ELSYS DESIGN

IMAGINE & DESIGN
coming electronic systems





ETF

BELGRADE – 22/11/2010

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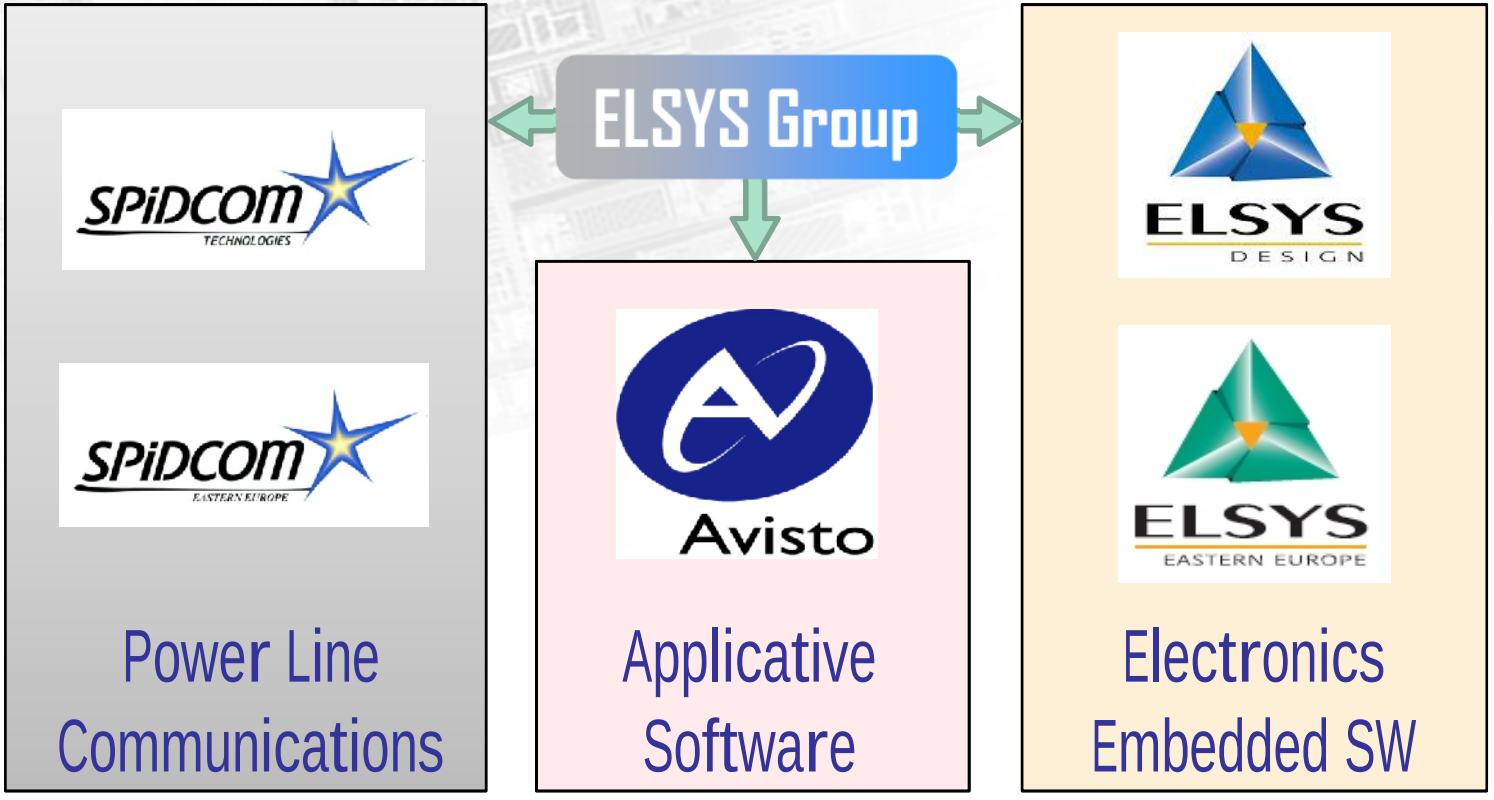
Agenda

- ELSYS Group
  - Overview
  - Know-How
  - Organization
- ELSYS Eastern Europe
  - Overview
  - Know-How
  - Organization
- Internship
- Conclusion

ELSYS Group


ELSYS Group
SPiDCOM TECHNOLOGIES
SPiDCOM EASTERN EUROPE
Power Line Communications
Avisto
Applicative Software
ELSYS DESIGN
ELSYS EASTERN EUROPE
Electronics Embedded SW

