

Toward fast prototyping of conformable and lightweight sensitive interfaces for robotic systems

Sylvain Blayac, Roger Delattre, Valentin Divay

- ID-Fab prototyping platform
- Sensitive interfaces technology
- Application projects
- ID-Fly: mini airship demonstration platform

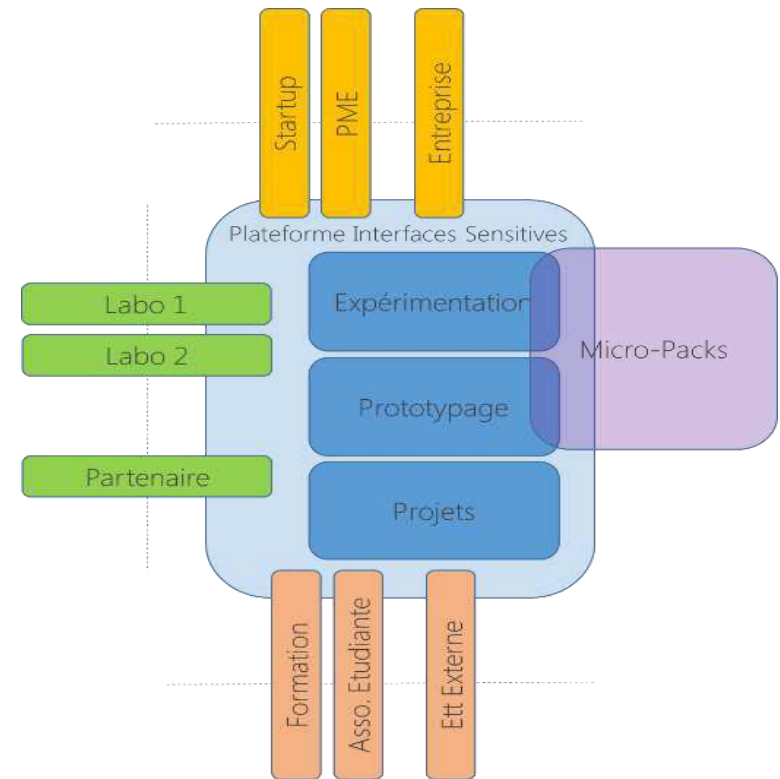
ID-Fab prototyping platform



- Since 2003, an innovation ecosystem
 - Research ([CMP](#))
 - Education: Engineering ([ISMIN](#)), Master degree ; PhD
 - Startup support ([Team](#))
 - Technological Platform ([Micro-PackS](#))
 - Prototyping platform ([ID-Fab](#))

ID-Fab prototyping platform

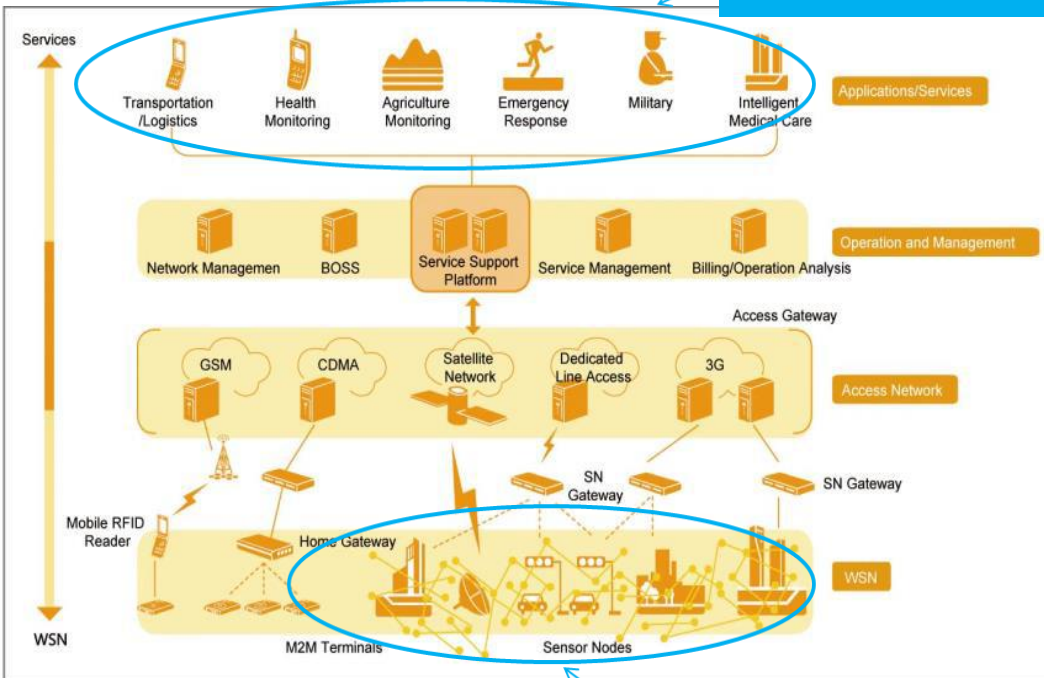
- Prototyping platform
 - Proof of concepts design and fabrication
 - Collaborative working
- Education
 - Learning by doing philosophy
 - Driving students towards autonomy
- Connection to society
 - Culture and science diffusion
 - Innovation and usage



