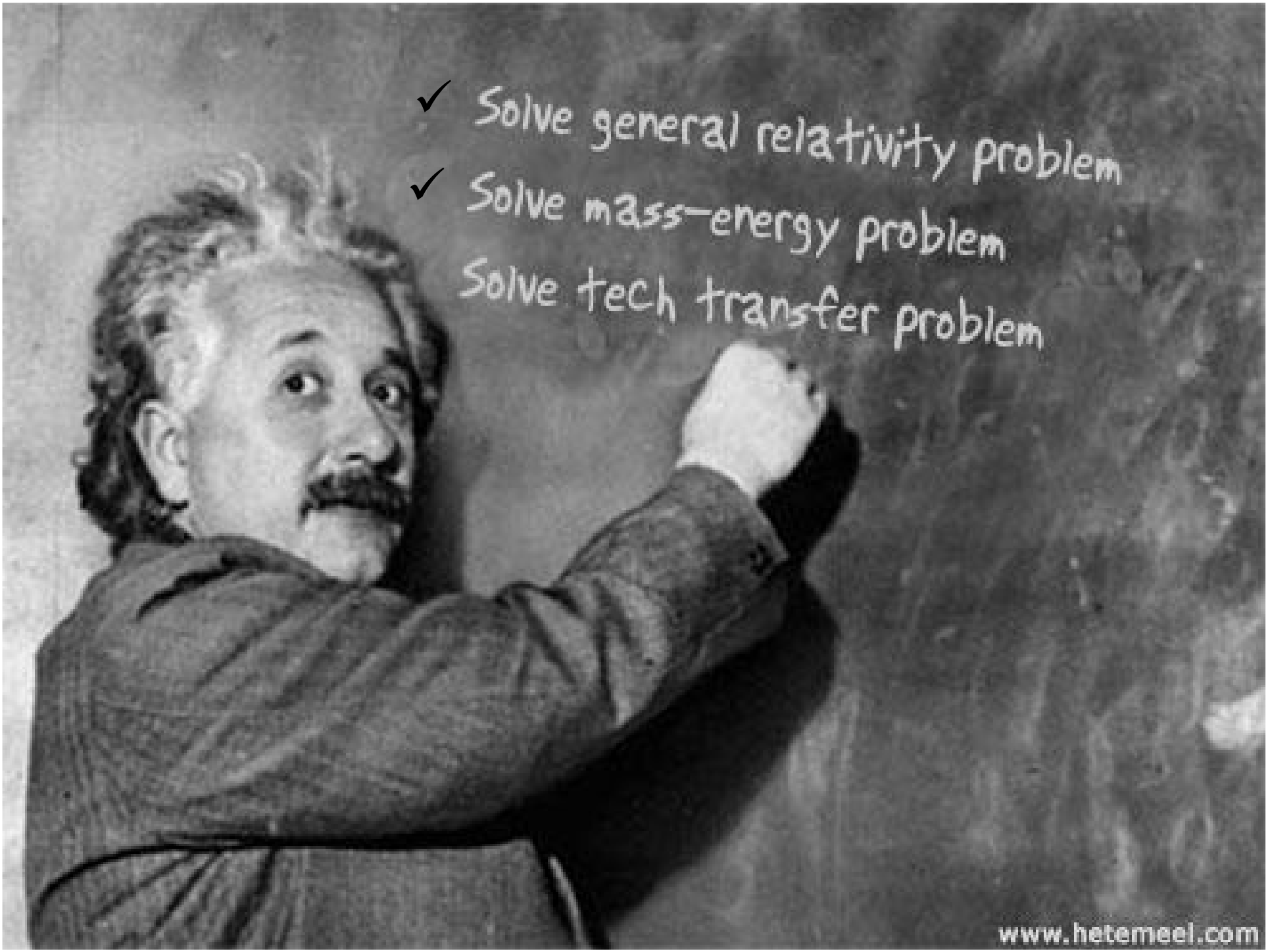

MINATEC®
Research Technological Organization (RTO), nice to have or must to have ?
Jean-Charles GUIBERT
CEA, Advisor to the CEO for innovation
Director of MINATEC®
Education Research Industry


