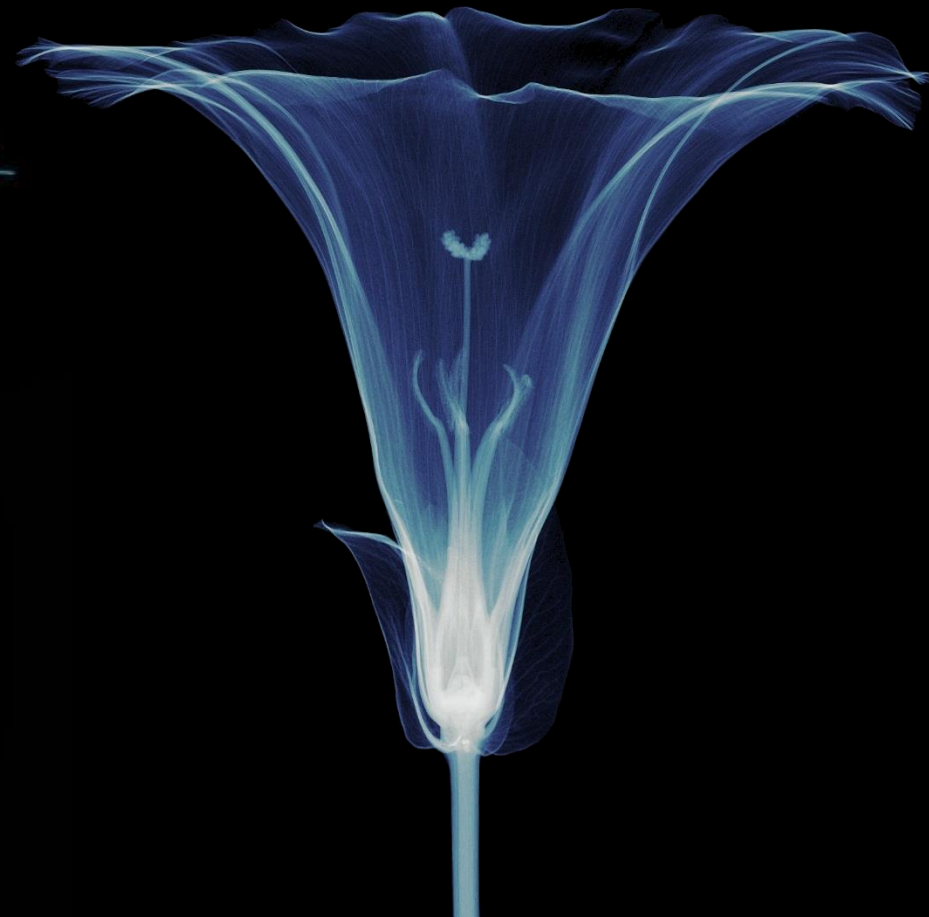
