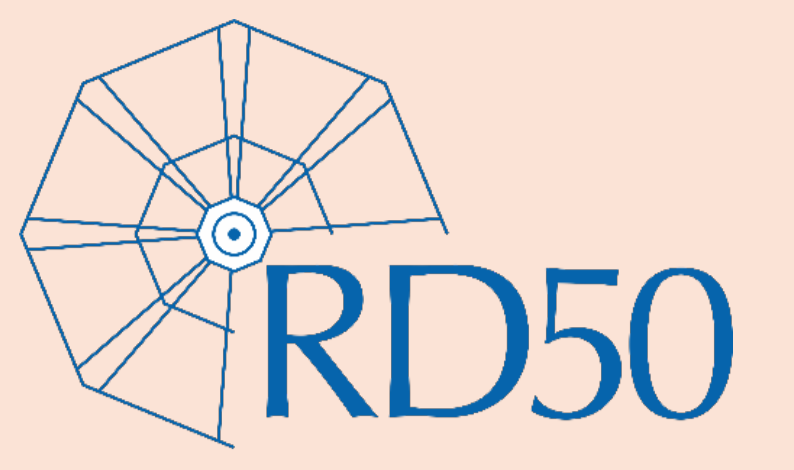




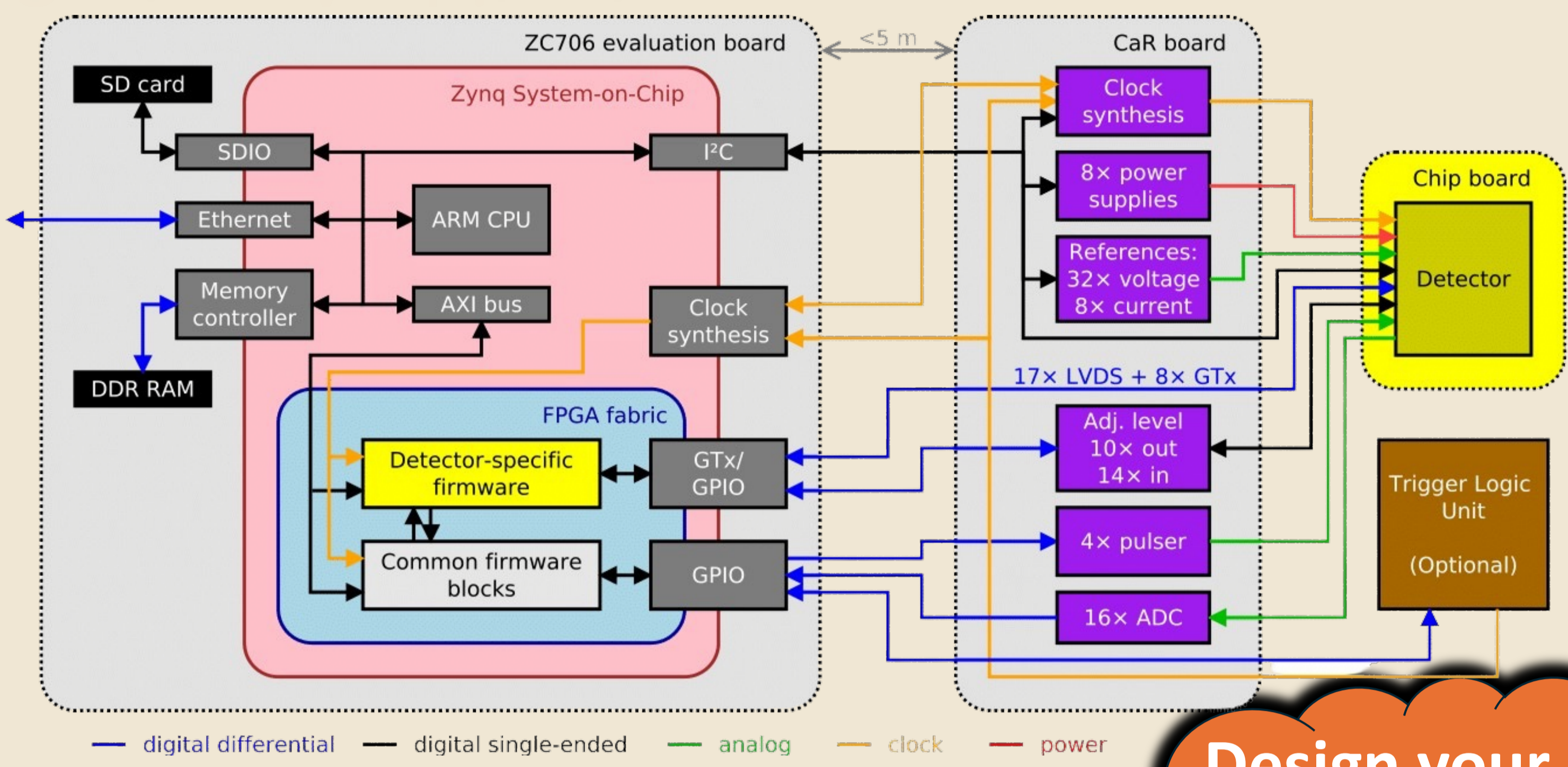
# Caribou - A Versatile Data Acquisition System for Silicon Pixel Detector Prototyping



