

# **Global Forum, Angers, France 7 October 2019**

## **Key Note Sessions**

### **The digital tech that will change the economy**

Darin Beach

Images & Réseaux

# Our world is facing major transitions

## ✓ Environmental

- An urgent vital must

## ✓ Digital

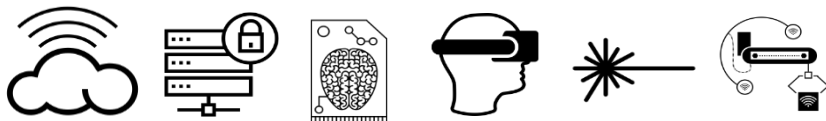
- Can and should be an enabler

Digital techs are changing and will continue to change our way of working and living

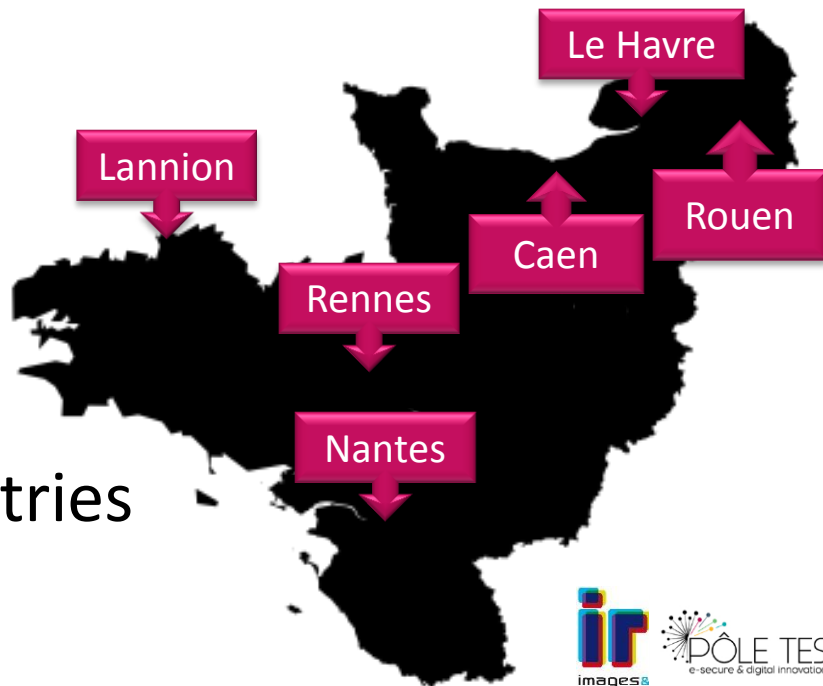


# I&R+TES: a digital innovation cluster

- ✓ 390 members, 70% SMEs
- ✓ 1,6B€ of R&D since 2005
- Mastering key technologies