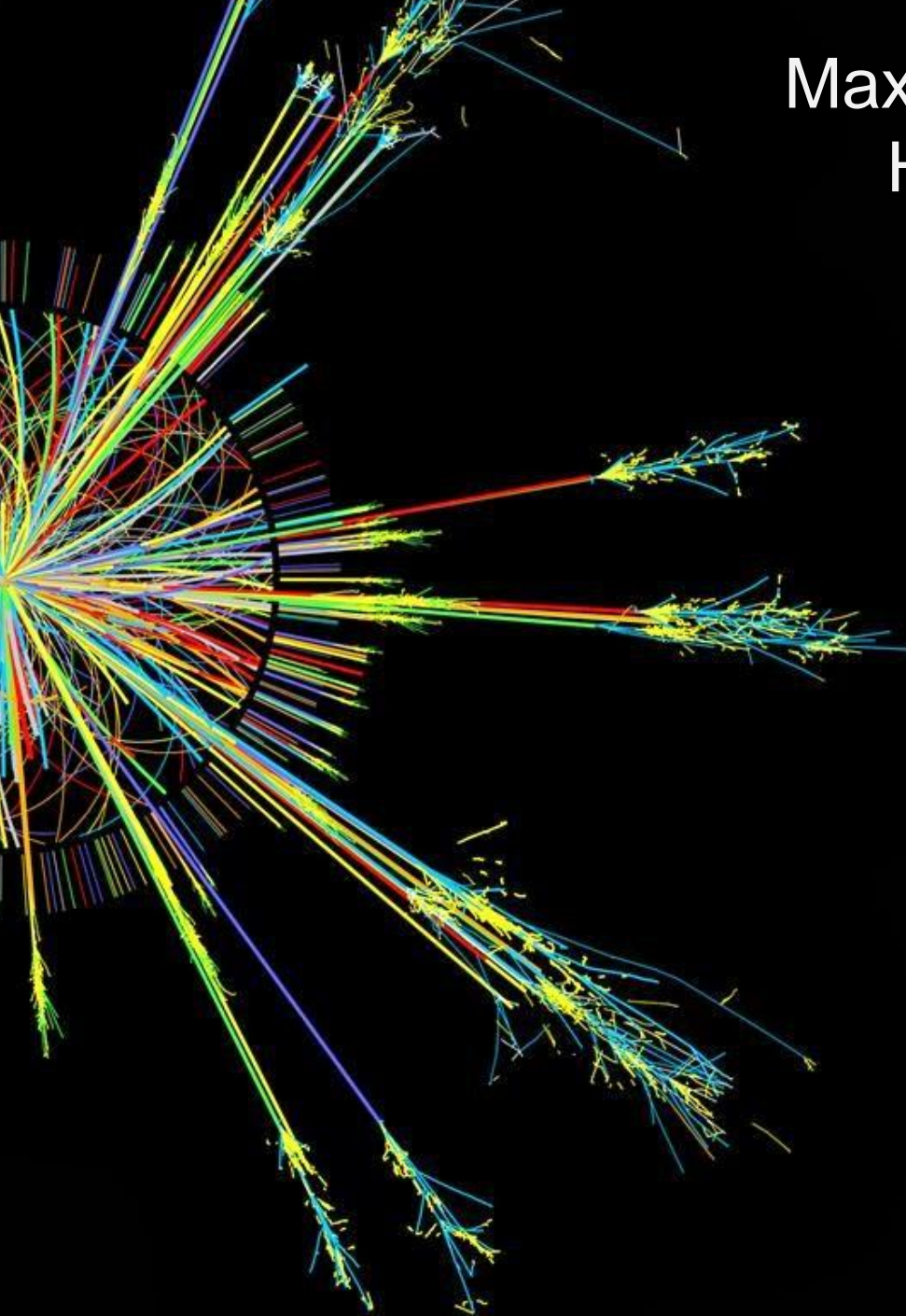


