



[cern.ch/knowledgetransfer](https://cern.ch/knowledgetransfer)

# RD51 mini week

CERN, June 2014

## Accelerating Innovation

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

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# Outline

- Knowledge Transfer
  - Mission
  - 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
- KT Fund
- Example: Scalable Readout System



# Knowledge Transfer

## MISSION

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

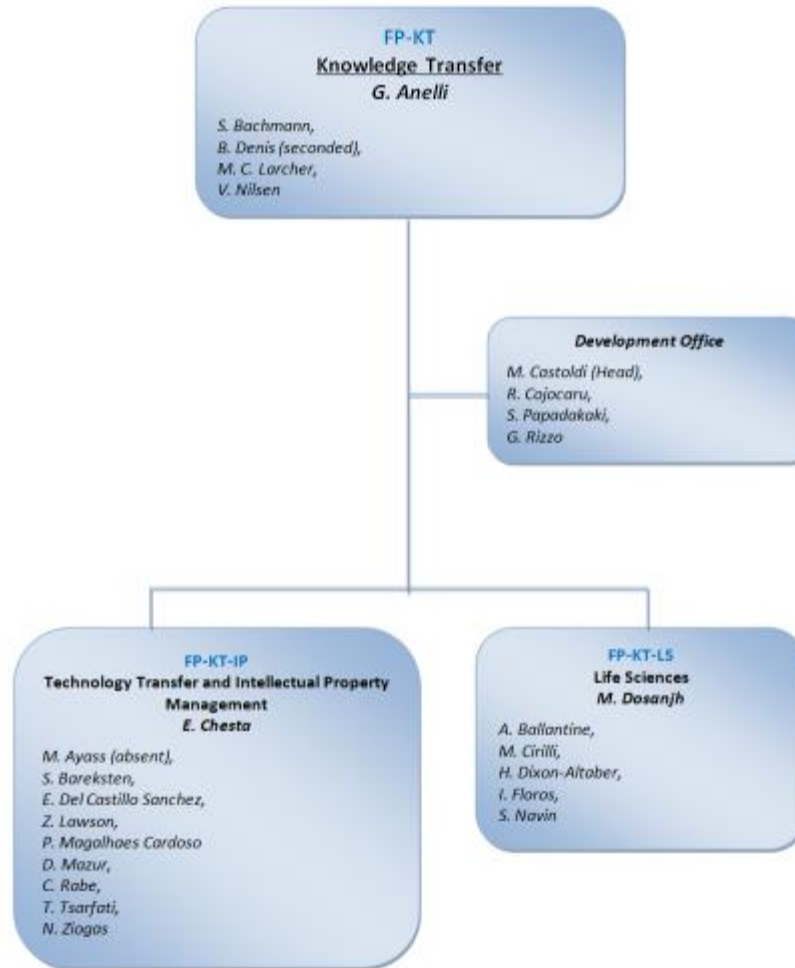
## SERVICES

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



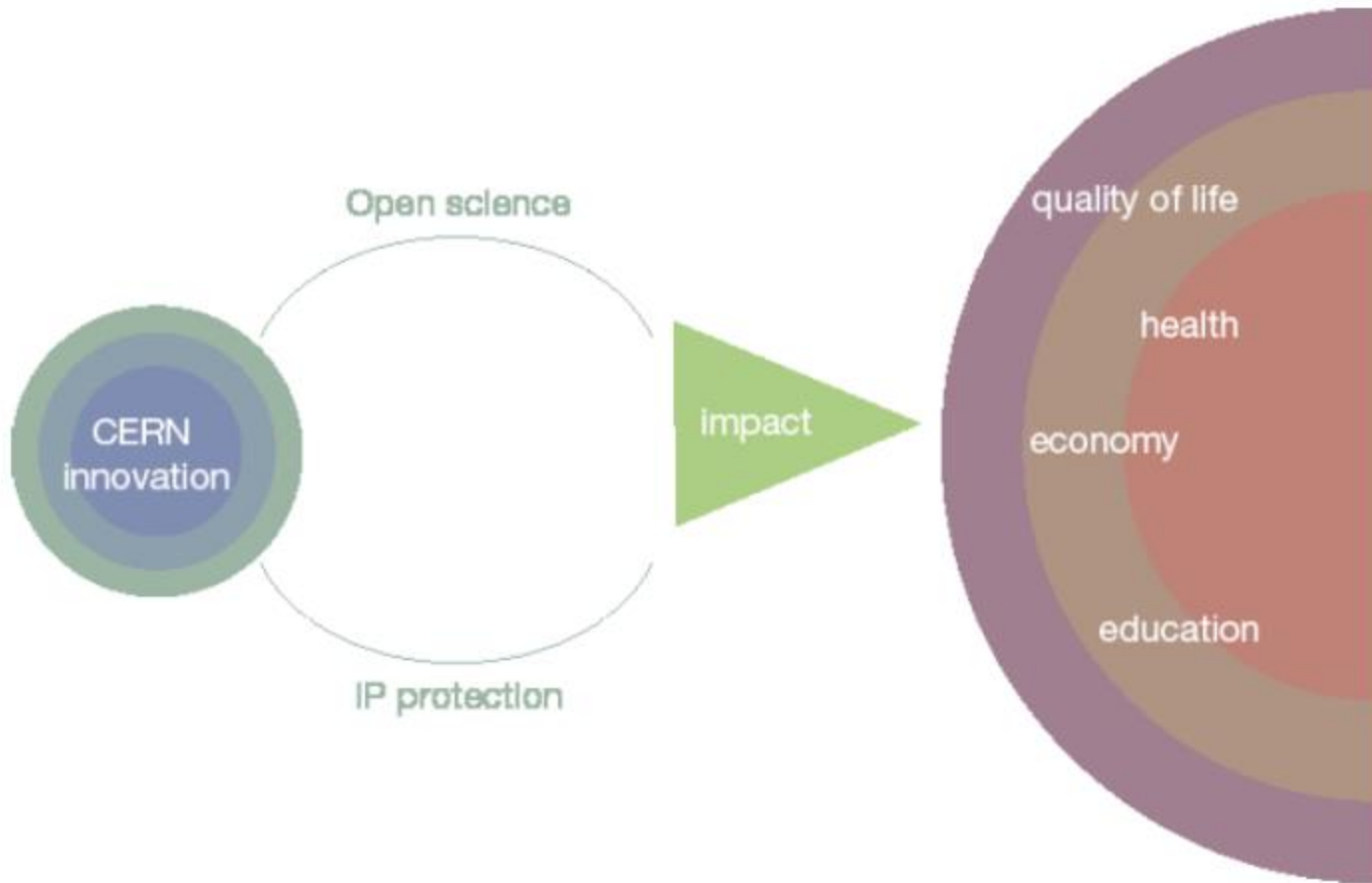