- Digitalizing key territorial industries



# Digital techs are major tools of the fourth industrial revolution

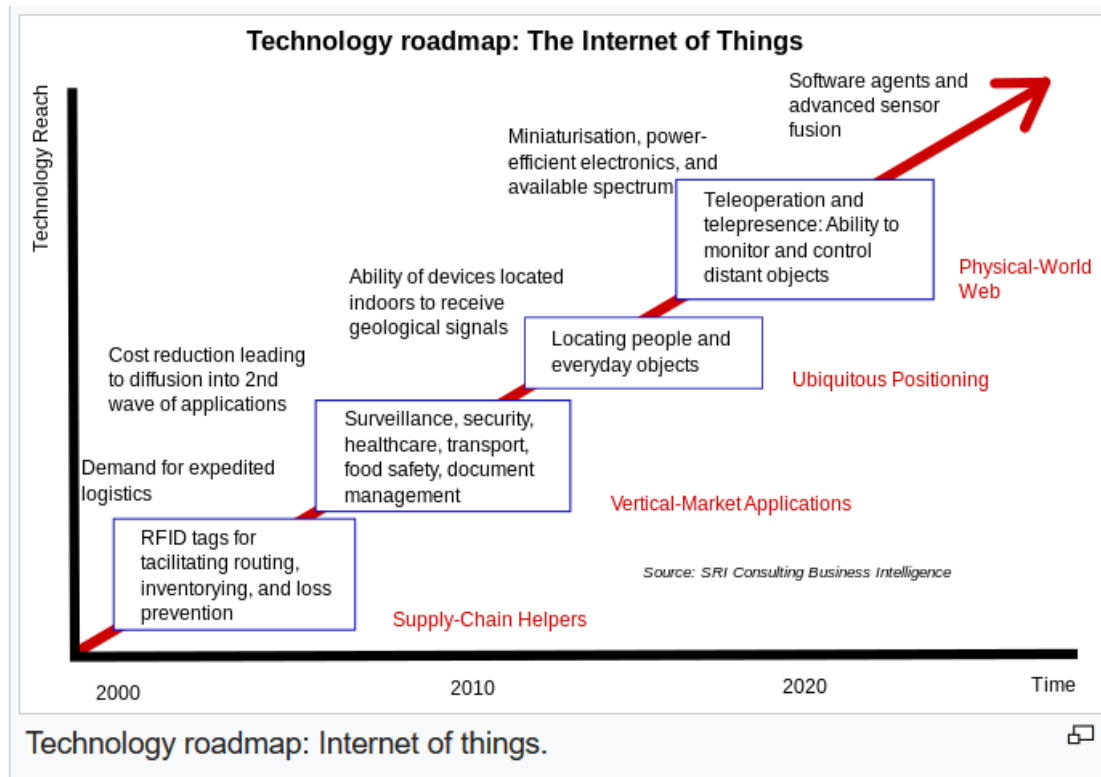
- ✓ New versatile communication
  - ✓ 5G
  - ✓ IoT
- ✓ New interactivity
  - ✓ AR/VR...
- ✓ New deep techs
  - ✓ Cloud
  - ✓ Photonics
  - ✓ Cyber
  - ✓ IA



# IoT to connect the world

- Factories, building, hospitals....
- Infrastructures (road, trains...)

➔ Connect everything everywhere



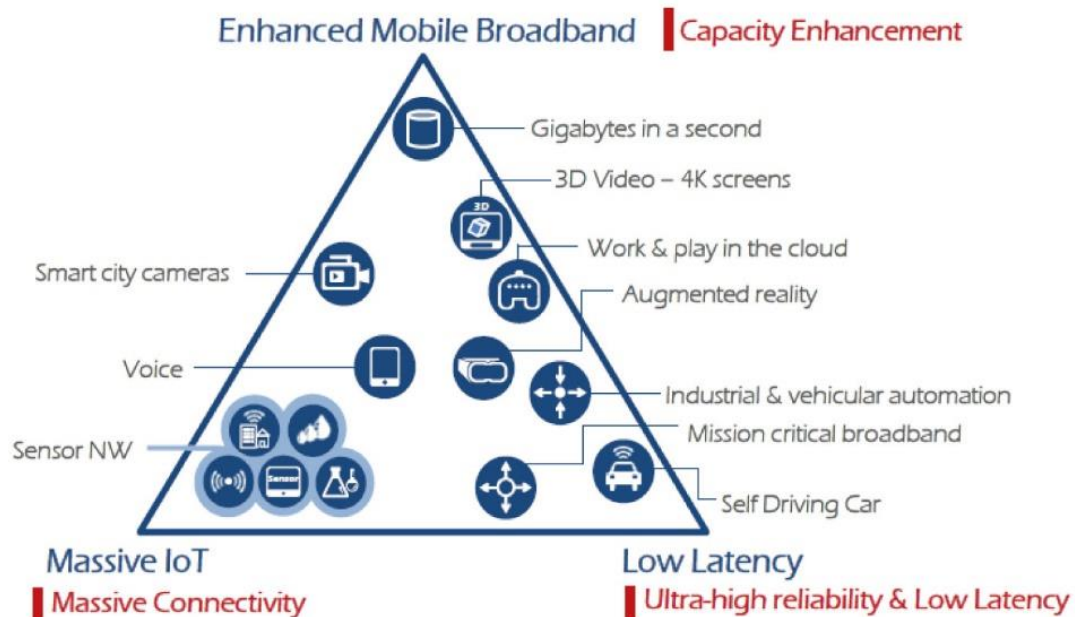
# IoT... a french touch!

