

Expression Of Interest

C-PCB

A EURIPIDES initiative for evaluating Carbon-drained Printed Circuit Boards for Airborne Applications

**EURIPIDES Forum in Berlin
October 9-10, 2008**

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SUMMARY

- ▶ **Current technology overview and requirements for next FADEC generation**
- ▶ **A new cutting-edge technology: carbon-drained PCB**
- ▶ **Facing manufacturing challenges and airborne equipment environmental conditions**
- ▶ **C-PCB Project Outline**
- ▶ **Presentation of C-PCB partners**

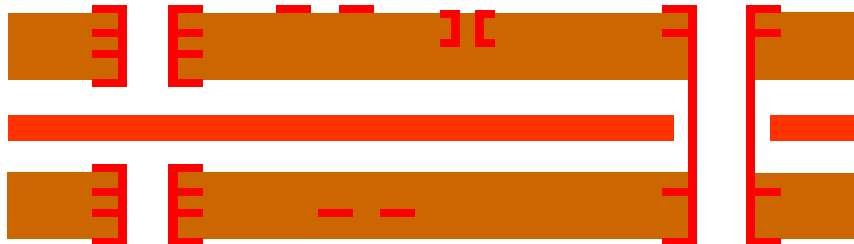
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Current technology overview and requirements for next FADEC generation



Severe environmental conditions
(fluids, EMC)

Engine control electronics (FADEC) is
packaged in closed boxes, which hardens
the thermal problem.



One solution in order to drain the
heat outside the box is to insert a
thick copper plane in the PCB (*)

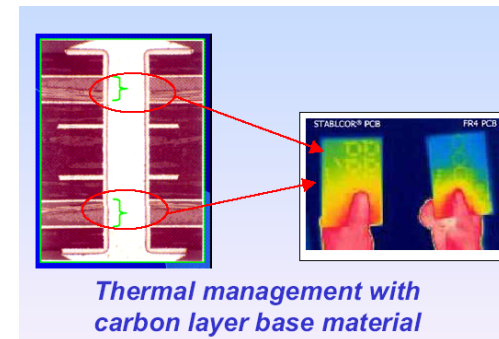
(*) Jean-Yves Soulier, Dr. Nathalie Kopp, « Unique Techniques to Remove Heat from Printed Circuit Boards or to Preheat PCB for COTS Use », Military and Space Electronic Conference, Brussels, 2000

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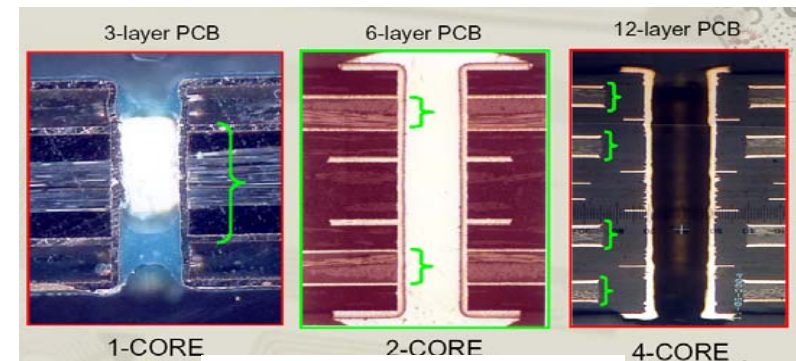
■ A new cutting-edge technology: carbon-drained PCB

▶ Using the US STABLCOR® license, some PCB manufacturers are producing carbon-drained Printed Circuit Board:

- CIREP (CIRE Group, France, presentation at IMAPS Workshop, La Rochelle, January 2008)
- ELTEK (Israel, presentation at INTERCONEX 2007, Toulouse)



By courtesy of
CIREP



By courtesy of ELTEK

▶ Carbon density is 1.7, while copper density is 8.9

→ A potential PCB weight reduction of 37% in Hispano-Suiza airborne applications

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Facing manufacturing challenges and airborne equipment environmental conditions

▶ Manufacturing challenges:

• PCB manufacturing

- Replacing copper by carbon without any more design change
- Demonstrating naked PCB capability to withstand solder reflow process and thermal cycles
- Having more than one PCB supplier and more than one carbon drain supplier

• Electronic module manufacturing

- Solder reflow profile set-up
- Mixed technologies: leaded or leadless SMT, BGA.
- Capability of being repaired.

