

# **SKYLAB SpW products:**

**Test solutions from low-cost  
to smart & high performance devices**

**SpaceWire Working Group # 13, ESTEC, September 14th.**

**Stéphane Davy, Matthieu Salanave**

[davy@skylab-corporate.com](mailto:davy@skylab-corporate.com)



# Outline

- 1** SKYLAB: who, what & why SpW ?
- 2** Win-win partnership with CEA
- 3** Low-cost PCI board
- 4** High performance PCI Express board
- 5** smartCable®
- 6** SpW Traffic Controller Application
- 7** Conclusion and questions



# Outline

- 1 SKYLAB: who, what & why SpW ?
- 2 Win-win partnership with CEA
- 3 Low-cost PCI board
- 4 High performance PCI Express board
- 5 smartCable®
- 6 SpW Traffic Controller Application
- 7 Conclusion and questions



## Who ?

- SKYLAB, French SME, 850K€ income in 2009.
  - A know-how and **complete skilled company**
    - Multi-disciplinary team (integration of Aero/Space electronics Engineers)
    - Managing team with more than 10 years successful experience with space field major accounts
    - Engineers with an international experience in space research renowned laboratories
- A products oriented company
  - Based on a **dynamic R&D** department (20% allocated)
- A **complete industrial cycle** experienced company
- Senior & Junior existing Engineers from SKYLAB learnt & implied themselves



# 1 – SKYLAB: Who, What and Why SpW ?

## What ?

- A catalog of SpW test equipments designed with **customers needs** in mind

## Why ?

- Become **visible** today for being able to build flight commercial hardware tomorrow
- SpW is a **new** technology and is to be widely used.
- SKYLAB has the **know-how and knowledge** on the SpW market
  
- Way to bring **innovative** products
- Way to setup win-win long-term **partnerships**





# Outline

- 1 SKYLAB: who, what & why SpW ?
- 2 Win-win partnership with CEA
- 3 Low-cost PCI board
- 4 High performance PCI Express board
- 5 smartCable®
- 6 SpW Traffic Controller Application
- 7 Conclusion and questions



## 2 - Win-win partnership with CEA

### Why a partnership?

- SKYLAB needed a **robust and recognized SpW IP Core** (without starting everything from scratch)
- **CEA** developed its own **ECSS compliant IP core** (Herschel) since 2000, and some **PCI and PCI Express boards** EGSE



