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Please find below a 30K foot view with the 5 most relevant points in the last 40 years.

Things began to happen when way back in the 80s, I learned and applied the concepts of reliable and fail-safe hardware/software while working with high-power propulsion (like radioactivity, things that you better have respect by default) and avionics grade electronics (blue screens while moving at high speed are a no option). I have never forgotten to honor them ever since.

My background is in electronics and engineering on industrial and research machinery. This gave me a sense of observing things from the inside, fully grasping their inner workings, and so being better positioned to infer their behavior accurately.

Then came the opportunity to work with analytical instruments as a gift. If it brought from one side the severe demand for 'really' understand and 'do apply' calculus, linear algebra, statistics, and several physics concepts (read sleepless nights); On the other, it was a superb chance to be in contact and learn with some of the best people in their respective activities. I thank the Lord for this.

But theories, devices, and methodologies are essentially predictable. Cut to being out of the comfort zone, enter the variable called people on the equation, and go to see things getting weird when you're in charge of customer care to a large pool of companies, building teams during missions in countries with diverse cultures, or providing sound arguments to back up sales initiatives (usually in a zap). It is a long road to master how to deeply understand customers' needs (an essential virtue) and to be fluid just enough to conquer respect either on the factory floor or at business negotiation tables and their chairs. I'm still riding (with humbleness) this road, knowing it has no end.

Considering the above, the practices of dosing innovation and creativity to the safe side mode development mainstream, dividing and conquering systems, and facing the hard work of learning to adapt to the unknown are composing a map that proved to be effective in producing a work path with no significant failures. Ok, it's naive to pretend failures won't happen, they do. But being prepared and keeping them small and manageable was one of the keys to be bringing many systems to life in the last two decades.

Looking ahead, I see a landscape where technology and computer power grows at such a fast pace that fantastic things can be crafted out Machine & Deep Learning in Data Science for example, all linked with powerful programable hardware to bring AI to things all around us or enhance the intuition of our research / financial fellows.

I want to be part of it. If you think the same, I'd like to invite you to keep reading (you may use the hyperlinks on this document to go deeper). Why not to team-up and show to the world something amazing and valuable ?

General Skills

- Embedded Systems ① ② ① ② ③ ④ ⑥ ⑨
- Machine Learning ① ② ① ④ ⑤ ⑥ ⑦
- Cloud ① ① ① ④
- Statistical Analysis ① ② ① ② ④ ① ④ ⑧
- Data Science ① ② ① ① ④
- Analytics ① ① ② ④ ① ④ ⑧
- Algorithms ① ① ② ⑥ ④ ⑧
- Linux Kernel ① ② ① ② ③ ④ ⑩
- Trading Strategies ① ⑧
- Blockchain ① ②
- Analog Circuits ① ② ① ② ③ ⑤ ⑥ ⑦
- CAD PCB Design ① ② ② ③ ⑤ ⑥ ⑦
- Reverse Engineering ① ② ⑤ ③ ⑥ ⑦ ⑧
- FPGA ① ② ③ ⑧
- ARM Cortex ① ② ① ② ③ ④

Programing Languages

C C++	88/22	① ② ⑤ ① ② ③ ...
Java	97/22	① ② ① ② ③ ④ ...
Python	16/22	① ① ② ④ ⑤ ⑥ ⑦ ⑧
JavaFX	19/22	① ① ② ④
SQL	98/-	① ② ④ ⑨ ⑩ ③ ④
VHDL	15/18	① ② ③ ⑧
Angular	17/19	① ①
R	21/22	① ① ①
Matlab	05/-	① ② ① ③ ⑤ ⑦ ⑧
Fortran	80/84	⑥

0 15+

Frameworks & Dev Tools

- scikit-learn ① ① ④ ⑤ ⑥ ⑦ ⑧
- pandas ① ① ② ④ ⑤ ⑥ ⑦ ⑧
- Flask ① ①
- Solidity/Geth ① ②
- OpenCV ① ①
- Spring ① ①
- GIT / Maven ① ② ① ② ...
- Docker / Kubernetes ① ①
- MongoDB ① ①
- Jupyter IPython ① ① ④ ⑤ ⑥ ⑦
- Google Cloud ① ① ④ ⑧
- IBM Watson ① ① ⑧
- IDA Disassembler ① ② ① ...
- Wireshark ① ② ① ② ...