# Knowledge Transfer

## ORGANIZATIONAL CHART



# Technology Transfer & IP Management

## IMPACT DRIVEN INNOVATION APPROACH



# Technology Transfer & IP Management

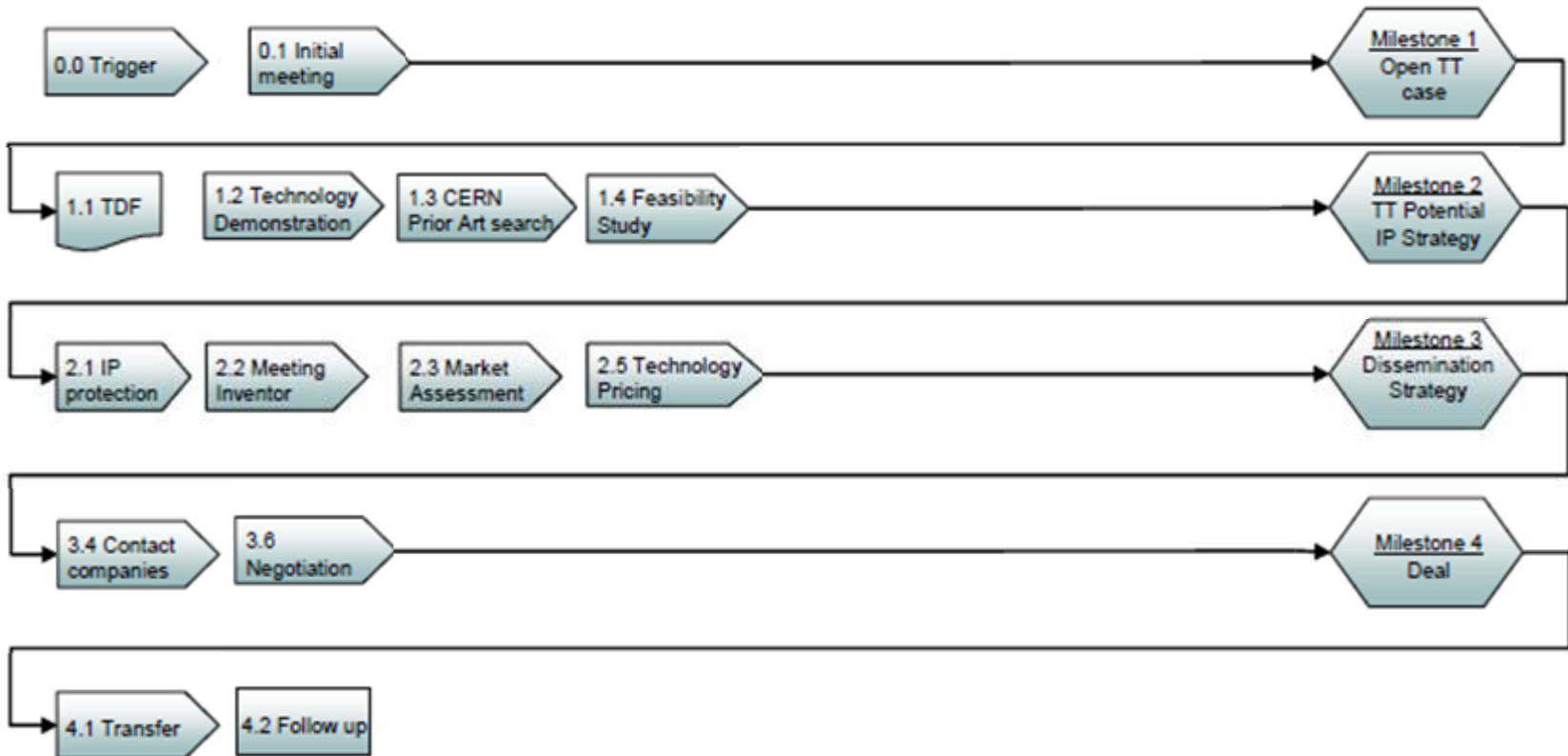
## CERN TECHNOLOGY TRANSFER POLICY

- 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. No military applications
- VII. No competition with industry
- VIII. No commercial role or responsibilities for CERN
- IX. CERN does 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

## CERN TECHNOLOGY PORTFOLIO

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

### Knowledge Transfer

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### Technology Portfolio



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

[View all available technologies >](#)

#### Information for external partners

[Technology Transfer Opportunities](#)  
[Technology Portfolio](#)  
[CERN Easy Access IP](#)  
[CERN Open Hardware Licence](#)  
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#### 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 >](#)

#### Electronics

Current accelerator systems and particle physics experiments at CERN are extremely 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 extremely 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 life science.

[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 extremely challenging operational conditions of accelerators and physics experiments 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.

