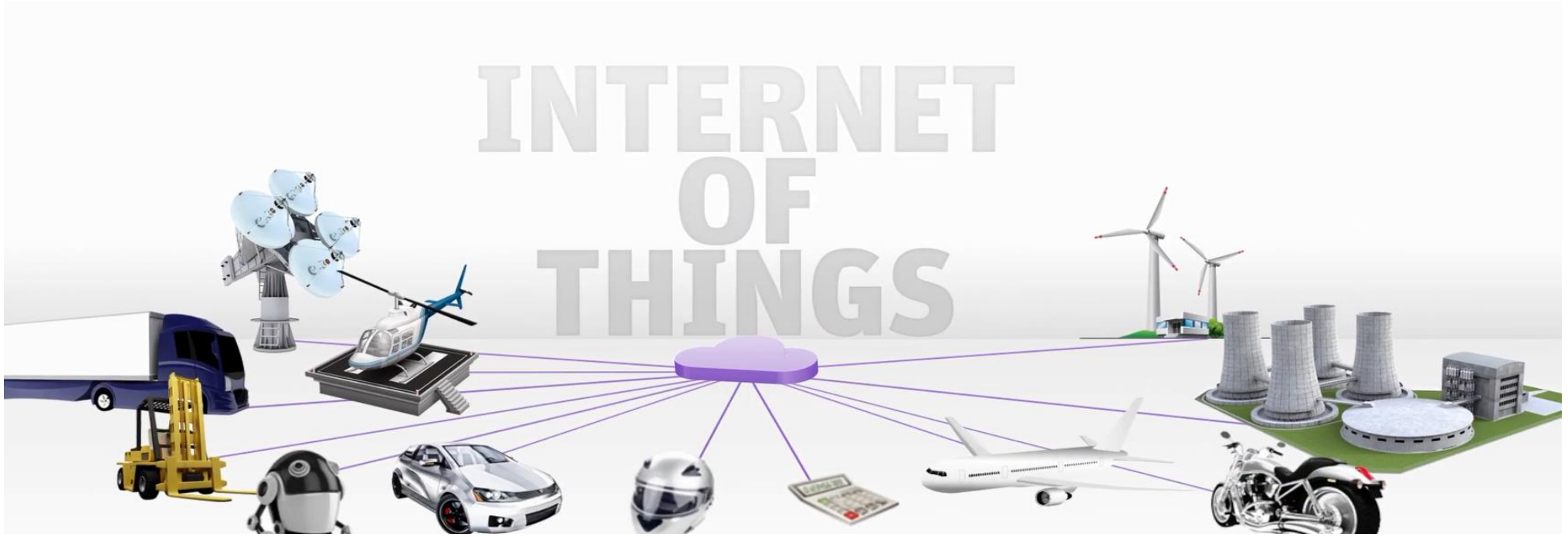


Friends or … ?

SAFRAN AT A GLANCE

*As of December 31, 2014

- An international **high technology** group
- Revenue of **15.4 billion euros***
- **69,000 employees** in nearly 60 countries
- 3 core businesses:

Aerospace
Defense
Security

MARKET POSITIONS: AEROSPACE

No.1 worldwide

- engines for mainline commercial jets with over 100 seats (in partnership with GE)
- helicopter turbine engines
- landing gear
- wheels and carbon brakes for mainline commercial jets with over 100 seats
- electrical wiring interconnection systems for aerospace
- power transmissions for mainline commercial jets with over 100 seats
- launch vehicles (in partnership with Airbus Group)

No.2 worldwide

- electrical power generation
- APUs for business jets, helicopters and military aircrafts

No.4 worldwide

- military aircraft engines

A world leader

- aircraft engine nacelles
- onboard power electronics

MARKET POSITIONS: DEFENSE

- **No.1 worldwide**
  - helicopter flight controls
  - FADEC engine control units (commercial aircraft in partnership with BAE Systems)

