

## MOTIVATION



“Humanity needs practical men, who get the most out of their work, and without, forgetting the general good, safeguard their own interests. But humanity also needs dreamers, for whom the disinterested development of an enterprise is so captivating that it becomes impossible for them to devote their care to their own material path.

Without doubt, these dreamers do not deserve wealth, because they do not desire it. Even so, a well-organized society should assure to such workers the efficient means of accomplishing their task, in a life freed from material care and freely consecrated to research.”

- Marie Curie



**PICO MEGA DESIGN LABS**

*The best way to predict the future is to invent it*

## Who we are:

We are a group of Designers, Researchers and Consultants with formal training in Engineering, Science and Technology. Our working knowledge spans a large space of the “science and art” of System Design.

## What we do:

We conceive innovative products and deliver total system level solutions. We begin with concepts and craft them into sophisticated systems. We design the system, realize the circuits/components/Modules, ergonomically package them, put prototypes through reliability qualification process, and finally see them through to the production line. Our designs target a vast spectrum of application areas including Identification & Tracking, biomedical, digital electronics, signal processing, wireless, automotive, Sensors & Instrumentation, Power, RF & Microwave, Lasers & Optoelectronics, Mechanics, Materials and Bio & Nano Science

## Research Areas:

- Identification & Tracking
- Biomedical Systems
- Digital Systems
- Energy
- Sensors & Instrumentation
- Signal Processing & Image Processing
- Power Electronics
- RF / Microwave
- Laser & Optoelectronics
- Biotechnology & Nanotechnology

# PROFICIENCY

## RF & Microwave Systems:

Modules, Systems, ISM Band Radios, Wireless Sensor Network, Spread Spectrum Data Links, RFID, GPS & GSM/GPRS, Antennas

- ISM Band Transceivers
  - \* UHF Radios
    - \* 300 MHz to 1000 MHz Transmitter
    - \* 300 MHz to 1000 MHz Receiver
    - \* 300 MHz to 1000 MHz Transceiver  $P_o = 100\text{mW}$
    - \* 300 MHz to 1000 MHz Transceiver  $P_o = 1\text{W}$
  - \* Microwave
    - \* 2.4 GHz ISM Band Radio, 1.5Mbps
    - \* 5.8 GHz ISM Band Radio, 1.5Mbps
  - \* Spread Spectrum Transceivers
    - \* 38.4 kbps, 127 chips
    - \* 200 kbps, 127 chips
    - \* 1 kbps, 1024 chips
    - \* 19.8 kbps, 1024 chips
    - \* 2 MHz, 11 chips

## Identification & Tracking:

Mastery of all aspects of RFID. We custom design each component/building block of the entire RFID hardware chain, applicable over the whole RFID spectrum including LF, HF, UHF and Microwave. We custom design, fabricate and commission custom RFID antennas, deliver RFID reader and tag designs, design RFID range extenders, integrate RFID technology with sensors and GSM and ISM transceivers.

## Radio Frequency Identification(RFID)

- Readers
  - \* Low Frequency (LF) 134.2 KHz
    - \* Handheld Reader
    - \* LF Distributed RFID Network
    - \* Immobiliser
    - \* LF Long range reader
    - \* LF Antennas
    - \* Reader for Supply Chain Management
  - \* High Frequency (HF) 13.56 MHz
    - \* HF Mini Reader
    - \* HF Dongle
    - \* HF 1W Reader
    - \* HF Fork Reader for Industrial Automation
  - \* Ultra High Frequency (UHF) 868/915 MHz
    - \* Passive
      - EPC C1 G2 Reader 500mW
      - EPC C1 G2 Reader 1W
      - EPC C1 G2 Passive Tag
    - \* Active
      - Active RFID Reader
      - Handheld Active RFID Reader