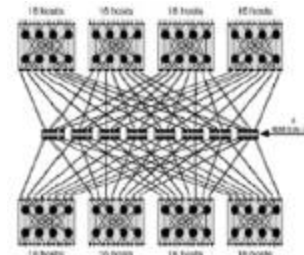
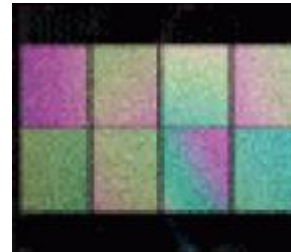
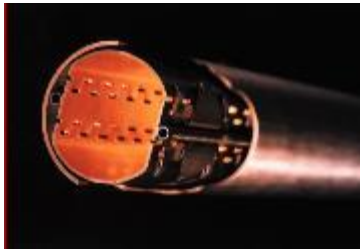
[Available technologies >](#)



# Technology Transfer & IP Management

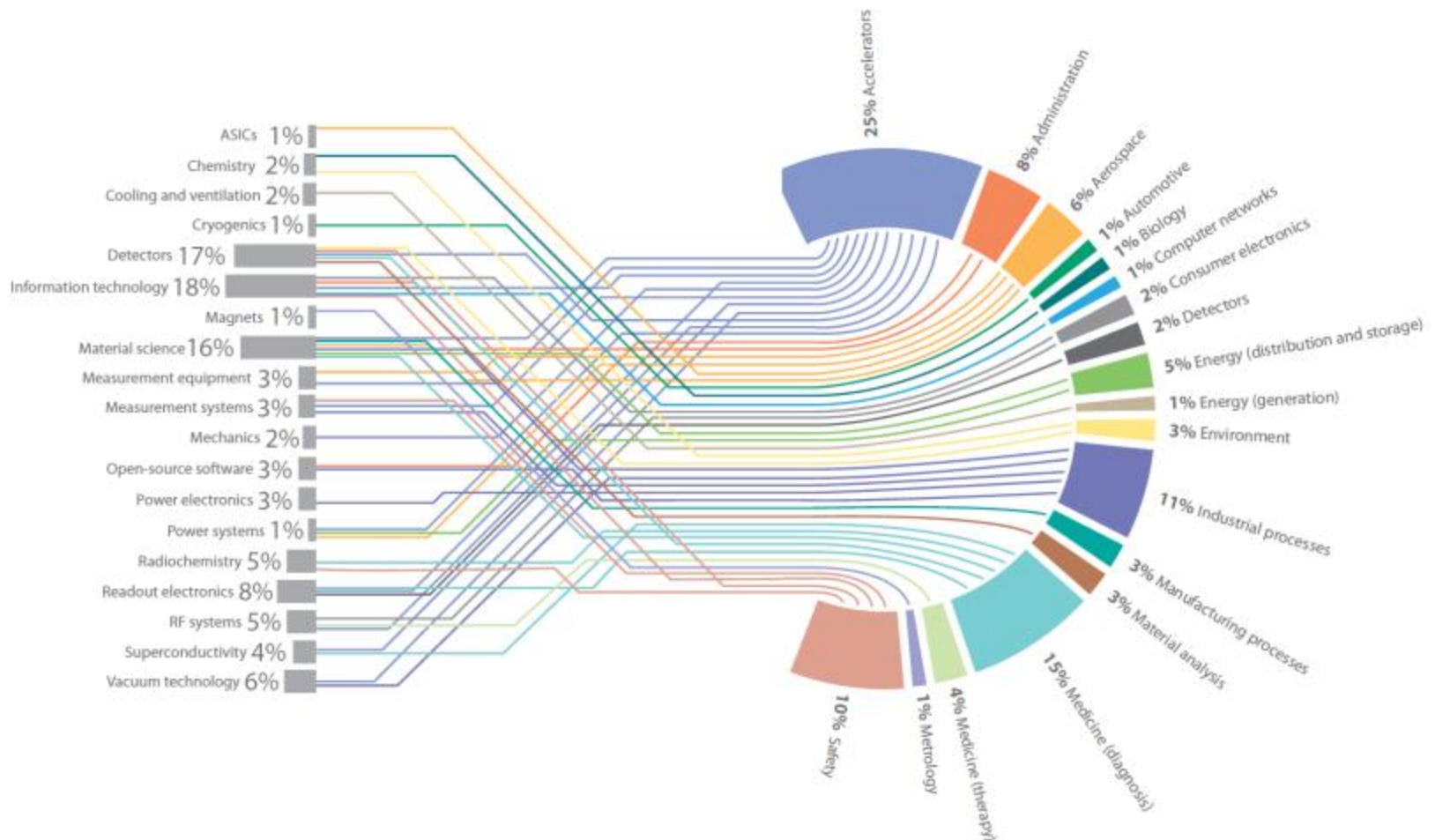
## CERN AREAS OF EXPERTISE

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
Evacuatable 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



# KT Fund

## KT FUND

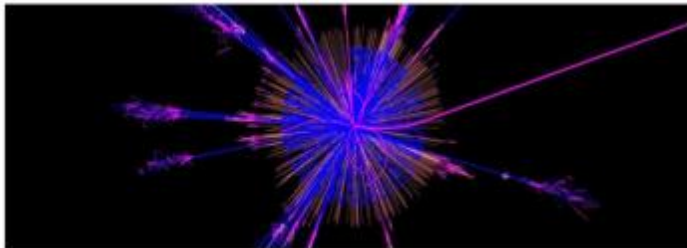
