A review of Technology Transfer at CERN

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Education and Technology Transfer Division

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Technology Transfer Activities - Introduction

CERN has a long tradition of Technology Transfer

March 1999:
FC/4126, basis for TT policy
Focus on IPR, licensing and TT projects
Technology Advisory Board, TAB

June 1999:
Council approved new Division -
Education and Technology Transfer - ETT
An Essential Aim: to broaden the scope of TT at CERN

March 2002:
Finance Committee: Technology Transfer AT CERN: status&policy
First results based on the new TT policy.
TT Vectors

Technology Transfer through:

- People
- Purchasing.
- Collaborative development agreements.
- Patents and licensing.
- TT projects.
- Start-ups.
- Services and Consultancy.
- Standardization and Benchmarking.
- Partnership.
- Topical Conferences and CERN schools.
Technology Transfer Structure

Director-General

Directorate

Director TT &...

Tab

ETT

All other Directors

All other Divisions

Internal network TT
Technology Description in the TT Database

CERN Technologies

CERN Technologies that can be transferred to industry or to external institutions are listed in this section. It is not an exhaustive list but it contains the most important ones. Technologies that have been already transferred to industry are listed as well. Different domains of Technologies are covered: Electronics, Mechanics, Software, Accelerators, Vacuum. Use the "Search and Sort" command in the left side, to specify your criteria for finding the desired technology that could fit with your particular interests.

Different levels of information access are foreseen. Use the login command from the main menu to get the privileges that have been assigned to you. Only CERN users with a valid "EDM" account can get advantage of this.

New technologies can be added to the existing ones by consulting the competed Technology Transfer sections: Service, New Technologies.
Distribution of Technologies listed in the Database

160 technologies are currently listed in the Technology Transfer Database
TT Process

HEP technology

Can be transferred

Via

Generates

Generates

R&D project

Collaborative Transfer Agreements

Can lead to

Transfer to

Industry

Start-ups

Can be transferred

Patent

Know-How

Open Sourcing CopyRights

License

Domain technology

Can be transferred

Technology

Industry

Can be transferred
Stages in development of technologies and projects

Phase 1
R&D for HEP Research → HEP Applications → HEP Money

Phase 2
R&D Applied to Specific Domains → Prototype, Demonstrator, Industry Interest → TT & Industry Money

Phase 3
Products, SME or SMI creation → Industry Money
CERN Favored domains of TT

Information Technology
Energy (Solar, Nuclear)
Medical Imaging
Hadron Therapy
Electronics
Material technologies

=> CERN TT is currently handling 54 technology transfer cases
Present status (54 TT cases)

A: R&D for HEP Research;
B: HEP Applications;
C: R&D Applied to Specific Domains;
D: Industry Interest (Prototype, demonstrator, license);
E: Products, SME and SMI Creation
TT in brief Mar. 1999 - Feb. 2002

Patents

20 patents in the CERN portfolio

Licenses

2 license agreements in 2000
16 license agreements in 2001

Collaborative Transfer Agreements

86 Collaboration Agreements in 1999-2000
12 Collaborative Transfer Agreements in 1999-2000
74 Collaboration Agreements in 2001 - Feb. 2002
38 Collaborative Transfer Agreements in 2001 - Feb. 2002

Start-ups

5 since 2000: IT (3), pharmacology (1), micro-electronics (1)

R&D Projects

11 projects since 2000 (FC/4386)
Examples of Patenting

A Cryogenic Optical Fibre Temperature Sensor  
(CERN & EPFL; W. Scandale, L. Thevenaz & M. Facchini)  (filed in UK, May 2001)

Standard optical fibre used to measure temperatures down to 1.4 K by mean of Brillouin scattering. Very cheap method. A single fibre can replace thousands of measuring points.

A PET Scanner  (CERN; P. Lecoq) (filed in UK and USA, June 2001)

Use of a new high-sensitivity crystal, LuAP or LuYAP to a dual layer PET camera  
⇒ provides greater image sharpness.
Examples of Licensing

Neutron Driven Element Transmuter (*CERN, C. Rubbia*)

Exclusive license to three European companies (Belgium, Italy, Spain).