ELSYS Group

System Development

Architecture, Hardware, Software

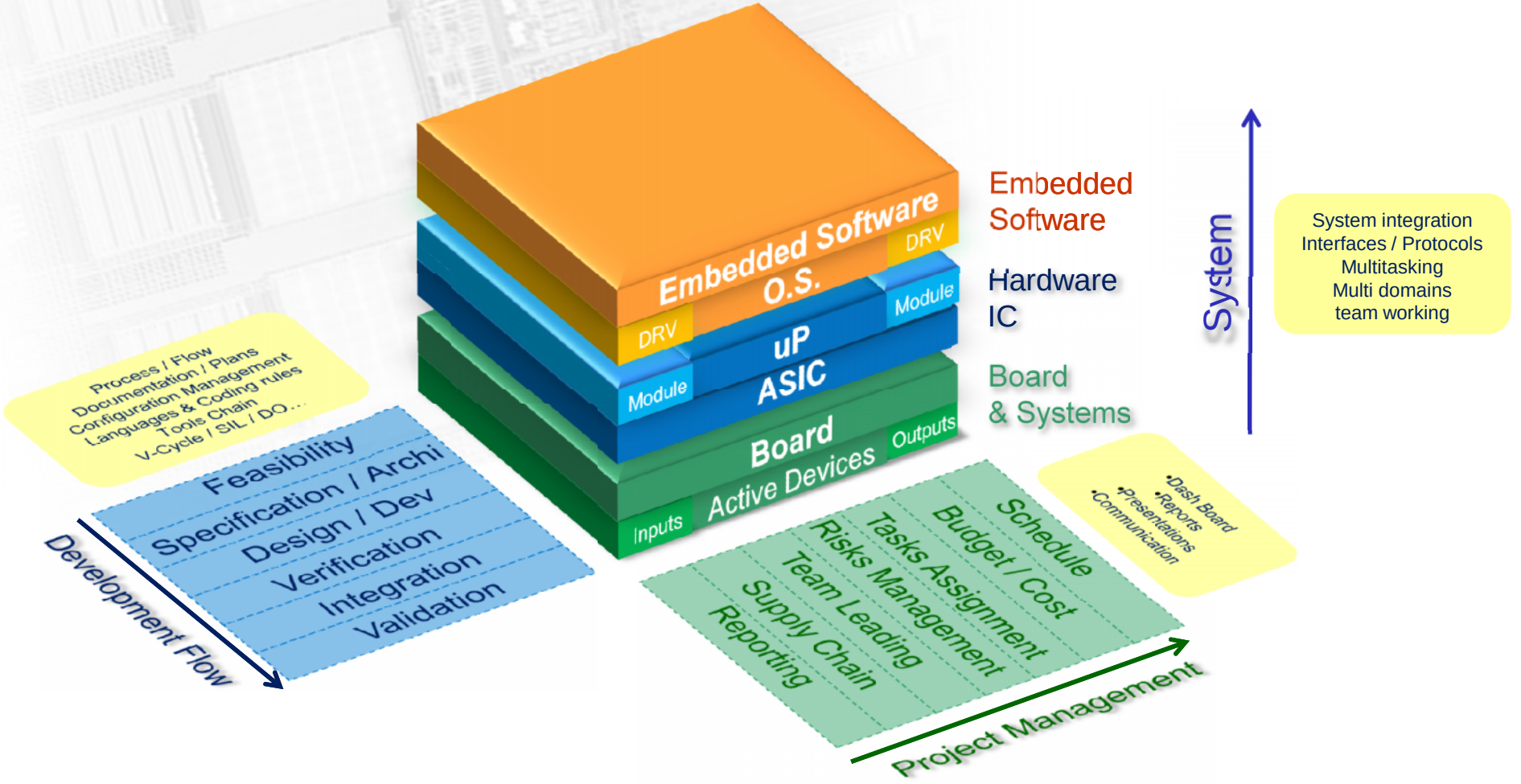
- Created in 2000
- Independant – Capital: 914 K€
- 700 Engineers – Turn-Over for 2010: 45 M€

- ISO 9001-2008 Certification
- Tax & Research Accreditation

- Technical Centers:
  - 3000 m² in France
  - 1500 m² in Serbia

Skills

From Architecture to System Integration & Validation



Skills
Hardware

Digital IC

- Modelling (SystemC / C / VHDL)
- RTL Design (VHDL / Verilog)
- Verification (TB / Specman / C / SystemVerilog)
- Synthesis / DFT / STA
- Floorplanning / Place & Route
- Verification Back-End

Analog IC

- Schematics
- Spice / Monte-Carlo Simulations
- Full-Custom Layout
- Parasitics Extraction
- Physical Verification

FPGA Xilinx / Altera / Actel
ASIC Mentor / Cadence / Synopsys / Magma

Boards: Digital / Analog / RF-HF / Power-Supply

- Schematics
- Spice / Frequencey / Timing Simulations
- Place, Route and Manufacturing Management
- Functional and Environment Validation (EMC, ESD, Climatic…)

Mentor / Cadence – PCAD – ADS – HFSS

Skills

Embedded Software

METHODOLOGY

Configuration Management

UML Modelling

Project Management

Development Process

Quality Assurance

AFAQ ISO 9001

Signal Processing

- Modelling, Simulation
- Algorithm Implementation
- Optimised Porting on Target

Telecom & Network

- 802.3, X.25, Frame-Relay, HDLC, ATM, SONET/SDH
- GSM, GPRS, EDGE, UMTS, 802.11/Wifi, Bluetooth,ZigBee
- TCP/IP, LON

Multimedia

- Audio: G.711, AMR-NB/WB, AAC, MP3, half-rate, full-rate
- Video: MPEG-1/2/4, H.264
- System: DVD, DVB

Embedded

- Firmware, Drivers, BSP
- Autotest
- OS Portting
- Bootloader, Kernel
- Virtualization

Real-Time

- Multi-task Architectures
- Critical Software
- RTOS Portting

Industrial

- Regulation Software
- GUI / Applicative
- Test Bench (LabView/TS)

Languages

Matlab, C, C++, ADA, ASM
Tcl, Perl, shell

Processors, DSP, Microcontrellers 8/16/32-bits

Leon, ERC32, ARM, Broadcom, Cypress, Hitachi, Intel, Mitsubishi/Renesas, Motorola/Freescale, NEC, PIC, TI, Siemens, ST-Micro, Toshiba,…

Development and DebugTools

Atmel AVRStudio, Cypress, Freescale CodeWarrior, IAR Workbench, Keil, Lauterbach Trace32, Microsoft Platform Builder et Visual Studio, National Instruments LabView & TestStand, TI Code Composer Studio,…

Embedded OS, Real-Time Kernel

VxWorks, Nucleus, CMX, OS9, eCOS, pSOS, µCOS-II, QNX, WinCE, Linux RT, Linux Embedded, TI DSP/BIOS, Keil RTL-RTX, Mentor Graphics VRTX, OSEK/VDX, LynxOS,…

Skills

Applicative Software

METHODOLOGY

Configuration Management

UML Modelling

Project Management

Development Process

Quality Assurance

AFAQ ISO 9001

Industrial Software

- Equipment and Board Management
- Network Management
- Service Industry Software

Database

- Optimisation
- DataWarehouse, ETL
- Reporting

GUI

- Human Engineering
- Thin & Thick Clients
- Web 2.0 Applications (RIA)