- Major LPWAN deployed technologies are coming from France
  - ✓ LORA
  - ✓ SIGFOX
  - ✓ Qowisio (UNB)
- Regulated bands
  - ✓ 4G IoT: CAT-M, NB IoT
  - ✓ 5G to come (2022...)
- How to choose?
  - ✓ cost, bandwidth, consumption, security, coverage



# 5G the revolution is just starting!

- ✓ 5G is not 4+1!
- ✓ 5G is a new network paradigm
- ✓ 5G will allow new deployment strategy of communication called “slices”



(Source: ETRI graphic, from ITU-R IMT 2020 requirements)





## 5G is expected to deliver significant performance improvements across eight capabilities

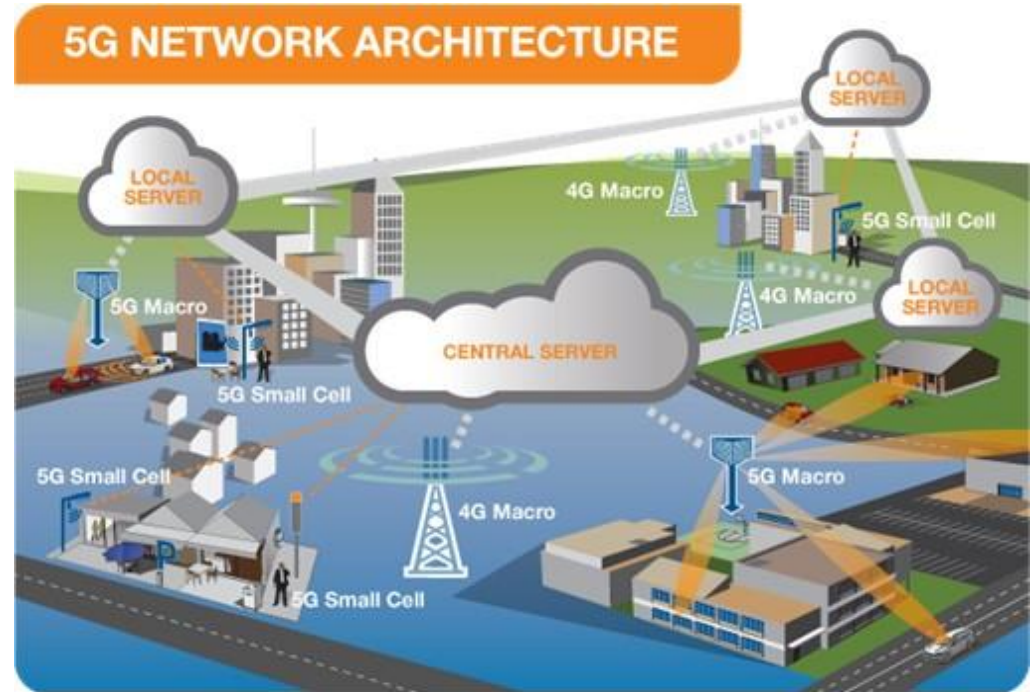
### The 5G value chain

Capabilities	4G (IMT-advanced)	5G (IMT-2020)	Improvement
User experienced data rate	10 Mbit/second	100 Mbit/second	10x
Peak data rate	1 GB/second	20 GB/second	20x
Spectrum efficiency	Measured in bits/second/Hz	Three times higher than 4G	3x
Mobility	350 kilometers/hour	500 kilometers/hour	1.4x
Latency	10 milliseconds	1 millisecond	10x
Connection density	100,000 devices per square kilometer	1,000,000 devices per square kilometer	10x
Network energy efficiency	Measured in bit/joule	100 times higher than 4G	100x
Area traffic capacity	0.1 Mbit/second/square meter	10 Mbit/second/square meter	100x