- Tags
  - \* Micro HF Tag
  - \* Mini HF Mount on metal Tag
  - \* UHF Laptop Tag
  - \* Jewel Tag
  - \* HF Mount on metal Tag for Process Control
  - \* High Temperature Tag (+160 ° C)
  - \* Application Specific EPC class 1 Gen 2 UHF Tag
  - \* 865/915MHz Active Tag
  
- RFID Accessories
  - \* RF Cables
  - \* RF power splitters
  - \* RF Multiplexer 1:8 @ 13.56 MHz
  - \* RF Multiplexer 1:16 @ 13.56 MHz

## Antennas:

- LF Long Range Antenna
- HF Walk through Antenna
- HF 300x300 mm Antenna
- HF 600x300 mm Antenna
- HF 900x300 mm Antenna
- HF Smart Shelf
- UHF Smart Shelf
- UHF Broad Band Antenna

## Sensors & Instrumentation:

Data acquisition system designs adapted to a wide variety of sensors including accelerometer, AC Current, DC Current, Dust, Electromechanical Controls, Float, Flow, Force, Gas, Hall Effect, Humidity, Image, Infrared, Isolation, Level, LVDT, Magnetic Sensors, Magnets, Optical Sensors, Pressure, Proximity, Shock, Temperature, Tilt, Touch, Soil Moisture Sensors, UWB Sensors, Ultrasound and Vibration. Designs include state-of-the-art technologies to meet stringent field requirements including ultra low power operation ( $\mu\text{W}$  micro controllers), high precision and resolution ( $>18$  bits), Ultra high speed ( $>20\text{MHz}$ ) and A/D & D/A converters. Our designs are routinely carried out on micro controllers/DSP/FPGA platforms using RTOS/VHDL/C.

## Global Positioning System & Global System for Mobile:

- GPS/GSM Telemetry
- GPS Data Loggers

## Biomedical Systems:

- Body Area Networks

## Materials:

- Encapsulants/Sealants/Adhesives
- Protective Coating
- Ceramics

## Biotechnology & Nanotechnology:

- Nano Drug Synthesis
- Cancer

## Optics & Optoelectronics:

- Image Sensors
- Laser source & Systems
- Displays

## Power Electronics:

- DC - DC
- DC - AC
- Automotive
- Motion Control
- Lighting

## Digital Systems:

- Microcontrollers based System
- Microprocessors based System
- PLC

## Signal Processing & Image Processing:

- FPGA
- DSP

## Data Acquisition:

- < 16 bit            < 1 Msps
- > 16 bit            1 Msps < S < 100 Msps
- 100 Msps < S < 1 Gsps
- > 1 Gsps

## METHODOLOGY

As entrepreneurs, we collaborate with partners to solve the last mile problem of reaching the market or the customer. As designers and researchers, we follow the age-old practice of learning extensively from multiple sources while pursuing our own path. We conceive our designs by constantly tracking and monitoring the scores of websites of device manufacturers, IEEE/OSA/SPIE Journals & Conferences publications. Our linkages with the academia and research labs are vital to our knowledge base and our test and measurement resources.

## DEVELOPMENT TOOLS FOR DESIGN & PROTOTYPING

### Embedded System:

- Atmel's AVR software & hardware development tools
- STK 500 Development Kit with AVR studio V 4.06
  - \* ICC AVR V 6.29
  - \* Xemics ultra low power 8 bit micro controller development tools
- XE 8000 EV Evaluation Kit with RAISONANCE RIDE V 06.10.14
- PIC Kit 2 Microchip Development Platforms
- Motorola 16 bit Cold fire Development tools
  - \* M5282 LITE Kit with CYGWIN Development tools
- Sharp 32 bit Blue Streak System on chip Development tools
  - \* SDK-LH7A400 Development kits with MS Platform builder V 4.2 for Windows CE

### FPGA:

- IDEActel's LiberoIDE Gold
- ProASICPlus Development Board

### Wireless Systems:

- Chipcon CC1000/CC1010/CC1100 ISM Band Radio Development Kit

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