Basic background & Languages

Curso Técnico Integrado – Engenharia Elétrica / Eletrônica
Escola Técnica Padre Landell de Moura - February 1975 – November 1978

Portuguese	Mother Tongue - native
English	First foreigner language. Good command both written and spoken
Spanish	Sister language to travel in the neighborhood. Good command both written and spoken
German	Second foreigner language. Basic classes during the stay in Germany. Good as usually written

Licences and Certifications

Data Science: Statistics and Machine Learning Specialization
Johns Hopkins University

- ① - Statistical Inference — Johns Hopkins University – April 2022
- ⑫ - Practical Machine Learning — Johns Hopkins University – June 2022

Blockchain Specialization
University at Buffalo / The State University of New York

- ② - Blockchain Basics — University at Buffalo / SUNY – March 2022

③ - An Introductory Guide to SQL
Educative Inc. – March 2022

④ - Google Cloud Big Data and Machine Learning Fundamentals
Google Cloud – March 2022

⑨ - Data Analysis & Processing with Pandas
Educative Inc. – June 2022

⑤ - Applied Machine Learning - Feature Engineering
LinkedIn Learning – May 2022

⑥ - Applied Machine Learning - Algorithms
LinkedIn Learning – May 2022

⑦ - Applied Machine Learning - Foundations
LinkedIn Learning – May 2022

⑧ - Algorithmic Trading and Stocks Essential Training
LinkedIn Learning – May 2022

⑩ - Applied Machine Learning - Ensemble Learning
LinkedIn Learning – June 2022

⑪ - Artificial Intelligence and Business Strategy
LinkedIn Learning – June 2022

⑬ - Lean Six Sigma Foundations
LinkedIn Learning – June 2022

⑭ - Six Sigma Foundations
LinkedIn Learning – June 2022

⑮ - Six Sigma : Green Belt
LinkedIn Learning – June 2022

Experience

System Architect - Development Manager

Opus Equipamentos Eletronicos e Ópticos Ltda. July 2008 → Now ①

Observing customer's requests in the past 20 years while developing systems for research and industry led to the following general initiatives/products being implemented (please use the link to go to the associated project and see better details):

- A custom, ruggedized, and clean Operational System based on Open Source Debian Linux to attend to the key concepts of freedom (no recurrent activation / no third parties), trust (all source code available / no eavesdropping), and simplicity (no useless gadgets or drivers loade). See on projects ASVP and PP200.
- A clean and fast desktop window manager (JAVAFX & C++ to interface with XLIB) resembling the successful Android canvas and activities management. A distraction-free, well-known look and feel and dynamic error check environment proved to raise the analyst performance effectively - See PP200 project and code in here @ MiddleStripB .
- An independent heavy-lift analytical core (Python - Scikit-learn and Pandas) providing services to implement AI strategies by Statistical Inference, Data Cleaning, Estimation, and Machine-learning. Note that it is real-time on the edge data processing (no fancy Tableau dashboards). Project ASVP has halved the expected analysis time (more than one hour). See ASVP

- A browser-based Research Server (Jupyter Notebooks) and IPython script executor on the analytical core to enable researchers to implement their theories and procedures. So no need to call for software upgrades; implementation is immediate. This server can be hosted on any Kubernetes managed clusters living on Google Cloud or IBM Watson environments, enabling genuine research cooperation or human resources administration.
- A robust hardware with very low MTBF was possible using a solid foundation in hardware development resources (quality IDEs and design tools), focus on well-known CPU cores (NXP ARM Cortex), stable toolchains (open source GNU GCC/Linker), use of FPGA when needed, the use of well-documented analog components and vendor design support tools, and a good simulation environment (PSpice MatLab).
- To do the legacy code interface always needed when retrofitting old instruments, the reverse engineering tasks were well supported by good tools like IDA Hex Rays, Wireshark, S010 Editor, JTAG probes among many others. The time spent to understand the inner workings of the linking, map and booting processes on several O.S. along with some assembler proved to be substantialy valuable.