C++, C#.NET, Java et J2EE (EJB, Spring, JSP/Servlet/Struts), Web 2.0, Swing, QT, Open GL
ORACLE, mySQL, PostgreSQL, SQL Server
Windows, Linux, Mac OS-X

Middleware

- Interoperability
- Distributed Architecture
  Web Services, CORBA

Protocoles

- TCP/IP, SNMP, SIP
- SOAP, JSON
- Telecom (PDH, SDH, ATM)

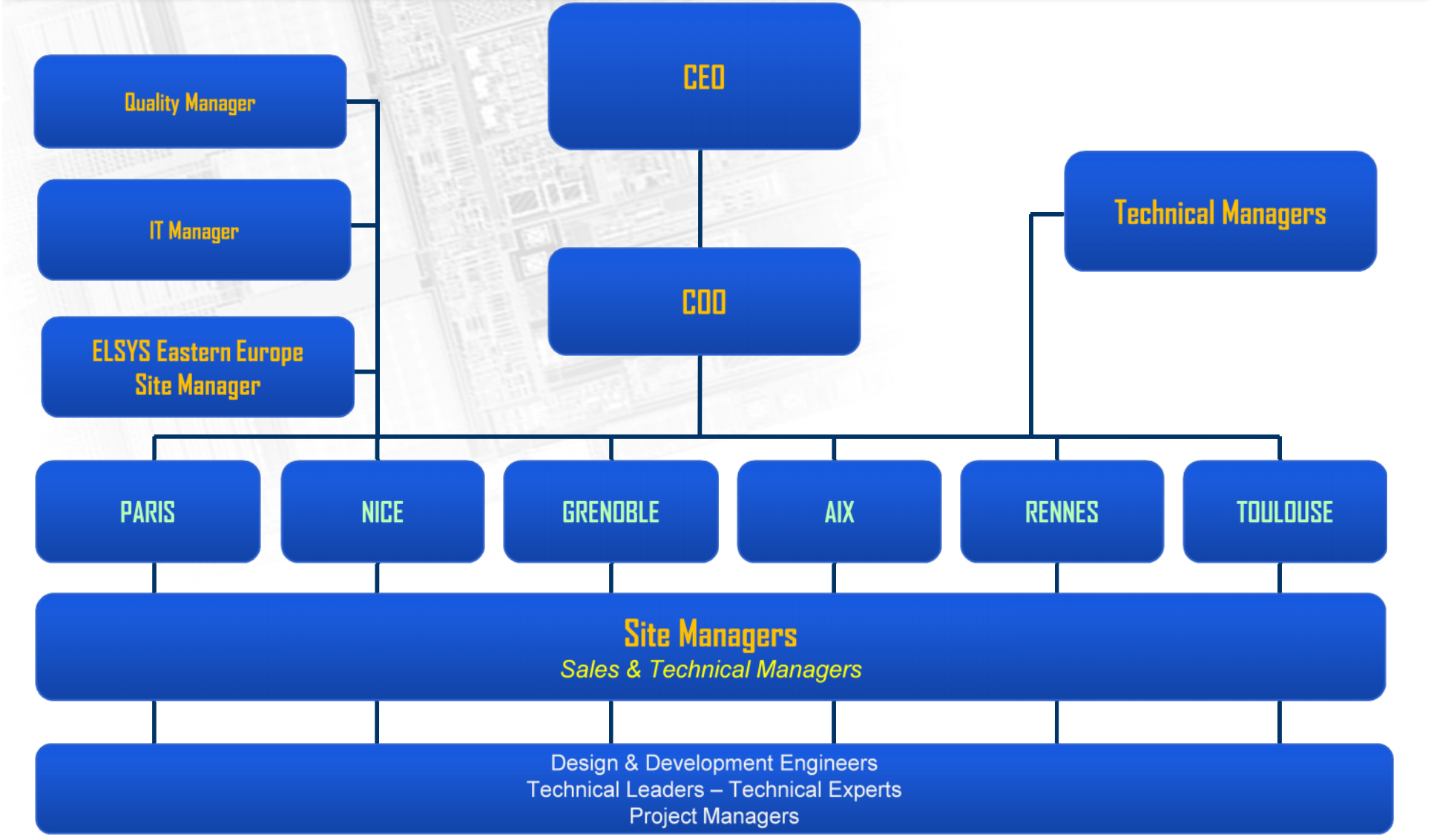
Applicative Embedded Software

- Communication
- Data Process
- Network

- GUI

C/C++ , C#.NET Compact Framework, Java-J2ME, QT, OpenGL
µLinux, Windows CE, Symbian, MAC OS-X

Organization



Technical Organization

Technical Referents / Capitalization / Expertise

Applicative SW	Real-Time SW	Embedded SW
Industrialization	Calculator	Test Bench
Digital Board	Analog/Power Board	ASIC / FPGA

Configuration Management / Quality Process

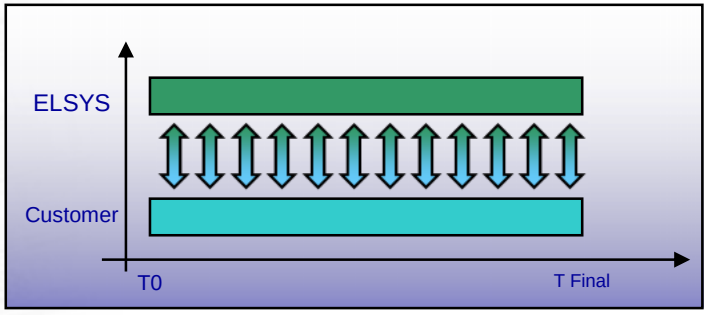
Business Model

Business Model

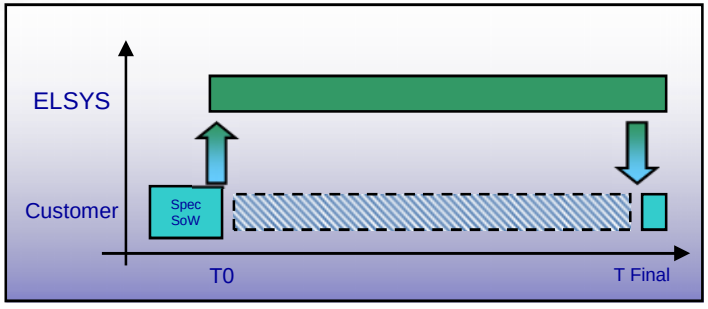
- Technical Assistance
  - Engineering / Expertise / Architecture
  - Design / Development
  - Methodology
- Fixed-Price Project
  - HW Design
  - SW Development
  - Test Benches
- Customer Partnership
  - Dedicated Technical Centers

