

# **SPI boards package, a new set of electronic boards at Synchrotron SOLEIL**

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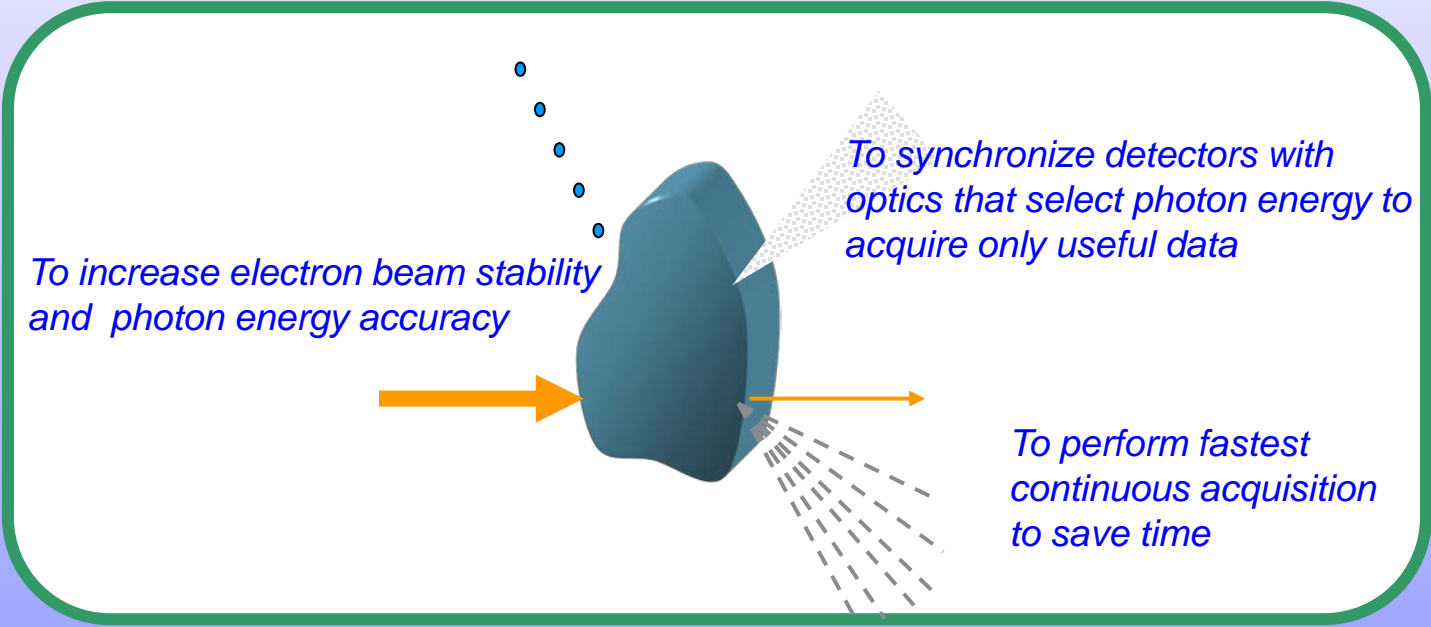
**Synchrotron Soleil, Paris, France**