Bath Electropolishing of Titanium and method to use it (*CERN, J. Guerin*)

The invention concerns a bath composition for electropolishing of a non-alloyed titanium metal surface.

Broker ⇒ Turbines blades & spectacle frames & orthopaedic.

Pumping Device by Non Vaporisable Getter and method to use it (*CERN, C. Benvenuti*)

Flat screen displays, Cathode Ray Tubes, energy transportation, energy generation

Non exclusive license for accelerating chambers granted to two companies (France, Italy). Discussion in progress with two other companies.

Other applications in study
Example of R&D Projects

CRYSTAL CLEAR

The Crystal Clear Collaboration was set-up in 1990, in the framework of R&D for the LHC detectors. It aims to develop new inorganic scintillators involving world experts in different aspects of material sciences.

Currently the CC collaboration is aiming to develop PET scanners comprising a plurality of scintillators, mainly lutetium based crystals, in particular LuAP.

Recently a license has been given to a German company for building Small animal PET scanners.
**Background:**
A personalised Web Search-Engine was developed within the framework of a Doctoral Studies at CERN. This comprises a large range of Knowledge Management applications.

**Present situation:**
- Intellectual Property issues settled up in K769/ETT;
- Software tool ready for validation, by the end of March 2002 at CERN;
- First contacts with incubators done, in the country of developer’s choice;
- Beginning of commercialization phase in 3 months time;
Partnership Main Domains

GRIDS

HADRON THERAPY
Partnership - Schematic Layout of the PIMMS (Proton Ion Machine Medical Study) Design
LIBO

3 GHz proton LINac BOoster for cancer treatment

High Energy Physics original development:
Particle and ions accelerator technology

Main properties:
Compact design
Low cost
Reduced commissioning operation and maintenance
Distribution of costs and revenue

Estimated costs and revenue for 2002
Science and Technology

• There is a deficit of people's knowledge of science.

  "We have arranged a global civilization in which most crucial elements profoundly depend on science and technology. We have also arranged things so that almost no one understands science and technology. This is a prescription for disaster. We might get away with it for a while, but sooner or later this combustible mixture of ignorance and power is going to blow up in our faces..."  
  
  Carl Sagan

• Governments should support effective strategies for the dissemination of information on Science and Technology (Education and Communication).

• Both governments and scientists should promote the application of scientific knowledge into tangible benefits for the Society (Technology Transfer).

  OECD, UNESCO.
R&D PROJECTS

CRYSTAL CLEAR (photon detection by using new scintillating materials).

MEDIPIX (pixel detectors for photon counting applications).

ISPA Camera (Hybrid Photodetector Tubes).

COMPTON CAMERA (electronic collimation using Compton effect).

LIBO (Linac Booster to transform cyclotrons in higher energy accelerators to treat deep seated tumours).

GRIDS (a new vision of how to harness and exploit truly distributed Computing).

CRISTAL (Distributed and integrated data management System).

PIMMS (Accelerator design for proton/ion medical therapy) (set at least a hadron therapy project going in Europe with CERN participation).

