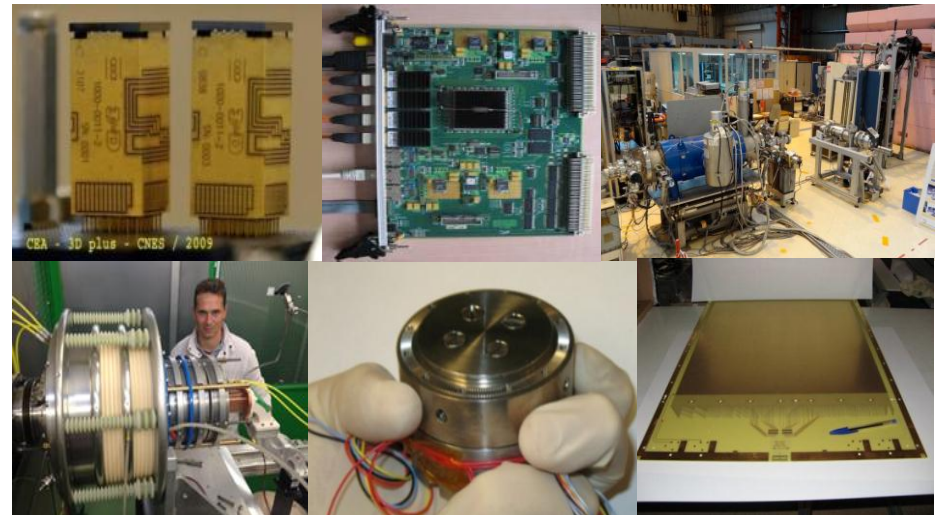


DE LA RECHERCHE À L'INDUSTRIE

cea

# INDUSTRIAL VALORIZATION



*Christine PORCHERAY*

Irfu



**Irfu's role is the production of world-class knowledge and know-how.**

- Need to have powerful, reliable and highly sophisticated equipment
- With required performances beyond the state of the art,
- ⇒ Innovations and conceptual breakthroughs.

**Irfu's links with companies are therefore of two types:**



**1. High-tech industries for building research instruments**

Diversified and long-term collaborations, in order to be able to meet the innovation challenges and to achieve the necessary skills for participating in European calls.

**2. Technology transfer from Innovations induced by scientific demand.**

Transfer to companies, innovations created by instrumental requirements

**Benefits for companies are:**

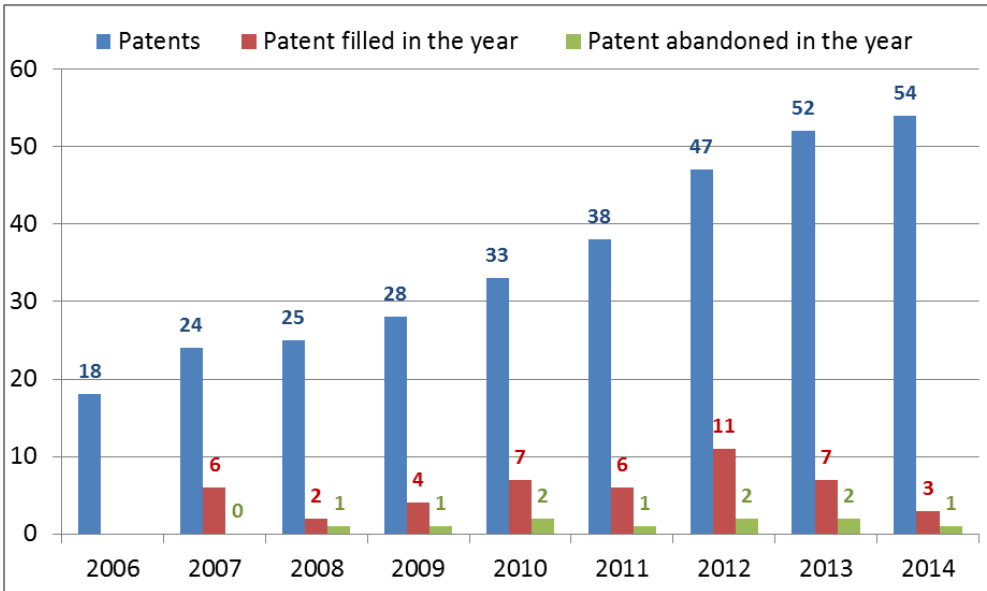
- **More competitiveness** due to the integration and development of new skills
- **Dissemination of knowledge in the enterprise** by Engineering and top researchers training
- Development of **applications for societal demands** (health, environmental protection, energy of tomorrow ...)