Sensitive interfaces technology

IOT context

Data management – Decision Making

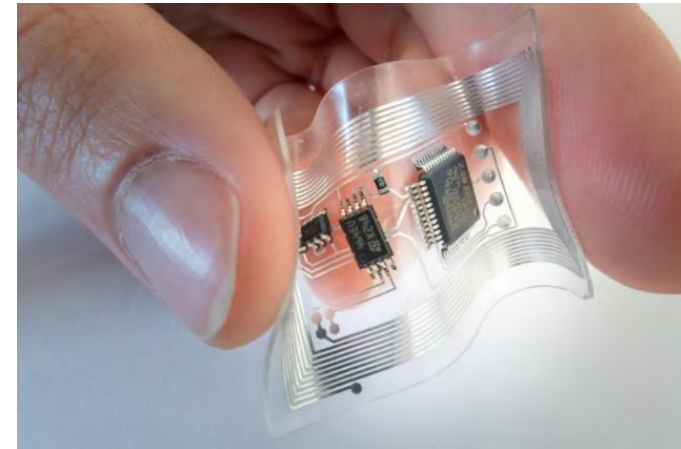
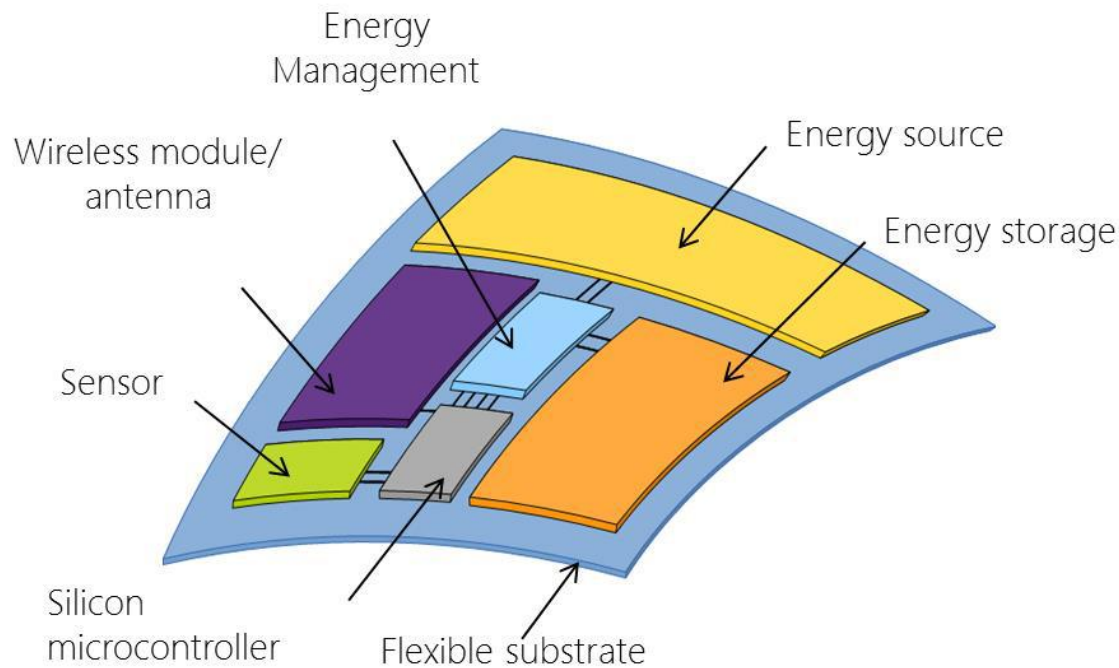