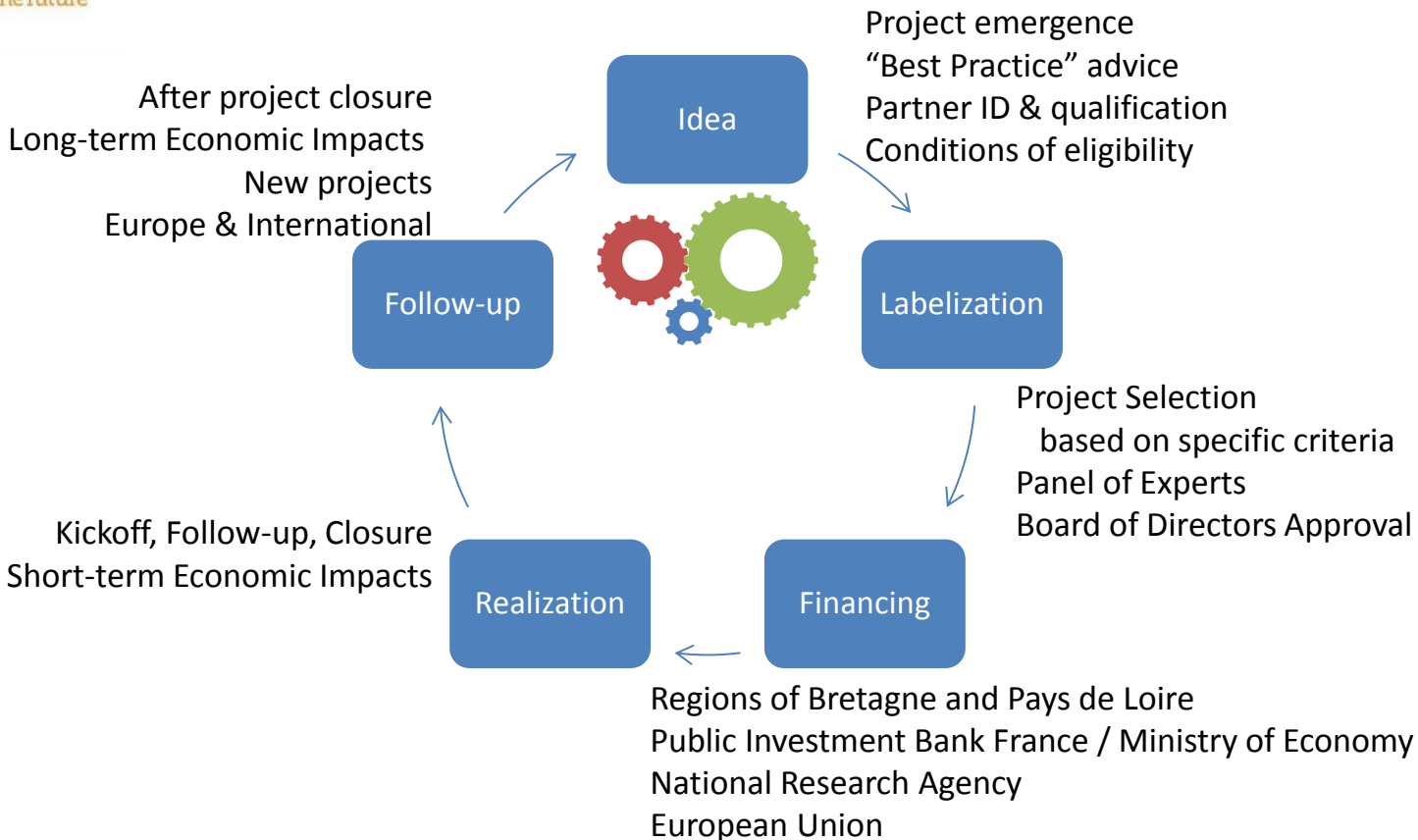
- 5G a fast simple network
  - ✓ Less nodes
  - ✓ Less complexity

## 5G less and less



5 network architecture (source EMF explained)

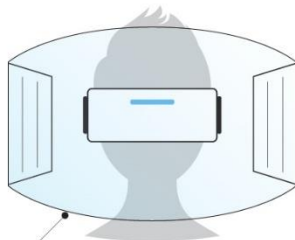
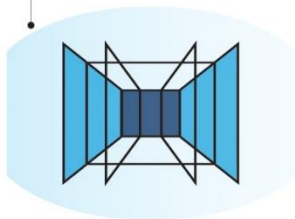
# Innovation Project Life Cycle



# Mixed (merged) reality: the digital model to fluidify interaction

## VIRTUAL REALITY (VR)

Completely digital environment

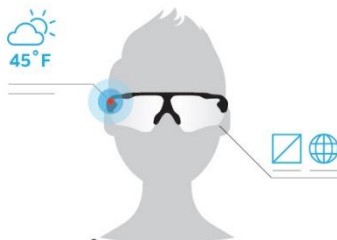


Fully enclosed, synthetic experience with no sense of the real world.