Maximizing the dissemination of HEP technologies to society: the CERN model

D. Mazur
CERN Knowledge Transfer Group



Overview

- A few words about CERN
- What makes knowledge transfer at CERN unique ?
- The cornerstones of our model:
 - Focus on impact
 - Open dissemination
 - Protect only when strictly necessary
 - CERN's Knowledge Transfer Fund
 - Local business impact with start-ups and SME's
- Dispelling a few myths



CERN: “Science for Peace”

~ 2300 staff

~ 1400 other paid personnel

~ 12500 scientific users

Budget (2016) ~1000 MCHF

Member States: Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Israel, Italy, Netherlands, Norway, Poland, Portugal, Romania, Slovak Republic, Spain, Sweden, Switzerland and United Kingdom

Associate Member States: Pakistan, Turkey

States in accession to Membership: Cyprus, Serbia

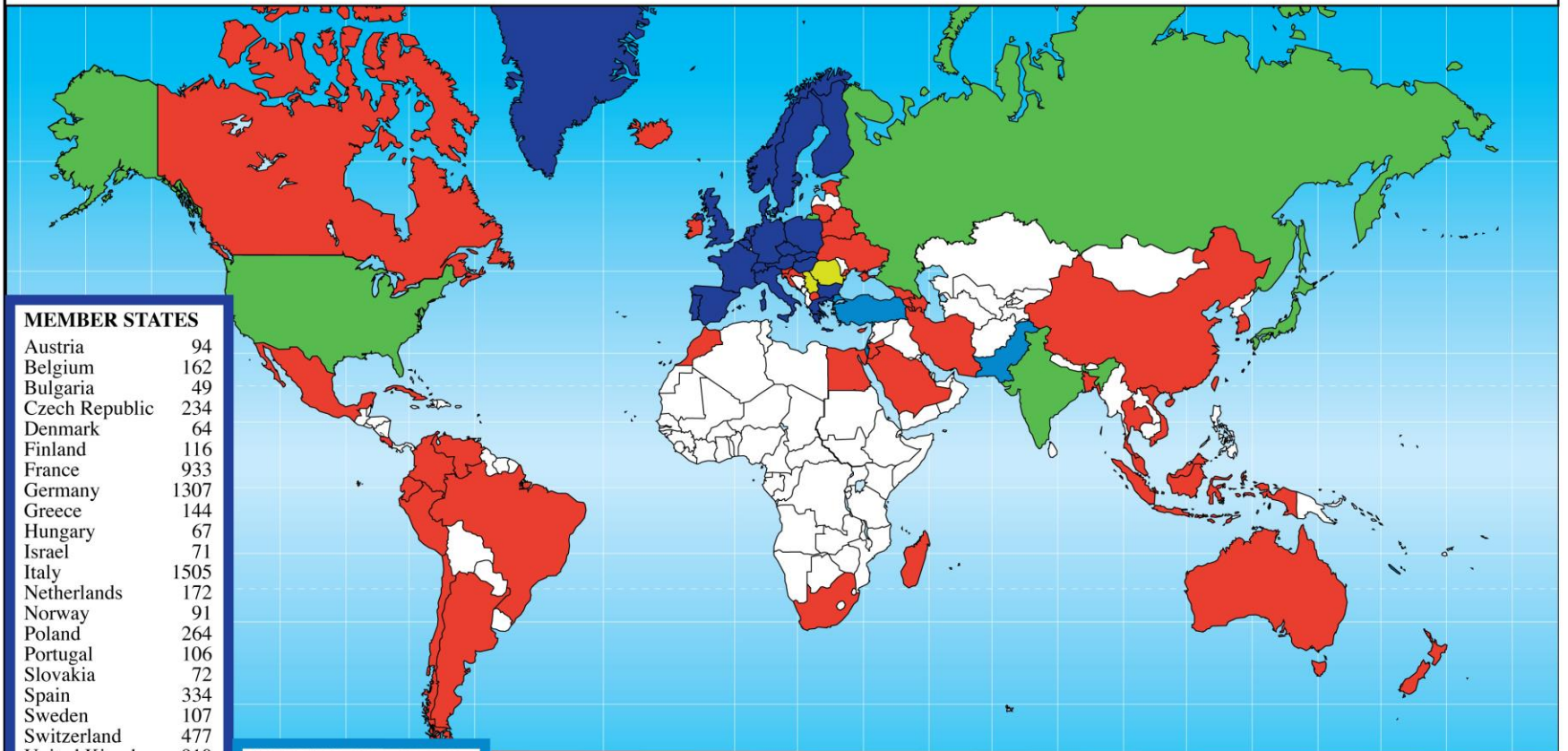
Applications for Membership or Associate Membership:

Brazil, Croatia, India, Lithuania, Russia, Slovenia, Ukraine

Observers to Council: India, Japan, Russia, United States of America; European Union, JINR and UNESCO



Distribution of All CERN Users by Location of Institute on 12 January 2016



MEMBER STATES

Austria	94
Belgium	162
Bulgaria	49
Czech Republic	234
Denmark	64
Finland	116
France	933
Germany	1307
Greece	144
Hungary	67
Israel	71
Italy	1505
Netherlands	172
Norway	91
Poland	264
Portugal	106
Slovakia	72
Spain	334
Sweden	107
Switzerland	477
United Kingdom	910

7279

OBSERVERS

India	187
Japan	279
Russia	980
USA	1915

3361

ASSOCIATE MEMBERS

Pakistan	36
Turkey	126

162

STATES IN ACCESSION TO MEMBERSHIP

Cyprus	11
Romania	99
Serbia	37

147

OTHERS

Argentina	29	China	208	Iceland	2	Mexico	64	TFYROM	2
Australia	40	Colombia	12	Indonesia	9	Morocco	7	Ukraine	30
Azerbaijan	4	Costa Rica	1	Iran	25	New Zealand	6	Venezuela	1
Bangladesh	2	Croatia	25	Ireland	9	Peru	3	Viet Nam	1
Belarus	26	Cuba	3	Jordan	2	Saudi Arabia	1		
Brazil	151	Ecuador	2	Korea	145	Singapore	1		
Canada	174	Egypt	26	Lithuania	15	Slovenia	20		
Chile	15	Estonia	17	Madagascar	3	South Africa	47		
		Georgia	23	Malaysia	12	Taiwan	78		
		Hong Kong	22	Malta	5	Thailand	13		

