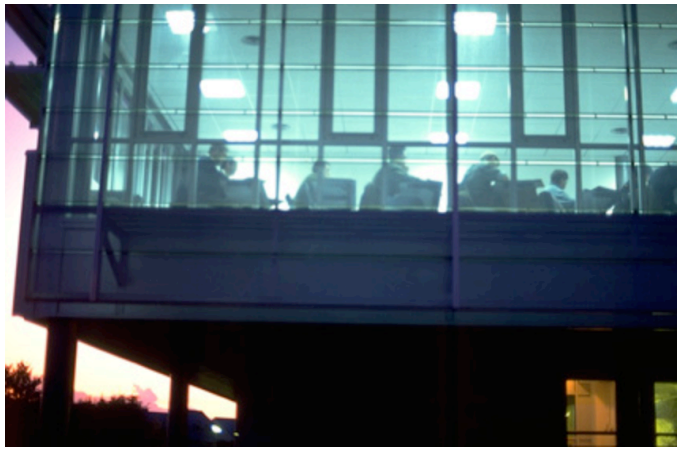
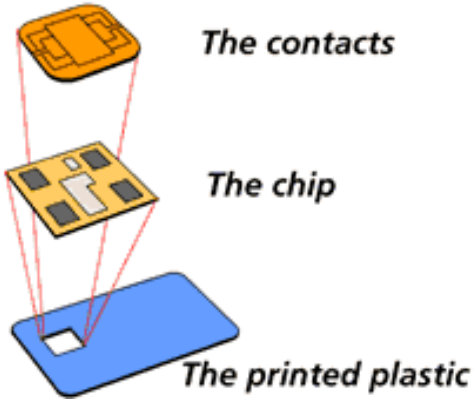


Pierre.Paradinas @ cnam.fr
Cnam/Cedric
Paris / France

Smart Card Software

- Smart Cards software and security issue related to the panel questions :
  - **Secure and safety critical vs. insecure, non-safety critical embedded systems: Do they require completely different design approaches?**

Smart Card Software



- 1st step : pioneer period 1974-1984
  - High memory constraints, assembler
- 2d step : adoption period 1984-1994
  - Evolution from “silicon” culture to “software” culture, high level language used
- 3rd step : large deployment 1994-2004 (more than 1 billion cards on the field today)

Smart Card Software (Cont'd)

- On the last period:
  - Java was introduced in card as language and model with Cardlet,
  - Formal Methods are also used and performed on some specific part of the development:
    - By request (ITSEC and CC) or,
    - By necessity (high level complexity on some part of software platform like firewall, byte code verification,…).

But the life is not so simple

- During all the steps the attackers know how also progress on attacks :
  - On failures (!),
  - By observation (consumption, SPA, DPA,…),
  - By injection of faults.

- And what means in term of development?

Come back to the roots!

- Compiler, automated code generator, FM, component approach,… open the door to attacker.
- Why?
  - PIN_Code_Verification MAY not program in a simple way. The chip behaviors (time, consumption, electromagnetism radiation,…) MUST be identical in any case !
  - Developers return to the assembler language where chip comportment MAY be handled.