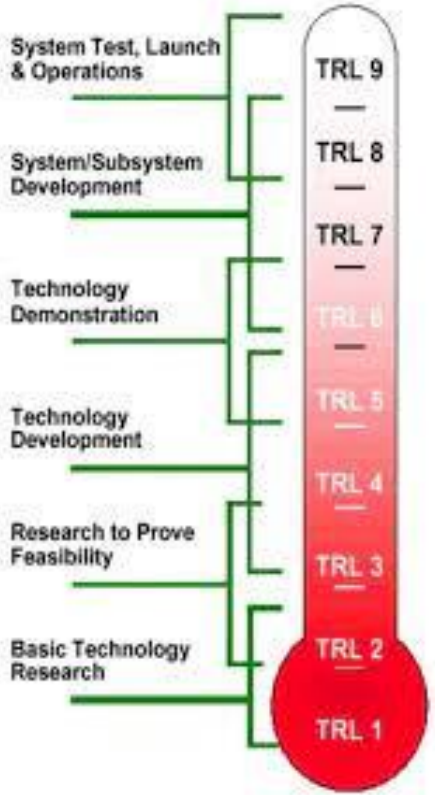
CICH-INOVAUSP

Integrated Center of Expertise in Connected and Intelligent Hardware

CICH-InovaUSP Goals



Impact

Concept

Consolidate na International Center of Excellence in Connected and Intelligent Hardware, with following purposes:

a) To meet Industry's demands, through projects in TRL 3-6 (technology) to TRL 7-9 (GoTo Mkt)
b) To develop both technology and HR in TRL 2 border areas of knowledge
c) Open Innovation with participation of startups
d) Establishment of Technological Association; **Strategic Alliances for Hardware and Semiconductors**

Historical Trajectory of the Proposing Group

1971 – First Brazilian Chip

1974 – Establishment of LSI-USP

1980 – Consolidation of Digital Systems Division

1990 – Consolidation of Interactive Electronic Midia Area

1998 – Creation of LSITEC

2006 – Installation of SMD Manufacturing Line

2011 – Establishment of CITI-USP

2016 – Creation of Program “Caninos LoucosW Abe”

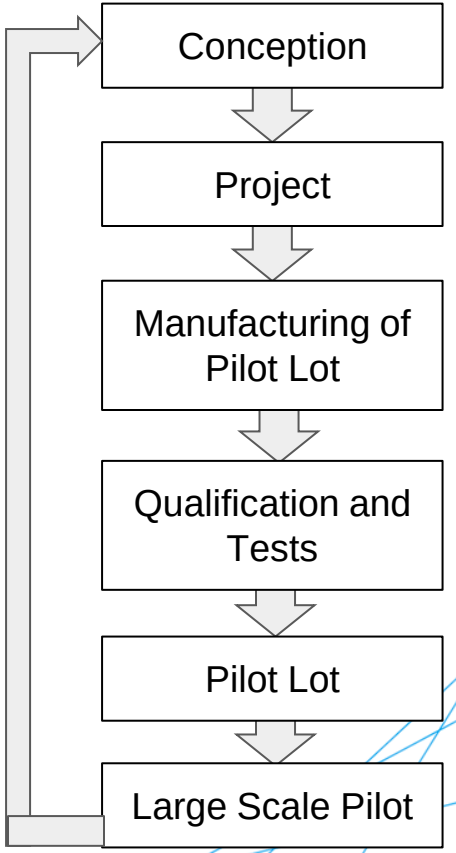
2017 – Launching of IoT Manufacturing Center

2020 – Pulmonary Ventilator (“Inspire”)

2022 – Establishment of PRPI and FOCO OF USP in Innovation

IoT Manufacturing Center (2017)

In December 2017, the end-to-end cycle for Connected and Intelligent Hardware from USP was completed: First Pilot Lots of Connected and Intelligent Hardware were produced in small scale (2000 products)



https://revistapegn.globo.com/Noticias/noticia/2018/01/usp-inaugura-laboratorio-de-pesquisa-em-internet-das-coisas.html