Younes Otard<sup>1</sup>, Mathieu Benoit<sup>2</sup>, Eric Buschmann<sup>3</sup>, Hucheng Chen<sup>3</sup>, Dominik Dannheim<sup>1</sup>, Thomas Koffas<sup>4</sup>, Ryan St-Jean<sup>4</sup>, Simon Spannagel<sup>5</sup>, Shaochun Tang<sup>3</sup>, Tomas Vanat<sup>5</sup>

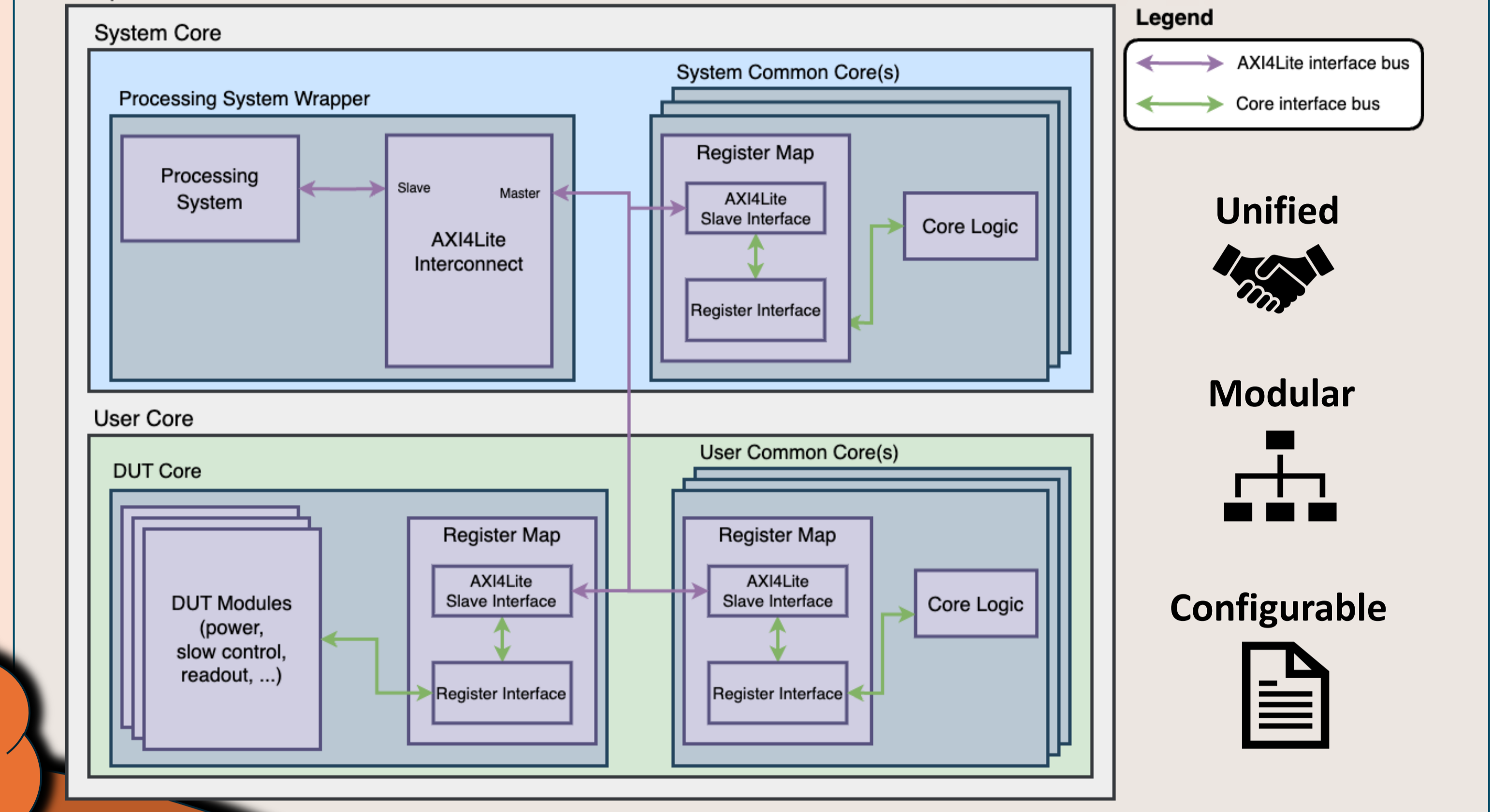
<sup>1</sup>CERN, <sup>2</sup>ORNL, <sup>3</sup>BNL, <sup>4</sup>Carleton University, <sup>5</sup>DESY

