Laboratório de Sistemas Integráveis Tecnológico

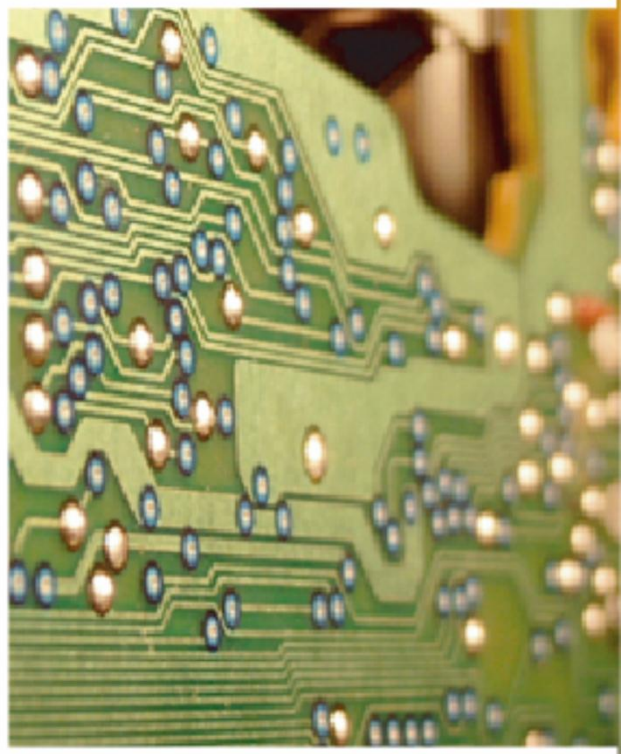
ABINEETEC 2012

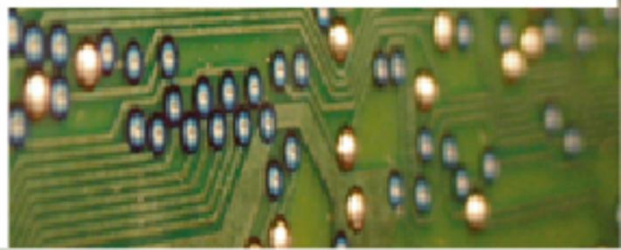
Eficiência Energética

LSITEC

Laboratório de Sistemas Integravéis Tecnológico

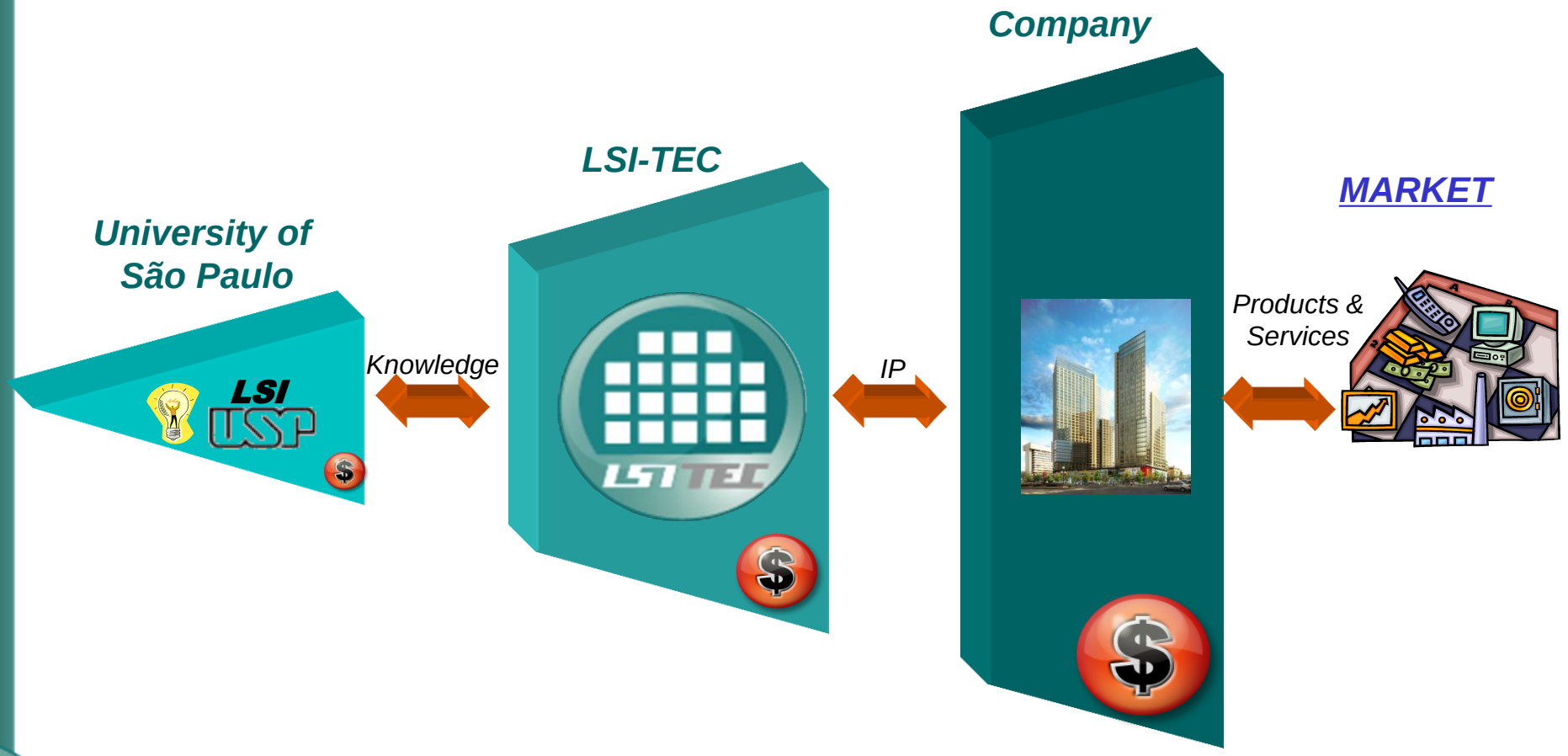
Innovative Solutions in Advanced Technologies





