cern.ch/knowledgetransfer

CERN Spring Campus

Gijon, April 2014

ACCELERATING INNOVATION

http://knowledgetransfer.web.cern.ch/

Eduardo del Castillo

Outline

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  - Organizational Chart
- Technology Transfer & IP management
  - Impact Driven Innovation Approach
  - CERN Technology Transfer Policy
  - Technology Transfer process
  - CERN technology portfolio
  - CERN areas of expertise
  - Opportunities, external request for support and developments in existing TTcases
  - Patent Portfolio Management
  - Selection of TTcases
  - IP issues to consider before starting a software project

Outline

- Life Sciences
- KT Fund
  - KT Fund
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- Innovation for Business
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  - STFC-CERN BIC
  - CERN OPENLAB
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  - HEP Unix information exchange
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Knowledge Transfer

MISSION

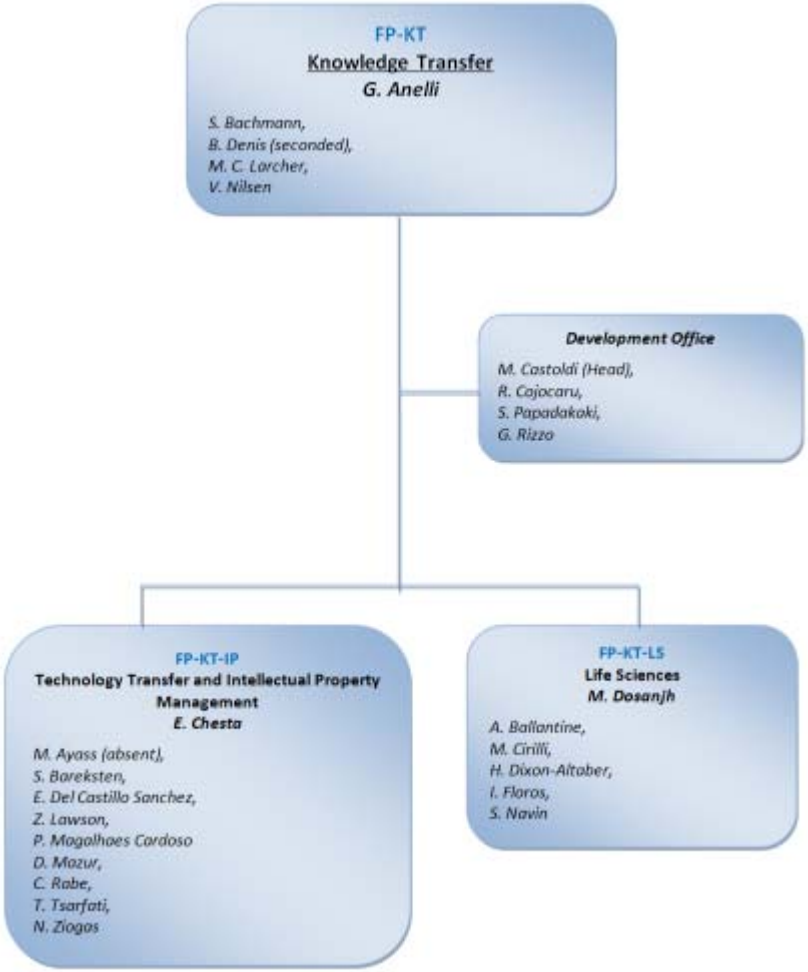
- Optimize the impact of CERN's science, technology and know-how on society

SERVICES

- Support on aspects related to technology transfer and intellectual property management
- Promote design and coordinate multidisciplinary activities relevant to the life science application
- Communicate CERN's positive impact on society
- Promote within CERN culture of inventiveness for technology applications, Knowledge exchange opportunities with CERN's key stakeholders