Senior Developer

Antrax Tecnologia Ltda. July 2000 → July 2008 ②

- Design (JAVA and C) of applications and libraries to work under real-time, critical mission, or MISRA standard constraints, like state machines, multi-threaded executors, dedicated database entity managers, and class loaders among others.
- Use of the Netbeans Platform API (version 8.0) as a development foundation for new applications. Many fully functional (including hardware interface) systems to analytical instruments are serving customers today - see some of them @ https://github.com/ msantrax/Controle-F and https://github. com/msantrax/VehicleDynamics.
- Use of the Android API (until level 21 / Lollypop / Material) and Android Studio 3.0 as support (human interface) to analytical software (e.g.: UI /sensors I/O with NDK / native drivers on the underlying Linux / Device JTAG & Bootp procedures, etc). See project LGT8
- Build and use several Unix kernels, systems, and custom device drivers since 1997.
- Gluelogic and SOCs using Xilinx Spartan 3E FPGA (Xilinx ISE IDE + VHDL). See projects LGT8 and Iris

During the years, the goal of being proficient in the following tools was achieved :

- Printed circuit board PCB design (Proteus 8) – See project LGT8, Vehicle Dynamics and others
- CAD & CAE : SolidWorks and his interface with Electrical. - see assy & parts modeling @ - Centauro
- Design of microwave cavities and waveguides and RF coupling with the HFSS / Maxwell. See project DGT 100
- Optical systems design with the Zeemax. -- See project Iris
- Simulation and math modeling with MATLAB (INRIA SciLab) - See project LGT8

Field Service Eng. - LATAM Operations Manager

Thermo Instruments Brasil. December 1995 → July 2000 ③

Hired by a group´s subsidiary (Gamma Metrics - San Diego USA) to perform technical operations (commissioning and maintenance support of gamma neutron spectrometers) in South America, Africa, and the Middle East, where the following main jobs were successfully completed on more than 15 customer sites:

- Tight coordination with big industrial facilities builders (FL-Schmidt, KHD Humboldt Wedag, Krupp) as well as team management / supervision during the construction process of new production plants.
- Training of laboratory and technical electronics personnel.
- Start-up and first training of self-learning expert systems used to support the control of automatic production lines (e.g., cement raw material blending).

The service trips usually had 30 days span, visiting countries like Argentina, Brasil, Colombia, Egypt, Equator, Saudi Arabia, Senegal, and South Africa.

The technologies :

- Gamma-Neutron Spectroscopy (PGNAA - Prompt Gamma Neutron Atomic Activation)
- Sub-nanosecond pulse discrimination and Multi-Channel analyzers to LiF detectors. Design and stabilization software.
- Directions on high radioactive materials: theory, handling, and safety. Cf252 Neutron sources from Oak Ridge, Cs137.
- High-ton hoppers and material transport on cement plants. Industrial heavy structures build.
- Inductively Coupled Plasma Spectrometers ICP-OES from Thermo Jarrel Ash (Waltham – USA)

Field Service Operations Manager

Divec Vácuo e Equipamentos Ltda.. December 1991 → March 1994 ④

As the person in charge of customer care and service / sales support to the instruments sold in Brazil, the duties were:

- Management of all service calls, including calibration / certification, sales of spare parts, and consumer items to a pool of 420+ customers like steel foundries, mining facilities, cement plants, petroleum extraction, and research institutes (among others).
- Service and calibration of high vacuum equipment (turbomolecular pumps, quadrupoles), precision mechanics (RX goniometers), optical systems (monochromators), high voltage (RX power supplies), and small-signal / fast electronics circuits (particle detectors).
- Development, assembly, and logistics of seminars and training classes in the area of analytical instruments.

The technologies :

- Inductively Coupled Plasma Spectrometers - ICP from Fisons Instruments (Dearborn – USA).
- Optical Emission Spectrometers – OES and Wavelength Dispersive (Fluorescence) RX Spectrometers – XRFS from Applied Research Laboratories-ARL (Ecublens – Swiss).
- Energy Dispersive RX Spectrometers – EDX from Texas Nuclear and Kevex Corporation (Texas USA)
- Hydrogen Sulfide (H_2S) online gas analyzers from Houston Atlas (Houston – USA)
- Turbomolecular Pumps and Electron Beam Furnaces from Leybold Heraeus (Koln - Germany)
- Quadrupoles and Magnetic Sector Mass Spectrometers – ICPMS from VG instruments (Sussex – Britain)

Field Service Technician

Mesbla Aviação e Equipamentos. March 1986 → March 1991 ⑤

As an invited professional, I worked at the Spectro Analytical facilities located at Kleve - Germany. There, I was in charge of the following activities intended (and done !) to increase the sales of their instruments (optical / plasma spectrometers) substantially (calculated that more than doubled). They were:

- Technical support to the sales strategy & coordination or new customer prospection in the metallurgical and mining markets.
- Customer consulting directly from the factory and in native language on new quality control procedures set-up or any customer production-related problem-solving.
- Optical alignment, calibration, and quality control of the instruments that were sent to Brazil and eventually to Italy, Australia and China. During the stay, more than 50 instruments were delivered ready and certified to be working in the customer production line.
- Technical hosting and support to the customers visiting the facility either during the sales phase or the certification prior to dispatching.
- Know-how acquiring, aiming to support the set-up of a new Spectro facility in Brazil, target achieved in 1990.