- **No.3 worldwide and No.1 in Europe**
  - inertial navigation systems

- **No.1 in Europe**
  - tactical drones
  - optronics systems

MARKET POSITIONS: SECURITY

No.1 worldwide

- biometric ID solutions (based on fingerprint, iris and facial recognition)
- Automated Fingerprint Identification Systems (AFIS)
- In computed-tomography (CT) explosive detection systems (EDS) for checked luggage
- multibiometric technology

No.2 worldwide

- gaming terminals

No.4 worldwide

- smart cards

A world leader

- trace detection equipment

IoT and Aeronautics

TWO WORLDS SO DIFFERENT

➔ **IoT is**

- Open
- Service oriented
- Agile
- On its own way ☺ to standardisation
- Driven by mass market

➔ **Aeronautics is driven by**

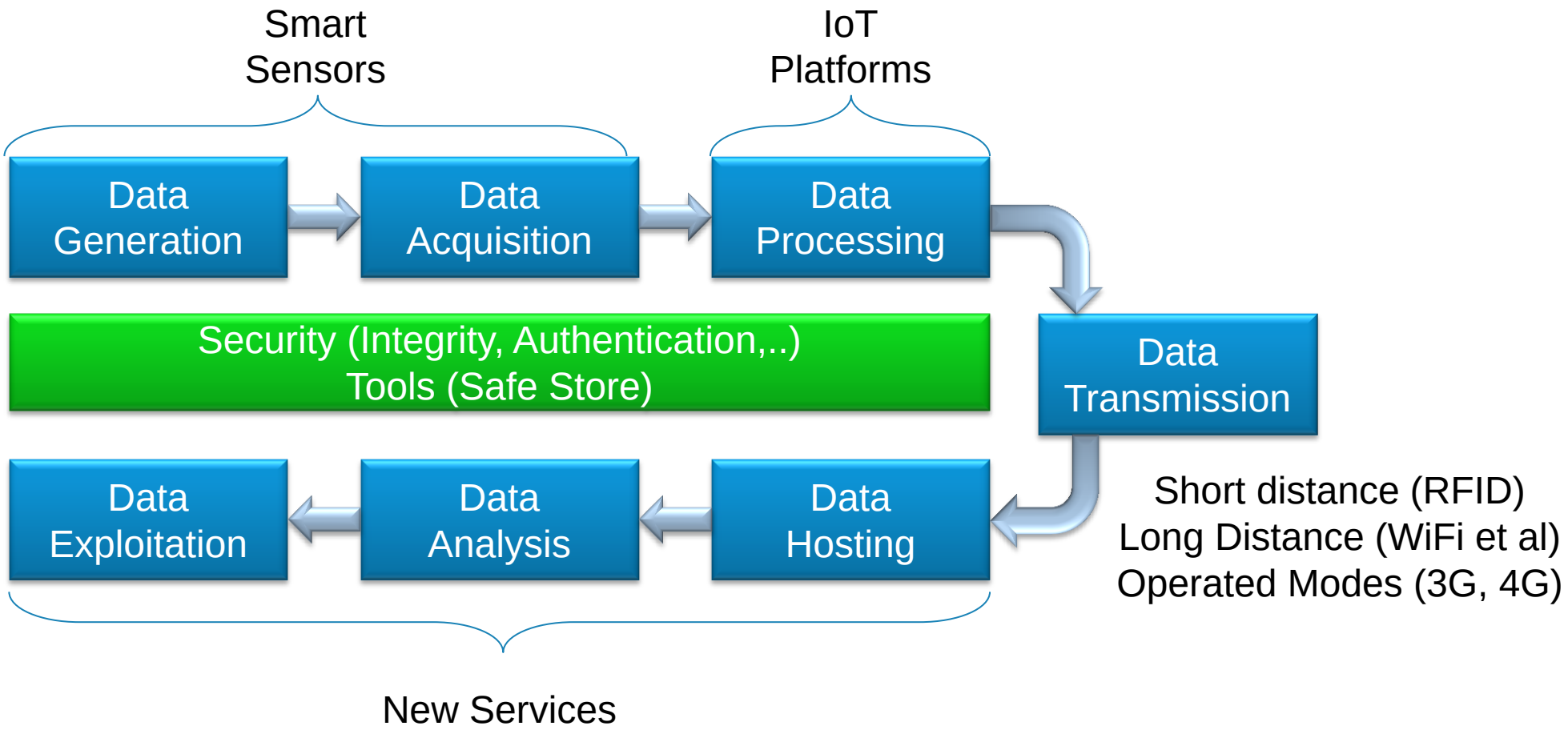
- Certification
- Determinism
- Extreme environment (T°, Vibrations)
- Availability

REALLY DIFFERENT ?