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## Knowledge Transfer

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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](mailto: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](mailto:KT-Fund@cern.ch)



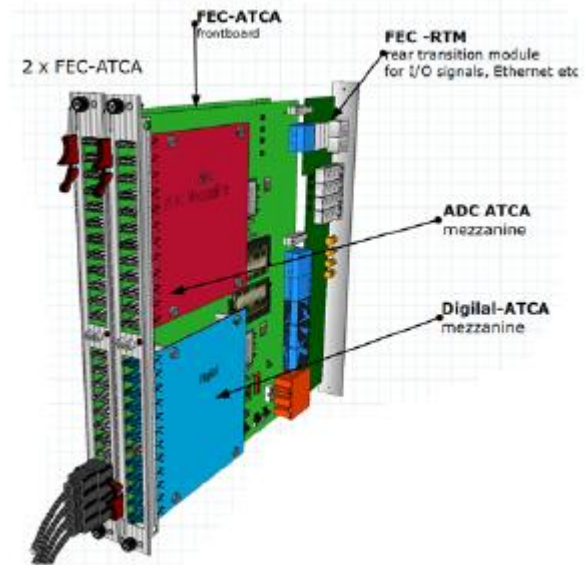
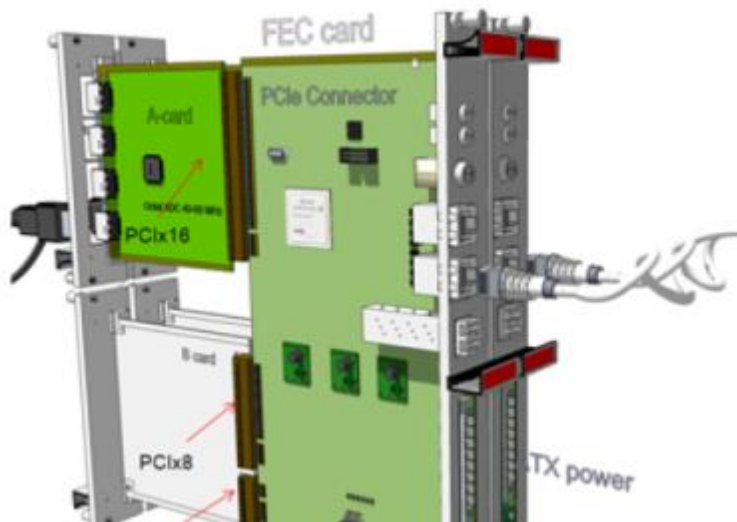
# Example: Scalable Readout System