### Principle of partnership between CEA and SKYLAB

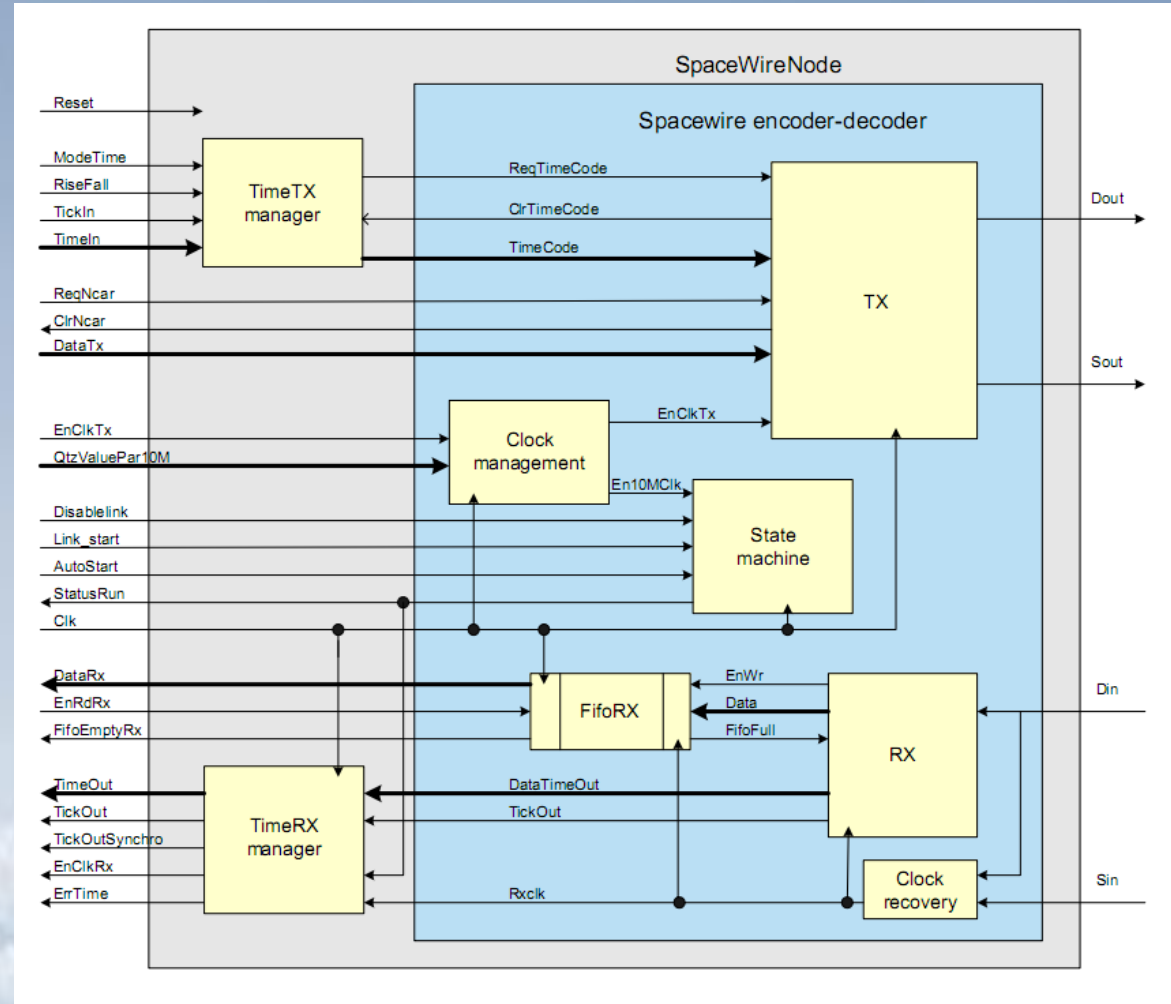
- a 3 years non-exclusive agreement for SKYLAB to be able to use CEA SpW IP Core in space and/or commercial equipment
- a 3 years exclusive agreement for SKYLAB to commercialize CEA PCI and PCI Express board



## 2 - Win-win partnership with CEA

### CEA SpW IP core

- developer: Frédéric Pinsard
- intensively used at CEA
- flying on **Herschel/PACS** instrument
- licensed to CNES
- space oriented architecture





# Outline

- 1 SKYLAB: who, what & why SpW ?
- 2 Win-win partnership with CEA
- 3 Low-cost PCI board
- 4 High performance PCI Express board
- 5 smartCable®
- 6 SpW Traffic Controller Application
- 7 Conclusion and questions



## 3 - Low-cost PCI board

### Overview



- ✓ SpW (4x) to PCI bridge
- ✓ Virtual routing by S/W
- ✓ Low Cost board
- ✓ Low cost SpW compatible cables available



## 3 - Low-cost PCI board

### Features



- Designed by CEA/IRFU in 2006
- Intensively used by CEA internally
- Also used by Tübingen University and CNRS APC
- Windows / Linux Driver included
- Supported by SKYLAB SpW Traffic Controller Application
- Low-cost (40% minimum saving compared to today's offer)