1299



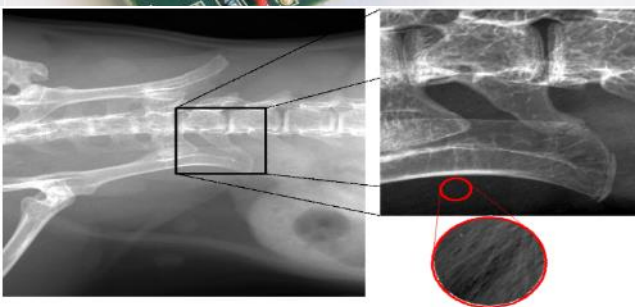
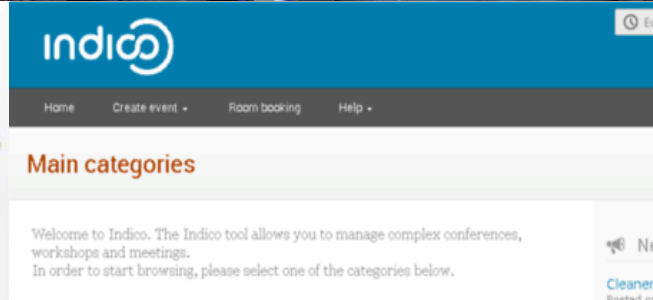
Accelerators



Detectors



Computing





How to optimize therapy for patients ?

PRESS RELEASE

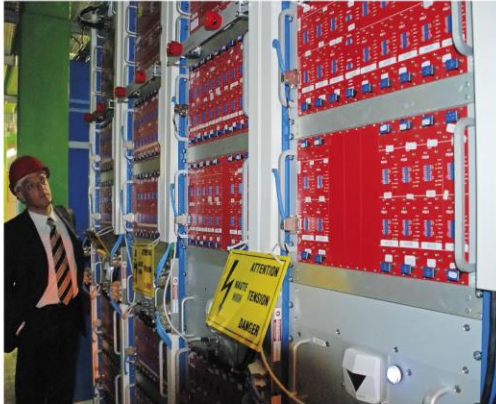
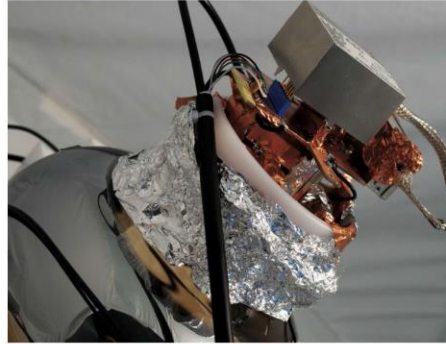
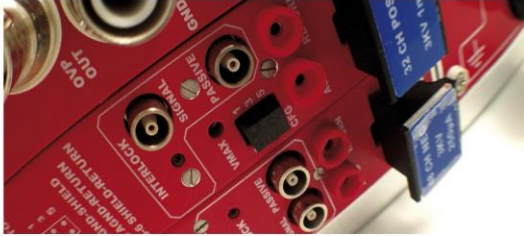
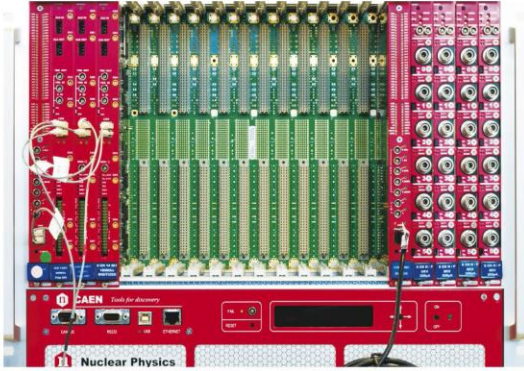
STOCKHOLM, SEPTEMBER 10, 2015

RAYSEARCH, CERN AND INFN SIGN LICENSE AGREEMENT IN THE FIELD OF ION BEAM THERAPY

CERN, INFN and RaySearch Laboratories AB (publ) have signed a long-term license agreement allowing RaySearch to utilize the FLUKA Monte Carlo code in its research and development in the field of ion beam therapy.

<http://www.raysearchlabs.com/about/press/?year=2015&cisionid=1977472>





How to make scientific instrumentation more performing ?

“ The unit features High Performance Time to Digital Converter chips developed by CERN.”

<http://www.caen.it/cs/site/CaenProd.jsp?idmod=789&parent=11>





<http://www.terabee.com/>

Terabee wins Web Summit Angels' Choice Award

Posted in [News](#)

From the 2,141 start-ups exhibiting at Web Summit this year, Terabee is thrilled to have been chosen for the Web Summit Angels' Choice Award! – It's another clear demonstration of the wider business world seeing the advantages and value of Terabee's unique sensors and products.

What makes KT at CERN unique ?