www.lsitec.org.br

LSI and LSI-TEC Structure Model



LSI-TEC OVERVIEW

- *Founded in 1999*
- *Private, profit is 100% reinvested in new technologies and services*
- *Organized into 11 Strategic Business Units*
- *Revenues (2010) – U$11.5 Million*
- *Over 200 employees (80%+ in R&D)*
- *Locations in São Paulo, Campinas, Salvador*
- *Company is seeking design projects with global companies in Analog, Mixed-Signal, RF and Digital IC Design*
- *Global Partnerships with **Intel, LGE, Cadence, X-FAB, TowerJazz, TU Delft***

LSI-TEC
Strategic Business Units

LSI-Tec is structured in the following Business Units:

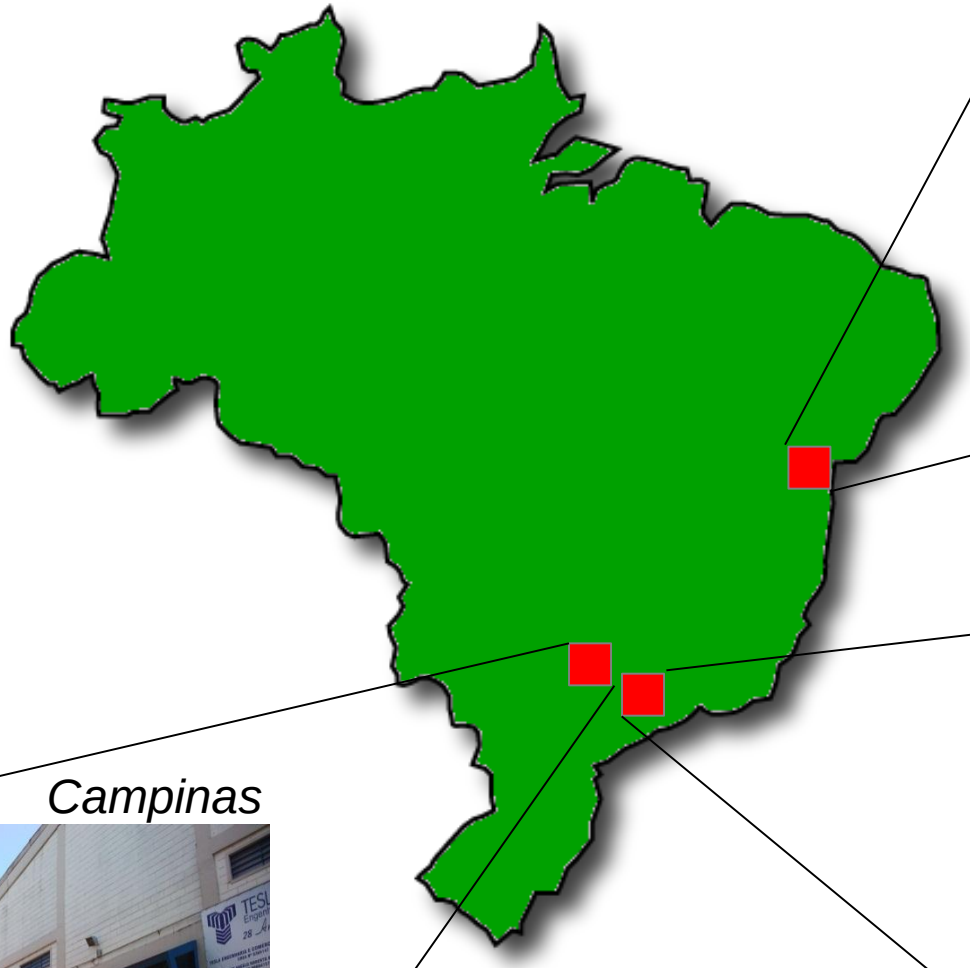
- *IC Design House*
- *Cell Phone Software and Cell Phone Testing*
- *Digital Certification*
- *Information Security and Compliance*
- *Instructional Technology Application for Education and Entertainment*
- *Media Engineering*
- *Microelectronics Process*
- *PCB Process*
- *Tele-health and Telemedicine advanced systems*
- *Virtual Reality*
- *Wireless and embedded technologies*

LSI-TEC

IC Design House

LSI-TEC – Strategic Business Units
IC Design House

- *Founded in 2006*
- *Over 50% of our Engineers have a MsC or PHD degree*
- *Complete chip solution provider*
- *Offer a one-stop-shop service for integrated circuits design (analog, mixed mode, RF and digital),*
- *Cover the entire work flow from system analysis and specification up to chip production (production is outsourced)*
- *The Brazilian Government, through the Ministry of Science and Technology, elected microelectronics as a national priority and created the IC Brazil Program, enabling high-potential Brazilian Design Centers like **LSI-TEC** to grow and consolidate their operations.*