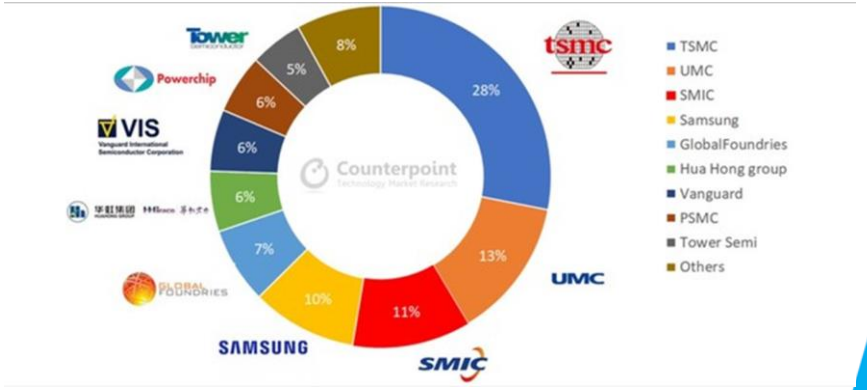
Caracterization of Industrial Demand

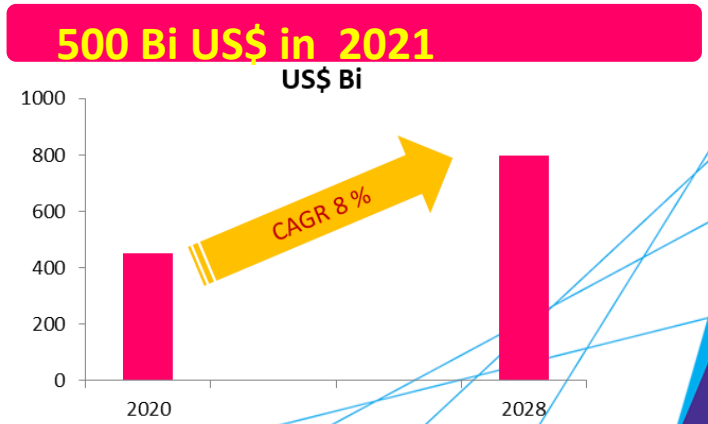
World Scenario

- Highly demanding global market and manufacturing concentrated in Taiwan
- Collapse in the world Supply Chain system
- Shortage of CPUs locally
- Impact in base industry and consumption
- Critical Element in Cold War 2.0
- Worldwide, countries are repatriating industry with national attractive programs.

National Scenario

- Importation of US$5,0B in 2021
- National Industry Sales : US$720M
- Memory-driven Industry, with:
  - 50% Smartphone
  - 80% Desktops and Notebooks
- Investment 150 MR$
- Lack of CPU industry
- Strategic Industries with shortage of CPUs until 2023 (Automotive, ITC and Automation)
- Growing demand with IoT and 5G without perspective for regularization and attendance.





Strategic Positioning in IoT Edge with Strong Demand for Connected and Intelligent HW

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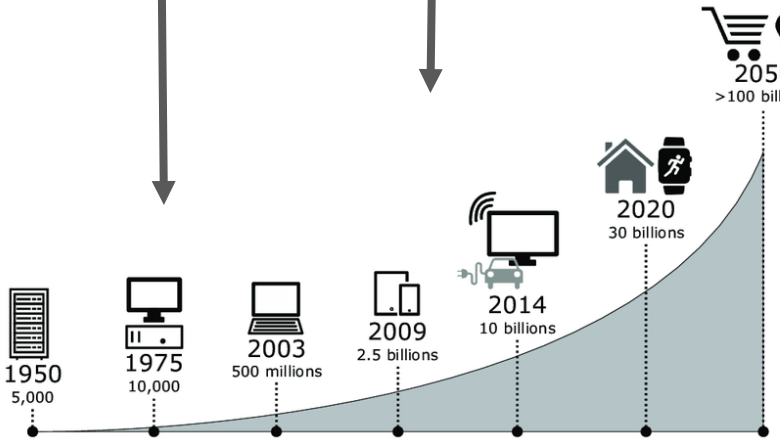
INTEL - Microsoft

ARM - Android

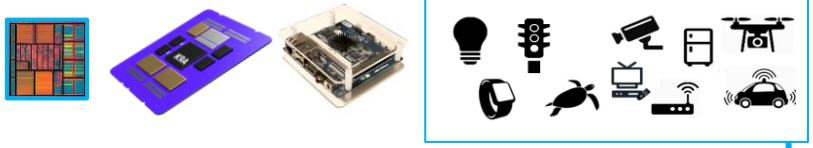
No Champions

CICH-InovaUSP



IoT Edge

Low Power & Cost, AI, Security



End-to-end Value Chain
From final application to Die

Intelligent and Connected HW – critical element for leveraging Industrial Competitiveness Valuation Chain