Business Model

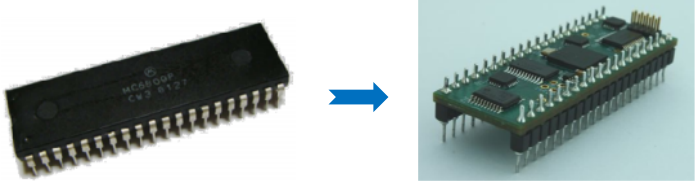
- Technical Assistance (Customer or ELSYS sites)
  - The expertise of our consultants as part of client's own task force resources
  - Time based fare
  - No technical input documentation or device required



- Fixed Price Projects
  - The dedication of our teams working as a 3rd part partner / subcontractors
  - Quotation based on Specifications and SoW
  - Specifications and SoW are mandatory



- IPs and Obsolescence
  - Development time saved by purchasing ELSYS internal IPs
  - ELSYS has dedicated department that can certainly help client solving its obsolescence issues



6809 Cycle Accurate IP
in a PCB with same footprint!

Market

Multimedia / Wireless

ARM, Sierra Wireless, SMARDTV, Sagem, Texas Instruments, Schlumberger, Infineon technologies, ST, IBM, Atmel, ST Ericsson, Philips, Parrot

Services Industry

ISSOS (Front to Back Office Software), Experian, Sogitec, Babelgum, aMaDeus (Your technology partner), Real.not, Aéroport Nice Côte d'Azur, CCI Nice Côte d'Azur

Transport / Medical

Alstom, Air France, Continental, Siemens, Visteon, Delphi, Valeo, Sorin Group (At the heart of medical technology), Peugeot, RATP

Network / Telecom

Nortel Networks, Alcatel-Lucent, hp invent, Bouygues Telecom, Bull, orange

Energy / Industry

Temex, DS DataSystem, Honeywell, EDF, Artus Pacific Scientific, Areva, Schneider Electric, ascom, Rolls Royce, CEA

Space / Defence

Safran, EADS, eca, INEO, Zodiac Aircraft Systems, Thales, MBDA Missile Systems

ELSYS Eastern Europe

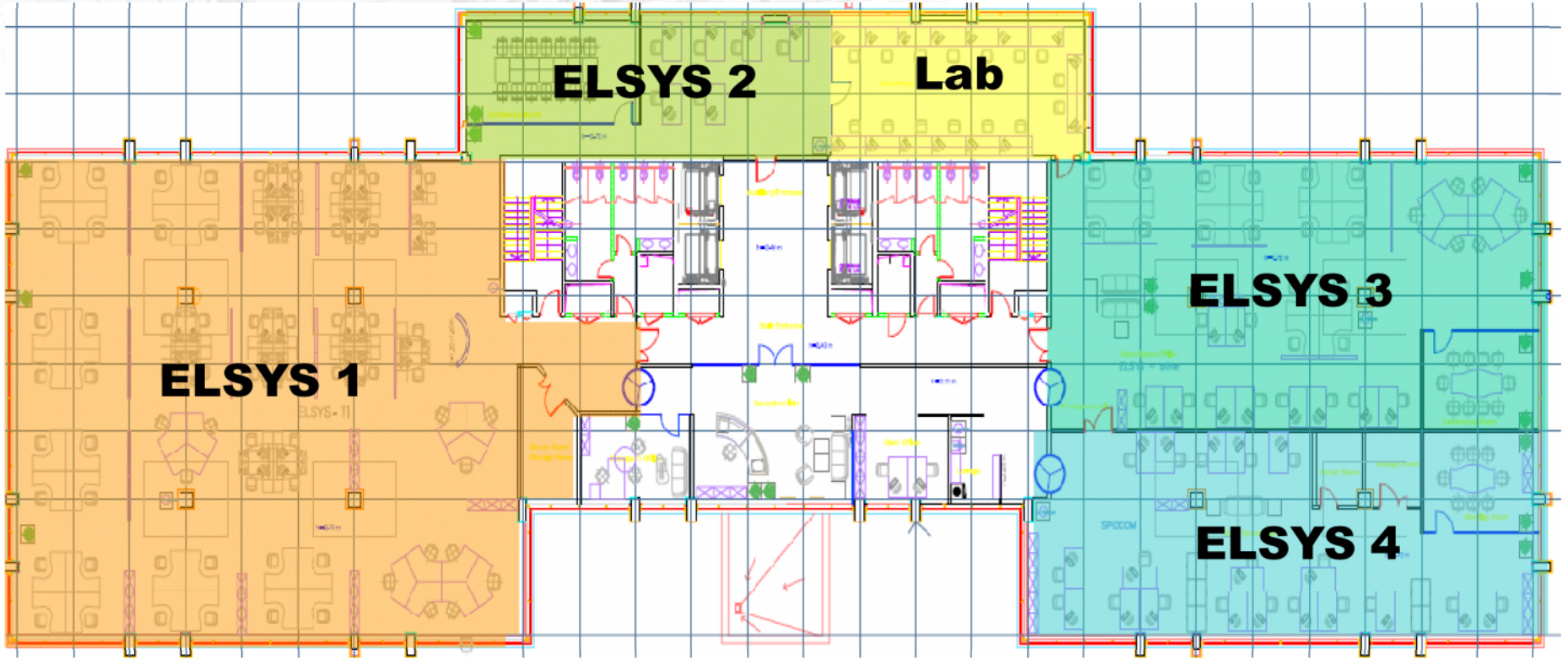
ELSYS Eastern Europe

- Created in 2004
- Location: Belgrade - Serbia
- Certification ISO 9001-2008 in progress
- The ELSYS' Cost Effective Arm
- Key figures in 2009 / for 2010
  - Staff: 70 / 80 engineers
- French Management on Site
- Technical Open Space: 1500 m²
  - Security: camera, badges, guards ...
  - VPN secured connection
  - 50 m² laboratory