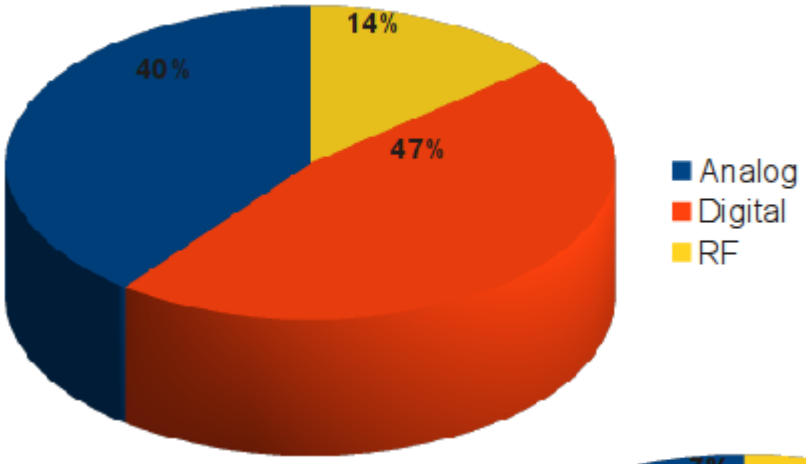
Salvador

São Paulo

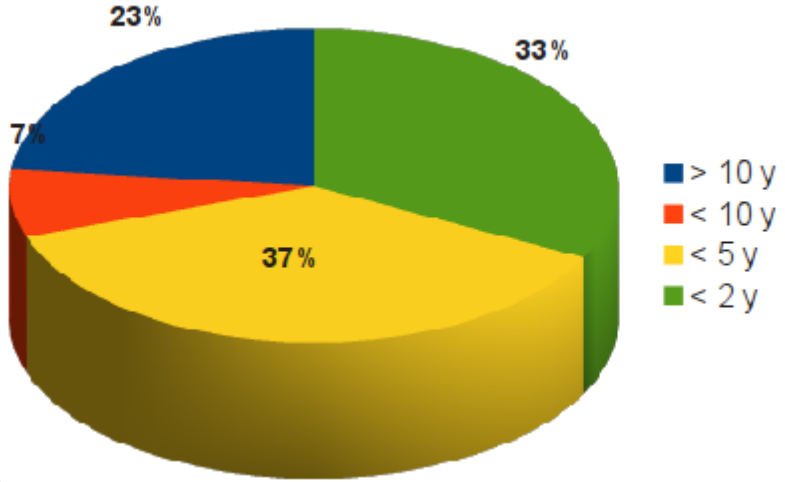
Campinas

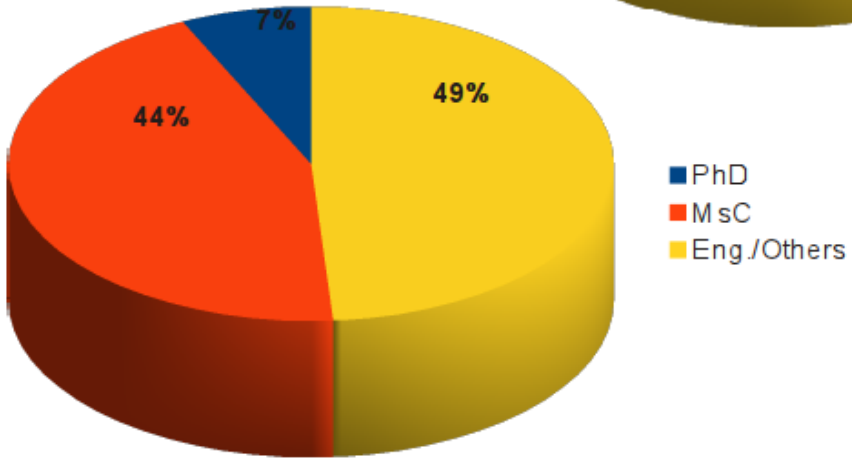
Design House in numbers

Team allocation



Team experience



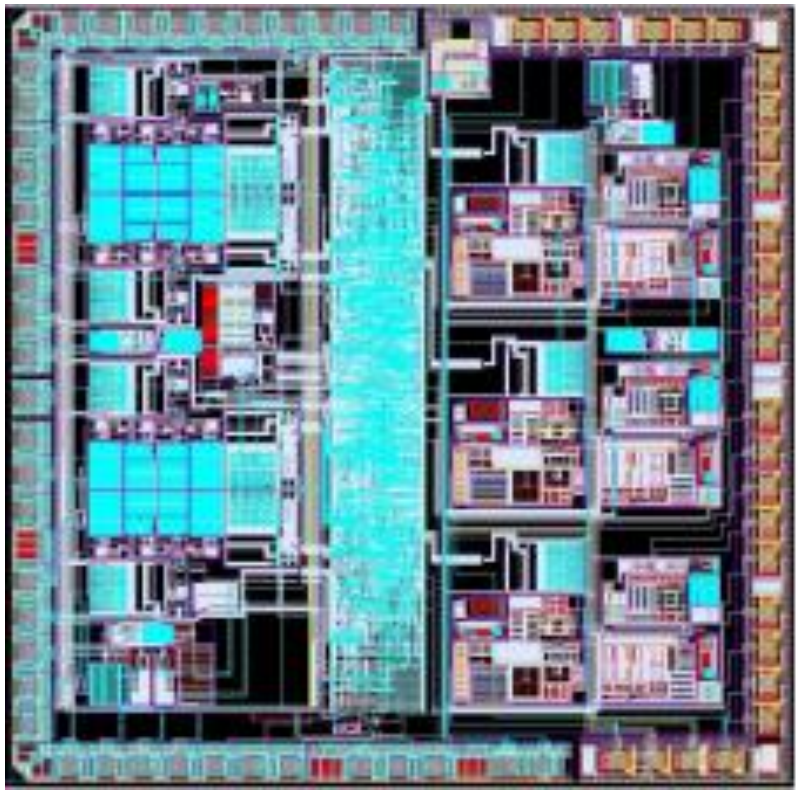


Total designers (excluding management staff and support): Over 40

Some Past Projects

IC for Industrial Instrumentation

- *Technology: CMOS 600 nm*
- *Analog communication: 4-20 mA and 0-10 V protocols*
- *Digital communication: SPI (slave)*
- *Digitally configurable*
- *Voltage, current and resistance measurement*

