead, the group was offered a task to make a fully working anesthesia machine prototype of Georgios patented **mini circle filter arrangement**, including clinically prove function and relevance. During this endeavor Michael developed various MCU systems, both Matlab based and bare. Michael additionally contributed in several patents for the mini-circle anaesthesia. The prototype was later further developed into a product by other teams for several years. The finished product was named **Flow-i** and saw the first light of the day at the **Medica exhibition in October 2007**.

Key words: Embedded Linux, Cava, Qt, Matlab RT workbench, statistical analysis, CAN, medical life-critical industry, CANalyzer, CANoe

Embedded development engineer

Pharmacia and Upjohn
Uppsala, 1997- 1998

Development of UNICAP 1000

Key words: *Finite State Machines FSM , medical analysis industry*

Embedded development engineer

Siemens Elema, Life Support System Division
Solna, 1997 - 1998

Michael is offered employment as consultant for **Elektronen Alf AB** and he and the family moves to Stockholm. Elektronen was a startup consisting of 6 people including Michael at the time. When Michael leaves Elektronen 1998, he has helped build-up the company to over 40 persons.

The first assignment was for Siemens Elema, a worldwide company developing **life-sustaining medical technology** for clinical caregivers. Michael participated in a development team of ~50 highly skilled **multi-disciplined** engineers with the development of the anesthesia machine KION.

KION is a Distributed machine consisting of a number of fully autonomous subsystems, in all 9-11 nodes on a CAN network with sub-system boundaries overlapping both each other and node-boundaries. The FDA required redundancy in SW/HW was needed for execution safety, graceful decline, measurement and control separation. He was lead SW/system developer for the central node (breathing) and later also responsible for the machine's entire CAN-network definition.

Key words: *CAN, anaesthesia, safety critical execution, real-time, medical life-critical devices*

Embedded SW development engineer

Tecator AB
Höganäs, 1995 - 1997

Michael participates in the development of Tecator's **paper pulp tester & analyzer**. The system was based on the Real-time operating system **QNX** which became Michael first acquaintance of

UNIX-like systems. As QNX is a beautifully crafted OS, this also became the start of a life-long commitment to POSIX for embedded systems, something that he is passionate about to this day. The interest soon after led to Michael's Tinker RTOS with a POSIX 1003.1c pthreads implementation long ahead of Linux.

Key words: *QNX, paper & pulp, process industry, Tinker, POSIX, embedded*

Student

MIUN university college, campus Sundsvall
Sundsvall, 1995

Finalizing studies

Embedded SW development engineer

Aptus Elektronik AB
Helsingborg, 1993 - 1994

Development of HW, SW and mechanics for the code-locks EC100, EC150 and EC250. Michael additionally developed a primitive kernel (his second) based on round-robin utilization of left-over CPU-sleep.

Key words: *Bare metal SW, Z80, 8051*

Student

MIUN university college, campus Sundsvall
Sundsvall, 1991 -1993

Embedded HW/SW development engineer

El-Fi innovationer AB
Helsingborg, 1989 - 1991

Solo developer of electronics design, CAD and mechanics for process-industry electric power-monitor used for ventilation fans and belt electric motors.

SW development of soft-starter interface.

Key words: *Electronic design, CAD*

Education and formal training

Data Electronics college university
Including Supplementary courses equivalent to
BSc
Mittuniversitetet, Campus Sundsvall - 1991 - 1995

5th year Technical College, Computer Science in.
Dragon School, Umeå. - 1987 - 1988

4-year Technical College, Electronics.
Tycho Brahe, Helsingborg - 1981 - 1985

OTHER EDUCATION

Heart-lung rescue
Pharmacia & Upjohn, Diagnostica Uppsala - 1997

Recurring annual courses
Siemens / Maquet Critical Care, Solna - 1997-2007

- Good Manufacturing Practice (GMP)
- Electrical safety
- ESD

Rhetoric and presentation skills
Siemens Critical Care, Solna - 2003

Project Management
Siemens Critical Care, Solna - 2005

Java for C++ programmers
Siemens Critical Care, Solna - 1999

Advanced Linux drivers for embedded systems
Monta Vista, Solna - 200

LEISURE ACTIVITIES

Michael spare time is mostly spent with family,
sailing and designing IoT gadgets.