- From connected object to sensitive interface

Smart Objects:

- Wireless Flexible/bio sensors
- Hardware security

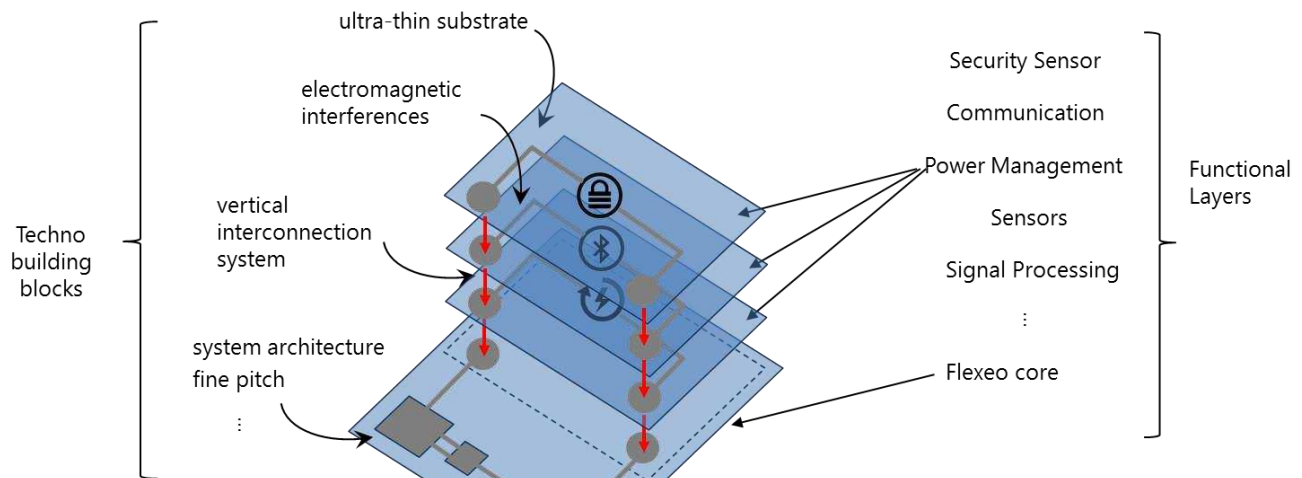
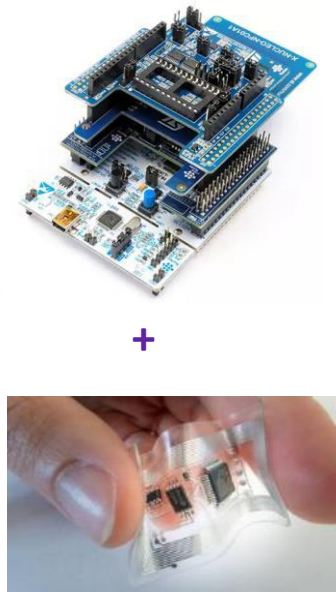
Sensitive interfaces



Flexible, conformable, distributed sensing

Flexeo concept

- Flexeo project: 3D fully wireless prototyping platform



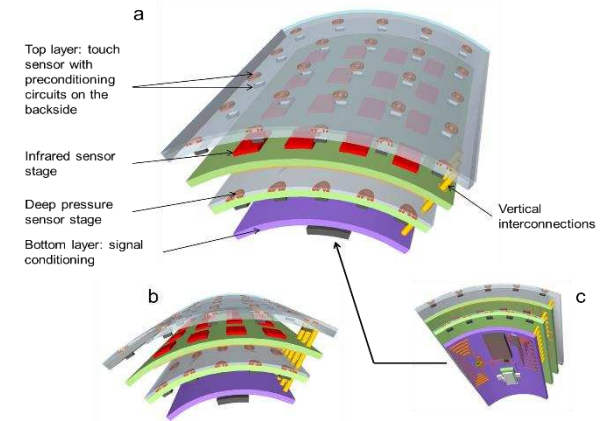
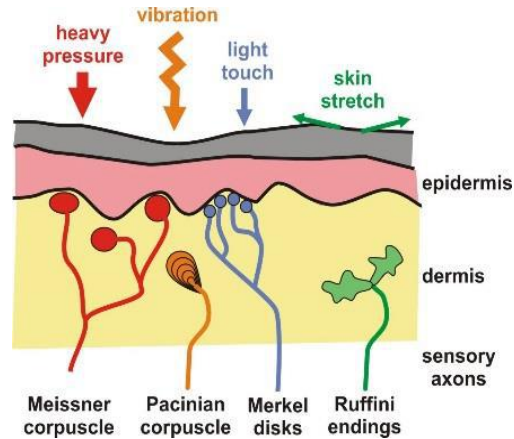
- Fully Wireless Communication/Powering/Programming
- Modular Multilayer
- Small fingerprint / ultrathin body
- Lightweight
- Conformable