- **A plane is a « Thing »**
  - Data Analytics is the key for service
  - Data has to be collected, stored, sent and processed
  - ➔ IoT is exactly that
- **Aeronautics is a small market for Electronics and Software**
  - Need for a technology provider
  - Adaptation to our constraints
  - ➔ Data Analytics is a Key enabler for our industry
  - ➔ IoT is a global trend in industry we have to follow
- **Aeronautics can be a booster for IoT**
  - ➔ As a B2B market, we can contribute to dissemination
  - ➔ Safe and Secure
  - ➔ Technology image
- **Our experience**
  - ➔ R&T Internal projects
  - ➔ Member of S3P French initiative

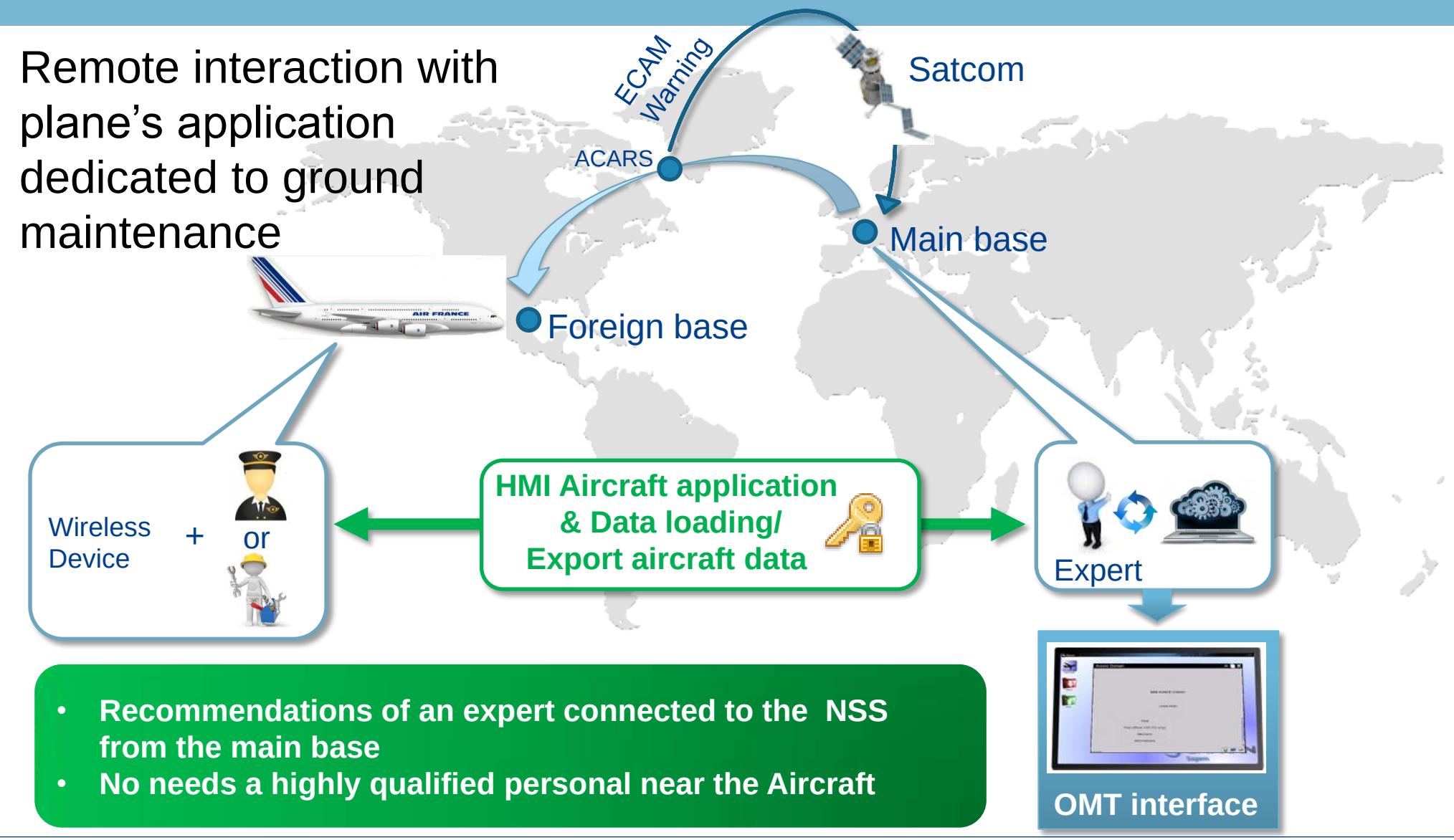
1) A plane is a « Thing »