<https://www.extremetech.com/>

## AUGMENTED REALITY (AR)

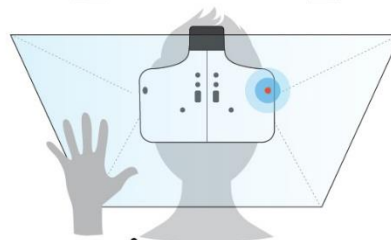
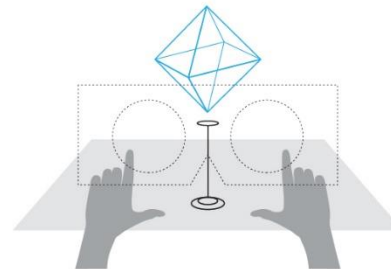
Real world with digital information overlay



Real world remains central to the experience, enhanced by virtual details.

## MERGED REALITY (MR)

Real and the virtual are intertwined



Interaction with and manipulation of both the physical and virtual environment.

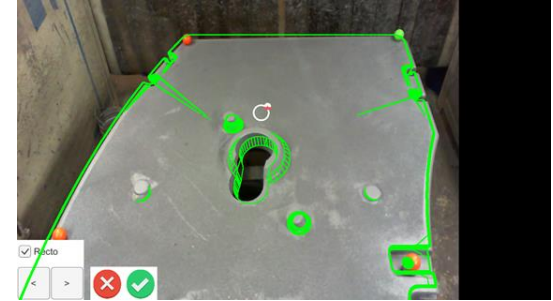
## Some examples accompanied by I&R



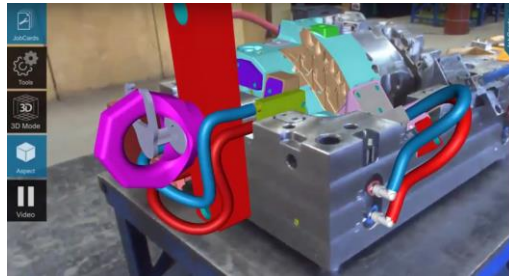
**Duarib: scaffolding optimisation**



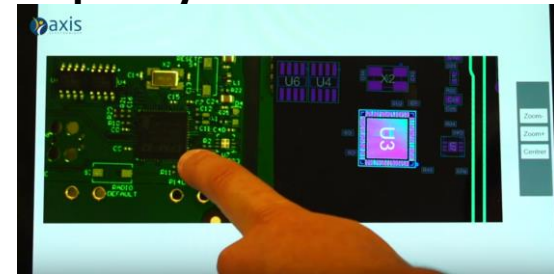
**2PL: commercialization**



**BOUHYER: counterweight quality control**



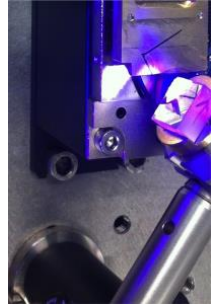
**BOUDIN: mold quality control**



**Axis: quality control electronic boards**

# Photonics: Let there be light!

- ✓ Photonics is far more than DVD and fiber
- ✓ 6 markets targeted
  - Environment: detection of....
  - Agrifood: quality measurement (cf REAMIT European project)
  - Health and biotech: detection, measurements
  - Factory: measurement, cutting...
  - Lightning: low consumption
  - Automated transport: LIDAR...



# Cyber: take the threat seriously!

- ✓ With the use of digital everywhere, we are multiplying the threats
- ✓ Be prepared
- ✓ Use sanity checks, audit your security



## AI : intelligence is here!

- ✓ The recent progress of AI allows extensive development of new applications with a efficient ROI
- ✓ Use by I&R-TES members
  - ❑ Qortex uses AI for managing efficient live distribution of TV programs
  - ❑ Hera-MI uses AI for image processing in order to identify cancers
  - ❑ Sensing vision or Energiency use AI to manage energy consumption in a building or in a factory
  - ❑ Redefine Strategy uses AI to manage people displacement in hospitals
  - ❑ Cosling uses AI to optimize the organization of operators job in big warehouse



# Thanks!



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