✓ Solve general relativity problem
✓ Solve mass-energy problem
Solve tech transfer problem
www.hetemeel.com

CEA : Worldwide leader in technological research

Alternative Energies and Atomic Energy Commission

Technologies

Defense Security

Military Applications Division (DAM)

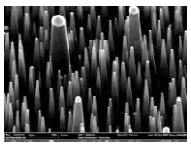
Nuclear Energy

Nuclear Energy Division (DEN)

Key Enabling Technologies

Technological Research Division (DRT)

Science



Fundamental Research

Materials Sciences Division
Life Sciences Division

Human ressources **16,000**

10 Research centers

Budget: **€ 4,1 Bn**

Scientific publications: **4,740**

6100 Patent families in portfolio

743 Priority patents delivered in 2016

195 Innovative high-tech start-ups since 1972

45 Joint research units with academia

- *Mission DAM : France's national **security independence***
- *Mission DEN : France's **energy independence***
- *Mission DRT : French business' **economic competitiveness***

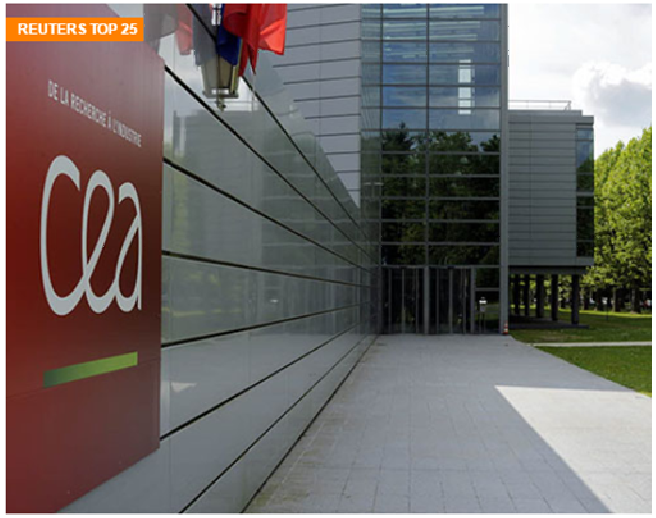
2016 The World's Most Innovative Research Institutions

CEA is topping the list of Research Institutions WW (Reuters)

Technology | Tue Mar 8, 2016 12:36pm EST

The World's Most Innovative Research Institutions

BY DAVID EWALT



1 - CEA	**Score : 206**	**France**
2 - Fraunhofer Society	Score: 202	Germany
3 - Japan Science & Technology Agency	Score: 201	Japan
4 - U.S. Department of Health & Human Services	Score: 193	USA
5 - National Center for Scientific Research	**Score: 189**	**France**
6 - Korea Institute of Science & Technology	Score: 183	South Korea
7 - National Institute of Advanced Industrial Science & Technology	Score: 182	Japan
8 - U.S. Department of Energy	Score: 179	USA
9 - Agency for Science, Technology & Research	Score: 175	Singapore
10 - French Institute of Health & Medical Research	**Score: 175**	**France**
11 - Helmholtz Association	Score: 157	Germany
12 - U.S. Department of Veterans Affairs	Score: 157	USA
13 – RIKEN	Score: 146	Japan
14 - National Research Council Canada	Score: 139	Canada
15 - Max Planck Society	Score: 137	Germany
16 - Chinese Academy of Sciences	Score: 135	China
17 - Pasteur Institute International Network	**Score: 135**	**France**
18 - National Institute for Materials Science	Score: 132	Japan
19 - United States Navy	Score: 123	USA
20 - Commonwealth Scientific & Industrial Research Organisation	Score: 119	Australia
21 - Spanish National Research Council	Score: 114	Spain
22 - Academia Sinica	Score: 106	Taiwan
23 - United States Army	Score: 100	USA
24 - National Aeronautics and Space Administration	Score: 99	USA
25 - Russian Academy of Sciences	Score: 98	Russia

Research Technological Organizations (RTO) : A key structure in the research tool box of governments

Who cares of innovation ?