SENSORS AND MONITORING
A CHAIN TOWARDS SERVICE



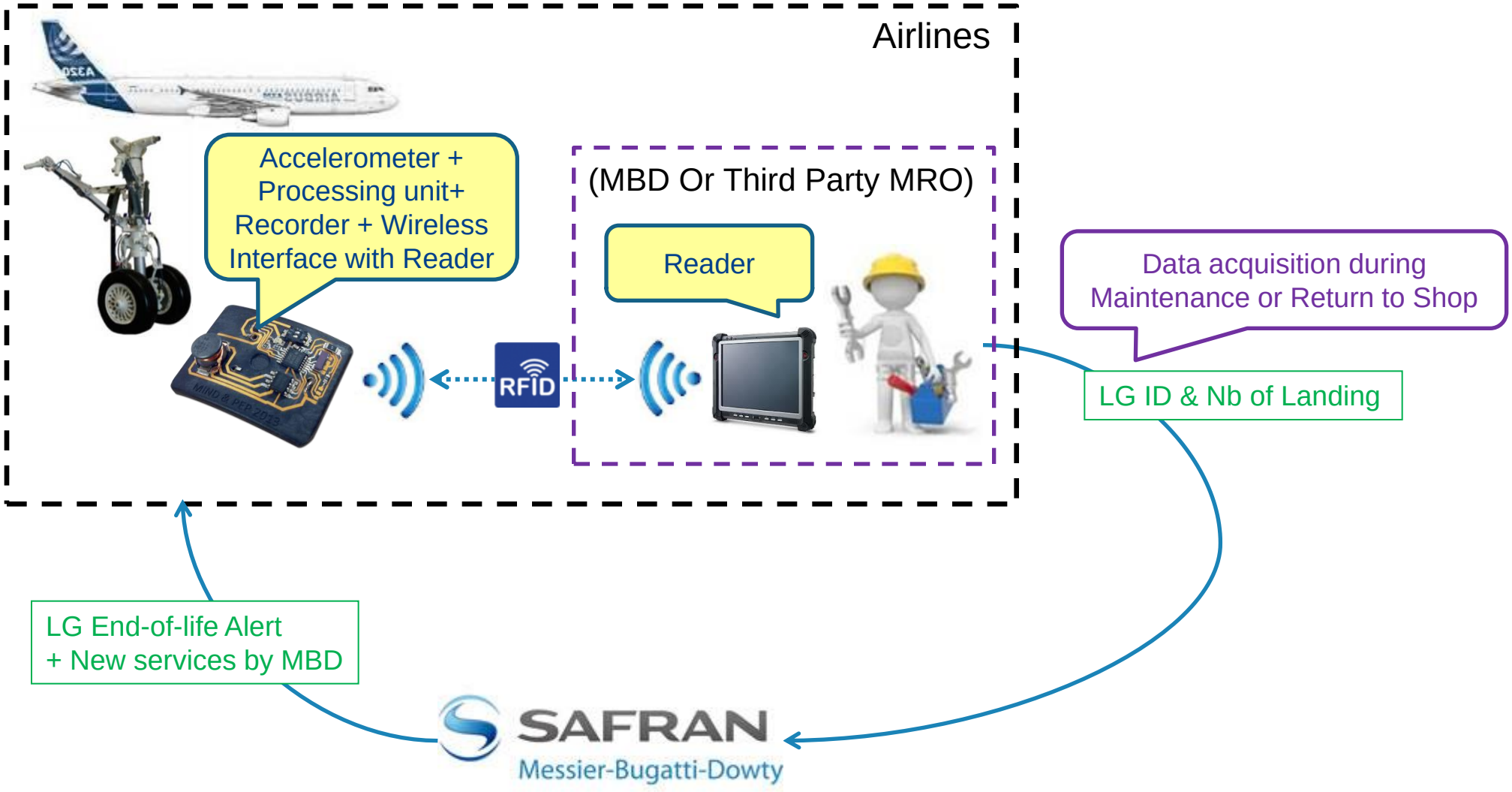
USE CASE 1 : REMOTE MAINTENANCE

Remote interaction with plane's application dedicated to ground maintenance



- **Recommendations of an expert connected to the NSS from the main base**
- **No needs a highly qualified personal near the Aircraft**

USE CASE 2 : LANDING NUMBER COUNTER



AERONAUTICS AND ELECTRONICS

➔ Just Basic facts

- Mass market : 1055B$ in 2014
- Embedded systems : 153 B$
  - Major part (18%) Automotive : 27 B$
  - We are some % of the market
- Market driven by Games, Telecom and Mutlimedia,… and IoT !

➔ Technologies of interest for Aero