*Available Q4/2009*



# Outline

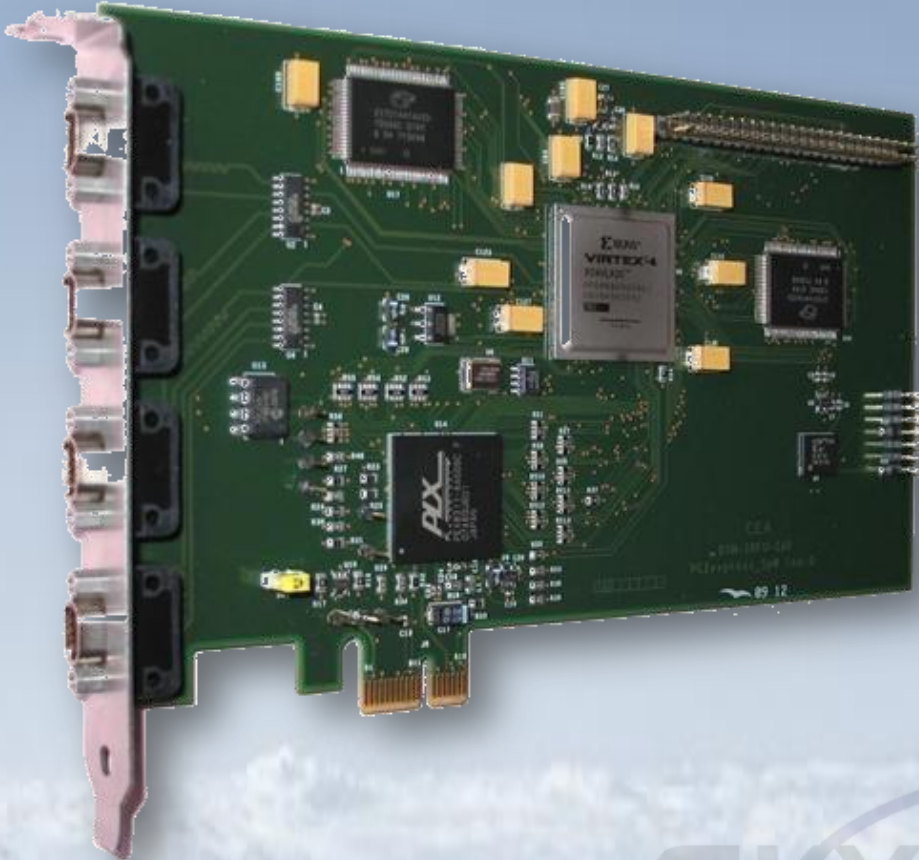
- 1 SKYLAB: who, what & why SpW ?
- 2 Win-win partnership with CEA
- 3 Low-cost PCI board
- 4 High performance PCI Express board
- 5 smartCable®
- 6 SpW Traffic Controller Application
- 7 Conclusion and questions





# 4 High performance PCI Express board

## Overview



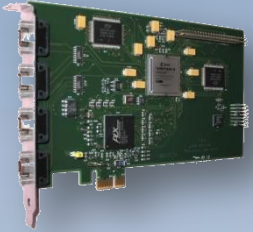
- ✓ SpW (4x) to PCI Express bridge
- ✓ Virtual routing by S/W
- ✓ Low cost SpW compatible cables available





## 4 High performance PCI Express board

### Features



- New design from CEA/IRFU
- PCI Express bridge (providing 250 MBps full-duplex bandwidth)
- Prototyping phase ends October 2009
- Windows / Linux Driver included
- Supported by SKYLAB SpW Traffic Controller Application

*Available Q2/2010*

# Outline

- 1 SKYLAB: who, what & why SpW ?
- 2 Win-win partnership with CEA
- 3 Low-cost PCI board
- 4 High performance PCI Express board
- 5 smartCable®
- 6 SpW Traffic Controller Application
- 7 Conclusion and questions



### Overview



#### ✓ Easy use:

- SpW (1x) to USB bridge
- Highly miniaturized over molded electronics

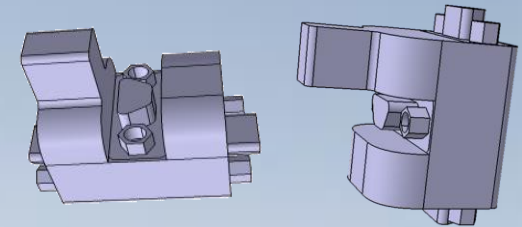
#### ✓ Performances:

- Virtual routing by S/W
- LVDS analog monitoring
- Optional PLUG analyzer

### Features



- New SKYLAB proprietary design, successfully prototyped
- 1x SpW ECSS compliant port
- 256Mbit DDR DRAM
- Unique LVDS housekeeping monitoring (eye diagram)
- High precision SpW transmit clock step settings
- Additional female PLUG for analysis
- Windows/Linux Driver included
- Supported by SKYLAB SpW Traffic Controller Application