Research leads to invention

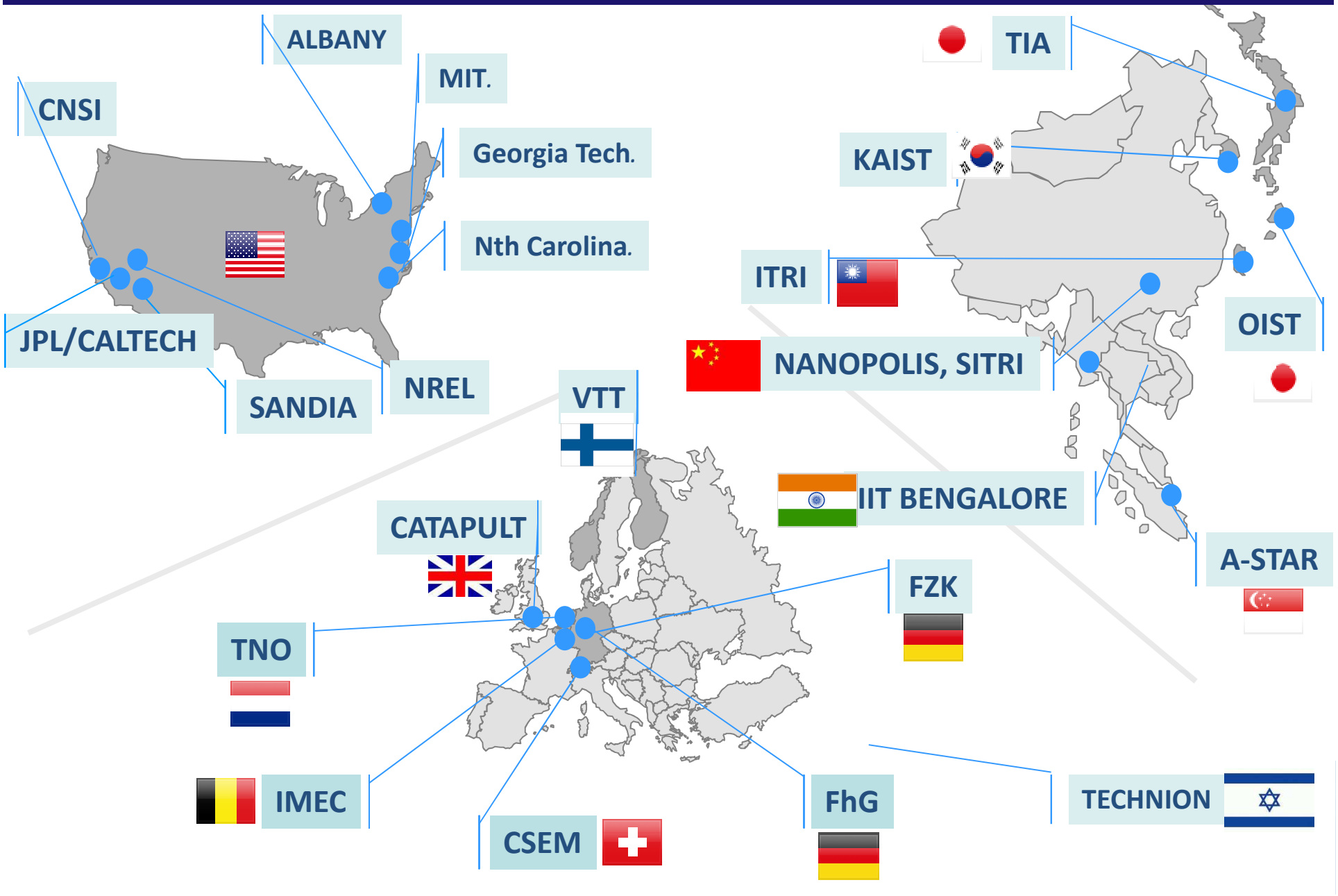
RTO mission is to bridge, to fill in the gap

