

**INNOVATION: THE LONG TERM  
STRATEGY:**  
*THE EXAMPLE OF THE AQUITAINE REGION*

*JEAN CLAUDE KIEFFER*

*On behalf of the Conseil Régional d'Aquitaine  
Mission sur l'innovation en Aquitaine*

# I am...

## Sharing my time between Quebec and Aquitaine

- Leading a very exotic high field physics program with high power ultrafast lasers at the advanced laser light sources (ALLS) national facility in Montreal (Quebec)
  - *The first 200TW/50W facility (5J, 25fs, 10Hz) Partnership with AT*
- Canada Research Chair (2002-2016) in ultrafast photonics applied to complex systems
- Advising CRA for strategy in optics and laser since 1997
- Leading CRA' effort on deploying industrial network and innovation strategy since 2010
- ...

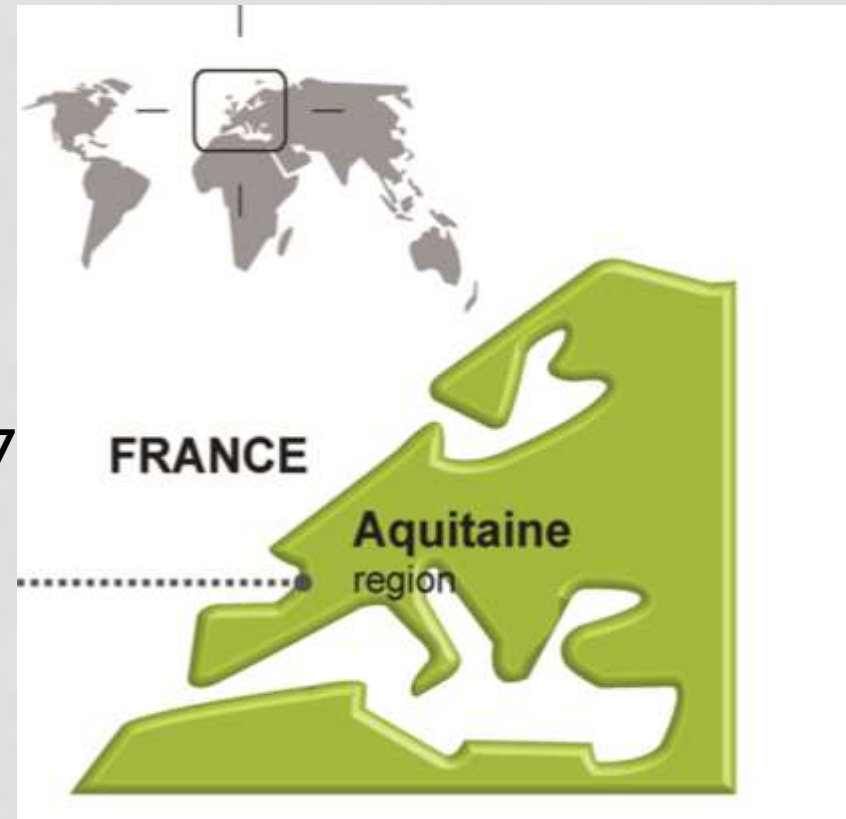
# OUTLINE

- THE AQUITAINE REGION
- LARGE SCALE LASER FACILITIES IN AQUITAINE
- 1997 - 2012: BUILDING THE ECOSYSTEM
- 2012 - 2016: TOWARDS INDUSTRIAL NETWORK
- CONCLUSIONS

# THE AQUITAINE REGION

## *NOT ONLY THE WINE*

- 6<sup>th</sup> in term of population and GDP
- 12<sup>th</sup> in term of research investment/GDP
- known for food, wood, tourism, aeronautics but...
- **A strong momentum from CRA since 1997**  
Large investments in Optics Laser and high tech. thanks to the leadership of **M. ALAIN ROUSSET, pres. of the CRA**
- 9%/Y increase of the number of researchers