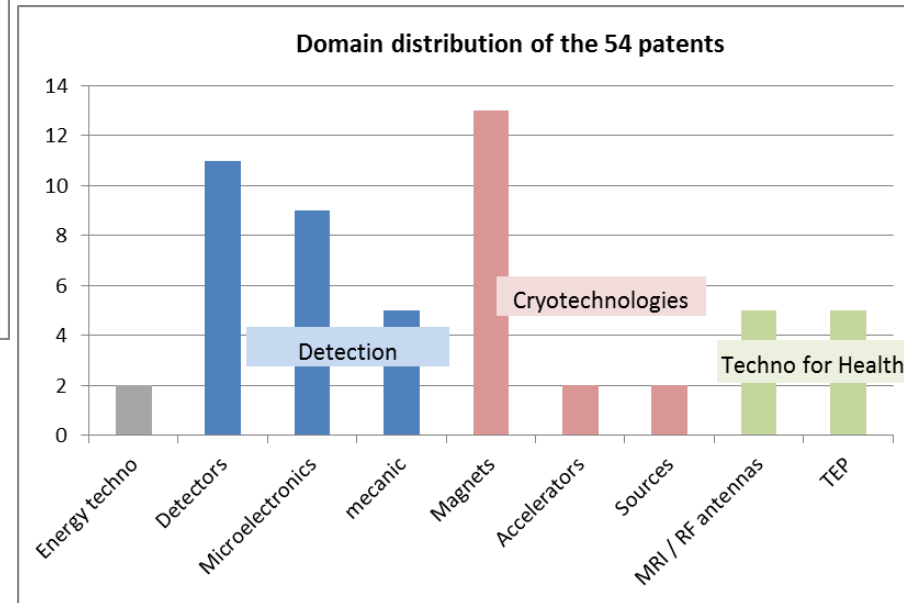
**Benefits for Irfu are:**

- **Maintain the creation of ideas** and concepts enabling the innovation process to be constantly renewed
- Development of **applications for societal demands**
- **Increase public funding** for fundamental research