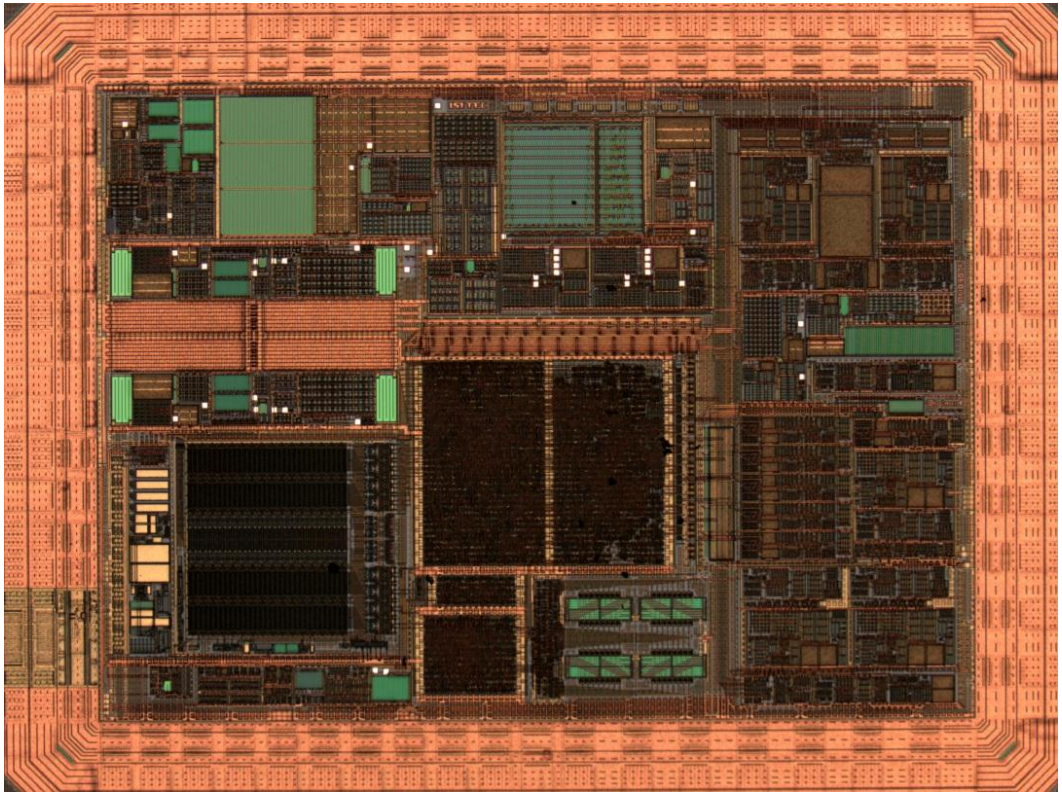


Some Functions

- *Status monitoring of transformer's oil*
- *Temperature monitor w/ Pt100 sensor*
- *Potentiometer taps reading*
- *Voltage source (0 to 10V)*
- *Current source (0 to 20 mA)*

IC for Analytical Instrumentation

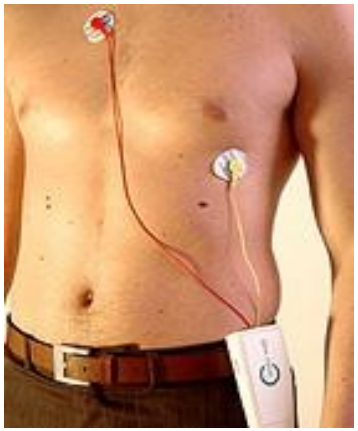
- *Technology node: CMOS 600 nm*
- *Internal EEPROM*
- *Analog communication: 4-20 mA protocol*
- *Digital communication: Hart-compatible (internal modem: 1200-2200 Hz)*
- *2 wires only (for power and communication)*