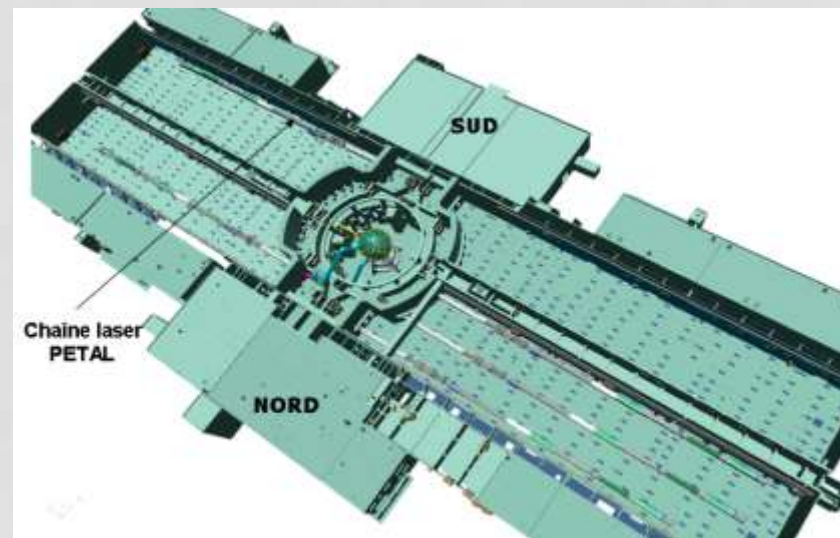
# LARGE SCALE LASER INFRASTRUCTURE IN AQUITAINE

- 1996: The LMJ: A major project and infrastructure (CEA). A National Flagship with an international visibility.
  - *240 beams, 1.5 MJ, ns pulses*
  - *ICF and stockpile stewardship*
  - *Building LMJ started in 2003*



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- 2005: PETAL, a 54 ME project for civilian research leaded by the Aquitaine region council
  - *1 beam, 3.5KJ, 500fs-10ps*
  - *A user facility, ICF, astrophysics, physics of extreme...*
  - *A demonstrator towards HIPER*
  - *2011: PETAL coupled to the LMJ*



# PETAL

- Starting in 2015, the French and European scientific community will have access to PETAL and to LMJ
  - *(20 to 30 % of laser shots available for academic civilian research)*
- This will give to the community the possibility to use a unique facility (the only other one like this being NIF) for addressing new physics, energy & societal issues, new accelerator concept...
  - *(PETAL has also been built as the major French contribution to the HiPER project)*