*Sailing is either as solo-sailor in his 27' Vega or as
blue-water extra hand (crew).*

OTHER

Born
25/11 1965 in Olofström
Relationship status
Married to Åsa since 1991

Children (grown-up)
Gabriella -91 and Douglas -99

Military Command - Petty Officer HMS Belos,
Berga Military Schools in Stockholm
1985

Tinker RTOS <https://github.com/mambrus/tinker>
1999 -

Contact person - Hedemoravägen Cohabitation
Society
1999 - 2007

Vice Chairman - Industry Group Mechatronics
DAMEK
2001 - 2002
*KTH in collaboration with CHASE Mekatronik at
Chalmers as well*
Industry representatives

PATENTS

Anesthetic filter arrangement - U.S. Pat.
Publication number: US 2003/0199804A1

Michael Ambrus profile

Embedded HW/SW systems developer/specialist/leader

SKILL PER CATEGORY

Note: Experience-scale is capped at 10 years

Developing or Analyzing for:

<i>Skill</i>	<i>Level</i>	<i>Liked</i>	<i>Last use</i>	<i>Years</i>	<i>Implicit</i>	<i>Pre career</i>
Deeply embedded systems	5	5	2016	10		
Embedded systems	5	5	2015	8		
Distributed controller systems	5	5	2016	10		
C	5	5	2017	10		
Lua / eLua (C-integration)	5	5	2016	1		
Lua (scripting)	2	5	2016	1		
C++	4	2	2005	6		
AWK & Sed	5	5	2016	10		
Bash (scripting)	4	5	2017	10		
C#	3	4	2017	1		
.NET (C# libraries)	2	3	2017	1	x	
Java	5	3	2013	4		
Java libraries	1	2	2013	4		
Android system/middleware	5	4	2013	4		
GNU tool-chain (using)	5	5	2017	10		
GNU cross tool-chain (building/modifying/extending)	4	4	2015	5		
Qt (V3.5)	5	5	2005	5		
Perl	3	3	1997	1		
Matlab Real-time wokbench	3	3	2005	2		
Expect (Tcl extension)	3	5	2005	4		
Microsoft Windows	3	1	2017	5		
Newlib (building/modifying/extending)	4	5	2005	3		
Newlib based system dev/depl	5	5	2016	6		
POSIX 1003.1c & 1b (pThreats & RT)	5	5	2016	10		
Kernel Device Drivers (POSIX kernel or Linux)	5	5	2016	10		
Kernel core-internals (POSIX compliant)	5	5	2016	10		
Kernel core-internals (Linux)	4	5	2013	5		
Mechanics design (mechatronics)	4	5	2005	5	x	
Electronics design (base-band)	4	5	2014	5		x
Electronics CAD (specific)	5	4	1988	2		
IoT (RF)	5	5	2016	10	x	x
Pascal	4	5	1996	3		x
OOP / OOD	4	2	2017	5		
IT-systems (enterprise solutions, banking e.t.c.)	3	3	2017	1		
RDB (SQL RAD)	4	4	2004	5		
Azure Service Fabric	3	2	2017	1		
Git (using)	5	4	2017	10		
CAN	5	5	2005	9		
I2C	5	5	2016	3		
BLE	3	5	2016	1		

Development environment:

<i>Skill</i>	<i>Level</i>	<i>Liked</i>	<i>Last usec</i>	<i>Years</i>	<i>Implicit</i>	<i>Pre career</i>
Vim (exl. Vim-script)	5	5	2017		7	
X (Gnome, KDE, Unity)	5	3	2016		10	
I3 tiling WM	4	5	2016		3	
Screen	5	4	2017		7	
Codewarrior	3	3	2008		3	
Code Composer Studio (TI)	3	3	2008		2	
IAR Systems	3		2001			
KEIL	3		2005			
Codewright	5		2004			
Kdbg	5		2016			
KDevelop (4.x)	NA	NA	2005			
Qt-designer (3.5) RAD	5	4	2005			
Eclipse	3	3	2005			
Visual Studio	2	3	2017			
CANalyzer / CANoe	4	4	2005			

Host OS:

<i>OS</i>	<i>Level</i>	<i>Liked</i>	<i>Last usec</i>	<i>Years</i>	<i>Implicit</i>	<i>Pre career</i>
Linux	5	5	2017			
QNX	3	5	1996			
Windows	3	1	2017			x

Personality:

<i>Color</i>	<i>Tested year</i>	
	<i>2017</i>	<i>1998</i>
Red	9	10
Yellow	7	-1
Green	-2	-1
Blue	-14	-8