Again as an invited professional, I did the quality control of instruments at Hilger Analytical facilities located at Margate - England in 1990.

in Brazil, I carried on hardware & software development, producing systems used to retrofit old instruments. From Apple II + Z80 using assembler & CPM/80 to PC/AT386 + C.

Technologies :

- (On Germany) Optical Emission Spectrometers from Spectro Analytical (Kleve - Germany)
- (On England) Optical Emission Spectrometers from Hilger Analytical (Margate - England)
- (On Brazil) Thermo Differential and Thermo Gravimetric Analysis from DuPont (Boston - USA)
- DPS Systems on PDP/11 from Digital Equipment Corporation Inc. (USA)
- C/C++ compiler and associated libraries from Borland Inc. (USA)
- CP/M 80 and Macro Assembler and associated libraries to 8080 and Z80 from Digital Equipment Corporation (USA)

Service Technician Level II

CIA. do Metropolitano de São Paulo - Metro May 1980 -> Feb 1986 ⑥

As service technician level II, the following training and experience were acquired:

- Electrical Propulsion Systems and High Power Conversion from Westinghouse Electric (USA) and Jeumount-Schneider (France).
- Vehicle control, fail-safe avionics, and redundant systems from Westinghouse (USA).
- Pneumatic control of deceleration coordinated with energy regeneration techniques.
- Track signaling and control.
- Analytical fault detection and preventive measures.
- Macro Assembler and associated libraries to 8080 from Digital Research (USA)
- PDP-8 Service/Programing from Digital Equipment Corporation (USA)
- Fortran on VAX VMS from Digital Equipment Corporation (USA)

Projects & Created Systems

ASVP

Fully developed at Opus Equipamentos - requested by **ACP Instruments Ltda.** August 2019 → Now ①

Development of a system to provide all needs to manage analytical instruments such as surface area by gas adsorption and particle size by laser scanning. Composed by :

- Custom S.O. : Debian @ Arm hosted on Raspberry 4B or iMx/RT20 (or PC)
- User Interface : All JavaFX. Including Window Manager, Android-like widgets/tools, Material-like LAF. - see simpler version @ - PP200
- Calculation core/server : Repository of libraries and functions used to do the hard work on instruments math & statistical tasks. The base language is Python (obviously) with Pandas and Scipy. Interfaces with Java UI above via sockets. - see MongoDB interface + Entity Manager & Compiler to it @ PServer_d
- Calculation Interface/Research: Browser based hook used to help university research people create new functions. Currently uses Jupyter notebooks interfacing with calc. core above.
- Remote access to calculation core and instrument tools : uses a custom https server (Jetty) to host Angular 7 apps in the local version. It was tested as a portal hosted at Google Cloud. Both Computer engine (with custom image uploaded plus load balance to 4 lanes) and Firebase version passed proof of concept phase. URL is Sorptionlab server - see frontend @ Temps1
- Hardware/Firmware and RTOS : uses NXP FRDM K64 Arm M4 core running custom return on completion state machines written in C/C++ (Arm GNU). - see examples @ github.com/msantrax/lgt8 and github.com/msantrax/Picno2 - Interfaces with the user SO via RS232 presently but drivers to talk ethernet/MQTT may be used from our past projects (Android app on tablets see @ Virna7

Ongoing research and not yet implemented are: A simple neural perceptron (Python) to help qualify adsorption isotherms prior analytic procedures and a real-time image pre-processing & feature-id on the edge to help dynamic particle size determination.