*Prof Dimitri Batani is the scientific coordinator*

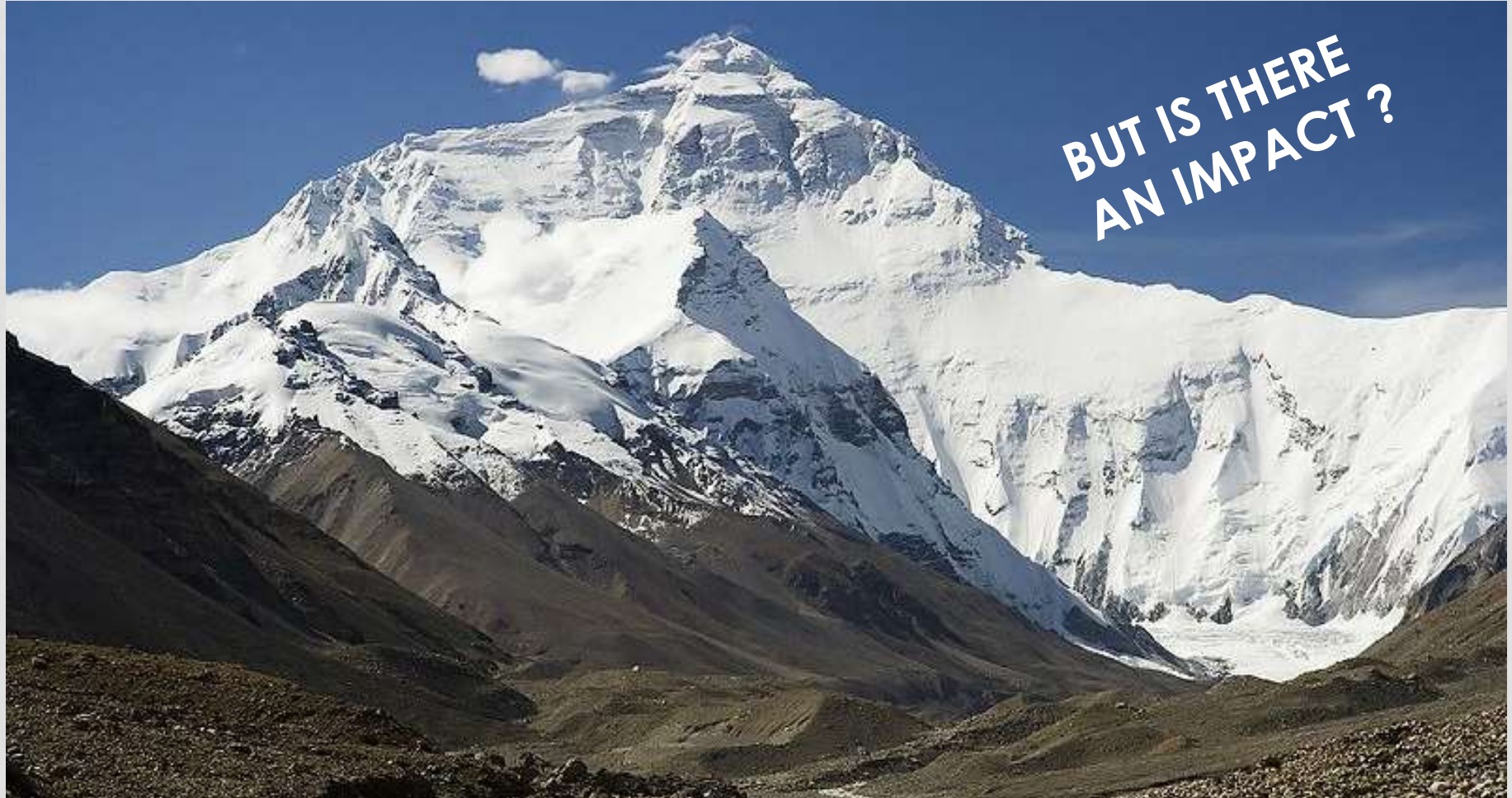
*big opportunity for Science in Europe*

# A STRATEGIC TOOLS FOR AMBITIOUS CONQUESTS





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*big opportunity for Science in Europe, **but also a catalyst for the local ecosystem development***

# PHASE I (1997 – 2012) :

## BUILDING THE ECOSYSTEM AROUND THE FACILITIES

- 1997: creation of the Center for Intense Laser and Applications (CELIA) at **Bordeaux University**.
- 2000: creation of the optics&laser **training platform** PYLA
- 2003 creation of **societe d'économie mixte** (business and technology sites)
- 2004: creation of the “route des laser” **cluster/network**
- 2007: creation of the **technology transfer platform** ALPHANOV
- 2008: establishing the Insitute of Laser & Plasmas (ILP) and signature of The **HIPER consortium**
- 2010: start to develop **key industrial network** on laser for bio-photonics
- 2011: creation of the **LP2N** (Laboratoire Photonique, Numérique et Nanosciences)
- 2012: Ecole supérieure d'optique à Bordeaux and creation of the **Aquitaine Optics Center**.