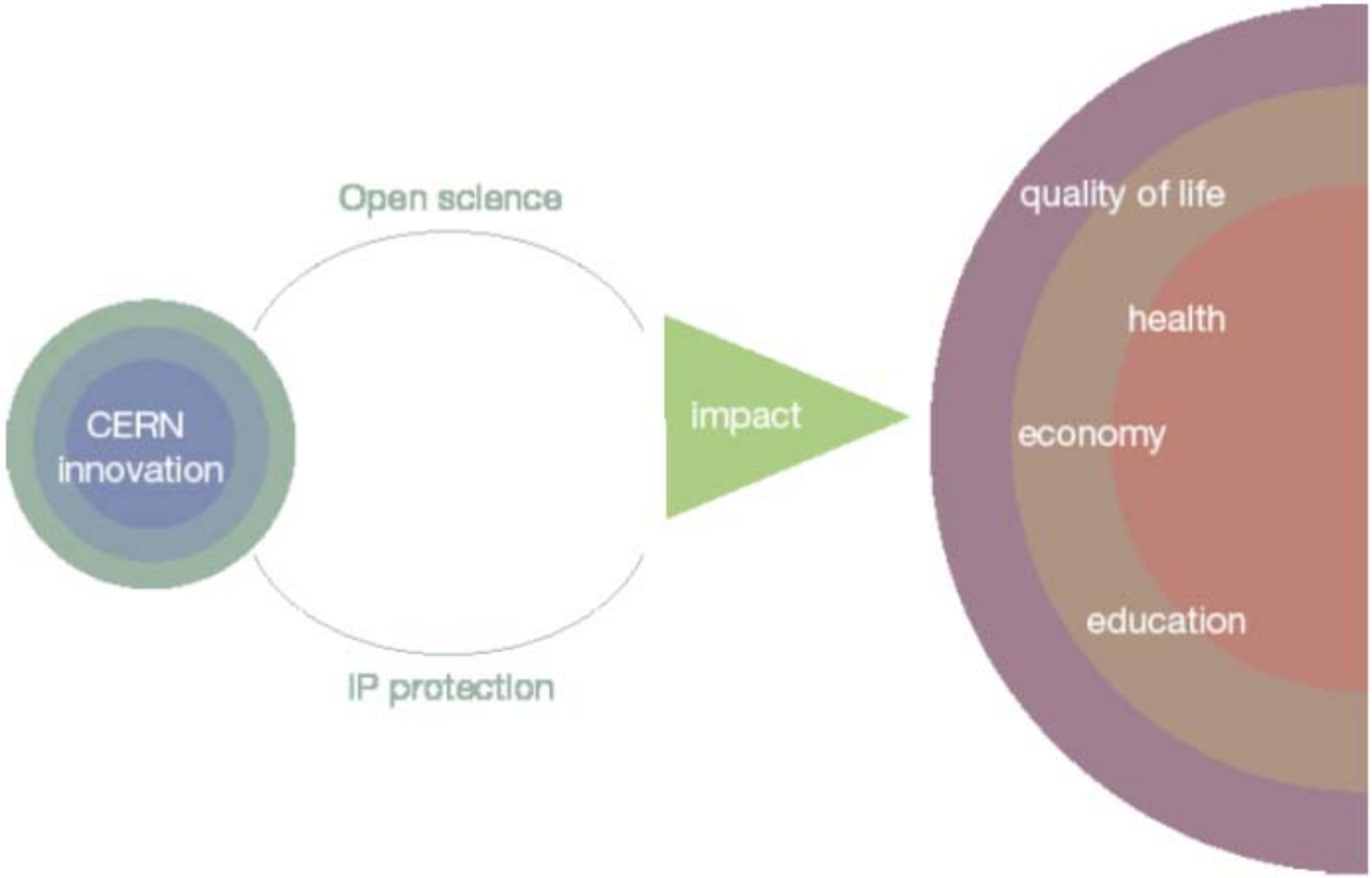
Knowledge Transfer

ORGANIZATIONAL CHART



Technology Transfer & IP Management

IMPACT DRIVEN INNOVATION APPROACH



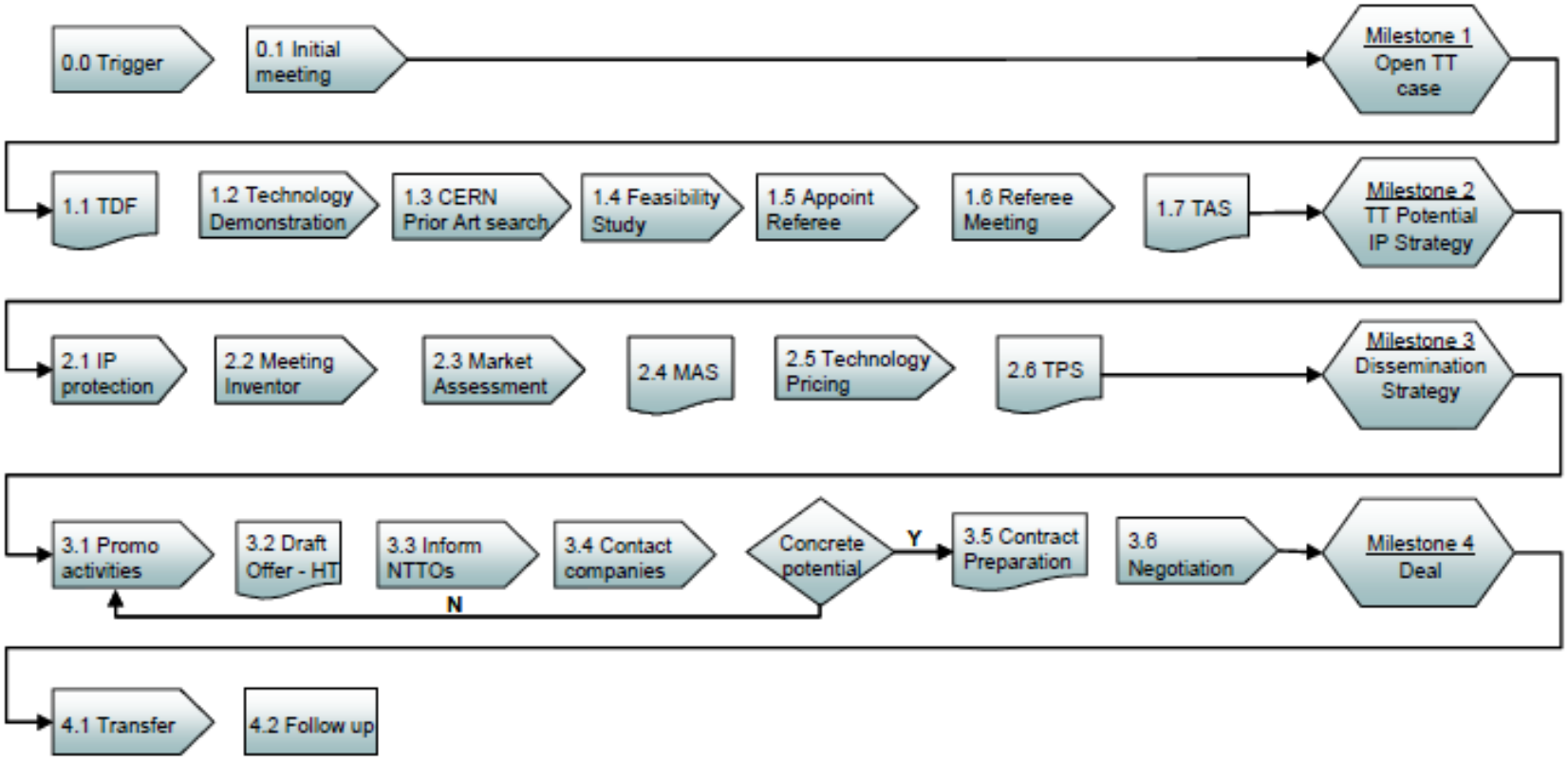
Technology Transfer & IP Management

CERN TECHNOLOGY TRANSFER POLICY

I. Maximize dissemination and visibility of technologies
II. Compatible with collaborative and open research
III. Priority given to CERN's scientific program
IV. Equal opportunities for industry in all CERN Member States
V. Preference for technology transfer to industry in Member States
VI. Avoid impairing the application of the principle of fair competition in future procurements
VII. No military applications
VIII. No competition with industry
IX. No commercial role or responsibilities for CERN
X. CERN doesn not provide warranties or accept liability for the use and commercial exploitation of the transferred technologies