AutoDensity

Fully developed at Opus Equipamentos - requested by **ACP Instruments Ltda.** April 2015 → June 2017 ②

Objective: provide hardware, firmware, and analytical user interface to operate a pycnometer able to measure density on ores/cement by gas volumetry compliant to standard ASTM D-2856 and ASTM D-6683. Technologies are :

- Hardware: All electronics (digital and analog), PCB design, and mechanical drawing were developed in-house. -- Tools used : Proteus8, SolidWorks, and Texas Instruments. - sample drawings @ Picno2
- Firmware: Used [Opus-Developed] Antares4 platform (over MBED drivers to ARM/M4) to the stand-alone version and [Opus-Devel] Antares5 platform (over NXP drivers to ARM/K64) to computer-assisted version. See MBED on GNU ARM-EABI C/C++ project codes @ Picno2
- Computer Application: The user interface used first the already established [Opus-Devel] Analytical Platform (Java Swing on Netbeans 8.0) working on Windows or Linux. After a big client (CVRD/Brazil) requested to make a multi-instrument interface, it was rebuilt using the new [Opus-Devel] Analytical platform (JavaFX), becoming then project AD100/AD200 after the associated upgrade of hardware and firmware.

LGT8

Fully developed at Opus Equipamentos - requested by **Acil Equipamentos Científicos Ltda**. April 2014 → February 2016 ③

Objective: provide hardware, firmware, and analytical user interface to retrofit a Logitech precision lap & polishing machine Series LP (to geological samples). Technologies are :

- Hardware: All electronics (digital and analog), PCB design, and mechanical parts were developed in-house. Proteus8, SolidWorks, Texas Instruments development tools and a simulation environment using INRIA SciLab (free MATLAB) were used. - sample drawings @ LGT8
- Firmware: Antares5 platform (over NXP drivers to ARM/K64) controlling main servo and LVDT sensor in real-time plus other eight normal priority services. Interfaced with analytical software via ethernet wi-fi link using a service API with keep-alive & recovery procedures. NXP MCUExpresso project codes @ LGT8
- Computer Application: An Android-based application designed to be operated on a 7 or 10" tablet. Two versions were provided to do the benchmark; the first used wi-fi on a dedicated socket (using native Linux driver under Android O.S. services). Another one used REST structures on HTTP so the instrument would be able to provide an interface with customers' laboratory information managers systems (LIMS). This version demanded that the firmware be backed-up by an FPGA glue logic (to reduce the ether data latency and race conditions with real-time sensoring). But the tests proved that it was an overshot and error-prone. AndroidStudio 3.0 Java native code to Android API level 21 to it may be found @ Virna7

Blaine

Fully developed at Opus Equipamentos - requested by **ACP Instruments Ltda.** February 2013 → October 2014 ④

Objective: provide hardware, firmware, and analytical user interface to operate a device able to measure powders' fineness by using a Blaine technique compliant to the standard ABNT 16372. Technologies are :

- Hardware: Interface electronics to a customer-provided test jig were made. A commercial SoC MIcrochip Mips 32 bits core was used as an instrument microcontroller.
- Firmware: A dedicated single event loop program was compiled using the Microchip IDE and the associated X32 C/C++ toolchain.
- Computer Application: The user interface used the Opus-based analytical platform (Java Swing on Netbeans 8.0) working exclusively on Linux so it could be embedded. Code may be found @ GitHub/PP100
- After a requested project upgrade, the especifications gave birth to the PP200 platform with a dedicated and specialized Linux O.S. tailored to analytical instruments, capable to work on different architectures (ARM, x86) and with Android-like window manager and distraction-free operation. Code may be found @ - PP200

Centauro

Fully developed at Opus Equipamentos - requested by **Centro Tecnológico da Aeronáutica CTA.** June 2009 → April 2011 ⑤

Objective: provide hardware to create a controlled atmosphere induction furnace to metal/ceramic materials capable of operating over 1500°C for extended periods of time. Technologies are :

- Hardware: Mechanical design using SolidWorks, PCB design using Proteus 8, Mosfet switching design using SPICE by Texas dev tools, RF coupling study using HFSS Maxwell.
- The project was on hold after prototyping due lack of funds. Drawings and PCB designs may be found @ - Centauro

Vehicle Dynamics

Fully developed at Opus Equipamentos - requested by **Vehicle Dynamics Ltda**. August 2008 - February 2010 ⑥

Objective: provide hardware, firmware, and analytical user interface to retrofit a Jurid instrument used to capture a vehicle's sensor network data. Technologies are :

- Hardware: Interface electronics in a single Eurocard PCB were done. It used a tandem of two MIcrochip Mips 8 bits cores as an instrument microcontroller. One core provided the real-time management of the sensors event bus, and the other managed to sequence the reactive answers to promises requested by the analytical software. This way, the time resolution of the process was kept down to hundreds of microseconds. The interface with the analytical computer was done by regular RS232.
- Firmware: Both programs were compiled using the Microchip IDE and the X08 toolchain. They were also compliant with the MISRA standard and were fuzzy tested according to the automotive recommendations.
- Computer Application: The user interface used the Opus-based analytical platform (Java Swing on Netbeans 8.0) working on Windows. A local version of a Postgresql server was used to store analytical results. All documentation and sample code are @ - Vehicle Dynamics except by the sensor grid refs. that was moved to Control-e project.