- More than Moore
- RFIDs and Data connectivity
- OS and tools for agile software
- Processors

2) Aeronautics needs IoT

TECHNOLOGY TREND

- **Moore is not enough**
  - Limits reached in size, cost and energy
  - Energy efficiency is a must (mobiles, embedded)

- **Smart systems: « functional scalling » or« More than Moore » approach**
  - Heterogenous integration of various technologies
    (MEMS, sensors, optical, CPU, energy,…)
  - Limited volume
  - Systems in Package
  - Smart objects

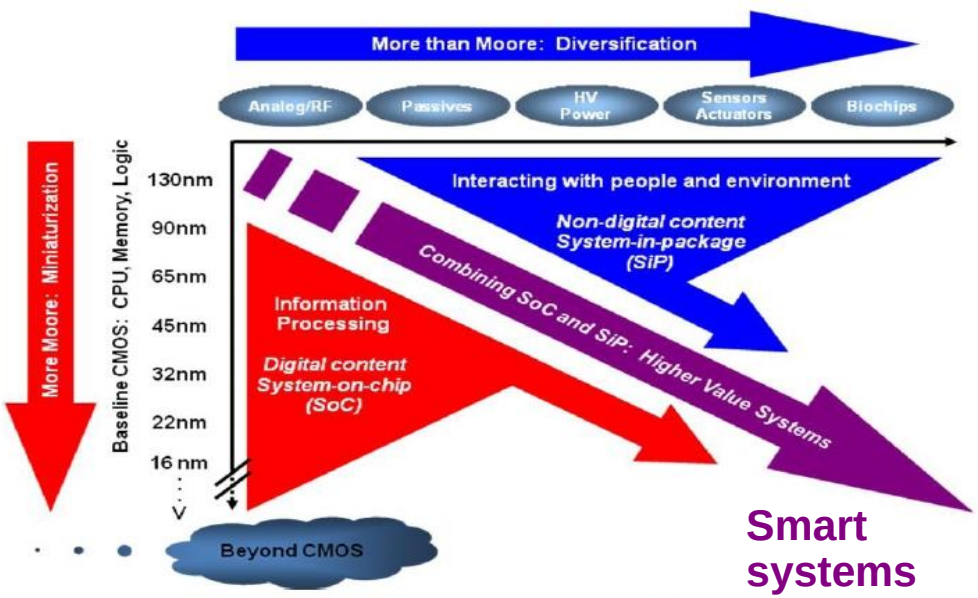


Figure 2 Moore's Law and More

(© International Technology Roadmap for Semiconductors)