# THE INFRASTRUCTURES ARE KEY INGREDIENTS IN THE BUILDING OF A DYNAMIC ECOSYSTEM

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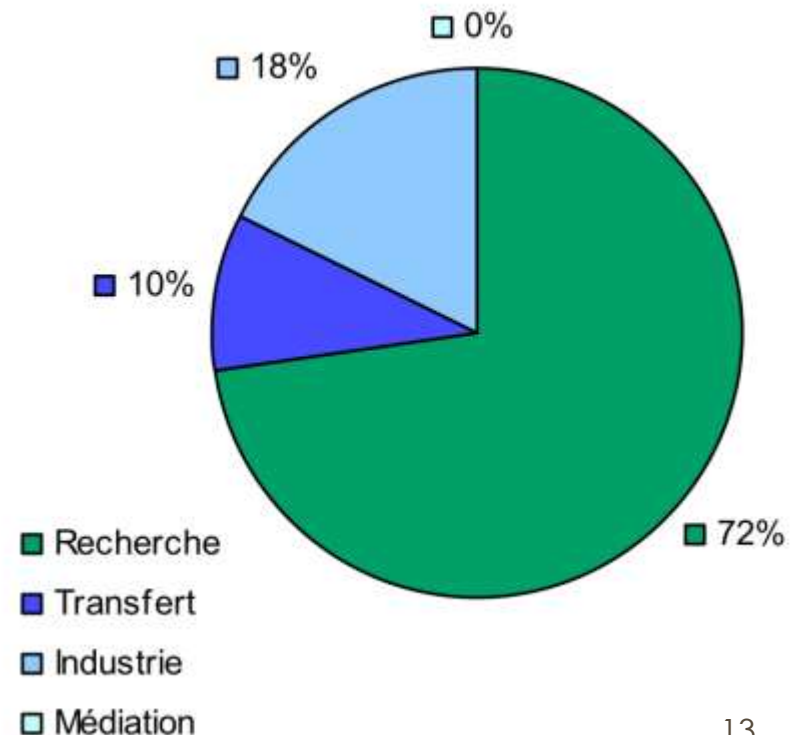
**TECHNO-PUSH BUT  
AN IMPRESSIVE SUCCESS STORY**



# PHASE I (1997 – 2012) : THE LEVEL OF EFFORT BY CRA

No direct causality BUT a trigger and an booster

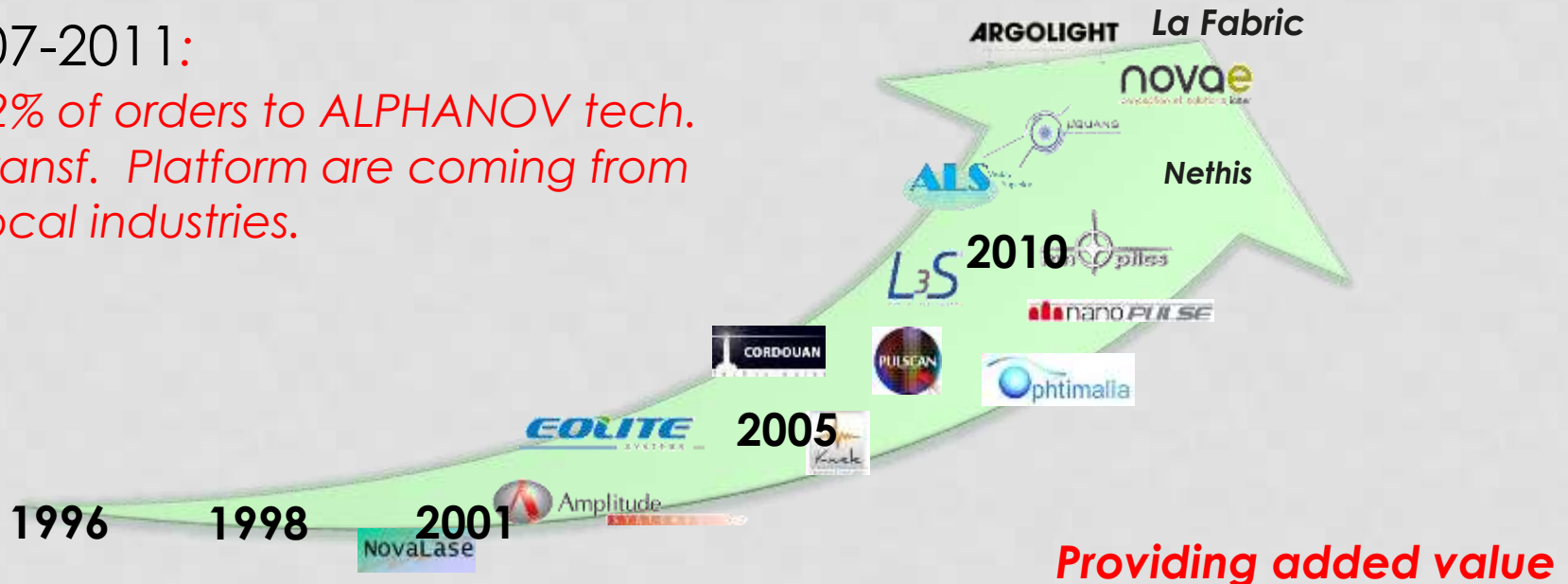
- 1997 to 2011:  
*123ME invested in optics/laser  
R&D by the Aquitaine Region Council*
- Since 2005:  
*focus on tech. transf. Around 65ME  
put in tech transf. by CRA*