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$

22nm
CPU Die

$

ChipLet

$

Qualified
ChipLet

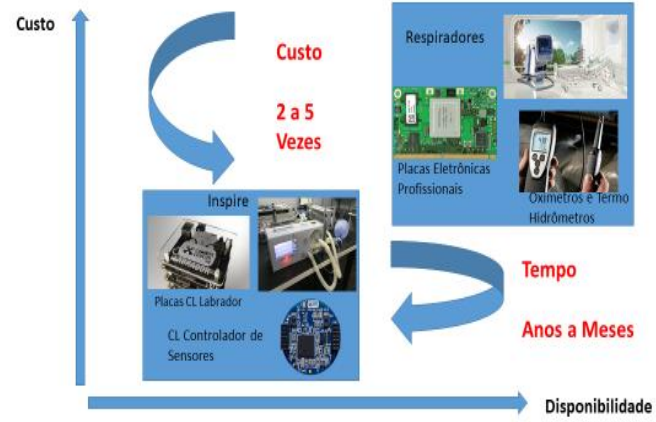
$$

Qualified
SBC

$$$$

Technology
Competitive

Potencial de Injeção de Competitividade – Domínio Cadeia de CHIP Inteligente – Casos Reais



Small but all from here

Operating Software

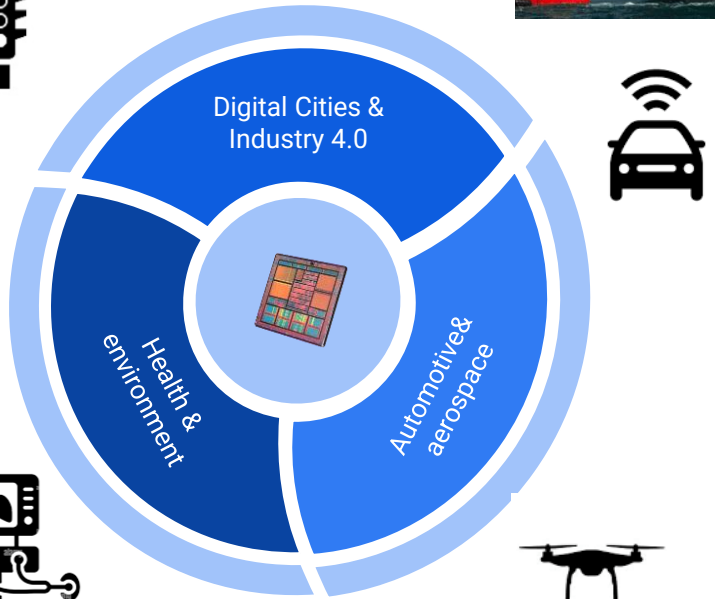
Application Software

Artificial Intelligence

Industrial Segments of the country committed with our HW

BNDES

Pilot IoT

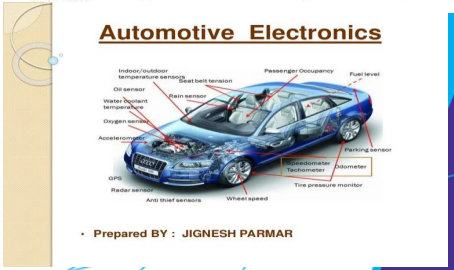


POC Off Shore Platform

POC for ECU

AUTOSTAR

BMW GROUP · Continental · DAIMLER · Ford · GM · PSA GROUPE · TOYOTA · VOLKSWAGEN



Actual iCases: Automotive Sector

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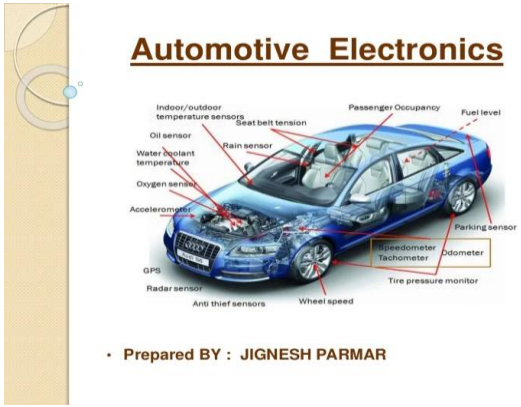
Innovation Center