Technology Transfer & IP Management

TECHNOLOGY TRANSFER PROCESS



Technology Transfer & IP Management

IP ISSUES TO CONSIDER BEFORE STARTING A SW PROJECT

1. People involved
2. For every collaborator, does the IP created belong to him/her or the institute?
3. Discuss views of all collaborators about IP and licensing.
   - Is the aim of the project to create a ‘platform’ technology?
   - is it also important to be able to develop specific products based on the core technology?
   - Should it stay entirely proprietary? Due to liability or business reasons?
   - Will it be a service for example on the cloud? Is your license choice compatible with this?
   - Is dual licensing relevant for your project?
   - Give a thought on how much effort you are willing to put in support.

Technology Transfer & IP Management

IP ISSUES TO CONSIDER BEFORE STARTING A SW PROJECT

4. Open source or propietary?
5. Make sure you are not using software which is in conflict with your choices.
6. If you are going to publish code, make sure the right copyright statements are included in your code AND all support material (documentation etc). You should either include the license text in your source or a reference to a LICENCE.txt file containing the license text, which comes with your distribution.
7. Ownership of copyright and giving credits to contribution are not the same thing! You can own all the rights and still give credits to all the contributors. It is more than good practice to give credits where due.

- Make sure you clarify
  - Copyright ownership
  - Licence issues
  - Who all the contributors are
- Before you commercialize anything and as early as possible!!

Technology Transfer & IP Management

CERN TECHNOLOGY PORTFOLIO

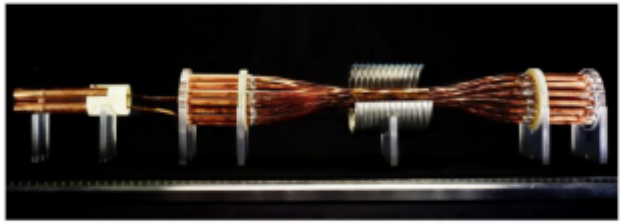
CERN › KNOWLEDGE TRANSFER › TECHNOLOGY TRANSFER OFFICE › INFORMATION FOR EXTERNAL PARTNERS

Knowledge Transfer

Search

Home | Technology Transfer Office | Life Sciences | Our team | Contact us

Technology Portfolio



All CERN technologies listed below are available for licensing and/or research collaborations with industry or institutes.

View all available technologies »

Accelerators, Magnets and Cryogenic Technology

Particle accelerators are devices to accelerate charged particles to very high energies, before bringing them to interaction with fixed targets or to collision with each other in a collider. In a particle accelerator, particles circulate in ultra vacuum tubes, accelerated through high frequency radio cavities and kept in position with high precision using powerful magnet systems. The extreme conditions of the LHC have led to the developments of many breakthroughs in the domains of underlying technologies such as accelerators, magnets and cryogenics and pushed existing technologies to its limits.

Available technologies »

Detectors and Instrumentation

In experimental and applied particle physics, a particle detector, also known as a radiation detector, is a device used to detect, track, and/or identify particles, such as produced by nuclear decay, cosmic radiation, or reactions in a particle accelerator. Radiation detectors are also used to measure the energy of particles. Driven by needs of many different experiments carried out over the last 50 years and in particular for the LHC, CERN today is at the forefront of detector technology development for many different applications inside and outside high energy physics.

Available technologies »

Information for external partners

- Technology Transfer Opportunities
- Technology Portfolio
- CERN Easy Access IP
- CERN Open Hardware Licence
- Contact us

Electronics

Current accelerator systems and particle physics experiments at CERN are extremly challenging in terms of handling huge amounts of data in very short time under tough radiation conditions. In particular for the LHC, that has led to the development of extremly fast radiation sensors and readout electronics, resulting in chip and sensor technologies available for use outside high energy physics such as medical imaging, material research and instrumentation for lifescience.

Available technologies »

Information Technology

Information Technology (IT or ICT) is most essential in modern particle physics. CERN has been the main driving force for many IT developments over the last few decades, such as the handling of huge amounts of data across global networks using GRID technologies and the World Wide Web, without that global economy can't be imagined.

Available technologies »

Materials Science

The multidisciplinary technology context of CERN and the extremly challenging operational conditions of accelerators and physics expirements in particular for the LHC required and still require the development of innovative solutions for the treatment and processing of materials to reach particular properties unachievable with methods available from outside.

Available technologies »

Mechanics

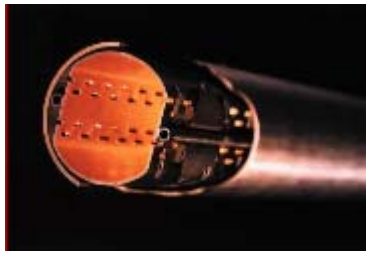
The design and the construction of accelerator elements or components of particle physics experiments in particular for the LHC are often accompanied by the development of specific mechanical systems or tools that provide also solutions for many engineering problems outside high energy physics.