ELSYS Eastern Europe

Offices

- Space
  - 1 entire floor of 1500 m² divided in 4 independent entities
  - Laboratory
- Floorplan



ELSYS Eastern Europe

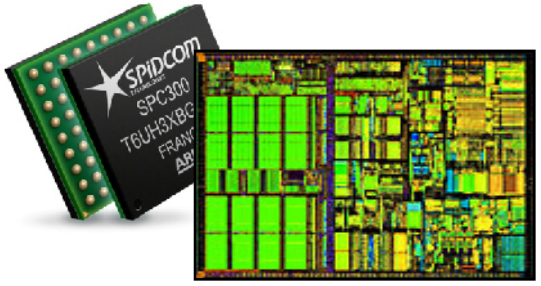
Offices

- Access to the Building:
  - Monitored by the lobby with ID registration.
  - CCTV surveillance system and guards 365x7x24.
- Access to our premises:
  - Anti-intrusion alarm.
  - Access Control System and registration.
- Per each Working Area:
  - Access Control System
  - Revolving door
  - Independent IT network (physically separated)
- IT Security:
  - 2 LAN rooms with restricted access.
  - All open-space networks can be physically isolated.
  - IT policies.

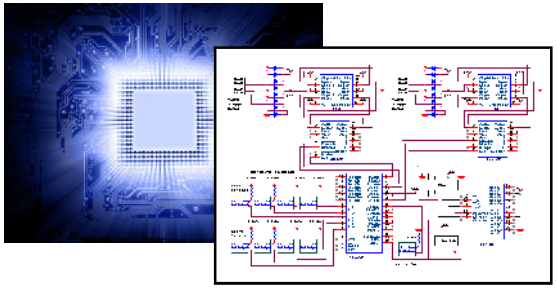
ELSYS Eastern Europe

Know-How

- Integrated Circuits
  - Analog / Digital / Mixed Signals / IPs / Obsolescence
  - Specification / Architecture / Design /
  - Verification / Integration / Validation



- System and Boards
  - Mixed Signals / Power / RF / Obsolescence
  - Data processing: DSP, uC, FPGA
  - Specification / Architecture / Design
  - Integration / Validation / Lab / testbench



- Embedded Software
  - Processors & µC: ARM, PowerPC, DSP, LEON, MC68xxy
  - OS: Linux, VxWorks, pSOS
  - Kernel, Drivers, Applications, Protocols
  - Specification / Architecture / development
  - Verification / Integration / Validation

ELSYS Eastern Europe

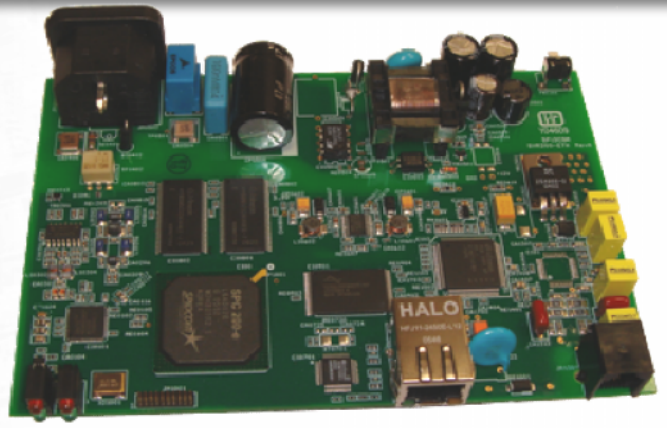
Background: Board

- Board & System Design
  - Architecture
  - Schematic & Bill of Material
  - Place & Route
  - Prototyping
  - In lab Validation
  - Hardware TestBench
  - Reference Design
  - Documentation (V-Cycle, SIL, DO…)

- Domain: Mixed Signals, Power,
- Data conversion and Processing

- Market: Telecom, Consumer Electronics,
- Transportation

- References: Spidcom Technologies, Alstom



Mixed Signals Telecommunication Board Design:

→Set Top Box: Internet/Phone VOIP Board design with ARM processors and codec:

- → Specifications
- → System solution
- → Design
- → Layout
- → Protocols implementation
- → Application
- → Prototype
- → Lab test
- → Reference design