BMW GROUP · BOSCH · Continental · DAIMLER · Ford · GM · PSA GROUPE · TOYOTA · VOLKSWAGEN

Especificação

AUTOSTAR



STELLANTIS

Stellantis I
POC (on going)
Detection of public security standards with embarked AI.
Stellantis II
Connected Car
Rota 2030

VW – MOU Signed
MMU: POC approved and Pilot under preparation with USP

Actual Cases: Smart Cities – Pilots of IoT – BNDES/MCTI

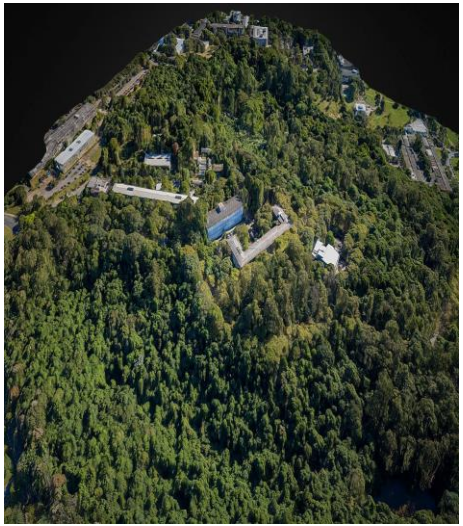
STELLANTIS

Public Safety : Pilot in São Paulo Police Department - Automatic search for risky and life-threatening patterns with embedded AI

BNDES

Urban Mobility CET – City of São Paulo - pilot in progress for digital traffic light control preserving legacy

RCGI/USP



Urban Forests – Usp - pilot in progress for monitoring urban forests

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Claro

5G USP - pilot in progress for 5G evaluation in Megalopol

Actual Cases: Offshore platform monitoring

Support system for loading and unloading containers for Oil Platforms using Labrador Board integrated with Digital Camera with AI embedded on pre-iTEX K9 CHIP

Pilot in progress with P52 with CENPES / Petrobras

Actual iCases : Digital Education

Pilots under development for *Start Up*, SENAI and Paula Souza during 2021 based in SBC – Caninos Loucos boards.

Reproduction in scale under negotiation, starting in 2022

Actual Cases: CPUs to the Automation of small commerces

***End to End Domain*: Semicondutor, Operational System and Platform for Applications**

***Operating System* – Kernell**

Application Software

Soluções como Inteligência Artificial

Global Semiconductor Value Chain – CICH

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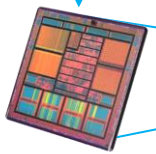
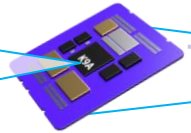
Future of CICH ← We have already achieved

IC Design	SIP Design	SBC Design	Application Design
simulation	validation	validation	SW design
Mask	SIP - SW	Assembly	HW design
Foundry	Assembly	Packaging	App integration
Cut	Packaging	SBC - SW	Packaging
Testing	Testing	Testing	Testing

500K!