- **Technologies for fundamental research**
Gap between CERN's use and industry (Technology).
Fundamental research is first and foremost priority (Time).
- **Global collaborations**
Shared ownership.
Collaborative exploitation.
- **A culture of openness**
Open dissemination models – Software / Hardware.
Building a bridge between industry's interests and CERN's openness.
- **An intergovernmental organization**
Duty of return to all 22 member states.
Equal treatment.



How does this translate to our dissemination strategy ?

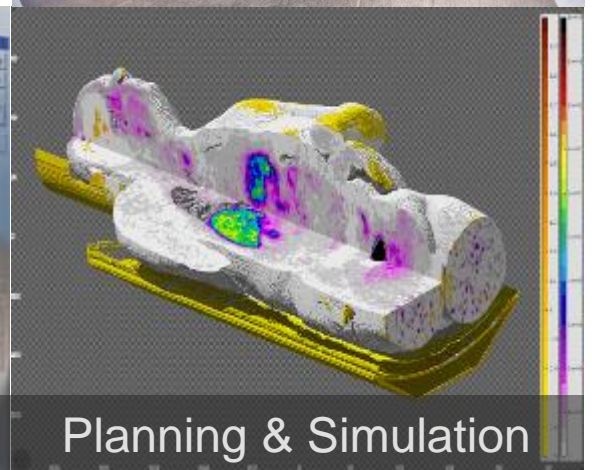
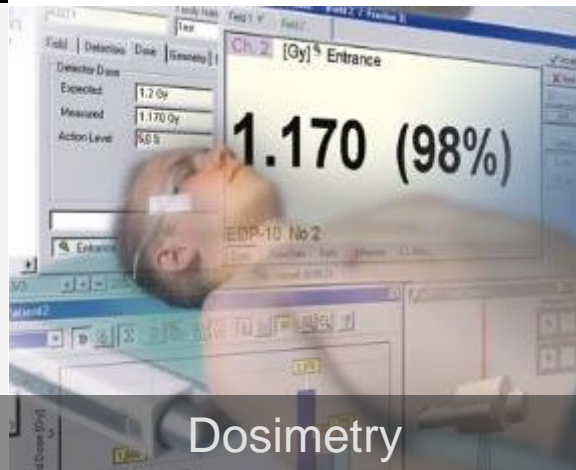
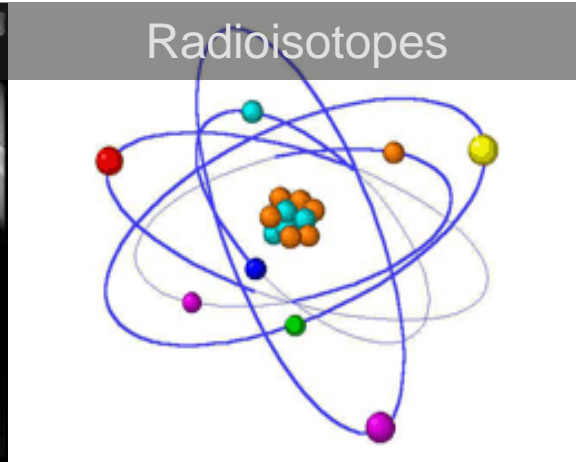
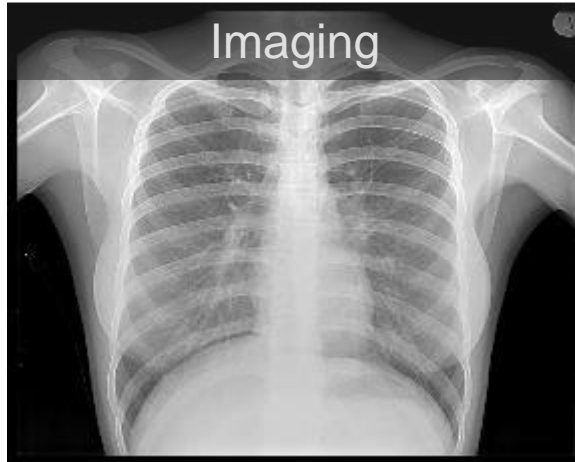
1. Focus on Impact
2. Open dissemination
3. Protect only when strictly necessary
4. Knowledge Transfer Fund
5. Create local impact in Member States



1. Focus on impact

- Impact over revenue
 - In general: exaggerated expectations on IP monetization.
 - Focus on revenue orthogonal to wide dissemination
- Strategic application domains:
 - Medicine
 - Aerospace
 - Safety
- Defining and monitoring impact

Impact – Medical Applications



2. Open Dissemination

Open, public, free – what is the difference ?