Industry leads to products

Technology Readiness Levels (TRLs)

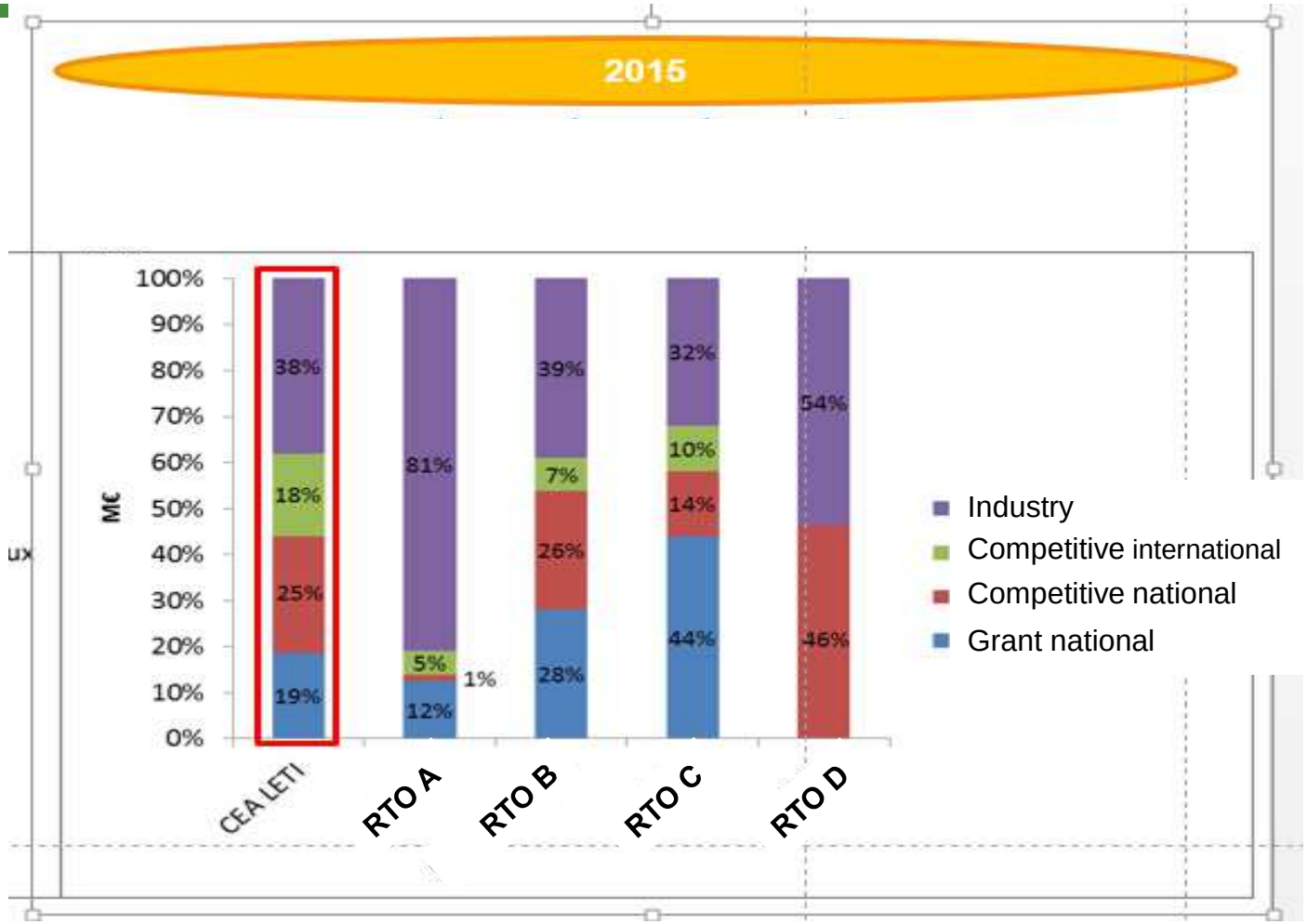
1. Basic principles observed	2. Technology concept formulated	3. Experimental proof of concept	4. Technology validation in lab.	5. Technology validation in relevant environment	6. Demonstration in relevant environment	7. Demonstration in operational environment	8. System complete and qualified	9. Successful mission operations	10. Mass Production