# PHASE I (1997 – 2012) : MEASURING THE IMPACT

•2007-2011:

*42% of orders to ALPHANOV tech. transf. Platform are coming from local industries.*



- ✓ Création of 12 start-up since 2000
- ✓ 14 new enterprises attracted and installed
- ✓ Création of more than 200 jobs
- ✓ Business mostly based on export

# PHASE II (2012 – 2016): CRA STRATEGY FOR AN INDUSTRIAL NETWORK

NEXT CRA STRATEGY AIMS TO STRENGTHEN  
INDUSTRIAL RELEVANCE AND IMPACT OF ALL THE  
PREVIOUS INVESTMENTS

*more specific goals:*

- ✓ *Target societal innovation (Lasers and health applications)*
- ✓ *Develop an industrial network in laser/optics responding to the needs of application markets*
- ✓ *Increase the size of Aquitaine small industries*
- ✓ *Help SMI positioning on high growth rate market*

## PHASE II (2012 – 2016): CRA STRATEGY FOR AN INDUSTRIAL NETWORK

- Reinforcing industrial segments with high added value
- Increase the coordination
- Capitalize on specificities adapted to markets
- Increase support to industrial project in the emerging phase
- Define a technological roadmap responding to market needs



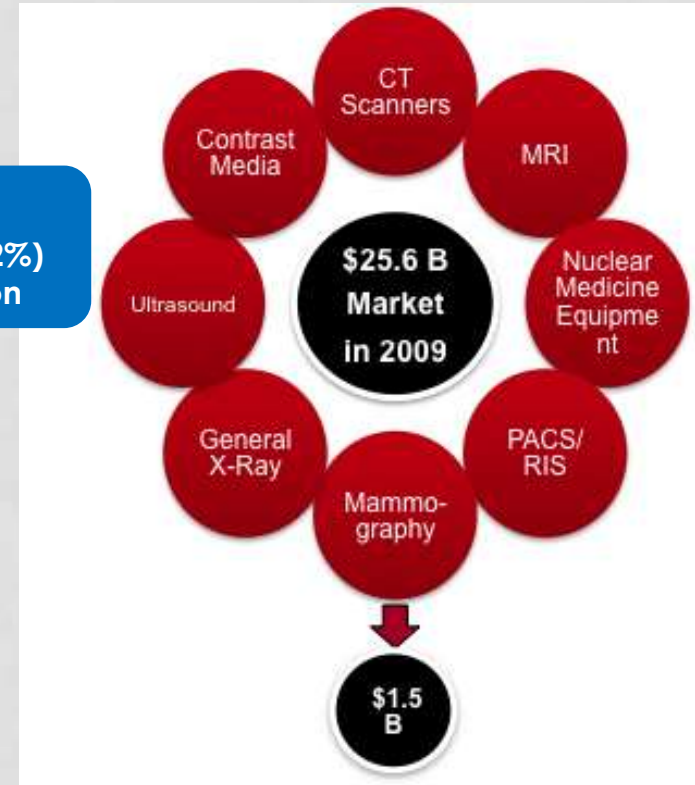
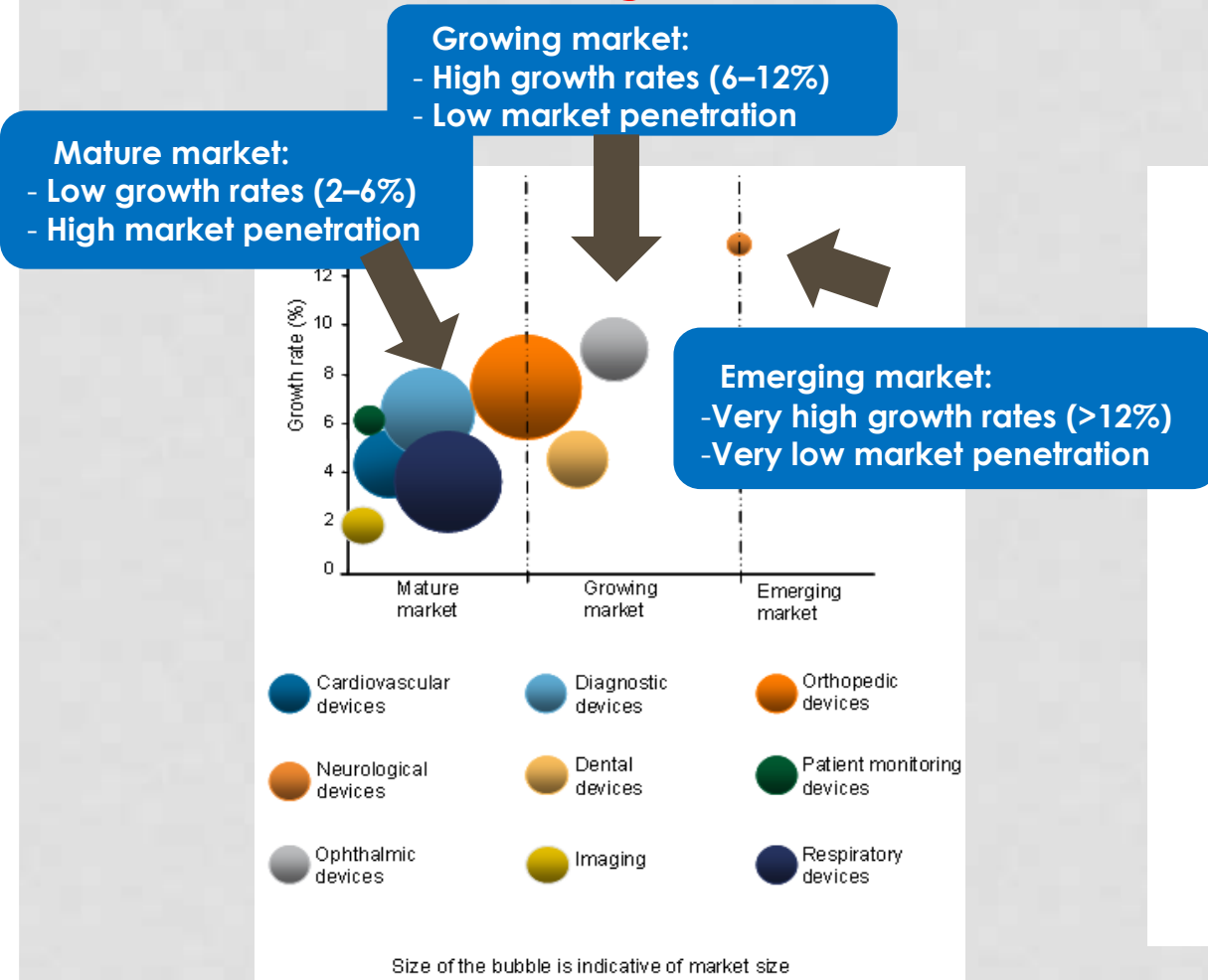
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**TECHNO-PUSH  
ASSISTED BY MARKET PULL**