The right tool for the right purpose:

- **Open Access Publications**

<http://library.web.cern.ch/OpenAccess>

- **Open Datasets**

<http://opendata.cern.ch/>

- **Open Source Software**

Examples: Indico, Invenio, Root

- **Open Source Hardware**

Examples: White Rabbit, Data Centre Environmental Sensor

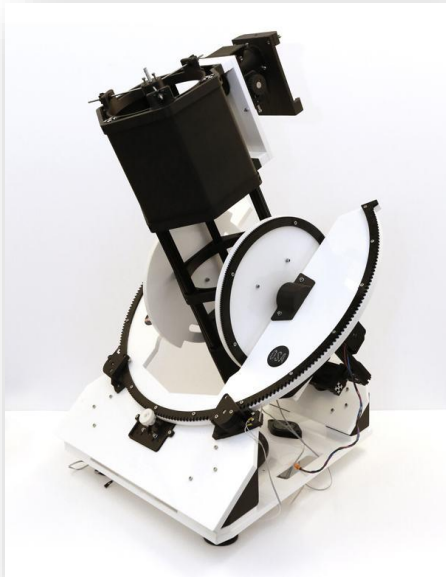
CERN Open Hardware Licence:

<http://www.ohwr.org/projects/cernohl/>



Did you know ?

The following projects have licensed their open designs under CERN OHL:



Example: TIND Technologies

MANAGE, SHOWCASE AND PRESERVE
ALL DIGITAL ASSETS.



UN Library
@UNLibrary

We've selected @T...
Library's Digital Libi...
preserve our digital

Caltech Library
News

Press Release: TIND Technologies [January 4, 2016]

ITU goes live on TIND Library Management System

CERN open source...
professional cloud service.