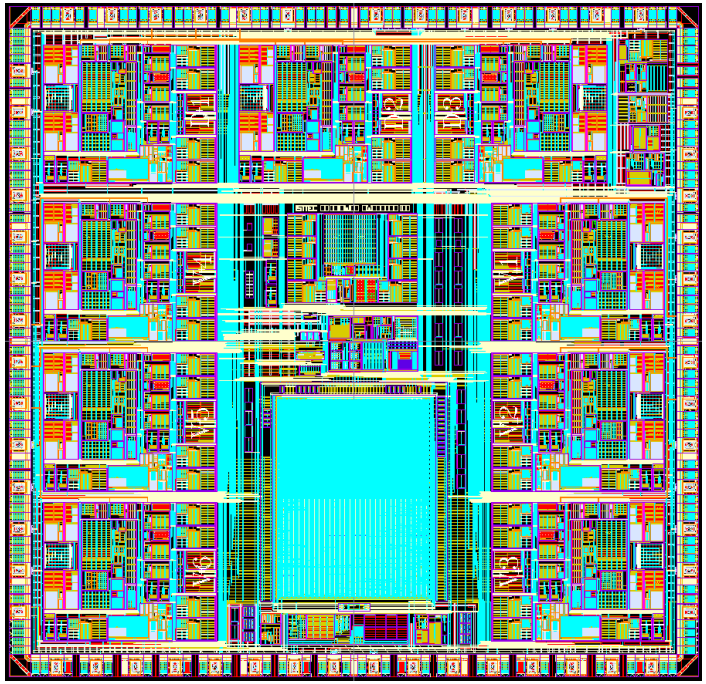


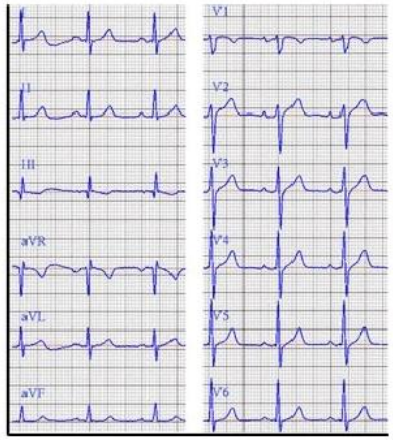
- *Sensors:*
  - *pH*
  - *Oxygen*
  - *Conductivity*
  - *Temperature*

IC for Electrocardiograph Monitor

- *Technology node: CMOS 350 nm*
- *Integrated gmC filters for offset cancellation (avoid external caps)*
- *Analog and digital outputs available*
- *SPI communication (slave)*
- *Up to 12 channels*







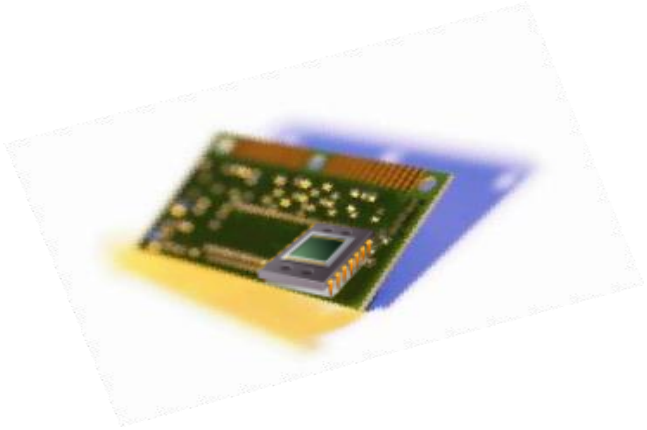
- *Portable, low cost ECG monitors*
- *Remote diagnostics*
- *Cost Reduction for Public health*

LTE (4G cellphone)

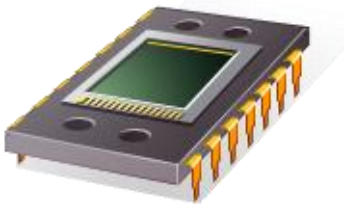
- *Development in association with an American enterprise*
- *To be sold as an IP for 4G cellphones*