Multiple research models vs technology transfer



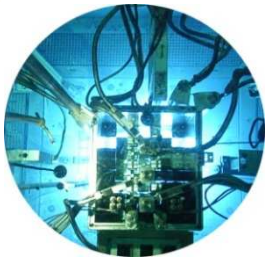
European RTOs – Funding benchmark

On long term, RTO funding equilibrium model : 1/3 Base, 1/3 Public competitive, 1/3 Industry (RTO B model)

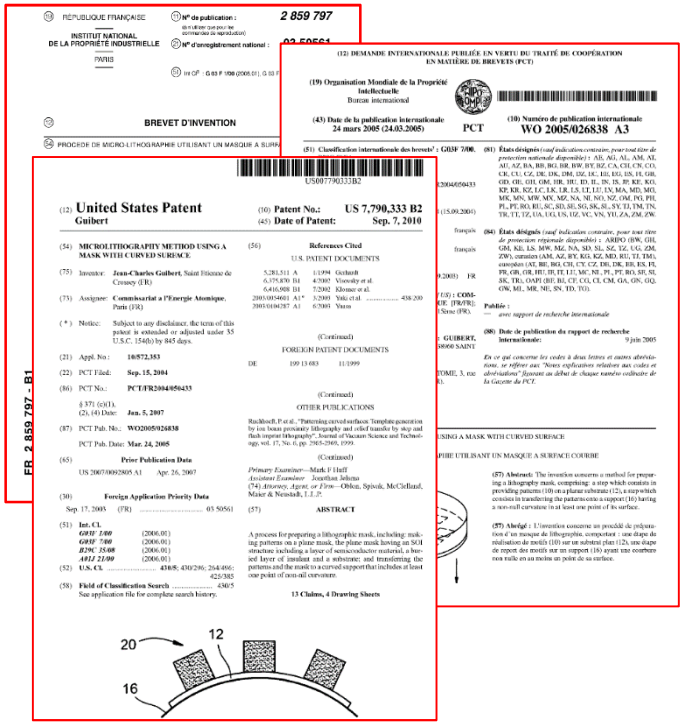


Basics for a sustainable RTO model

Excellent research staff



Affordable and securized results



(12) United States Patent
Guibert

(10) Patent No.: US 7,790,333 B2
(45) Date of Patent: Sep. 7, 2010

(54) MICROLITHOGRAPHY METHOD USING A MASK WITH CURVED SURFACE

(12) DEMANDE INTERNATIONALE PUBLIÉE EN VERTU DU TRAITÉ DE COOPÉRATION EN MATIÈRE DE BREVETS (PCT)

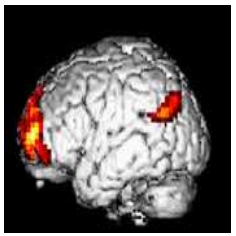
(19) Organisation Mondiale de la Propriété Intellectuelle
Bureau international

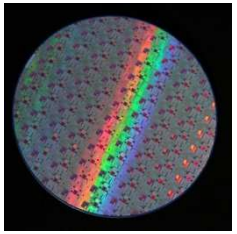
(43) Date de la publication internationale
24 mars 2005 (24.03.2005)

PCT

(10) Numéro de publication internationale
WO 2005/026838 A3

Up-to-date equipment platforms





A[illegible] concepts worldwide to adress R&D 2/2

ANALYSIS STARTED 1995

The key factor of success of all this type of initiatives is MASSIVE INVESTMENT CAPACITY, mainly from states, in order to guarantee the integration of fundamental research into the projects, & the dynamics of innovation and technological transfer.