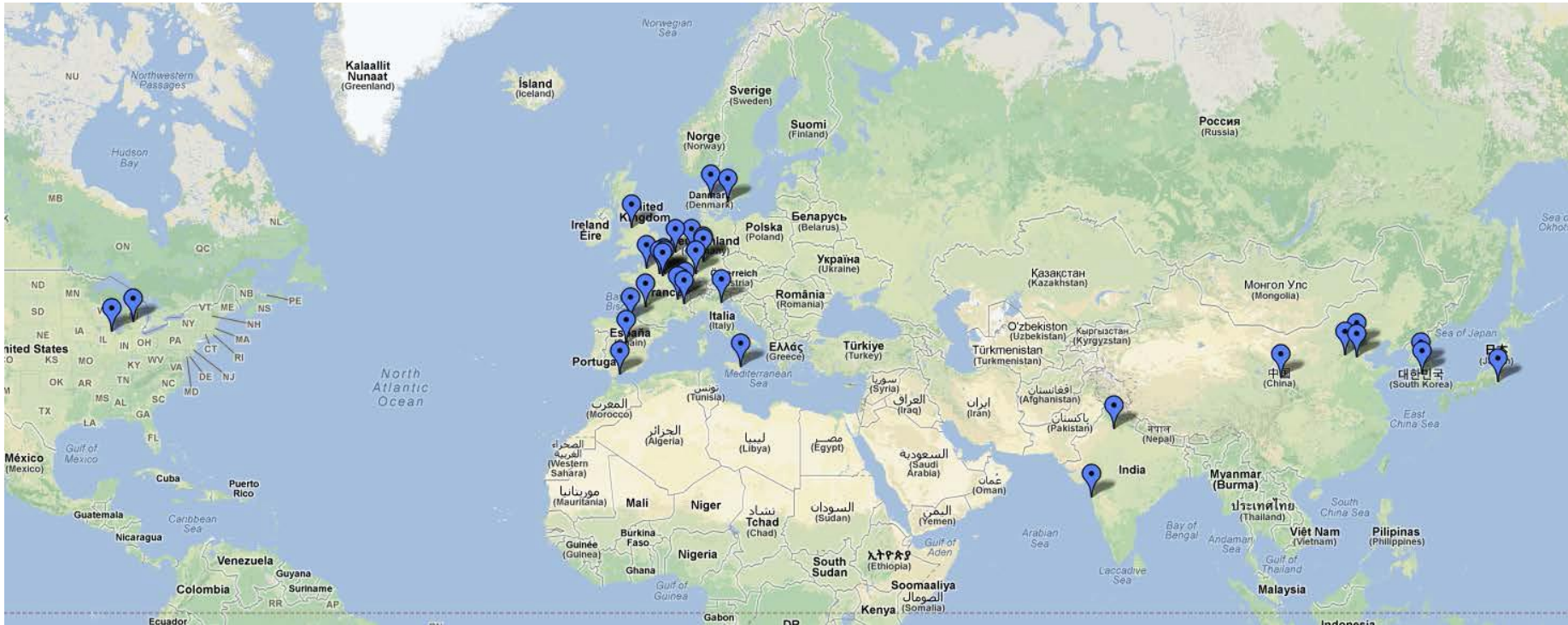
## 54 active priority patents



## Management system



**A world-wide distribution : 100 licenses of software per year**  
(accelerator design and beam dynamics simulation)



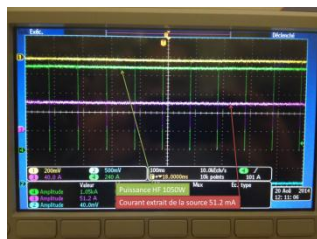


## Partnership with PANTECHNIK

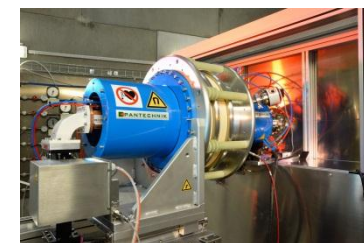
SILHI, ECR source :  
2.45 GHz 875 Gauss



⇒ in **2013**, Irfu and Pantechnik had signed a license about transfer of know-how. Authorization to manufacture and to market the ECR ion sources of our registered trademark « SILHI ».



⇒ Irfu tested with succeed, in **July 2014**, on its installations, the two first sources manufactured by Pantechnik.



⇒ **At the end of 2014**, Irfu and Pantechnik have just signed a R&D contract, for two years, in order to collaborate on simulation of ECR ion sources. Pantechnik use a method implemented by the government to finance the labor needed for this collaboration call C.I.R.



## Partnership with Thales Electron Devices : Research training

Co-funding of a PhD student, started in **2014** for three years, working on the study and design of 12GHz klystron useful for the development of new concepts of particle accelerators for Research Infrastructure.

**GASEOUS DETECTORS :**  
High TRL, Attractiveness

Particles physics

**elvia**  
PRINTED CIRCUIT BOARDS

GRUPE  
2011-2014

**ETOS**

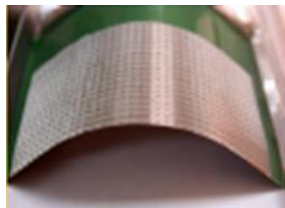
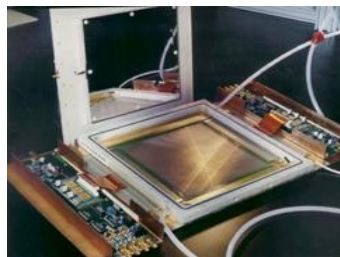
circuiti stampati professionali

2011-2012

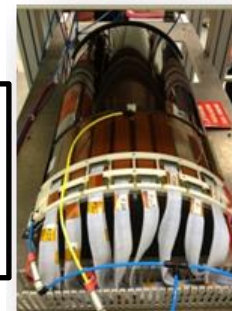
Homeland security  
Fire detection

**Schlumberger**

2014 - ?