▶ Airborne equipment requirements

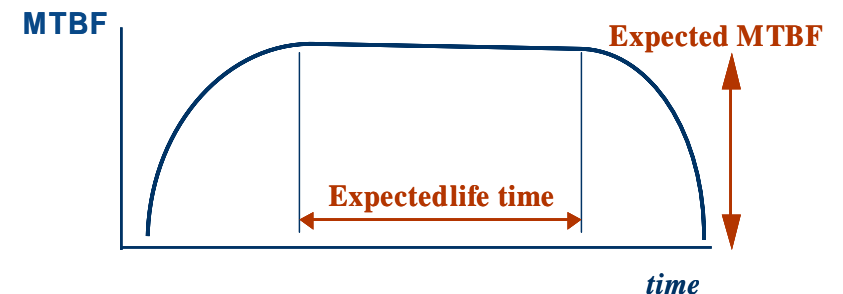
▶ Temperature (high and low)

▶ Thermal cycles

▶ Vibration

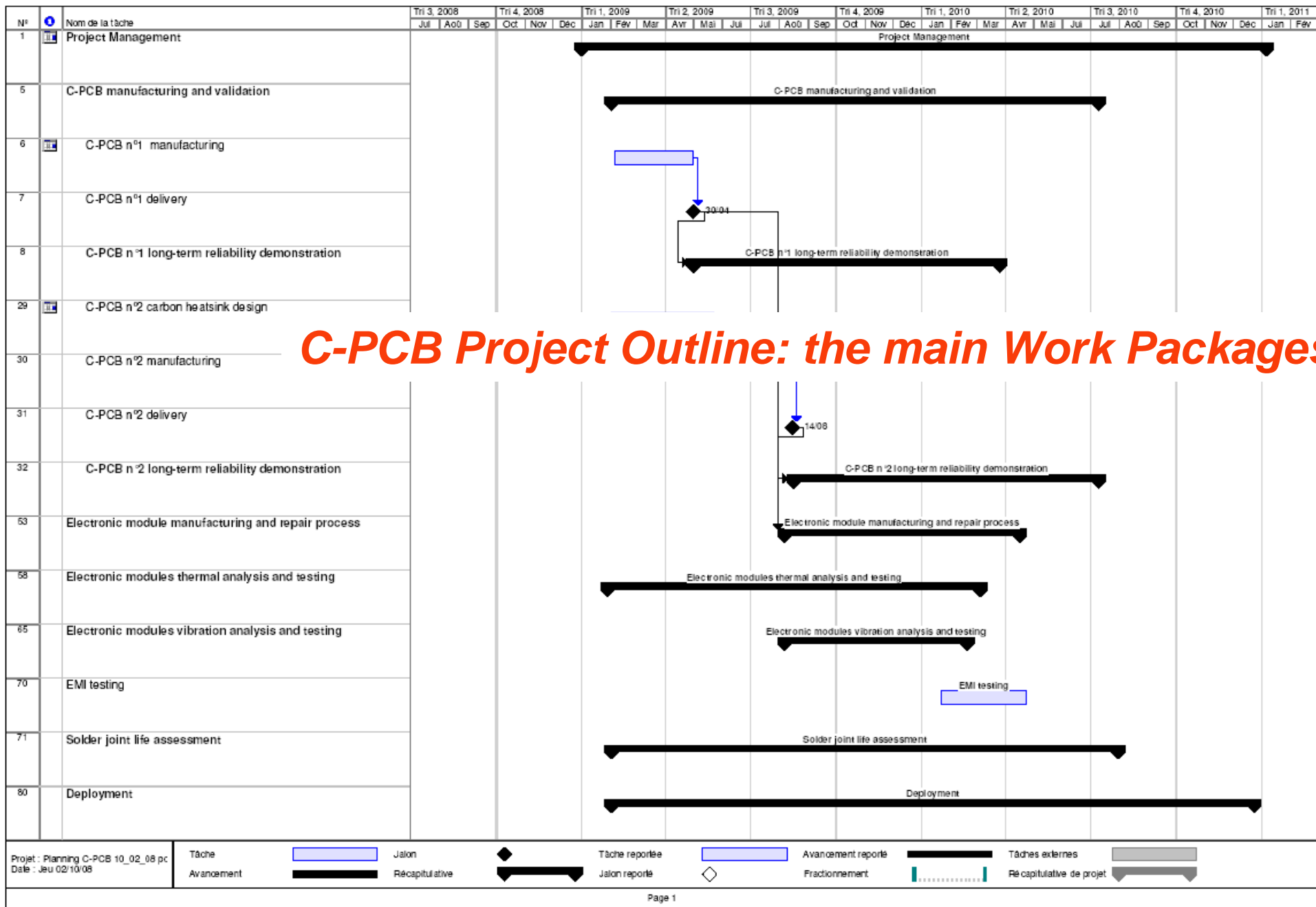
▶ EMI

▶ Life duration



▶ Use of lead-free alloys ASAP

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■ Presentation of C-PCB partners



- ▶ HISPANO-SUIZA (Project leader – **France**)
- ▶ IMS Laboratory (**France**)
- ▶ EPSILON Ingénierie (**France**)
- ▶ INASCO (**Greece**)
- ▶ INASMET Tecnia (**Spain**)

- ▶ Other potential partners:
 - ACB (Belgium)
 - ELTEK (Israel)
 - Others?

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Thank you for your attention