Ex-nihilo centers	✓ Established « from scratch », in line with **a strong political will** to build high-tech infrastructures & create jobs and wealth. ✓ Required massive and long-term investments to support the project ✓ **Initiated without enough core research and industry partners** and without a leader to anchor the project in a dynamics of innovation & growth ⇒ Projects difficult to maintain over time…
***Has* been projects**	✓ **Difficulties to pursue the needed strategy of massive investments** ✓ Turned towards academic research and no more industry leaders mid/long term needs ✓ Or towards technical support of short term needs of SMEs
Leaders	✓ **Historical actors who have maintained massive investments in Research infrastructures while developing intensive collaborations with industrials** ⇒ Example of progressive shift from microtechnologies towards nanotechnologies requires partners to be increasingly innovative to guarantee technological transfer towards industry and to enable fundamental research actors to take an active part in te process of innovation

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Key factors of success for places for innovation

International network

Collaboration between various actors

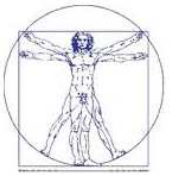
Massive investments

Partners' strong commitment

1 (or+) anchor company

A leader to support the project in the long term

Scientific skills & international renown



Appropriate ground for tech transfer, spirit of enterprise, innovative leadership and technical skills

RTOs Vision and mission → cultural change vs academics

- ✓ **Vision**
  - → have to be supported by politics and top management
  - → focus on cultural change (ie public research favorize employment….in private industry)
  - → results only on long term → will not be seen at the timing of political agendas !
  - → Comprehensive by all citizens

- ✓ **Mission**
  - → daily job of management to focus on impact
  - → explain why and how public salaries are financed,
  - → Short / middle term oriented
  - → Dedication of all research staff
  - → Benchmark : programs, organization, costs, investment,..

The 3 pillars of attractivity

- ✓ **Research staff platform → how much ? Permanent staff ? engineers, technicians, PhD ? International ? Master students available on site ?**
- ✓ **Equipments platform → Investment capacity along last years? Wwide unique ? Maintenance ? 24/7 operation for industry support ? Sharing costs with start-up ?**
- ✓ **Intellectual property platform → Investment capacity along last years? portfolio size ? In-house dedicated staff ? Strong management strategy ? Seen as an advertising tool or as a cost ?**

The 3 requests from customers

- ✓ **How to achieve customer goals → Project management ? Reporting ? ISO certified ? Results guaranteed ? SWOT analysis culture ?**

- ✓ **Business model → existing one ? Full cost per person per activity per year ? How much to cover for the customer : 50, 80, 100, 120 % ? Same cost for national and international customers ?**

- ✓ **Intellectual property access → Background access included in program cost ? Foreground proprietary rules ? Licence fee calculation ? Rules for exclusive or non exclusive licence ?**

3 proposed high level KPI *(Key Performance Indicators)*

- ✓ **International visibility → are you in premier league ? Impact of international rankings? Is your center attractive enough for the best students, researchers, industry, investors?**

- ✓ **Ecosystem generation and development → strength and commitment of collaborations and interactions at different levels : education, research and industry ? Are you contributing to new research model generation ?**

- ✓ **Economic impact → estimated per year, on your research area ? who is able to calculate? analytic datas or global ones ? Advertising tool or guideline for authorities ?**

What's next ???

Year after year, succesfull RTOs moved to industry based processes :

- **24/7 Prototype capability to support customers and start-up**
- **Staff recruitment to achieve critical size**
- **Package for best researchers to foster excellence**
- **Marketing staff to identify potential applications**
- **Business development staff to attract customers**
- **Advertising strategy to be more visible at international level**
- **……..**

Sucessfull future will need to continue on this trend:

- **Subcontract some research programs to «smaller research centers»**
- **Establishment of foreign offices, labs, alliances**
- **Fusion with complementary labs mainly at national scale**
- **«Acquisition» of competitors, at national or international scale**
- **…..**

In conclusion,

within 20 years, future map of RTOs will show :

- **a few global RTOs**
- **Many local and specialized ones**

Thank you for your attention