- Development of a portable multichannel data acquisition system
- Alleviate a basic problem of detectors R&D
  - easy-to-use electronics with associated readout system at affordable cost
- small and large-scale physics applications with a mix of detectors can be based on a compact readout system
- SRS was targeted for low channel cost and minimal size for desktop applications

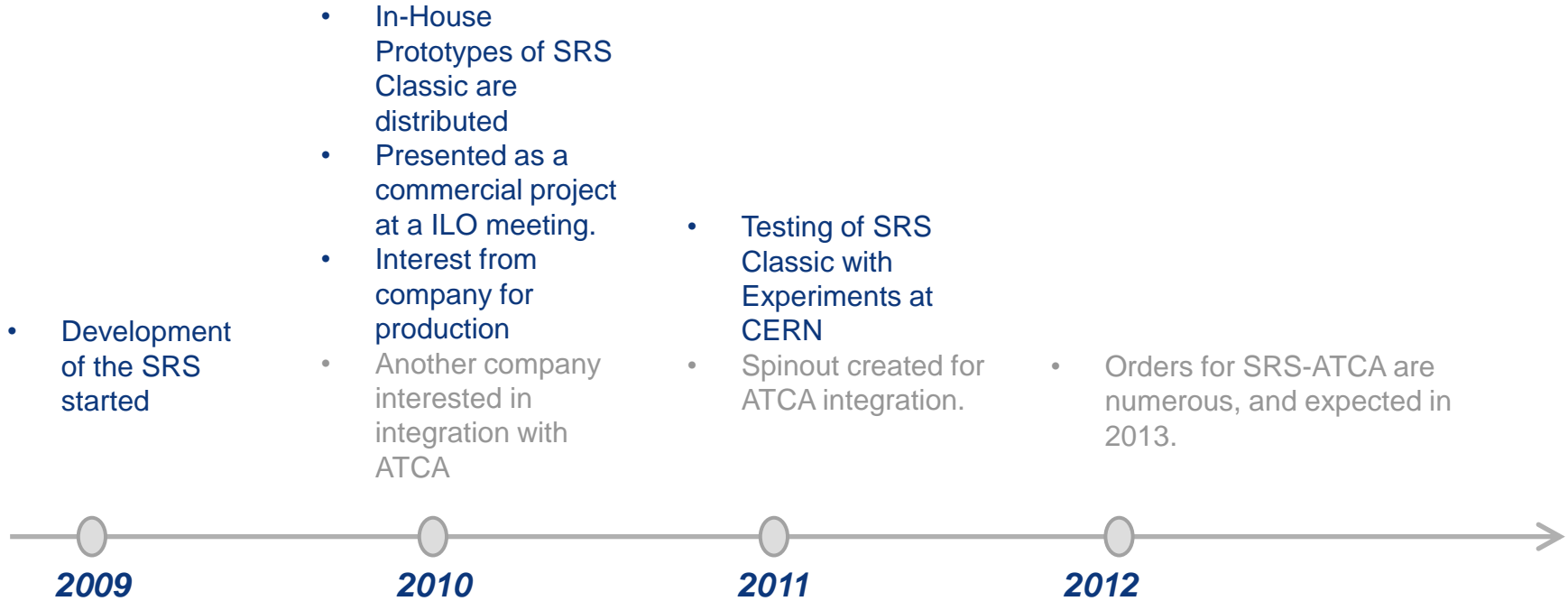


# Example: Scalable Readout System

- Readout ASICs interconnected via chip-links to a crate-based SRS layer
- Pcle interface via Gigabit speed lines to a common Front End Card (FEC)
- Readout of up to 2k ( 6k for ATCA ) channels of 128-channel ASICs.
- One SRS slice is autonomous
- Different detector-specific front end ASICs
- Scalable Readout Unit



# Example: Scalable Readout System



# Example: Scalable Readout System

- Company interested in commercialization of SRS-ATCA
- RD51 and HEP community
  - Major client base
  - Source future developments
- Other possible markets to be explored
- Co-Ownership and Exploitation Agreement
- Draft of license on the SRS IP required for SRS-ATCA



# Questions