Application projects

Human machine interfaces

Eskin

- Robotic skin
- Human machine interface
- Augmented perception



Brain machine interface

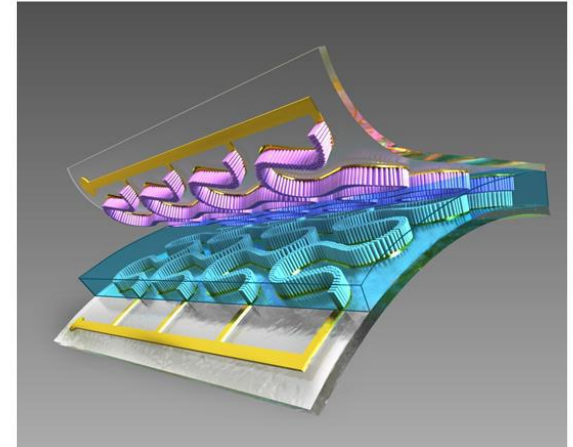
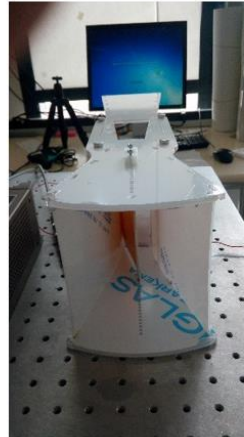
- Electronic/biologic transduction



Environmental sensing

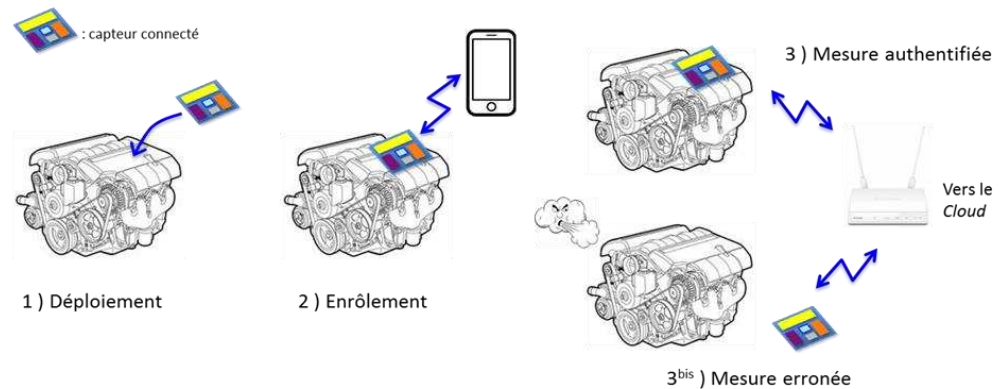
- Autonomous environmental sensors

- Energy harvesting
- Stretchable batteries



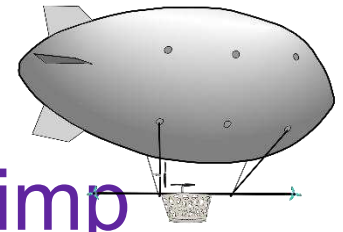
- IOT data authentication

- Environmental sensor signature



ID-Fly: mini airship demonstration platform

- **ID-Fly: indoor autonomous blimp**



Project overview



Self displacement in the building



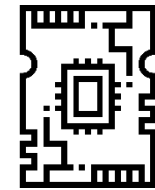
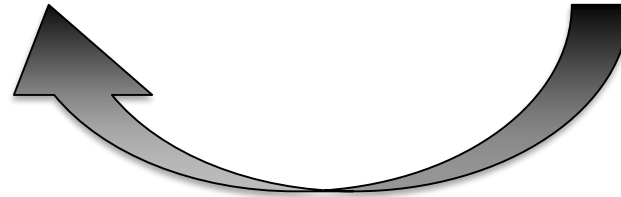
Automatic energy refill



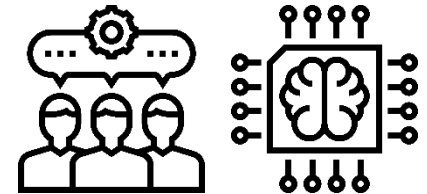
Collision-avoidance system

Autonomous blimp

Unique demonstration on platform...