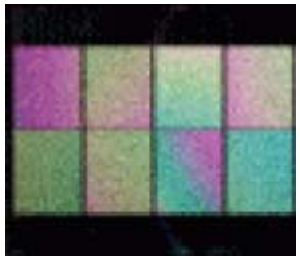
Available technologies »

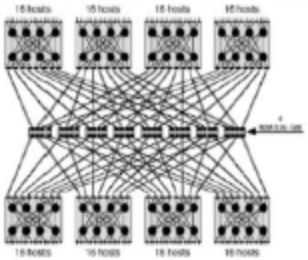
Technology Transfer & IP Management

CERN AREAS OF EXPERTISE

1. Beam Physics
2. Cooling and Ventilation
3. Cryogenics
4. Electrical power converters
5. High and ultra-high vacuums
6. High-performance detectors
7. High-performance materials: development and Characterization
8. High precision mechanical processes and measurements
8. Industrial controls and simulations
9. Large-scale distributed computing and data management
10. Magnets
11. Microelectronics
12. Radiofrequency Technology
13. Software Development
14. Superconductivity
15. Surfaces and coatings

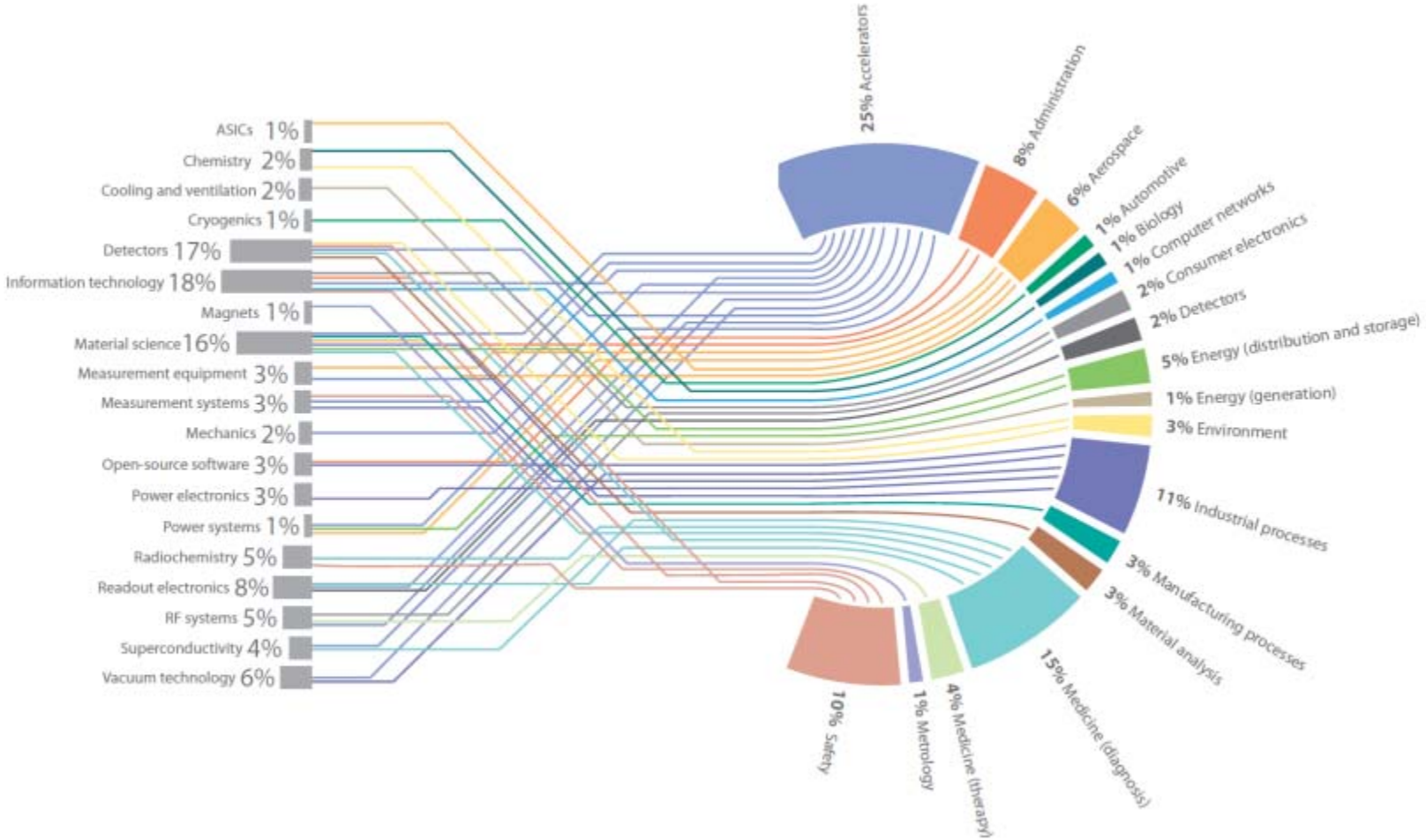






Technology Transfer & IP Management

OPPORTUNITIES, EXTERNAL REQUESTS & DEVELOPMENTS IN EXISTING TTCASES



Technology Transfer & IP Management

PATENT PORTFOLIO MANAGEMENT

Name	Priority date	Type	Owner(s)	Inventors
A wall-less electron-multiplier assembly	22/03/2013	PCT	CERN	Vladimir Peskov Antonello Di Mauro Rui De Oliveira Philippe Breuil
Apparatus and method for determining a dose of ionizing radiation	04/04/2013	EP	CERN	Helmut Vincke Julia Brigitta Trummer
A detector configuration with semiconductor photomultiplier strips and differential readout	07/05/2013	PCT	CERN (75%) INFN (25%)	Crispin Williams
AC-current-induced quench protection system	28/06/2013	EP	CERN	Emmanuele Ravaioli Glyn Kirby Vladimir IvanovichDatskov
A detector and method for detecting ultraviolet radiation	31/07/2013	PCT	CERN	Vladimir Peskov Paolo Martinengo Philippe Breuil
A molybdenum-carbide/carbon composite and manufacturing method	31/10/2013	PCT	CERN (50%) Brevetti Bizz (50%)	Alessandro Bertarelli Stefano Bizzaro