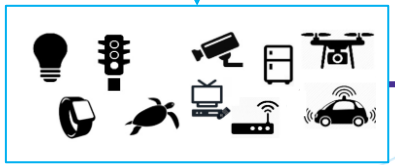


CPU on a
Chip DIE



CPU on a
Package SiP

CPU on a
Module SBC



thousands of products
Billions of Devices

Global IoT/Edge Market

Index
- 3rd Party technology
- iTex Technology

Research Focus TRL-2- ChipLet Full Computer on a Chip

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RAM & Flash storage,

Full Kernel SO

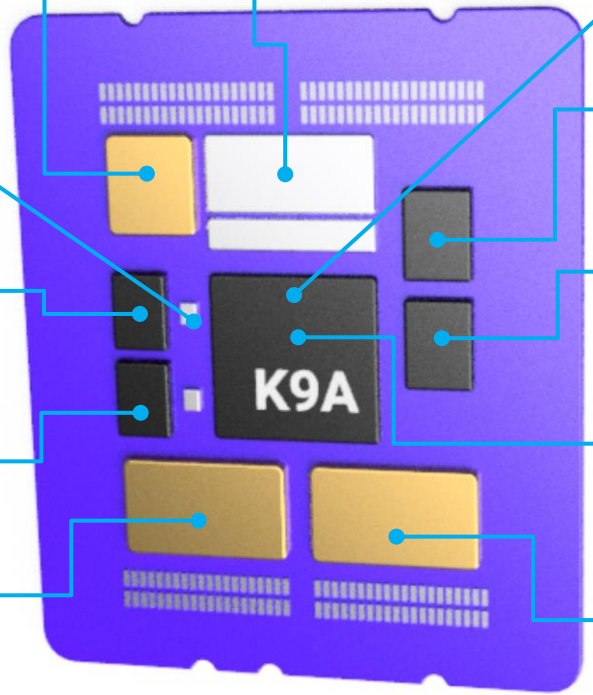
Audio & Video

High Speed chip to chip communications

Display

Expansion of functionality

Gerenciador principal de energia



Expansion of communication

Communication Interfaces (CAN, RS422, Gb Ethernet, PCIe, other)

Industrial grade multi-core processor with GPU, NPU and capacity to DDR4

Auxiliary power consumption manager to peripherals

Summary of the opportunity (1/2)

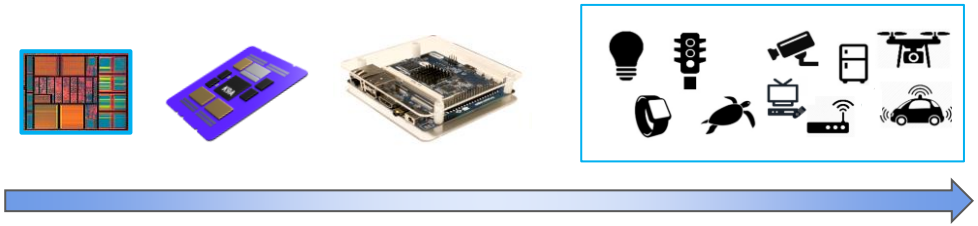
Integrated Center in Hardware Competence: Design house and semiconductor industry and SiP (System in Package)

Vision: from the chip to the product

- Chiplets Design and manufacture
- Domain of Operational System
- Single board computers for IoT with AI
- Customization Projects
- Focus in Border IoT/AI

Features of the Project

- Intelectual capital with more than 30 Years of experience
- Senior Team and world executives
- Technological Support from Escola Politécnica da USP and MCTI



Domain HW of end to end Chain: “from final application to die”

Summary of opportunity (2/2)

Integrated Center of Competence in Hardware: Design house and semiconductor industry and SiP (System in Package)

- Global Product without direct competition with world giants
- Technological domain and Local Industrial Property
- Generation of hardware and software qualified Jobs and Work Labor
- Viabilization of National Companies and Start-Ups
- Secured Demand since the first year of operation
  - Automobile – Control Embarked Electronic
  - Defense
  - Logistics and Sensing
  - Education
  - Industry 4.0

Conclusion

TECNOLOGY SECTOR – Integrated Center of Hardware Competence

DESIGN HOUSE E INDÚSTRIA DE SEMICONDUTORES E SIP – SYSTEM IN PACKAGE

VISION

International Integration Center in Hardware Competence, with:

- More than 30 years of experience in design and manufacture of CIs.
- Domain of Operational System
- SBC – Single Board Computers dedicated to IoT market with Border AI
- Customization Projects with secured demand:
  - Automobile – Control Embarked Electronic
  - Defense
  - Logistic and Sensing
  - Education
- Intelectual Capital
- Technological support from Escola Politécnica da Universidade de São Paulo and MCTI
- Senior Team of World Executives

STRATEGY AND FOCUS

- Domain of CPU CHIP Design to IoT and Border AI
- Cutting Edge Technologies
- Focused in IoT and border AI (low cost, low energy consumption and global use)
- Customizável por segmento
- Product of CI last phase
- Test and integration of board to Industry 4.0
- 100% Nacional-base technology with secured PI
- Secured Demand since the first year of operation
- Global Product without direct competition with world giants.

Main Product: Labrador

Source: Projeto de Lei para Prorrogação do PADIS, Câmara dos Deputados. Outubro de 2021

Gartner, abril 2021