# A PRIORITY ON LASERS FOR BIOMED IN AQUITAINE

- understanding markets

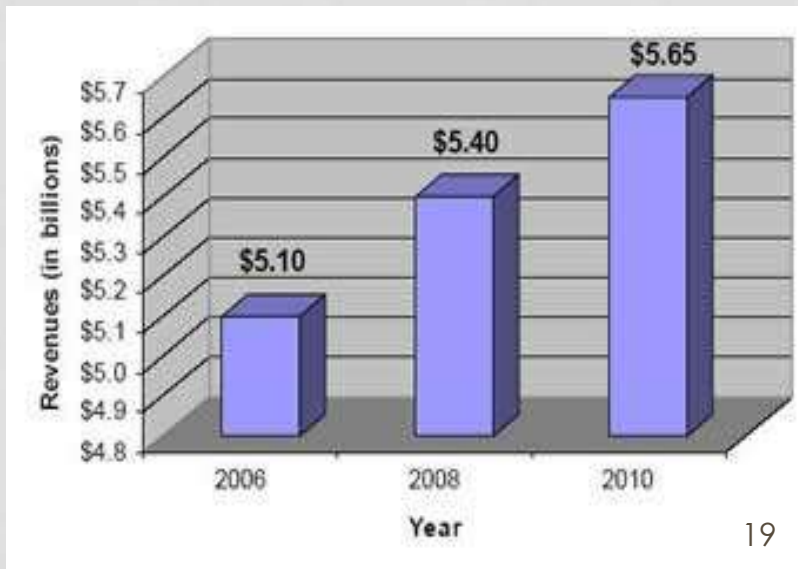


# A PRIORITY ON LASERS FOR BIOMED IN AQUITAINE

targeted markets :

- *short term* : optical components and instruments, lasers, ophthalmology
- *mean term*:
  - x-ray radiographie,
  - early detection of cancer (mammography),
  - small animal imaging,
  - dosimétrie
- *long term*: therapy (particules)

Summary: World Market for Medical X-Ray Equipment  
2006, 2008, 2010



# A PRIORITY ON LASERS FOR BIOMED IN AQUITAINE

- **increasing multidisciplinary and transversality**
  - *LABEX TRAIL, BIOTIS, LP2N, CELIA/Bergonié/CENBG*
- **Extending the role of transfer platforms**
  - *ALPHANOV, Bordeaux Imaging Center, PTIB, Inst. Bergonié*
- **capitalizing on industrial actors already positioned on medical market and fostering consortium on Medical Devices**
  - *Amplitude Système, VIC/EBC Médical, Imagine Optics (ophtalmologie), i2S, Explora Nova, Photonis, Cordouan Tech. (image), Acteon (dentisterie)*

# A PRIORITY ON LASERS FOR BIOMED IN AQUITAINE



- **Identifying key partners**
- **Identifying critical technologies**

2013

- **Evaluating risks and costs**
- **Defining the business model**

- **Strategic marketing**  
*Syntheses and recommandations*
- **Working group Las4Med:**  
*Definition of the technical roadmap*
- **Management structure**
- **Définition of the industrial priorities**
- **Development of the enabling technologies**

# CONCLUSIONS

- ✓ PETAL/LMJ HAVE BEEN KEY INGREDIENTS IN BUILDING A DYNAMIC ECOSYSTEM BUT A LOT OF EFFORT AND INVESTMENT NEEDED
- ✓ NEXT CRA STRATEGY AIMS TO STRENGTHEN INDUSTRIAL RELEVANCE AND IMPACT OF ALL THE PREVIOUS INVESTMENTS
  - ✓ *STRATEGIC MARKETING*
  - ✓ *A FIRST PRIORITY ON LASERS FOR BIOMED*
  - ✓ *LONG TERM EFFORT*
  - ✓ *A SYSTEMATIC ASSESSMENT OF PRIORITIES AND TARGETED INVESTMENTS BY CRA*
  - ✓ *REINFORCING FINANCIAL ENGINEERING*