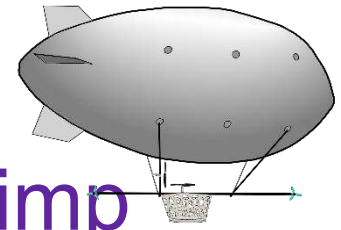


...for new technologies



...for your research results

- **ID-Fly: indoor autonomous blimp**



Technical specifications

Enveloppe:

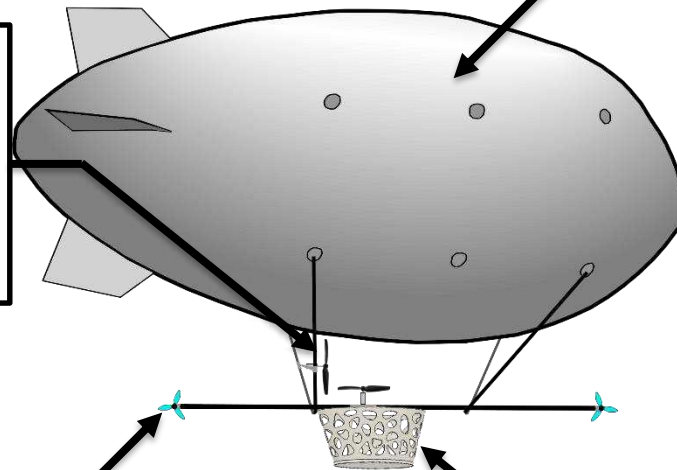
Helium inflated
Volume = 600 L
Mass lifted = 300 g

Propelling engines x2:

Max power = 4,5 We
Max thrust = 40 g
Max efficiency = 17 g/We

Guiding engines x2:

Max power = 4 We
Max thrust = 7 g
Max efficiency = 4 g/We



Electronics:

Raspberry Pi zero W

- μ P 1 core 1 GHz
- 512 Mo RAM
- Wifi, BT

Motor shield

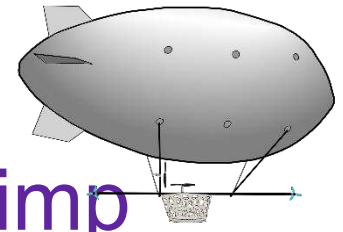
- L298P x2

Battery

- Li-ion technology
- 2500 mAh capacity
- 2h autonomy

Payload = 125 g

- **ID-Fly: indoor autonomous blimp**



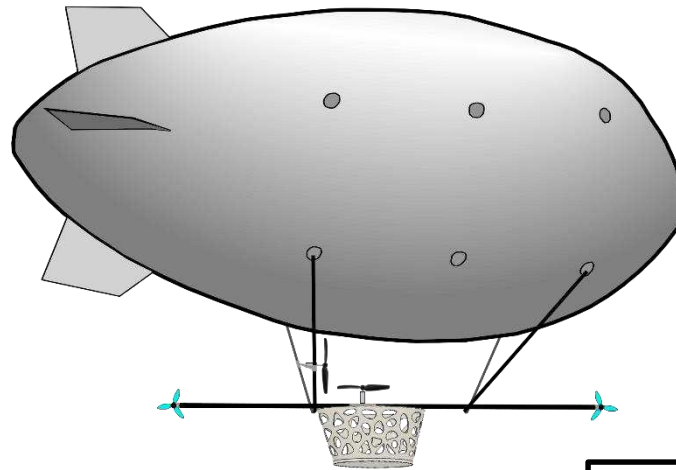
Possible implementations and developments

Position feedback control (x, y, z, θ)

Precision indoor positioning

Sensors embedding (inertial unit, compass...)

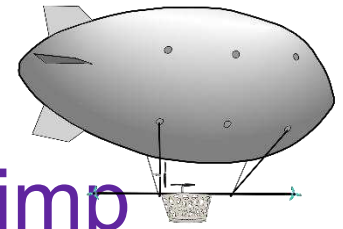
3D path finding AI



Remote powering

Obstacles detection and avoidance

- **ID-Fly: indoor autonomous blimp**



Coffee break & demo !