ELSYS Eastern Europe

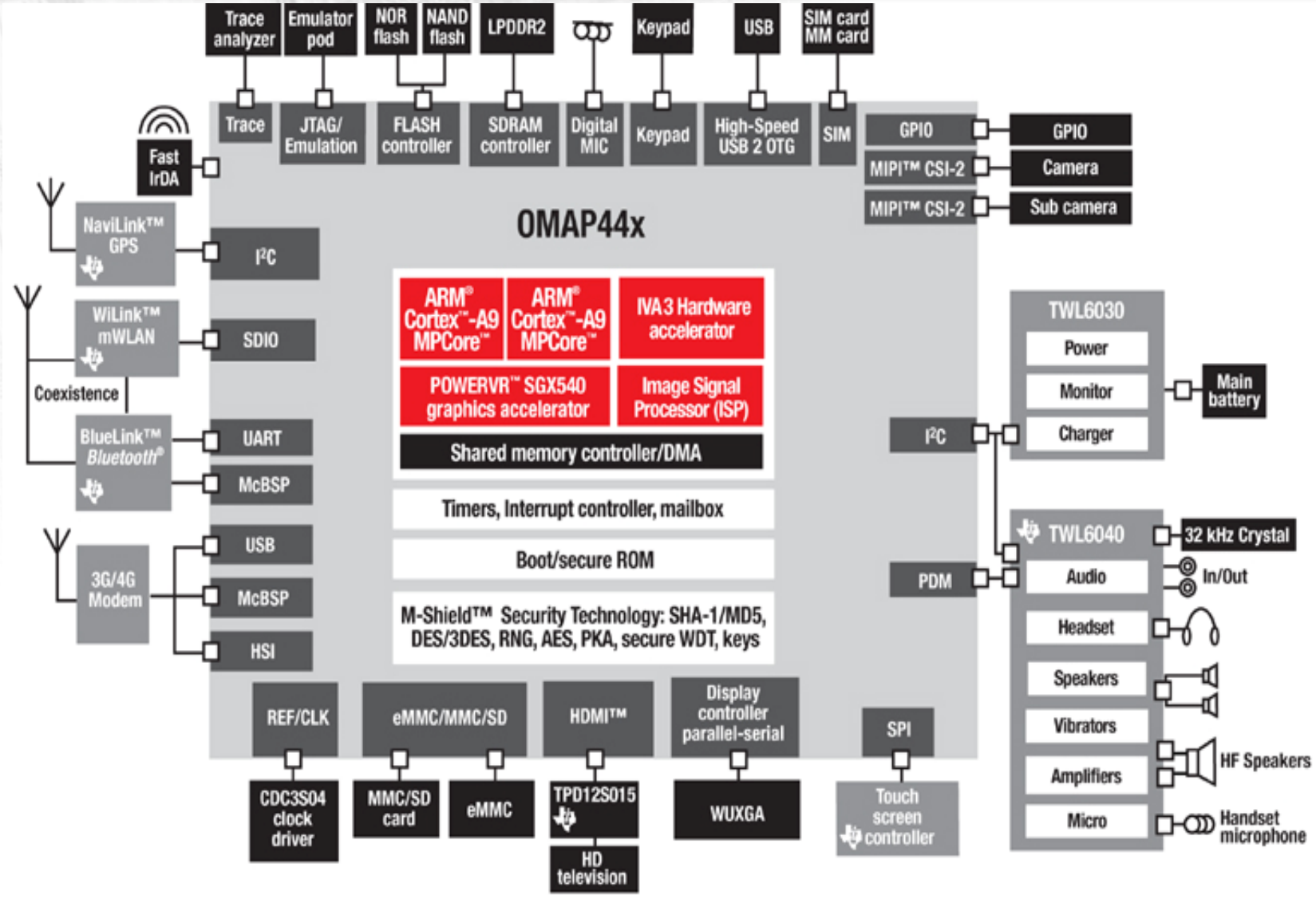
Background: IC

- IC: ASIC / FPGA / SoC
  - Design of modules, cells, IPs and uP Cores
  - Integration of customized and on-the-shelve components
  - Pre-Silicon Verification (VHDL, C, Specman testbench)
    - Module / IP Level
    - Top Level
  - Design For Test
  - Layout up to chip finishing
  - Post –Silicon Validation + Wake-up phase(Lab, Asm, C)
  - Model creation for algorithm verification (Codecs,...)
  - Associated Documentation (V-Cycle, SIL, DO...)

  - Domain: Digital, Analog, Power Management
  - Market: Telecom, Consumer Electronics, Transportation, *Automatism*
  - References: Texas Instruments, NXP, IBM, ALSTOM

ELSYS Eastern Europe

Example of IC development



ELSYS Eastern Europe

Background: Embedded Software

UMTS

- **Embedded Software**
  - Processors & uC : ARM, PowerPC, DSP ...
  - OS: Linux, VxWorks, pSOS, OSE …
  - Protocols: Bus / Wireless / Network
  - Specification / Architecture / Development / Integration / Validation

ARM: porting on Linux 2.6, development of low level drivers, applications for telecommunication and networking.

uControler: uCode for Digital Radio Altimeter on **Airbus A380** with DO254 norms for **THALES**.

Protocols: Implementing internet protocols (RTP,HTTP, VOIP, SNMP Agent, IGMP broadcast…). Mobile protocols (low level layer 1: EDGE, GPRS, UMTS)

Interfaces: Bus, interfaces and peripherals on OMAP platforms (cameras, keyboard, I2C, USB, memories, …)

ELSYS Eastern Europe

Team Organization

- Local Leadership
  - ELSYS Eastern Europe Developers
  - ELSYS Eastern Europe Team Leader

- French Leadership
  - ELSYS Eastern Europe Developers
  - ELSYS Design Team Leader

- Customer Leadership
  - ELSYS Eastern Europe Developers
  - Customer Team Leader

ELSYS in Semiconductor Industry

References

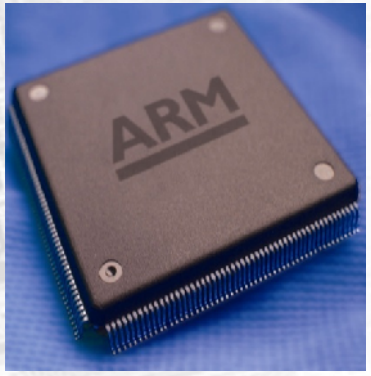
- Texas Instruments
  - Analog & Digital IC Design & Validation for Mobile Phones
  - Digital IC Design & Validation for Multimedia Platforms
  - Analog IC Design, Layout & Validation for Analog/Power Applications
- ST-Ericsson
  - Digital & Analog IC Design & Validation for Mobile Phones
  - Digital IC Design & Validation for Multimedia Platforms
  - Test Chip Design for Automotive Industry
- IBM
  - Digital IC Design & Validation for Network Processors
  - CPU/GPU Design for Entertainment Industry
- ATMEL
  - Digital, Analog & RF IC Design for Medical, Automotive & Biometrics Industries
- EADS Astrium
  - Digital IC Design & Validation for Space Industry
- ALCATEL-Lucent
  - Digital IC Design for 4G LTE Base-Station
- ARM
  - ARM Core Verification
- BULL
  - Digital IC Design for Super Computers
- RENESAS
  - CPU Design