4G Device

LTE(4G) IP/chip



PCB



IP/Chip under development

Silicon Tuner for Digital TV

- *Technology node: 180 nm*

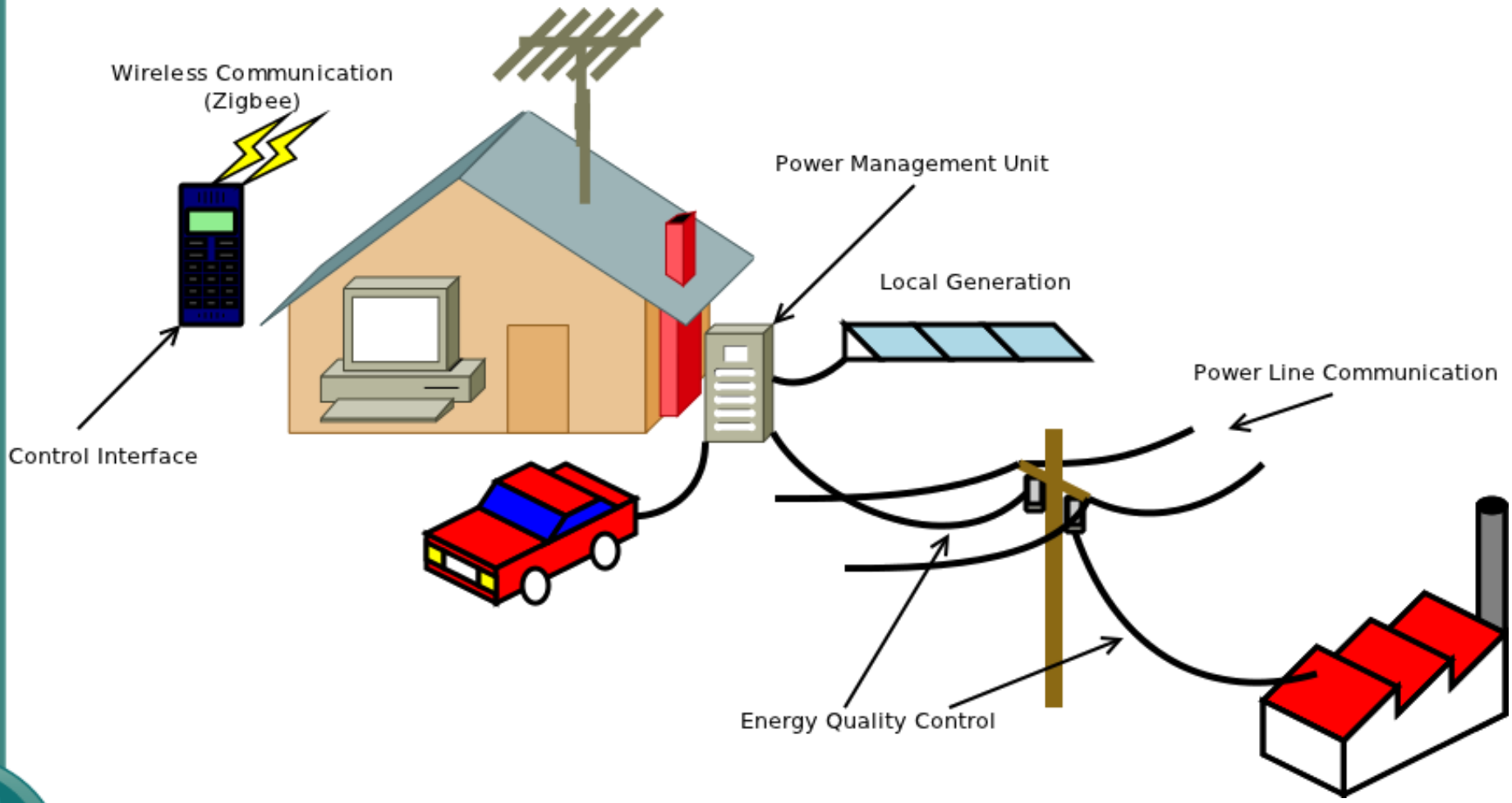
Set Top Box

Silicon Tuner

Standards:

- ATSC (Revision C) and A/74
- NorDig Unified version 1.0.3
- OpenCable
- DVB-C
- DVB-T
- ISDB-T
- NTSC
- PAL
- SECAM
- DOCSIS 2.0
- DTMB

Smart Grid Scenario



Smartgrid Development Opportunities

- *IC for Power lines monitoring for faults detection (reduce maintenance time).*

- *IC for Energy Quality measurement and control (allows differentiated pricing policy).*

- *IC for Power Management Unit*

- Allows Maximum Power Point Tracking (MPPT) for local generation systems;

- Integrates local and central energy distribution grids;

- *IC for Zigbee communication.*

- *IC modem for Power Line Communication.*

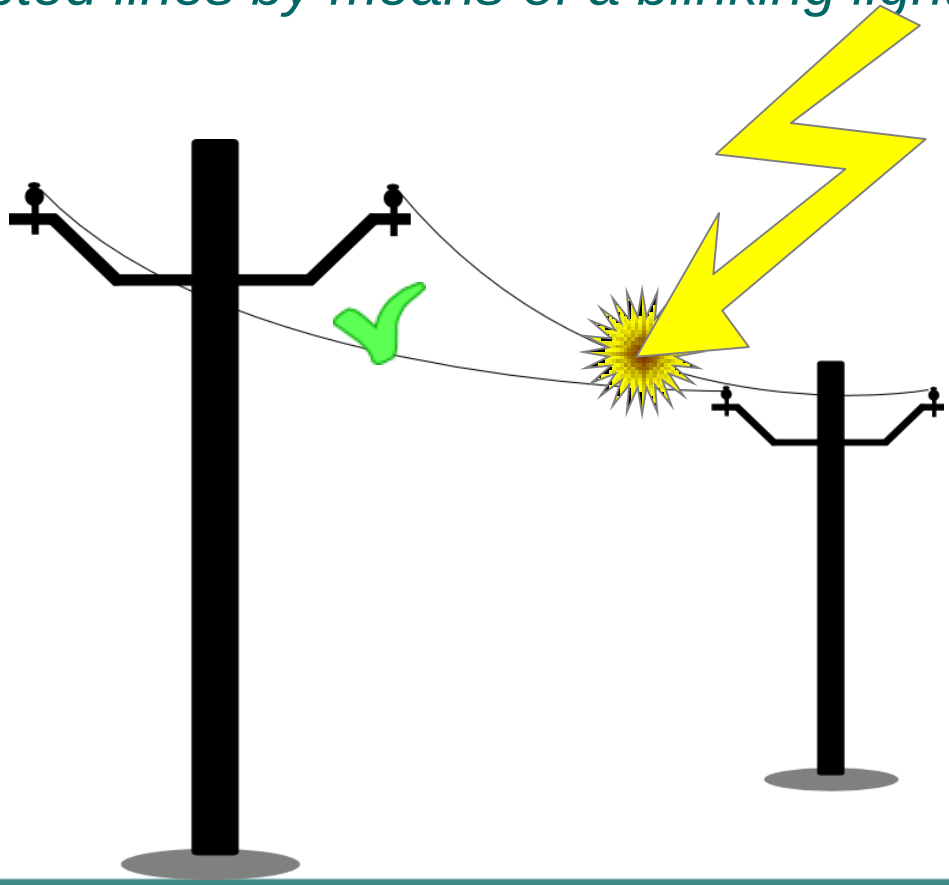
Case 1

Power Lines Monitoring System

IC developed in partnership with

Objectives

- *Minimize maintenance time by tracking down failure points on power lines: very complex topography.*
- *Pinpoint affected lines by means of a blinking light signal.*



Concept

- *Power lines are monitored by current and voltage sensors.*

- *If a burst of current is followed by a voltage drop, then a blinking signal is emitted.*

- *Blinking lights direct the technical team to the right spot of the failure occurrence.*