Table 1: New patent families - applications filed in 2013

Technology Transfer & IP Management

PATENT PORTFOLIO MANAGEMENT

Name	Geography	Filing date
HELIX NEBULA	Europe [Community trademark]	24.10.2013
INDICO	Europe [Community trademark]	23.08.2013
	Switzerland	28.08.2013
	USA	03.09.2013
ZENODO	Europe [Community trademark]	23.08.2013
	Switzerland	28.08.2013
	USA	03.09.2013

Table 2: New trademarks – applications filed in 2013

Name	Geography
Readout circuit for use in a combined PET-CT apparatus	USA
A method of manufacturing a gas electron multiplier	Japan
	USA
Nanostructured target for isotope production	Europe
Pixelated radiation-sensing device	USA
Capacitive-spreading readout board	USA

Table 3: National patents granted in 2013

Technology Transfer & IP Management

PATENT PORTFOLIO MANAGEMENT

Name	Geography
Multifunctional detector for measuring characteristics of beam of particles or radiation	France UK Switzerland
Klystron amplifier	Japan
Evacuable flat-plate solar collector	Ecuador
Detector-readout interface for an avalanche particle detector	EP
Installation for cryogenic cooling for superconductor device	Germany France
Method for making a multilayer module with high-density printed circuits (MCML sur Kapton)	France
Thermally insulatable vessel	Germany and France - family abandoned
Waveguide vacuum valve	France - family abandoned

Table 4: Patents abandoned in 2013

Technology Transfer & IP Management

PATENT PORTFOLIO MANAGEMENT

Project/Technology name	Dep.	IP assessment type
Relative-humidity sensors based on FOS	PH	Prior art search
Switch for ultra-high vacuum, low temperature and strong magnetic field	BE	Prior art search
New sensor for low temperatures	PH	Prior art search
Helix Nebula - The Science Cloud	IT	Similarity search word report
CLIQ – Coupling-loss-induced quench	TE	Prior art search
Indico	IT	Similarity search word report
GEMPix	DGS	Prior art search
Zenodo	IT	Similarity search word report
Collimator material - molybdenum-carbide base	EN	Prior art search
Innovative wideband amplifier topology	BE	Prior art search
Molten fluoride-salt targets	EN	Prior art search
Medical RFQ development at CERN	BE	Freedom to operate assessment

Table 5: IP assessments performed in 2013

Technology Transfer & IP Management

AGREEMENTS SIGNED

Technology	Type of agreement	Type of partner	Country
ActiWiz software	2 Licence agreements	Academic	DE, CH
Mounting mechanism for cantilever with high-precision positioning	Licence agreement	Academic	IT
Electromagnetic pulse-forming applied to niobium	Collaboration agreement	Commercial	FR
Fast beam-current transformer	Collaboration agreement	Commercial	FR
Fast digital integrator (FDI)	Amendment to licence agreement	Commercial	CH
GEM	3 Licence agreements	Commercial	US, KR, IN
GEM	Licence agreement	Academic	CN
GEM	Intellectual property rights assignment	Academic	FR
Hadron therapy	Partnership agreement	Academic	AT
Hadron therapy	Partnership agreement	Commercial	CH
Large monolithic SiPMs with differential readout	Co-ownership agreement	Academic	IT
Medipix2	3 Licence agreements	Commercial	NL, CZ
Medipix2	Research & development contract	Commercial	NL
MicroScint	Collaboration agreement	Academic	CH
NEG	Service & consultancy agreement	Commercial	US

Technology Transfer & IP Management

AGREEMENTS SIGNED

Technology	Type of agreement	Type of partner	Country
NEG	Licence agreement	Academic	SE
New etching method for GEM manufacturing	3 Licence agreements	Commercial	US, KR, IN
New etching method for GEM manufacturing	Licence agreement	Academic	CN
Augmented reality and ICT	ATLAB partnership agreement	Academic	GR
Augmented reality	ATLAB partnership agreement	Commercial	FR
Radiation sensors for health and environment	ATLAB partnership agreement	Commercial	FI
Radiation sensors for health and environment	ATLAB partnership agreement	Academic	DE
Openlab educational services	Service and consultancy agreement	Commercial	CH
Photonic crystals	Collaboration agreement	Commercial	FR
Root software	Service and consultancy agreement	Academic	BE
Standard and radiation-hard optical fibres	Collaboration agreement	Commercial	NL
Vidyo monitoring system	Service agreement	Commercial	CH
Scalable readout system (SRS)	Co-ownership agreement	Academic	ES, RO
Collimator material	Co-ownership agreement	Commercial	IT

Technology Transfer & IP Management

SELECTION OF TTCASES

VIDYO MONITORING SYSTEM

- Videoconferencing system used by CERN's users and experiments as official collaboration tool
- Point-to-point calls or multipoint videoconference meetings
- Desktop machines, tablets, smartphones, specially equipped meeting rooms and from traditional phone lines
- Developed by Vidyo Corporation in close collaboration with CERN
- CERN's requirements pushed Vidyo to develop new solutions and increase the robustness of existing ones
- In addition to this product CERN IT developed a dashboard for displaying important service metrics and a monitoring system, which has attracted the interest of several Vidyo users.