Internship in Elsys Eastern Europe

ELSYS Eastern Europe

Internship

- **Faculty Projects**
  - ARM7
    - Peripheral drivers
    - Image display via Ethernet
    - USB flash disk
    - Music Player
    - Oscilloscope
    - …



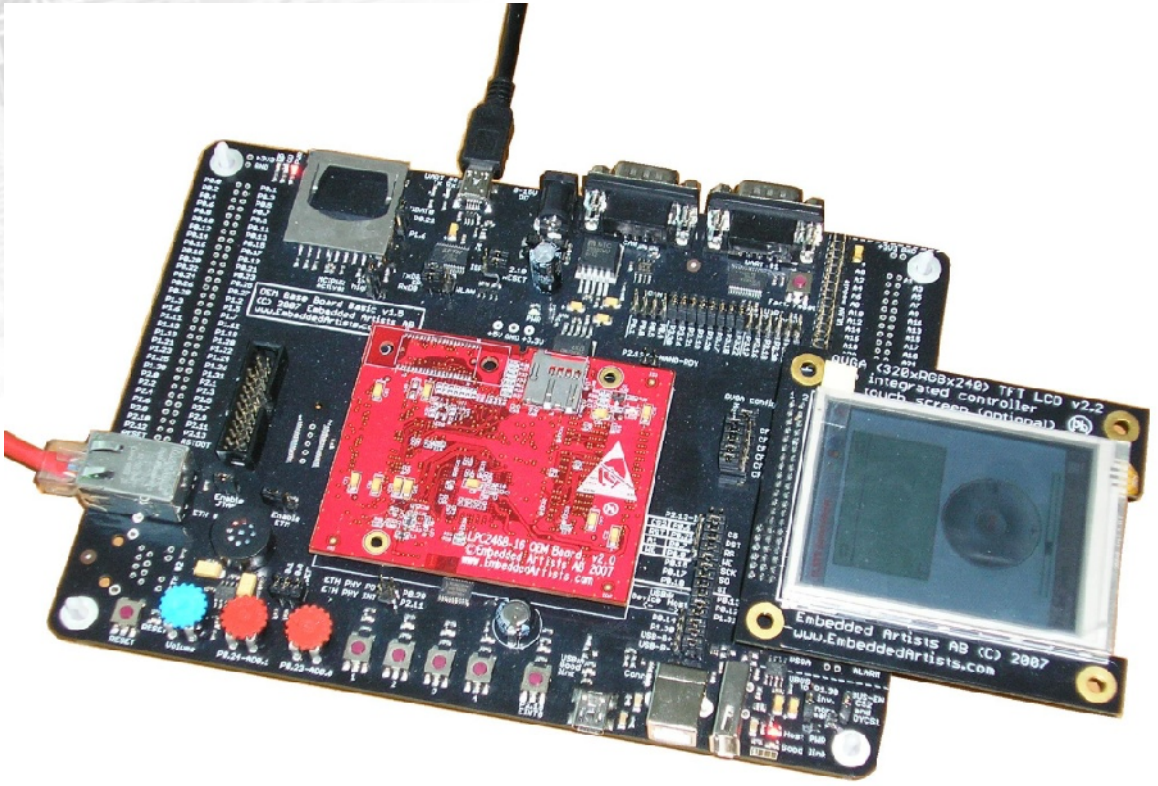
XILINX®
The Programmable Logic Company℠

  - SPARTAN 3E
    - VGA controller

  - VIRTEX 4
    - Ethernet Controller
    - VGA Controller

- Features & Applications

LPC2468 OEM Board



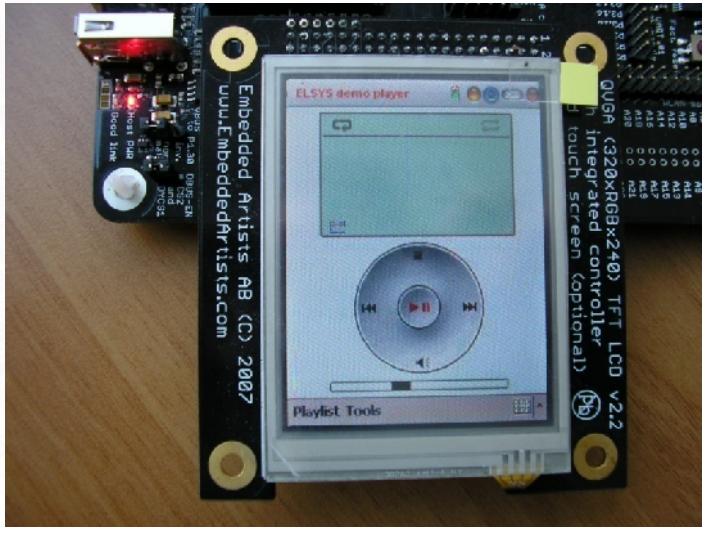
ELSYS Eastern Europe: Software Projects - ARM7

Software Implementations

- Ported uClinux distribution (kernel 2.6.11)
- Implemented drivers for:
  - USB
  - Ethernet
  - LCD Screen
  - Touch controller
  - USB (Host)
  - ADC
  - DAC (Sound)
  - Keys and Leds
- Network services (FTP,TFTP,NFS)

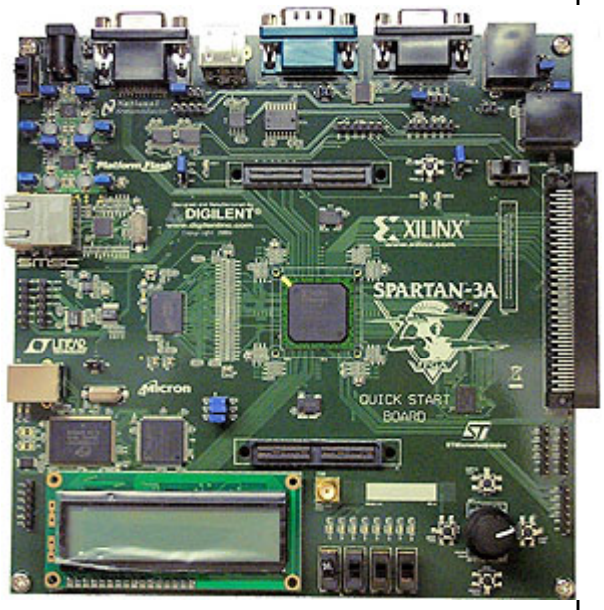
ELSYS Eastern Europe: Software Projects - ARM7