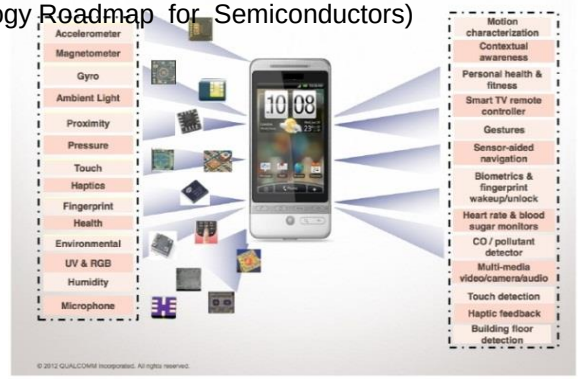


Figure MEMS11 Sensors trends for handsets, presented by Len Sheynblat, Vice President of Technology, Qualcomm CDMS Technologies, at MIG's M2M 2012 Workshop, Pittsburg PA.

PROCESSORS

- **IoT is driving the race**
  - High calculation capabilities
  - Energy efficiency
  - Size
- **Evolution towards many core (>8)**
  - Provide useful Hardware support for segregation
  - Certification issue
- **New measurement unit**
  - pJ/instruction
- **Disposable and transparent**
  - Easier to certify
  - Size, Weight, Power, Low radiation levels

OPERATING SYSTEM AND SOFTWARE

➔ Agile development

- Service has to be fine tuned to customer needs
- Late deployment
- Local deployment

➔ Platform approach

- Mix of Standards functions and customized services

➔ Connected

- Mix of embedded/sensors and cloud analysis

➔ IoT and smartphones have the solutions

- Embedded Android ™ ?

Safran has a prototype
Solution for Embedded world ?

ANDROID AS A PLATFORM

Needs	Solutions	ANDROID Value
Lot of different customers and needs	Need for a tooled platform	Android is a validated platform (900 millions of users in 2013 and 48 billions of apps) fooly tooled (Eclipse)
Developments are late in the process	Software has to be added incrementally	Android provids all the needed services A Store model is the solution
Needs are unknown	Customers has to be able to add functions	Android is known and competences widely available
Security is an issue	Architecture has to include security services	Security solutions exists in 3rd part (Trust Zone ARM, Safe booting)
Business cycles are very long	We need to manage versionning	Android is Open Source