Technology Transfer & IP Management

SELECTION OF TTCASES

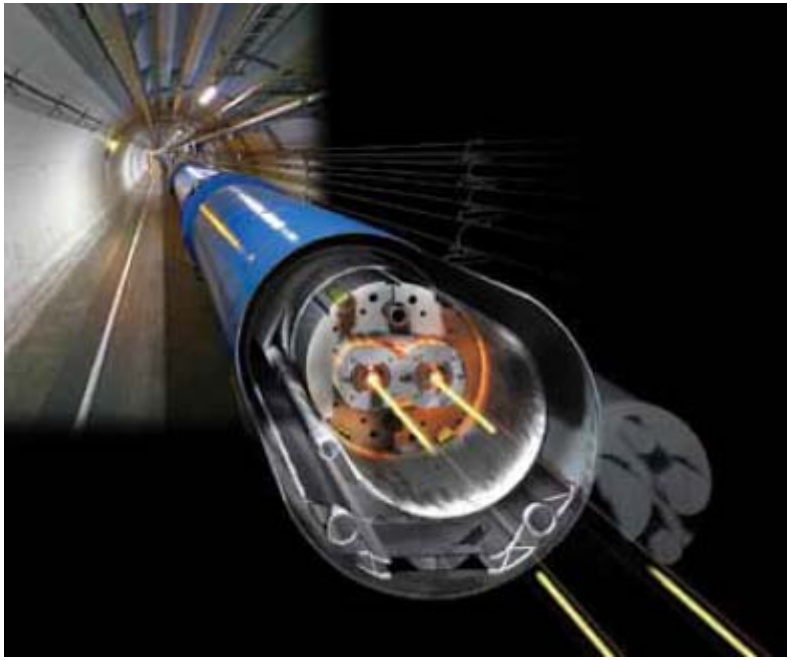
BLOG FOREVER

- Collaborative project funded by EC to develop a new system to harvest, preserve, manage and reuse blog content.
- The project ran from 2011 to 2013 coordinated by Aristotle University of Thessaloniki.
- CERN's IT department coordinated the software developments
- The software platform makes use of Invenio digital library technology.
- Some of the project partners continue to develop the concept further and actively work to deploy the technology outside the scientific community

Technology Transfer & IP Management

SELECTION OF TTCASES

ROXIE



- electromagnetic simulation and optimization of accelerator magnets.
- Used for conceptual design, electromagnetic optimization, interfacing with structural mechanics and thermal calculations, technical drawing and quality assurance during production.
- This SW is used in 20 HEP related institutes worldwide
- KT group currently handling several new enquiries for ROXIE licenses

Life Sciences

- Life Science section catalyse opportunities for collaboration under the unbrella of ENLIGHT
- ENVISION and ULICE projects were both extended;
- the ENTERVISION training network was selected as a gold project by the European Commission to promote the Horizon 2020 programme
- PARTNER project published many results
- Dissemination and communication of CERN's activities in life sciences

KT Fund

KT FUND

CERN › KNOWLEDGE TRANSFER › TECHNOLOGY TRANSFER OFFICE › INFORMATION FOR THE CERN COMMUNITY

Knowledge Transfer

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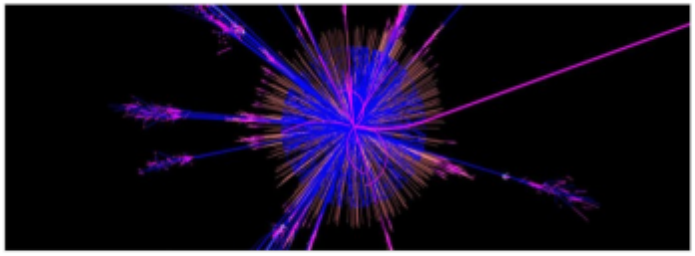
KT Fund



The Knowledge Transfer Group has introduced a fund to support and develop knowledge transfer activities at CERN.

Eligibility

In order to be considered for funding, projects should meet the following conditions:

- The project proposal must be approved by the Department Head;
- The salary cost of staff members involved in the project are covered by the Department;
- The project is based on a CERN technology;
- The Intellectual Property (IP) required to execute the project is owned or co-owned by CERN and there is no conflict over the IP required to execute the project.

Information for the CERN community

- Technology disclosure
- CERN IP-TT Policy
- The KT Fund
  - Selection process
  - KT funded projects
- FAQ
- Who to contact

How to submit a project

Projects proposals must be submitted to the KT Fund committee using the KT fund submission form covering the following elements:

Project description:

- The CERN technology on which the project is based
- Deliverables
- Schedule and key milestones
- Organization (roles and responsibilities, key competencies)
- Overall financial planning and requested budget

Market potential or user community:

- Field of application
- Competing technologies
- Identified and/or potential commercial partners, identified user community

Project holders may request the support of KT experts in market analysis and to help assess the dissemination potential of the related technology.

To request support, please write to KT-Fund@cern.ch

In 2014 two KT Fund Selection Committee Meetings will be held:

- **04 April 2014 (submission deadline 26 March)**
- **22 October 2014 (submission deadline 01 October)**

Questions

If you have any question, please contact the KT Group at: KT-Fund@cern.ch

KT Fund

NEW PROJECTS 2013

RECOMMENDATION SYSTEM FOR THE INVENIO DIGITAL LIBRARY SOFTWARE

- The project aims at transferring in-depth know-how of the Invenio software to a technical student who will then be hired by the newly created company TIND Technologies.

- TIND technologies sells services around the open source software Invenio. It was created following of the technology screening weeks of the students of the NTNU in Norway

Innovation for Business

CERN EASY ACCESS IP

CERN › KNOWLEDGE TRANSFER › TECHNOLOGY TRANSFER OFFICE › INFORMATION FOR EXTERNAL PARTNERS

Knowledge Transfer

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CERN Easy Access IP

CERN Easy Access IP is a new opportunity to benefit of CERN's Intellectual Property.

The scheme involves making some of CERN's technologies available free of royalties, released only to partners who can best develop them to benefit the economy and society.
If you would like to know more about CERN Easy Access IP or other technology transfer opportunities, please contact CERN's Technology Transfer Office.