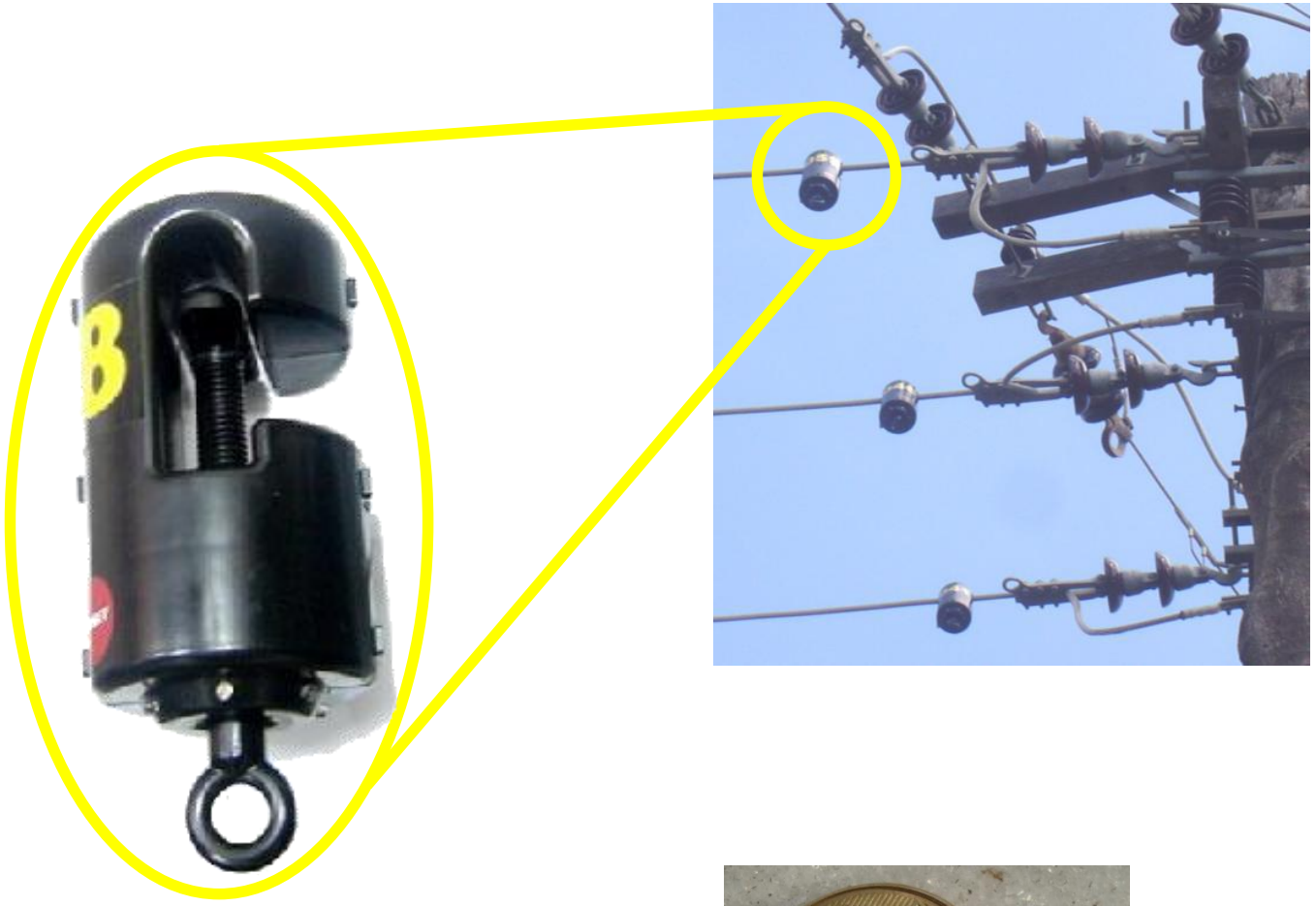
Features

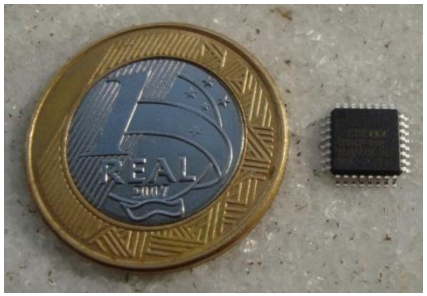
- *Battery powered: 3.6V*

- *No rechargeable batteries are used because regular batteries last longer (~10 years in stand by and 300 h during signalization).*

- *Time-based logic to distinguish between failures and normal fluctuations on the line.*

- *Embedded self-test routine.*




REAL
2007

Results

- *50% reduction of average failure localization time;*
- 18% reduction of the average time for solving emergency calls;
- 7% reduction of maintenance cost;
- A wireless version of the project will be developed with performance improvements in the localization of the problem (since the ID of the actuated unit can be transmitted through the wireless mesh).