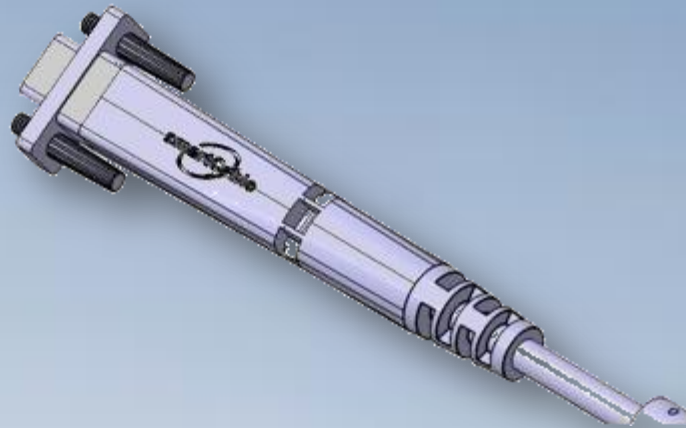
Available Q1/2010



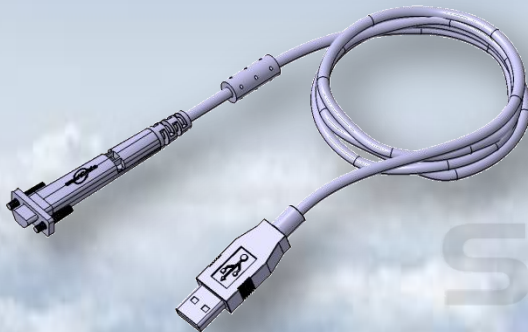
## smartCable 3D views



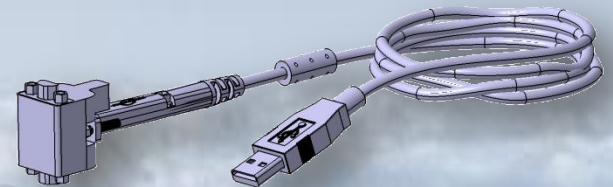
Closer view on the micro D 9pin male side



Standalone smartCable



smartCable with PLUG





# Outline

- 1 SKYLAB: who, what & why SpW ?
- 2 Win-win partnership with CEA
- 3 Low-cost PCI board
- 4 High performance PCI Express board
- 5 smartCable®
- 6 SpW Traffic Controller Application
- 7 Conclusion and questions



## 6 – SpW Traffic Controller Application

✓ Hardware: PCI, PCI Express, smartCable, ...

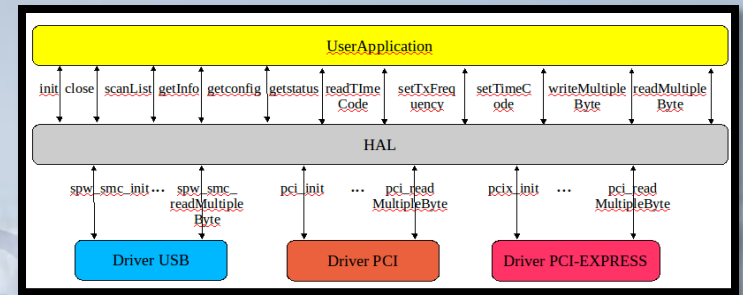
HW

## 6 – SpW Traffic Controller Application

### ✓ Device Virtualization Service API

- transparent compatibility with 3 driver types

✓ Hardware: PCI, PCI Express, smartCable, ...