- **Applications**
  - Picture viewer (JPG, PIC)
  - Sound player (WAV, RAW, MP3)
  - Oscilloscope
  - Utilization of USB mass storage devices
  - LCD driver enhancement
  - Touch driver developing (HID interface)



ELSYS Eastern Europe: Hardware Projects SPARTAN

- SPARTAN 3A FPGA Starter Kit Board
  - Xilinx 700K-gate XC3S700A Spartan-3A FPGA
  - Platform Flash PROM, SPI serial Flash PROM, Parallel NOR Flash PROM, DDR2 SDRAM Memory
  - 50MHz On-Board Oscillator, Auxiliary Clock Oscillator Socket, SMA Clock I/O Connector
  - Switches, Buttons, LEDs, 2-line by 16-character LCD
  - VGA Display Port, RS-232 Serial Port, PS/2 Mouse/Keyboard Port
  - ADC & DAC, 10/100 Ethernet Physical Layer Interface, Stereo Audio Jack
  - Hirose 100-Pin Edge Connector, Differential I/O connectors, Six-Pin Accessory Headers.



ELSYS Eastern Europe: Hardware Projects SPARTAN

- **Application: Implementing VGA Controller**
  - Design moves the image (bitmap format) from Flash to DDR2 SDRAM memory and displays it at 266 Mb/s through the analog VGA output port.

- **Phases of project:**
  - Programming Flash memory (storing the image to be displayed into the flash)
  - Design of DDR2 SDRAM memory interface
  - Design of controller that moves image out of the flash memory and into the DDR2 SDRAM memory
  - Design of controller that moves data out of the DDR2 SDRAM and into the line buffer (one line of image on demand)
  - Designing VGA signal timing to drive the VGA monitor in 640 by 480 pixel mode at 60Hz.

ELSYS Eastern Europe: Hardware Projects VIRTEX

- **ML403 Board – VIRTEX 4**
  - Virtex–4 FX FPGA chip speed grade 12
  - 64 MB of DDR SDRAM
  - Stereo AC97 Audio Codec
  - RS-232 Serial Port
  - 16–Character X 2-Line LCD
  - VGA Output
  - PS/2 Mouse and Keyboard Ports
  - JTAG Configuration Port
  - 10/100/1000 Tri-Speed Ethernet PHY
  - USB Controller with Host and Peripheral ports

ELSYS Eastern Europe: Hardware Projects VIRTEX

Application 1: Ethernet Controller

- GOAL - 1 Gbit Ethernet Controller, for usage by various wrappers
- Used resources - Embedded MAC resource in Virtex – 4 FPGA, 4 FIFO Memory blocks and controlling logic.
- Each of Receiver and Transmitter has 2 FIFO blocks, one of which is used as a memory for actual frame and the other is used to memorize length of corresponding frame, and in the case of Receiver validity of frame.
- Interface to On-board PHY chip is GMII
- Also the design is combined with a VGA controller and a decoding logic, to allow change of image being displayed on monitor, depending on the content of length/type field of sent ethernet frame.

ELSYS Eastern Europe: Hardware Projects VIRTEX

Application 2: VGA Controller

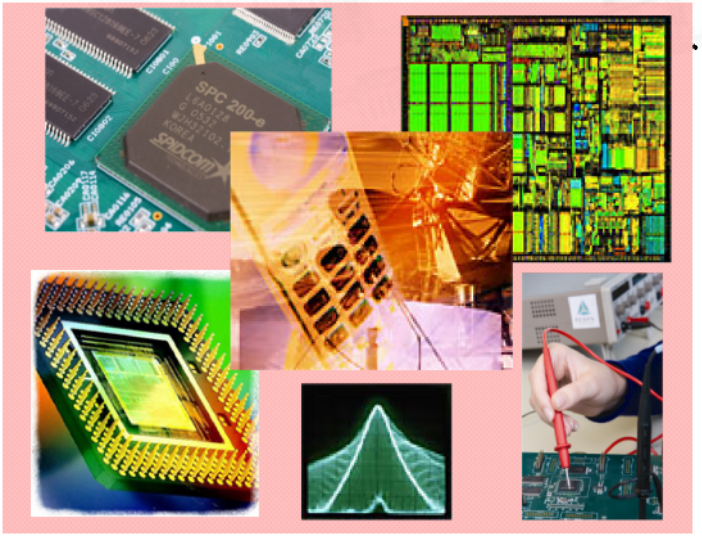
- Displaying image stored in on-board DDR SDRAM memory
- Design can be divided on three parts:
  - CRT (VGA connector) interface
  - Memory interface for DDR SDRAM memory
  - FIFO memory - makes bridge between these two parts which work in different clock domains
- This could be used as a module in designs with display.

➢ Projects applications…

ELSYS Eastern Europe

Employment benefits

- Working for World Class Companies
- French Management – Work Organization
- Career Path
- Work Environment
- Trainings and seminars
- On site employment
- Language courses + Sports
- Colleagues
- Solidarity
- Stability



Jobs / Internships

Job Positions:

ELSYS forecast new positions in 2011 in the following domains:

- **Analog Design** → **analog.job@elsys-eastern.com**
- **Digital Design** → **digital.job@elsys-eastern.com**
- **Embedded Software** → **soft.job@elsys-eastern.com**
- **Board Design:** → **board.job@elsys-eatern.com**

Internships:

Like every summer ELSYS will have new internship positions:

- **Subjects post at the faculty** → **April/May 2011**
- **Applications** → **until June-15, 2011**
- **Internship period** → **July to September 2011**

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