Case 2

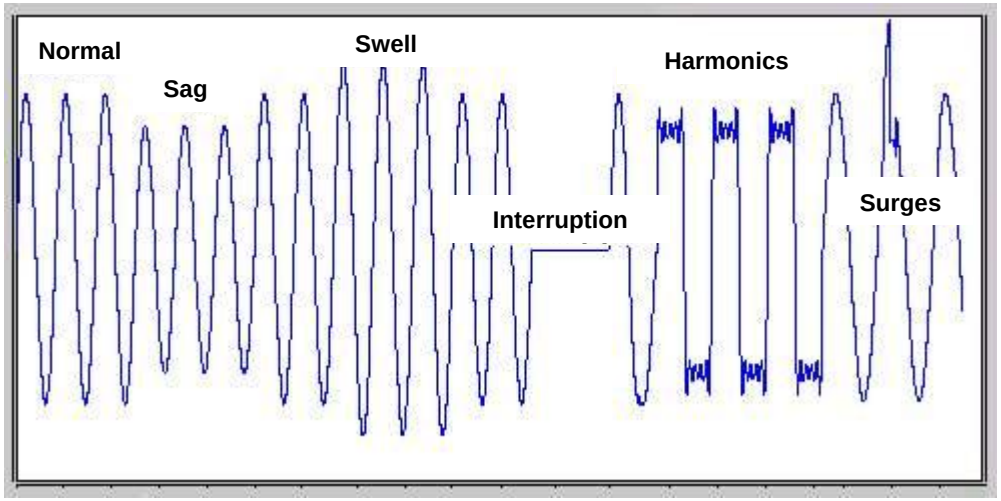
Energy Quality Measurement

IC in development in partnership with

ims Power Quality

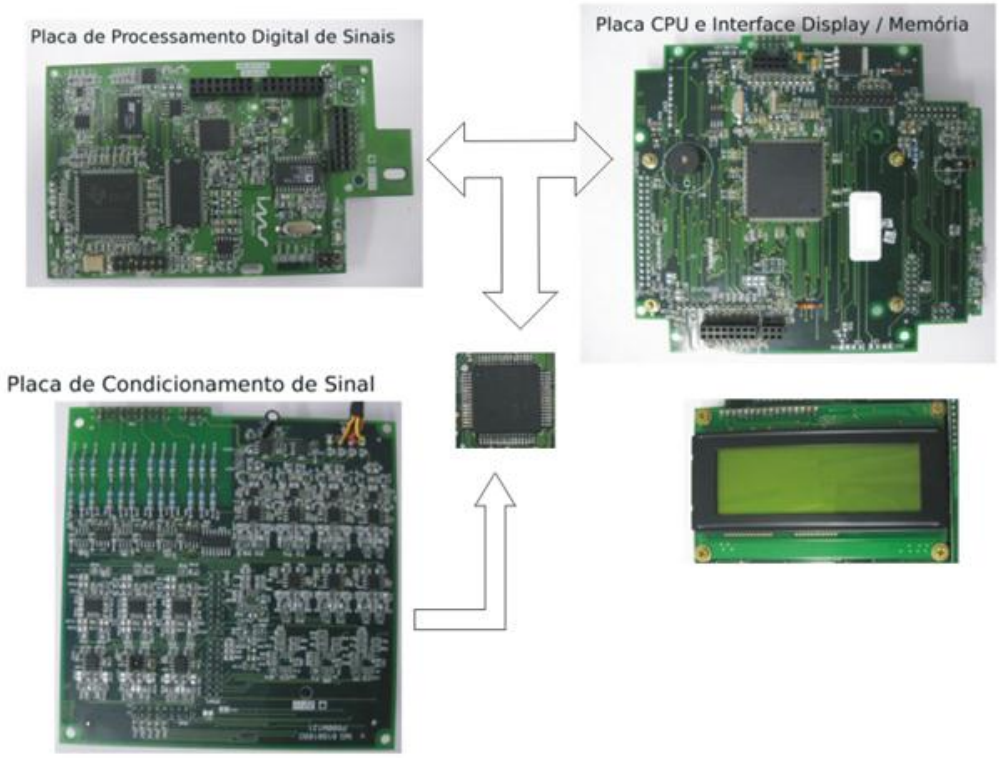
Problem

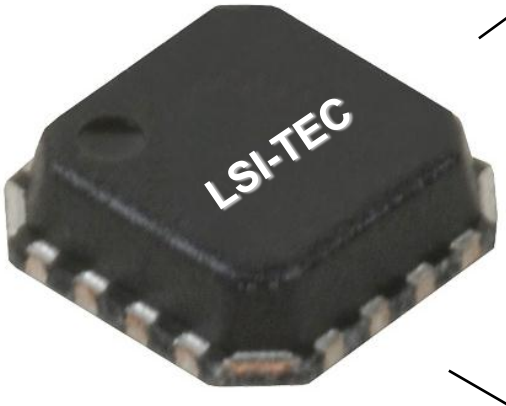
- *Detect and measure/calculate electrical disturbances, such as sags, swells, surges, energy absence and harmonic composition of the waveform;*
- *Keep a record of such events for pricing sake;*



Concept

- *Three-phase device;*
- *Compliant with IEC 61000-4-7/15/30, as well as with Brazilian standards;*
- *Dedicated hardware and internal MCU;*
- *Developed SoC should replace IMS's hardware for various products.*




LSI-TEC

SMART METER
ELECTRICAL POWER METER

SMART TRANS

SMART INDICADOR
ELECTRICAL POWER METER

Applications

- *Measurement Equipments, Analyzers and Controllers*
- *Mono and Three-phase Equipments*
- *Low and Medium voltage*
- *Pricing meter and Electrical Energy consumption supervision*
- *Residential, Commercial and Industrial Meters*
- *Electrical energy quality analyzers*
- *Power factor and demand controllers.*

Features

- *Phase voltage*
- *Line voltage*
- *Phase current*
- *Frequency*
- *Active power (signed)*
- *Reactive power (signed)*
- *Aparent power (signed)*
- *Interruption (duration)*
- *Battery monitoring*
- *Digitalized waveforms for all voltages and currents*
- *Calendar (with weekday) and time information with precision of ±1 second/month*
- *Harmonic composition up to 50a. Order (odd and even)*

Features – cont.

- SAG (magnitude and duration)
- SWELL (magnitude and duration)
- Flicker (voltage fluctuation)
- Voltage unbalance (V-/V+ %)
- Surge (presence)
- Phase sequence detection
- Total Harmonic Distortion (THD) for voltages
- THD for currents
- Chip temperature
- External temperature
- Crest factor (Peak-to-Average Ratio – PAR)
- Angle between voltages

Contact information

Seeking opportunities for:

Joint Venture;
Outsourced design;
Partnership;

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Support and Partnership

Thank you!

Obrigado!