The following technologies are available under the CERN Easy Access IP scheme:

Information for external partners

- Technology Transfer Opportunities
- Technology Portfolio
- CERN Easy Access IP
- CERN Open Hardware Licence
- Contact us

3D Magnetic sensor calibrator

This is an innovative device for calibrating magnetic field with high resolution. The technology measures all three axes of the magnetic field, by performing a scan over the full unit sphere, independent of its orientation relative to the magnetic field.

[read more]

RF Waveguide Vacuum Valve

This device enables low-loss RF power transmission in a waveguide across a gap, where a liftable instrument is positioned.

[read more]

Thermally insulatable vessel

The Thermally insulatable vessel is a simple container system for hot substances, incorporating a temperature display within the vessel's cap or lid.

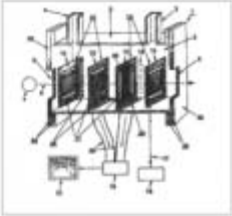
The key element in this technology is an integrated infra-red thermometer developed with Micro-Electro-Mechanical systems on a common silicon substrate through micro fabrication technology.

[read more]

Multifunctional detector

A multifunctional, versatile position-sensitive detector for measuring characteristics of a beam of particles.
The technology consists of a microwire-based monitor that allows measuring non-destructively the spatial profile, divergence, and intensity of UV, x-ray, and charged particle beams, including anti-particles.

[read more]



Cryogenic optical fiber temperature sensor

The technology consists in a simple and relatively cheap cryogenic temperature sensor, composed of an optical fiber and a Brillouin spectral analyzer for measuring one or more temperature dependent Brillouin scattering parameters.

[read more]

Easy Access IP was first trialled by Easy Access Initiative, a collaborative project between the University of Glasgow, King's College London and the University of Bristol.

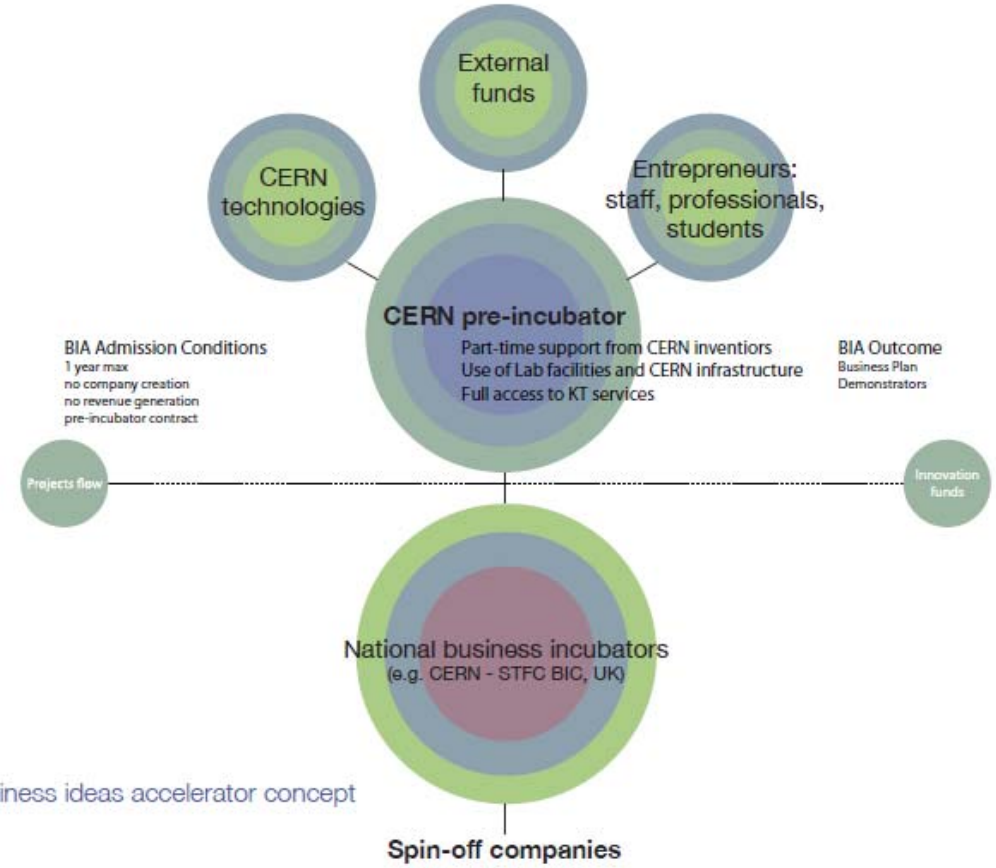
CERN Easy Access IP Exclusive Licence agreement
CERN Easy Access IP Non-Exclusive Licence agreement

Innovation for Business

SCIENCE-BUSINESS WORKSHOP ON ADVANCED MATERIALS AND SURFACES

Innovation for Business

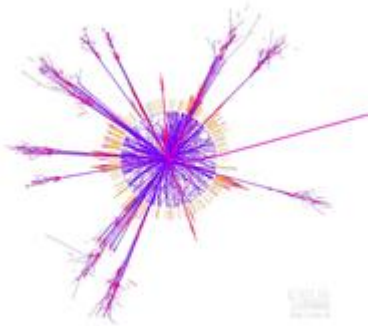
BUSINESS IDEAS ACCELERATOR



CERN Business ideas accelerator concept

Innovation for Business

STFC-CERN BUSINESS INCUBATION CENTRE



- £40000 of total funding for use on intellectual property protection, design, prototyping, market studies, …
- Access to up to 40 hours of CERN and 40 hours of STFC scientists and technical expertise.
- Use of CERN intellectual property and favourable conditions
- Access to collaboration and networking opportunities at the Sci-Tech Daresbury science and innovation campus and through the STFC and CERN networks
- Wider access to potential sources of financial support through STFC's links with venture capitalists and funding bodies.