This project was also used to test the first Opus-based sensor grid compliant with IEEE 802.11. The modules used were the Microchip MRF401 on the 2.54 GHz. The pub/sub broker was Opus proprietary living on the computer application. Both Mesh and Node Master modes were tested and succeeded.

DGT100

Fully developed at Antrax Tecnologia - requested by **Provecto Analítica Ltda.** March 2005 → November 2007 ⑦

Objective: provide hardware and firmware to upgrade a microwave digestion device with a modern microcontroller and double the delivered power compared with similar devices. The technology used on these devices had to be changed to achieve the target and give a requested advantage over competitors.

- The microwave cavity design was changed from a regular oven device (that demanded sample vessels built with expensive materials) to a focused mode (that required only normal steel vessels). To operate so, the Magnetron had to be pulse modulated, a synchronized circulator had to be implemented, and the waveguides were tuned to avoid reflection. The tools used were HFSS, SolidWorks, and INRIA SciLab. A prototype with six vessels delivered 4+ times more energy to a sample than the regular device and allowed true concurrent digestion cycles and different power levels to each vessel.

That opened the opportunity to embrace the research of using the device to do effective Organic Synthesis/Catalysis using molecular resonance principles already learned from Microwave Spectroscopy since 85. Unfortunately, the project was put on hold due to a lack of funds and sponsorship. (but would gladly accept sponsoring offers nevertheless).

IRIS

Fully developed at Antrax Tecnologia - requested by **Aqualab Laboratorios Ltda.** March 2002 → April 2003 ⑧

Objective: Refurbish an Inductively Coupled Plasma Spectrometer (ICP) Iris model from Thermo Jarrel, replace (and make compatible) his CCD Camera, and modify entrance optics (radial to axial). Technologies used :

- The technics and theory to perform optical design and alignment of poly/monochromators used on UV/VIS spectrometers (learned skill since 85) were applied to recalculate the optical path to fit the new camera device.
- A proprietary software tool using the Opus-based analytical platform was designed to help the dimensional corrections on the Echelle Optics and the design of new focusing devices chain to the optical entrance path. Calculations were also performed using Zeemax optical CAD (old version).
- Redesign and programming of the camera timing and control FPGAs were done with Altera Quartus (old version). Pictures of the instrument under this process will be uploaded to GitHub.

Antares

Fully developed at Antrax Tecnologia - requested by **BSW Tecnologia Ltda.** August 1998 → January 2001 ⑨

Objective: provide hardware, firmware, and analytical user interface to coordinate a pool of 10 instruments able to execute long-term Metallurgical Creep Tests compliant with the standard ISO 204 / ASTM E039. Technologies are :

- Hardware: Each instrument received an entirely in-house designed 8051 microcontroller board associated with sensors front-end and power control interfaces able to maintain the furnace temperature up 960°C in a 2°C range and convert the signal from an LVDT sensor in submicron levels. The data network was based on an optoisolated RS485 bus and was compiled ising a mix of C (SDCC) and assembler.
- The user interface used first a VisualBasic (Antares2) based version and later was upgraded to use the Antrax based analytical Java platform. The first implementation of the analytical procedures designer canvas to help researchers develop their own methods (resembling MATLAB Multisim or INRIA Scicos but connected real-time with sensors) proved successful (become Antares3).

Medusa

Fully developed at Antrax Tecnologia - requested by **BSW Tecnologia Ltda**. February 1997 → July 1998 ⑩

Objective: Provide ways to intercept, filter, and transform analytical results from instruments unable to talk to enterprise database managers. Technologies are :

- Hardware data converters were developed to capture from RS232, GPIB, Parallel Centronics, and bare metal proprietary thermal printers. The modules used 8051 cores and C compiled with SDCC and assembler.
- On the corporate interface side, a concentrator and protocol modifier was used, written using QT C++ Framework, and hosted on Linux. A small and simple MySql DBServer was used as a buffer and public access port.