spin-off

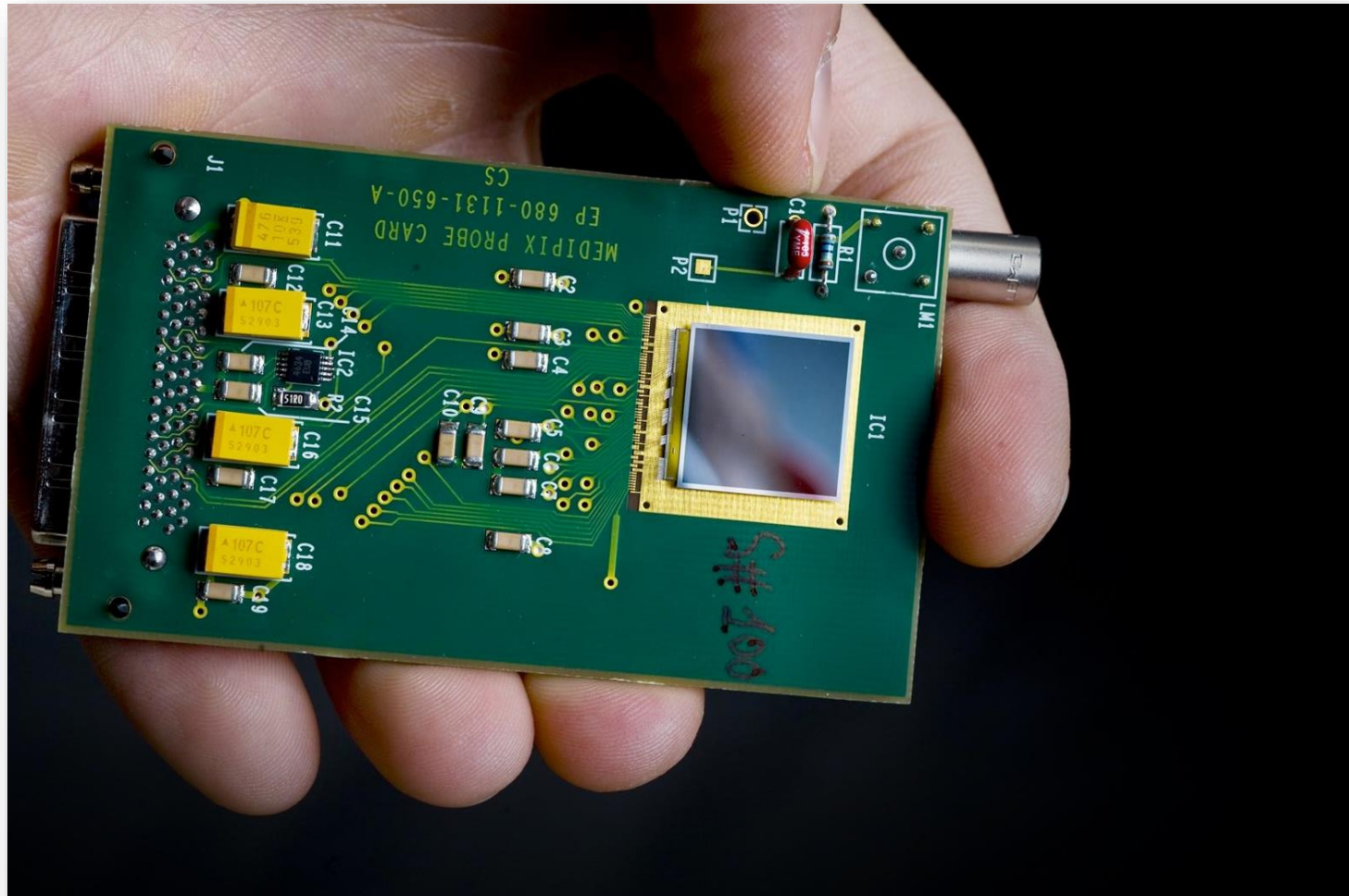
<http://tind.io>



3. Protect only when strictly necessary

- Protection comes at a cost:
 - Patents at financial cost
 - Trade secrets at an organizational cost
- Patents are a poor indicator of innovation
- When is there a benefit ? When dissemination would not happen in absence of either the patent or the trade secret

Example: Medipix



4. CERN's KT Fund

- How to encourage projects for innovative applications outside of HEP ?
- 1/3rd of KT revenues go to CERN's Knowledge Transfer Fund (KT Fund)
- Funding of innovative CERN projects with impact potential outside HEP.
- At least one call per year:
 - ~ 6 Projects
 - ~ From CHF 25k to CHF 200k



Call for Proposals for AIDA-2020 Proof of Concept funding

AIDA-2020 is launching a call for proposals to support collaborative industry-oriented projects, originating within the general field of detector development and testing.

Projects will be selected on a competitive basis to implement actions financed by the Proof-of-Concept fund.

Who can apply?

AIDA-2020 beneficiaries with partners from collaborating institutes and / or industry

What kind of topics?

Innovative detector technologies with potential for societal and industrial applications

How to apply?

<http://aida2020.web.cern.ch/content/poc>

Closing date:

October 20, 2016, 17h00 (CET)

Contact:
AIDA-2020-PoC@cern.ch



KT Fund Examples –

Funded:

Prototype of a hand-held radiation survey meter operable in high magnetic fields



The KT Fund has catalysed the creation of



Off-the-shelf industrial-grade radiation survey meter by a company from a state



KT Fund Examples – Photonic Crystals

Funded:

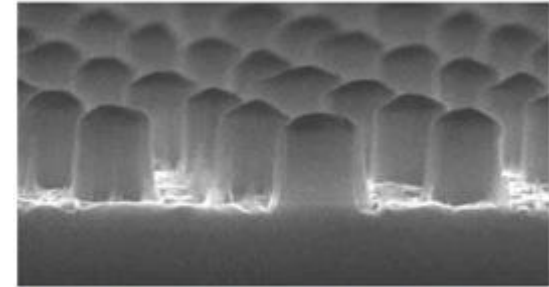
Nanostructuring for improved light extraction from scintillating materials



The KT Fund has catalysed the creation of



An industry-driven collaboration to achieve breakthrough PET scanning performance for breast cancer diagnosis



Si₃N₄ layer nanostructured to produce a photonic crystal



5. Local Business Impact

- CERN Network of Business Incubation Centres (BIC)
- Benefits:
 - Preferential access to CERN technologies
 - 40 hours of consultancy
 - Access to CERN labels
 - Seed funding (through local partner)
- Entrepreneurship Development at CERN



