

# Research, Development and Innovation

The Hardware and Software Integration Lab (LISHA) develops a series of projects in partnerships with private companies and public agencies in the areas of embedded systems design, telecommunications and digital TV.

## Embedded Systems Design

LISHA investigates the use of [ADESD](#) methodology for developing embedded systems. This methodology proposes the use of advanced engineering technics for building systems based on the use of components highly adapted to the execution scenario, thus facilitating their reuse. Currently the laboratory has a set of components (EPOS Project) for the implementation of applications in areas as sensor networks, home automation, remote data acquisition, telecommunication and digital video entertainment devices.

### Projects

- [EPOS: Embedded Parallel Operating System](#) (1997 - )
- [PDSCE: Embedded System Development Platform](#) (2004 - 2007)
- [SmartHome](#) (2009 - )
- [EPOS-Mote](#) (2009 - )
- [FlexES: Flexible Embedded Systems](#) (2010 - 2012)



## Automotive Systems

LISHA develops a number of projects involving partnerships with with automotive industry players such as Bosch, Renault, Stellantis, Intelbras, and Yak, and has an expertise in the areas of architectures for automotive systems, from software embedded at ECUs to automotive data lakes, including, data acquisition and storage, predictive maintenance, driver profiling, and autonomous vehicles.

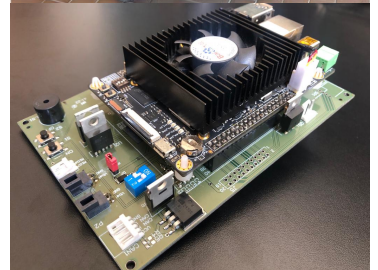
### Projects

- [SmartData on Wheels - a Safe and Secure Runtime Support System for Autonomous Vehicles](#) (2023 - )
- [Auto5G — Intelligent Vehicle Telemetry and Supervision System](#) (2023 - ) : Intelbras and Yak
- [Secure and Privacy-Aware Data Lake for Vehicle Data Storage and Processing](#) (2024 - ) : Renault, Stellantis, Bosch
- [Intelligent Acquisition and Analysis System for ECUs \(IASE\)](#) (2020 - 2023) and IASE II (2023-) : Renault



## Telecommunication

LISHA develops a number of projects involving partnerships with local telecommunications companies, and has an expertise in the areas of architectures for telecommunication systems, communication GPRS / GSM, VoIP services (audio and video) and software-defined radio architecture.

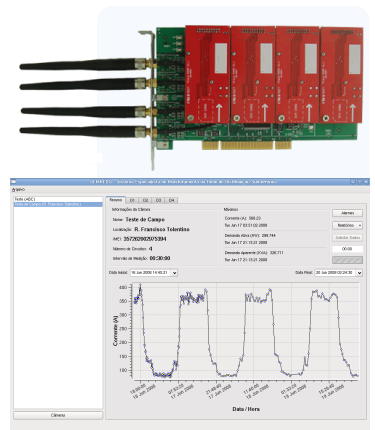


### Projects

- [ADEG-Hydro: Anomaly Detection in Hydroelectric Energy Generators](#) (2021 - 2023) : AQTech
- [ADEG-Eolic: Anomaly Detection in Eolic Energy Generators](#) (2020 - 2021) : AQTech
- [Architecture Communication ICIP60](#) (2009 - 2012): Intelbras
- [Corporate Video Conferencing](#) (2010 - 2011): Intelbras



- [eSDR: Embedded Software-defined Radio](#) (2009 - 2010): Dígitro
- UnderNET: Underground Energy Distribution Network Monitoring System (2007 - 2008): CELESC
- Serial Terminal GSM (2007): vOffice
- Gateway GSM (2007): Khomp
- NanoPBX (2007): vOffice



## Digital Television

LISHA has actively participated in the consortium of academic institutions that studied the proposal for the definition of Brazilian Digital Television Standard (SBTVD), and directly contributed to the studies of the Transport Layer and encoding of audio and video. Currently LISHA represents the UFSC on the SBTVD Forum and participate on the research network on DTV Set-top box proposing an free, scalable and open architecture for DTV STB.

## Projects

- [Rede ALTATV: an Open, Free, Scalable Set-top Box Architecture for DTV and IPTV](#) (2009 - 2010): CTIC
- [H.264 Encoder: Design and Implementation of a H.264 Encoder for the ISDTV](#) (2008 - 2011): FINEP / CiaNET
- [RH-TVD: Special Graduate Program for Digital TV](#) (2009 - 2012): CAPES
- [Rede H.264 SBTVD](#) (2008 - 2010): FINEP
- IPTV STB: Design and Implementation of a Set-top Box for IPTV (2008 - 2009): FAPESC
- SAM: Layered Scalable Video Codec (2006 - 2008): FINEP
- PMM: Modular Multimedia Platform (2006 - 2008): FINEP
- [SBTVD: Brazilian Digital Television System](#) (2005 - 2006): FINEP
- [I2TV: Interactive TV for Internet2](#) (2002 - 2004): CNPq



The image shows a screenshot of a television program guide. At the top, it says '4:14 on Wednesday, February 2' and '40 TLC'. Below this, there's a section for 'While You Were Out' with a description: 'Connecticut Norwich Avenue, Doc. A Navy lieutenant's wife has their kitchen redone. Robert Ives'. The main part of the image is a grid showing various channels and their current programs. The channels listed are 34 QVC, 35 BET, 36 MTV, 37 COMEDY, 38 MTV, 39 VH1, and 40 TLC. The programs shown include 'Fine Jewelry Collection', 'Rap City: The Basement', 'Vegas Showgirls: Nite', 'Vegas Showgirls: Nite', 'The El True Hollywood Story', 'My Blue Heaven', 'Premium Blend', 'The Daily Show With...', 'TRL', 'Hip Hop: Industry Inside', 'Def Jam Uncensored', 'TV Guide's Truth Behind the Sitcoms 3', 'TV Guide's Truth Behind the Sitcoms 5', 'Trading Spaces', and 'While You Were Out'.

Channel	4:00 p.m.	4:30 p.m.	5:00 p.m.	5:30 p.m.
34 QVC	Fine Jewelry Collection		Now You're Cackling	
35 BET	Rap City: The Basement			
36 MTV	Vegas Showgirls: Nite	Vegas Showgirls: Nite	The El True Hollywood Story	
37 COMEDY	My Blue Heaven		Premium Blend	The Daily Show With...
38 MTV	TRL		Hip Hop: Industry Inside	Def Jam Uncensored
39 VH1	TV Guide's Truth Behind the Sitcoms 3		TV Guide's Truth Behind the Sitcoms 5	
40 TLC	Trading Spaces		While You Were Out	