Innovation for Business

CERN OPENLAB

- £40000 of total funding for use on intellectual property protection, design, prototyping, market studies, …
- Access to up to 40 hours of CERN and 40 hours of STFC scientists and technical expertise.
- Use of CERN intellectual property and favourable conditions
- Access to collaboration and networking opportunities at the Sci-Tech Daresbury science and innovation campus and through the STFC and CERN networks
- Wider access to potential sources of financial support through STFC's links with venture capitalists and funding bodies.

Innovation for Business

HELIX NEBULA

- Particle physics confronted with acquiring, analysing and storing an enormous quantity of data.
- To meet this big data challenge CERN is collaborating with other institutes and industry
- In 2012 CERN in collaboration with the European Molecular Biology laboratory (EMBL), the European Space Agency (ESA) and with leading IT providers launched “Helix Nebula – the Science Cloud: big science teams up with big business”
- At CERN Helix Nebula is being tested using ATLAS simulation software with a plan to extend the testing to other experiments in the future supported by a European Commission project

Knowledge Sharing

CERN OPEN SOURCE SOFTWARE

- Lack on how the intellectual property derived from software produced at CERN could be protected.
- CERN needed to protect itself against misappropriation of its work.
- In 2011 Open Source Software License (OSL) Task force established for recommendations on which license should be used for which class of software developed at CERN
- The OSL task force delivered its recommendations in January 2012.
- Consistent with the CERN convention
- The policy of management of IP in TT activities regarding software expresses preference for open source approach for CERN-owned software.
- Statement acknowledging the copyright of CERN and other owners, applicable license and CERN's special status as governmental organization
- Which open source license to use depends upon the SW was developed solely by CERN or in collaboration with partners and whether it makes use of third party software.
- For software developed solely by CERN, copyleft is the default license

Knowledge Sharing

HEPIX

- Workshop series to bring together technical managers and providers of IT services from the HEP laboratories, institutes and universities.
- BNL, CERN, DESY, FNAL, IN2P3, INFN, JLAB, NIKHEF, RAL, SLAC, TRIUMF and many others.
- HEP-specific disciplines around scientific high-throughput and data intensive distributed computing
- Forum for exchanging information, discussing ideas in an early inception phase, identifying common needs and agreeing on common technical directions.
- Workshops less formal, allowing for more open and constructive exchanges.
- CERN participants have usually provided 15 to 25% of the contributions to any given workshop

Knowledge Transfer Activities overview

Spain

Eduardo del Castillo

Roxie

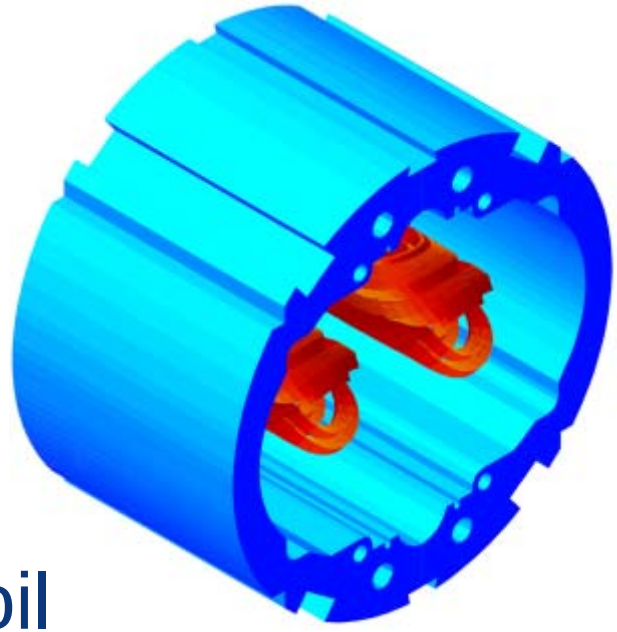
Routine for the

Optimization of magnet

X-sections,

Inverse field calculation and coil

End design



ROXIE model of the LHC main dipole extremities

Licenses to:

- CIEMAT
- Consorcio ESS Bilbao

CDS – CERN Document Server

INDICO

- For planning meetings, workshops, or conferences, and to store minutes

INVENIO

- Digital library or repository system

Service & Consultancy agreements:

- Universidad de Zaragoza
- Universitat Autònoma de Barcelona

Knowledge Sharing under FP7

- 7th Framework Programme for Research and Technological Development
- CERN has taken part in 23 and coordinated 10 FP7 projects with partners from Spain
- These projects have had 34 unique Spanish participants involved in one or more projects, with CSIC as the most active participating in 12 projects

SEVENTH FRAMEWORK PROGRAMME

Knowledge Sharing under FP7

Examples of FP7 projects coordinated by CERN

Knowledge Sharing under FP7

European NoVel Imaging Systems for ION therapy

The Cooperation project aims to develop solution for better monitoring and treatment planning for hadron therapy, such as:

- Real-time non invasive monitoring
- Quantitative imaging
- Precise determination of delivered dose
- Fast feedback for optimal treatment planning
- Real-time response to moving organs
- Simulation studies

CSIC and Universidad de Castilla La Mancha are part of ENVISION

Knowledge Sharing under FP7

AIDA

Advanced European Infrastructures for Detectors at Accelerators

AIDA aims to upgrade, improve and integrate key European research infrastructures and develop advanced detector technologies for future particle accelerators

The project has over 80 institutes and laboratories involved, 37 of which are beneficiaries

CSIC and Universidad de Barcelona are beneficiaries in AIDA

Knowledge Sharing under FP7

Enhanced European Coordination for Accelerator Research & Development

EuCARD-2 is an Integrating Activity Project (IAP) for coordinated R&D on Particle Accelerators. It will contribute to positioning European accelerator infrastructures at the forefront of global research.

The project has 40 partners from 15 European countries, including Russia.

CSIC is a partner in EuCARD-2