Aeronautics is an help for IoT technologies

WHAT AERONAUTICS BRINGS TO IOT TECHNOLOGY

➔ A world wide sand box

- All aeronautics application will be immediately widely deployed

➔ A healthy B2B business

- Ready for investments and economically efficient solutions

➔ Dedicated to reliability and robustness

- We will ruggedize solutions
- « Aeronautics proven » label

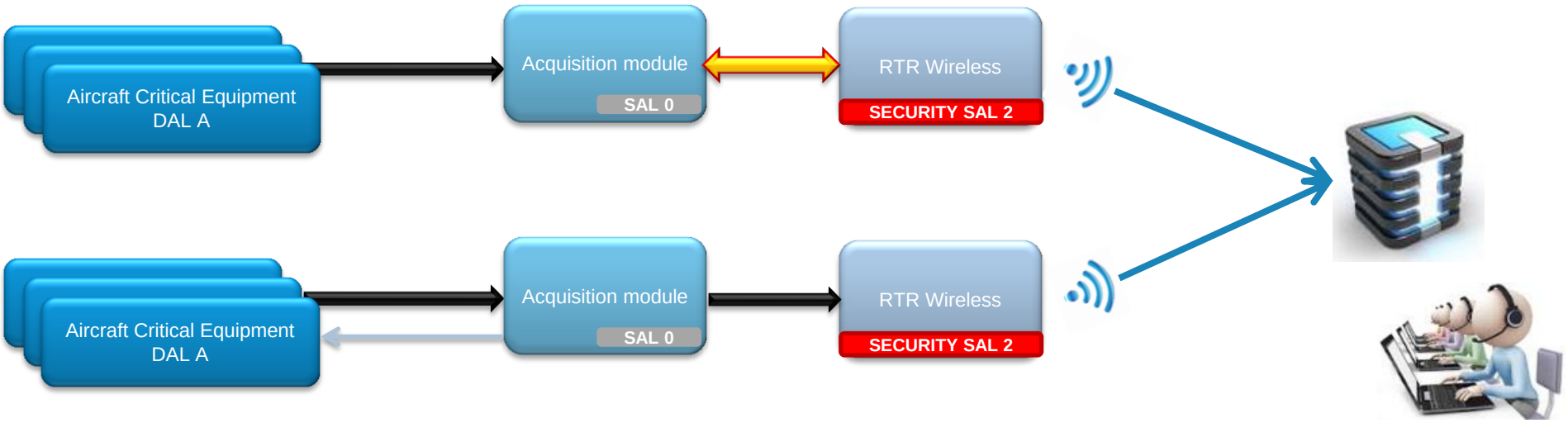
➔ Embracing cyber-security

- Connecting planes will need proven security solutions

Safran Projects

RFID TESTED IN OPERATIONAL CONDITIONS

CYBER SECURITY TEST CASE



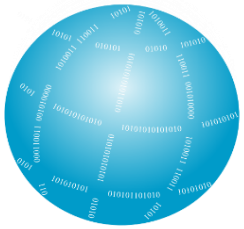
ACQ Module:
Functional : EDXX/CDAX
- Data Acquisition
- Data export to RTRW

Security :
- N/A

RTRW :
Functional : Wefa like
- Data Storage
- Data export

Security :
- dataflow from ground denied

Use Case 1:
•ACE are not reachable from the outside thanks to internal hardware (unidir link) => ACQ in SAL0
•RTRW must be protected against wireless attack => SAL2