## System Architecture



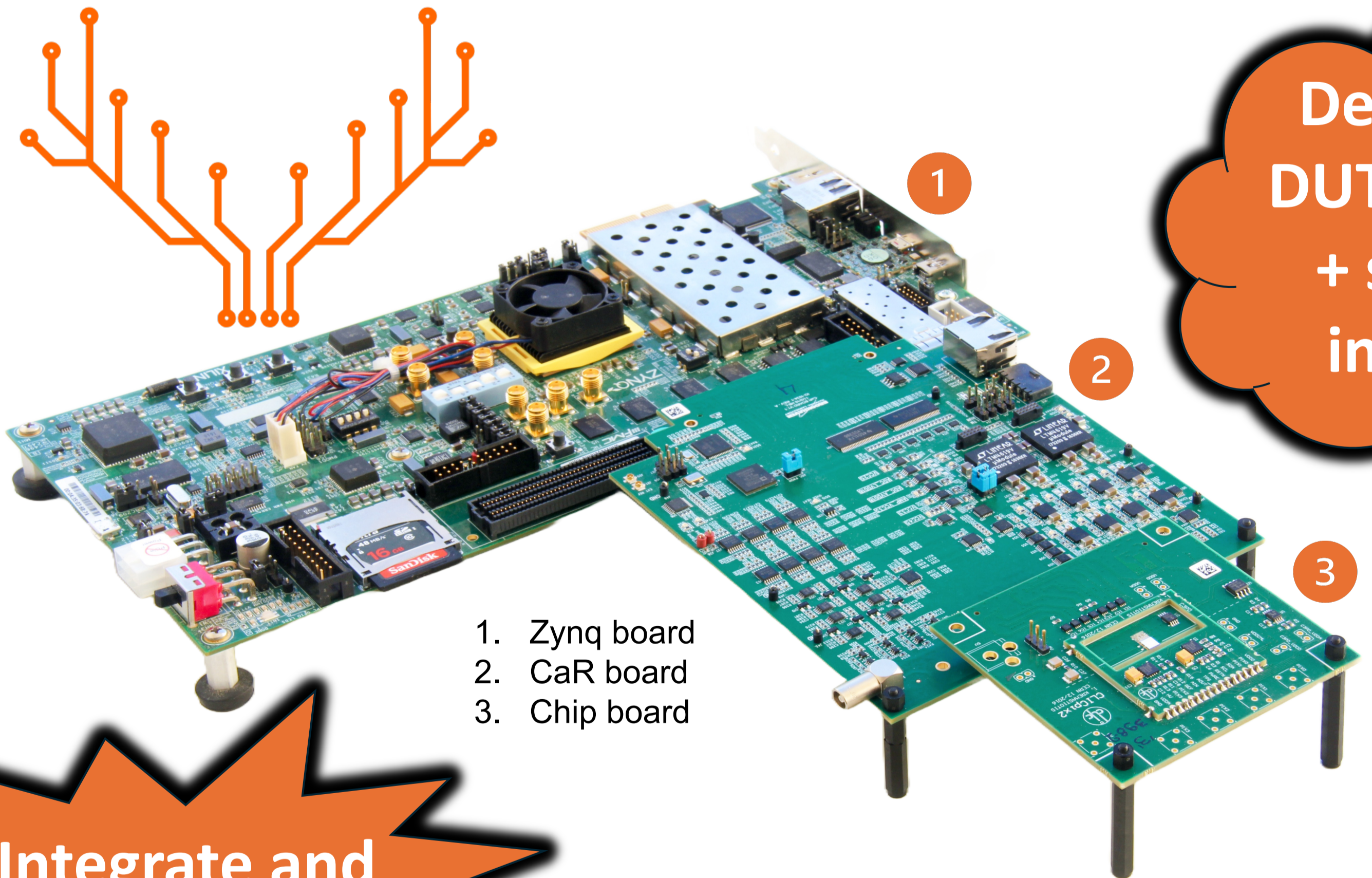
Design your DUT chip board

## FPGA Firmware



Design your DUT firmware + software interfaces

“Minimal work on the base test system development. Maximal focus on detector integration and testing”



Integrate and test your DUT

**Hardware System Upgrade**

Mercury+ XU1 SoC Module  
Zynq Ultrascale+ MPSoC

Zynq board and CaR board unified into modular CaR board

Single compact and modular CaR board

More features and processing resources

Development & Synthesis → AMD XILINX VIVADO

Simulation & Validation ← Ccotb

Vivado project management, code linting, simulation and building

## Integration & Testing

> 50 CaR boards delivered to 14 institutes and > 15 tested prototypes

Laboratory Test-Bench

Beam-Test Infrastructure

## Software Stack

yocto PROJECT

Yocto-based Linux Distribution  
Reference distribution: Poky

AMD XILINX

Petalinux build tools and workflow  
Caribou image builder

Code linting, nightly Petalinux builds and Peary deployment

Peary DAQ software framework  
Caribou system and detector control

## Documentation

Access to Documentation, Publications, and Community platforms

QR code linking to <https://caribou-project.docs.cern.ch>