**MICROME GAS**  
MICRO-MESH  
Gaseous Structure



**THALES**

Future



Asacusa, Riken (Jp)

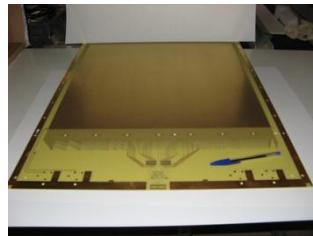
LHC - CERN  
Gbar, Zurich (CH)



2014 - ?

Medical imaging

DGA (French general  
direction of the armament)

Geology  
Archeology  
Petroleum detection



<b>Irfu's links with companies</b> 	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>Companies</b>
transfer of know-how to Pantechnik	30 000	30 000	30 000	30 000	Pantechnik
Test of sources (Silhi) for Pantechnik		9 600			Pantechnik
R&D Pantechnik : 50% postdoc (CIR)		43 000	43 000		Pantechnik
Co funding (50/50) PhD student withThales Electron Devices		21 000	21 000	21 000	THALES
Idef-X Leti/Morpho			50 000		SAFRAN - MORPHO
NRBC multiplexage		170 000	230 000	x	ELVIA
R&D PMB (coupleurs)		16 000	16 000	21 000	ALCEN/PMB
INTERDIM : aimant WAVE			150 000	147 000	SIGMAPHI
Joint laboratory with ELVIA (CIR, ANR)			x	x	ELVIA
Joint laboratory with 3DPlus (CIR, ANR)				x	3DPlus
Joint laboratory with SigmaPhi (CIR, ANR)			x	x	SIGMAPHI
Study for Gantry Supra			x	x	Varian
R&D detector with Schlumberger		15 134	x	x	Schlumberger
<b>Total relationship with industries</b>	<b>30 000</b>	<b>304 734</b>	<b>619 000</b>	<b>569 000</b>	



The Innovations created for the instruments, with high technology readiness level, can be valorized by sales all around the world.

⇒ Enable a financial returns to Irfu and renew the innovation process.

AGET (Japan, China, USA, Korean, Italy, Spain, Romania, Poland)

Electronic cards

Asics

supraconductive wave



micromegas detectors

Forward Tagger (Usa)

AFTER (Canada)

ASACUSA (Japan)

FEC, FEMINOS (Greece)

Neutrons detection(Schlumberger, France)

PSI (Switzerland) and Varian (Germany)



<b>SALES</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
Vente un detecteur -> <b>Schlumberger</b>		15 134		
Ventes presta faisceau (Silhi) -> <b>Pantechnik</b>		9 600		
Ventes AGET	153 792	114 442	51 734	293 416
Ventes autres cartes (FEC, AFTER, ML507)		6 350	5 920	
Ventes détecteurs -> Research Institutes		49 000	136000	
Détecteur Gbar à ETH Zurich(triplet de détecteurs)			200 000	300 000
ASACUSA		380 000		x
vente presta expertises V. Minier			180 000	
Etude pour GSI par une vente de presta pour Ansaldo			x	x
<b>Total Vente</b>	<b>153 792</b>	<b>574 526</b>	<b>573 779</b>	<b>943 416</b>





2015

R&D to optimize the Micromegas manufacturing process. Different sizes and models of detectors.



2015

Development of tools (design, processes, ...) allowing the realization of innovative magnets.



2015

Development around "CALISTE » X-ray spectro-imager in 3D microelectronic technology.



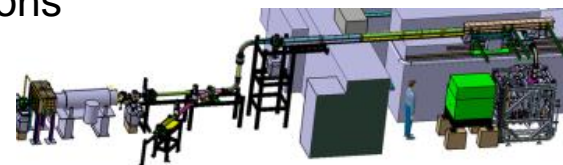
R&D to optimize the design of a new cryomechanisms for the astrophysical' s instruments.





2015

Design, manufacture and sale of positrons' sources ( $e^+$ ) and non-destructive testing solutions using these positrons



**MUSCADE®**, Human Machine Interface, Remote Supervision (Web module)

Thank you  
for  
your attention