CERN BIC Network today

UK – STFC-CERN BIC

Netherlands – NIKHEF-CERN BIC

Norway – NTNU BIC of CERN Technology

Greece – Technopolis BIC of CERN Technology

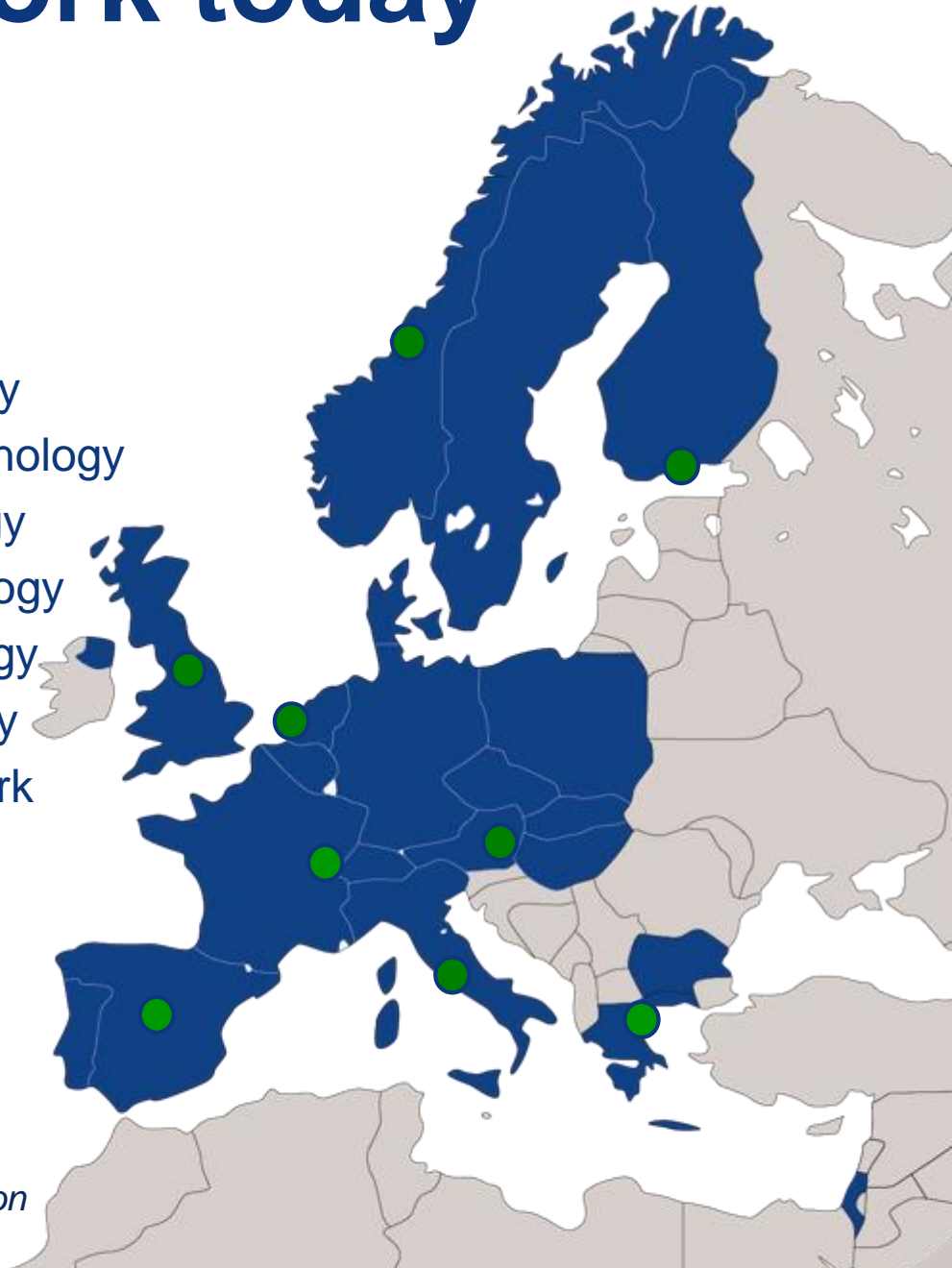
Austria – Austria BIC of CERN Technology

France – InnoGEX BIC of CERN Technology







Finland – Finnish BIC of CERN Technology

Spain – Spanish BIC of CERN Technology

Italy – CERN-INFN R2I Innovation Network



CERN Spin-offs and CERN Technology Start-ups

 <p>TERABEE</p> <p>Sensor technology for drones</p> <p>FR</p>	 <p>AMSTERDAM SCIENTIFIC INSTRUMENTS</p> <p>Medical imaging devices</p> <p>NL</p>
 <p>Cloud-based Library Management</p> <p>NO</p>	 <p>Solar collectors</p> <p>CH/ ES</p>
 <p>Applications of Detectors and Accelerators to Medicine</p> <p>Particle therapy systems for cancer treatment</p> <p>CH</p>	 <p>Oxford nanoSystems</p> <p>Coatings for heat transfer</p> <p>GB</p>

Dispelling a few myths

- Large collaborations and knowledge transfer are incompatible.
- R&D in High Energy Physics is too far from the market.
- Industry is only interested in closed and exclusive access



Technology Transfer Networks





CERN Knowledge Transfer Group

cern.ch/kt

Mail-KT@cern.ch

David.Mazur@cern.ch

Tel. +41 22 767 2623