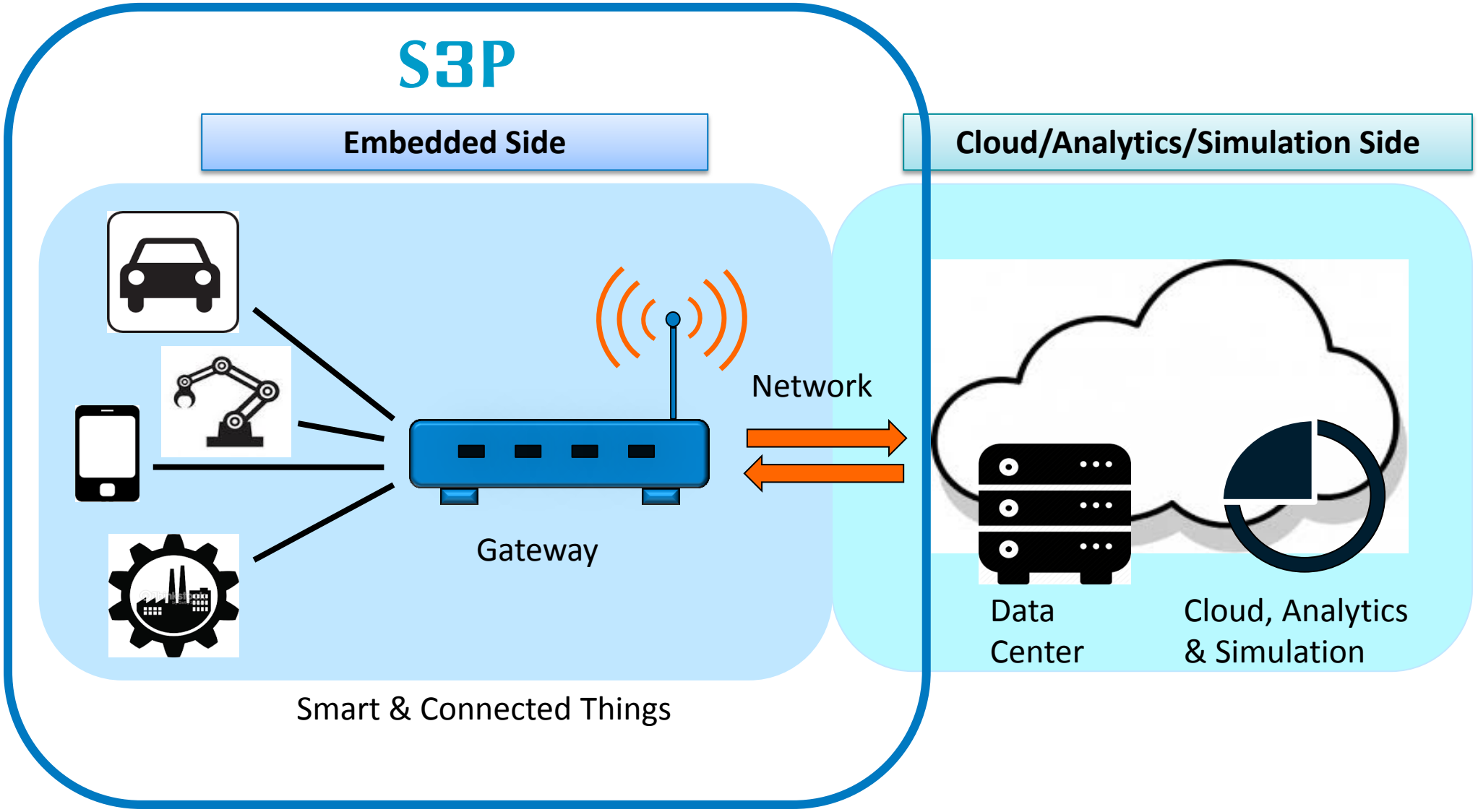
S3P

SMART, SAFE & SECURE PLATFORM

The IoT Opportunity

Our Focus

S3P
SMART, SAFE & SECURE PLATFORM



S3P Focus

Smart

- Adaptability and Scalability
- Access (anywhere, anytime)
- Cost and affordability
- Flexibility
- Precision
- Assets Management
- Maintenance and Updates friendly

Safe & Secure Platform

- Safety
- Security
- Devices autonomy
- Ecosystem of developers
- Smart Machines application development and deployment
- Great User Experience
- Hardware and network –agnostic
- Multi-domain

S3P Use Cases (as of today)

AIRBUS	ATC on distributed platform
ALSTOM	Rail signalling on new generation platform
SAFRAN AEROSPACE · DEFENCE · SECURITY	Connected control platform for airborne equipment
Schneider Electric	Smart Speed Drive
THALES	Secured multi-domain gateway
	Real-time, distributed, reconfigurable systems
	Legacy code migration
ALTRAN	E-Health platform
	Platform for digital, virtual and resources efficient factories
freescale semiconductor	Secured automotive entertainment system
	Multipurpose multiservice box for cars
	Secured gateway for 3D printing
SurTec	Smart home monitoring and alert system
ST life.augmented	Multiprotocols gateway
	Smartwatch

Embedded France
L'embarqué made in France

S3P
SMART, SAFE & SECURE PLATFORM ALLIANCE

TECHNOLOGY PROVIDERS

PROVE & RUN
SYSGO EMBEDDING INNOVATIONS
ESTEREL Technologies
KRONO-SAFE Safe design in real-time
PRISMTECH
TRUST IN SOFT
MICROEJ
cea

Smart, Safe and Secure Software Development and Execution Platform for the Internet of Things

USE CASES

AIRBUS
ALSTOM
altran
AXA
CAP'TRONIC Systèmes électroniques et logiciel embarqué
Continental
eclipse
éolane
Embedded France L'embarqué made in France
freescale semiconductor
SAFRAN AEROSPACE · DEFENCE · SECURITY
Schneider Electric
life.augmented
SORIN GROUP AT THE HEART OF MEDICAL TECHNOLOGY
SurTec
TELECOM ParisTech
THALES
Withings Inspire health