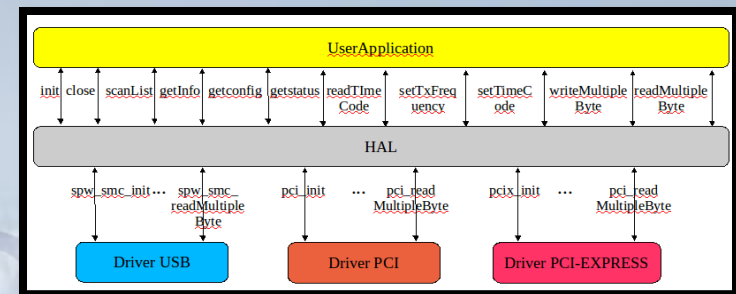


HW

## 6 – SpW Traffic Controller Application

- ✓ SpaceWire Traffic Controller API
  - **Virtual Router(s) and Node(s)** objects
  - **RMAP** support
  - Local/Remote modes (Ethernet)
- ✓ **Device Virtualization Service API**
  - transparent compatibility with 3 driver types
- ✓ Hardware: PCI, PCI Express, smartCable, ...

API



HW

## 6 – SpW Traffic Controller Application

✓ **Graphical User Interface** to fully benefit from the Application Programming Interfaces

✓ Console applications as examples

✓ SpaceWire Traffic Controller API

- **Virtual Router(s) and Node(s)** objects
- **RMAP** support
- Local/Remote modes (Ethernet)

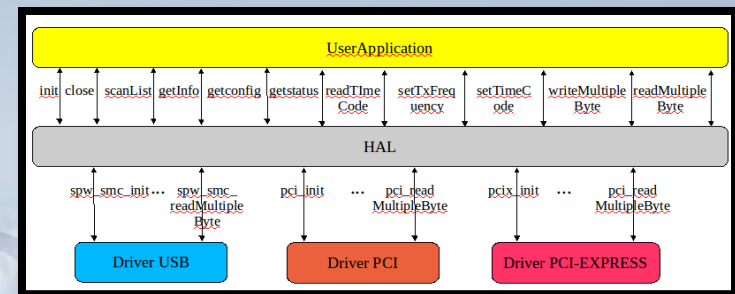
✓ **Device Virtualization Service API**

- transparent compatibility with 3 driver types

✓ Hardware: PCI, PCI Express, smartCable, ...

GUI / console

API



HW



# Outline

- 1 SKYLAB: who, what & why SpW ?
- 2 Win-win partnership with CEA
- 3 Low-cost PCI board
- 4 High performance PCI Express board
- 5 smartCable ®
- 6 SpW Traffic Controller Application
- 7 Conclusion and questions



## 7 – Conclusion and Questions

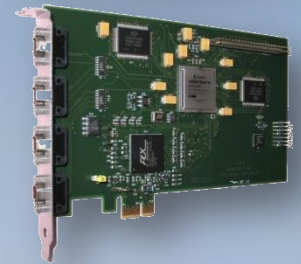
SKYLAB is now able to:

- ✓ Use **CEA SpaceWire IP core** in flight hardware and EGSE
- ✓ Provide low-cost cables
- ✓ Provide a **PCI board** at low-cost

The first **PCI Express board** will be available by Q2/2010)

SKYLAB developed a **SpW smartCable®**, available Q1/2010, a two in one device (bridge and analyzer) miniature equipment

SKYLAB will provide a **SpW Traffic Controller Application**



# SKYLAB Industries SAS

42, av. du Général de Crouette  
31100 Toulouse, FRANCE

Tel. +33 (0) 5.61.41.77.03  
Fax +33 (0) 5.61.41.63.56

[spacewire@skylab-corporate.com](mailto:spacewire@skylab-corporate.com)  
[sales@skylab-corporate.com](mailto:sales@skylab-corporate.com)

[www.skylab-corporate.com](http://www.skylab-corporate.com)



### SKYLAB products SpaceWire Task Force

#### SKYLAB INDUSTRIES

Stéphane Davy, Project Manager, Research Engineer

Matthieu Salanave, Research Engineer (system, electronics)

Jacky Rozmus, CTO (system, software)

Joris Labay, Junior Engineer (electronics)

Aude Allouard, Junior Engineer (embedded software, drivers)

Vincent Macary, Senior Engineer (QA, software, drivers)

Julien Kazmareck, Mechanical Engineer

Jean-François Cazaux, Sales & Marketing

#### AEROSPACE SERVICES INTERNATIONAL COMPANY

Slim Ben Saoud (et al), Senior Engineer (application software)

#### CEA / IRFU

Frédéric Pinsard, Research Engineer (SpW IP core, electronics)