**WEMMU004**

# Project Goal

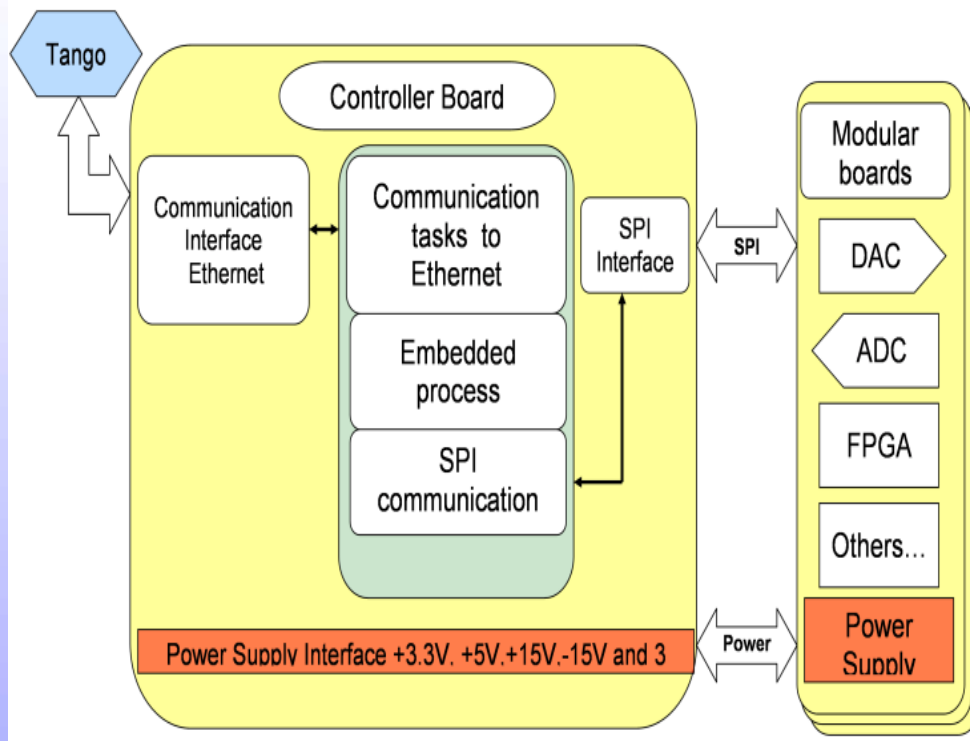
- **Objectives:**
- Development of a new platform with up to date components that allows:
  - Building of solutions for applications requiring synchronization
  - Modular system with board communicating in SPI
  - Easy to connect to a control system via Ethernet.
  - Development with simple and reliable tools.
  - Embedded low level code

- **Requirements:**



# Solution Outline

## • Architecture



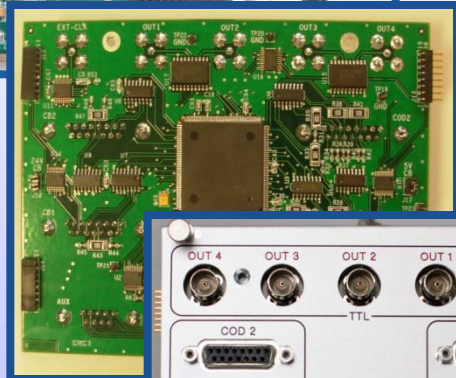
## Technology used:

### Microcontroller ARM cortex M3

- Multipurpose microcontroller used in industry and medical applications
- Integrated Ethernet controller
  - ✓ Ethernet 10/100 MAC&PHY
- On-chip memory
  - ✓ 256KB Flash
  - ✓ 96KB SRAM
- Cortex Processor Core 80 MHz.
- 2 SPI interfaces
  
- Keil tools with RTX operating system and TCPnet TCP/IP stack.

# Conclusion

## SPICONROLLER



SPIETBOX

- The current set of boards:
  - SPICONROLLER : Controller board based on ARM Cortex M3
  - SPIDAC: 4 channel DAC board, 16 bits,  $\pm 10V$
  - SPIADC: 4 channel ADC board, 16 bits,  $\pm 10V$
  - SPIETBOX: Processing encoder signal board based on Xilinx SPARTAN III FPGA, 4 encoder inputs/outputs, 4 TTL outputs, 1 SPI interface (Works in standalone or connected to SPICONROLLER)
- Some applications already in production :
  - Control of three HU256 Electromagnetic undulators for CASSIOPEE, PLEIADES and ANTARES beamlines
  - Synchronization of Goniometer and Pilatus detectors for continuous acquisitions.
- Next possible improvement:
  - Upgrade of SPIETBOX with more higher performance FPGA.
  - Development of a co-processor board for SPICONROLLER with FPGA or DSP.

***Thank you for your attention and see you in the poster session for more details!***