Incineration of long lived Nuclear Wastes (Energy Amplifier) and production of isotopes etc.
<table>
<thead>
<tr>
<th>TITLE</th>
<th>Ownership</th>
<th>Comments</th>
<th>Status</th>
<th>Licensing</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Thermal Management Device and Method of Making such a Device</td>
<td>CERN + Queen Mary and Westfield College, University of London</td>
<td>Initially filed in UK (8-Jul-98) with title: &quot;A Thermal Management Board&quot; PCT (8-jul-99)</td>
<td>PCT in National phase</td>
<td>Proceeding</td>
</tr>
<tr>
<td>Radiation detector of very high performance and planispherical parallax-free X-ray imager comprising such a radiation detector</td>
<td>CERN</td>
<td>Initially two patents in USA: 1) Radiation detector of very high performance. 2) PLANISPHERICAL PARALLAX-FREE X-RAY IMAGER BASED ON THE GAS ELECTRON MULTIPLIER. Actually both are used for the PCT extension in JP, CA &amp; Europe</td>
<td>PCT in National phase</td>
<td>Proceeding</td>
</tr>
<tr>
<td>Coquille de reniflage</td>
<td>CERN</td>
<td>France, 15-dec-1999. PCT requested.</td>
<td>PCT in International Preliminary Examination phase</td>
<td>Proceeding</td>
</tr>
<tr>
<td>Cryogenic Monolithic Semiconductor Detector</td>
<td>CERN + Université de Bern, Laboratorium für Hochenergie Physik</td>
<td>Initially filed in United Kingdom, 01-Jul-1999; PCT word coverage filed on July 3, 2000 with title: &quot;A Monolithic Semiconductor Detector&quot;</td>
<td>PCT filed: answering to objections from EPO</td>
<td>Proceeding</td>
</tr>
<tr>
<td>Polissage électrochimique titane</td>
<td>CERN</td>
<td>Initially filed in France, 25-jun-1999; COMPOSITION DE BAIN POUR LE POLISSAGE ELECTROLYTIQUE DU TITANE, ET SON PROCEDE D'UTILISATION; PCT requested on June 20, 2000 with title &quot;BATH COMPOSITION FOR ELECTROPOLISHING OF TITANIUM AND METHOD FOR USING SAME&quot;</td>
<td>PCT in National phase</td>
<td>Proceeding</td>
</tr>
<tr>
<td>Pumping device by non-vaporisable getter and method for using this getter (Neg Surfacique)</td>
<td>CERN</td>
<td>Initially filed in France, 19-jun-1996 (refered by PLASSERAUD as &quot;Neg Surfacique&quot;); world PCT on June 18, 1997. French title &quot;DISPOSITIF DE POMPAGE PAR GETTER NON EVAPORABLE ET PROCEDE DE MISE EN OEUVRE DE CE GETTER&quot;</td>
<td>PCT in National phase</td>
<td>Proceeding</td>
</tr>
<tr>
<td>Arrangement and method for improving vacuum in a very high vacuum system (Catalyseur surfacique)</td>
<td>CERN</td>
<td>Initially filed in France, 26-feb-1997; title &quot;AGENCEMENT ET PROCEDE POUR AMELIORER LE VIDE DANS UN SYSTEME A VIDE TRES POUSS&quot; (refered by PLASSERAUD as Catalyseur surfacique); world PCT</td>
<td>PCT in National phase</td>
<td>Proceeding</td>
</tr>
<tr>
<td>Neutron-Driven Element Transmuter</td>
<td>CERN</td>
<td>Initially filed on 19-jun-1997. All PCT contracting countries.</td>
<td>PCT in National phase</td>
<td>YES</td>
</tr>
<tr>
<td>Device and method to measure a short radiation pulse or an electric pulse</td>
<td>CERN + CEA</td>
<td>Initially filed in France 22-jan-1988, with title &quot;DISPOSITIF ET PROCEDE DE MESURE D'UNE IMPULSION BREVE DE RAYONNEMENT OU D'UNE IMPULSION BREVE ELECTRIQUE&quot; PCT requested and actually France, Germany, Suisse, Liechenstein, USA are maintained.</td>
<td>Granted.</td>
<td>No</td>
</tr>
<tr>
<td>Tete + support interchargeables</td>
<td>CERN</td>
<td>18-apr-2000 France</td>
<td>PCT filed on 12-April-2001</td>
<td>Proceeding</td>
</tr>
</tbody>
</table>

Juan Antonio Rubio
Review of TT at CERN
June 2002
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<table>
<thead>
<tr>
<th>Invention Description</th>
<th>Owner/Inventor</th>
<th>Details</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiation tolerant NMOS device</td>
<td>CERN</td>
<td>UK 21-Dec-2000 with title &quot;NMOS layout structure for radiation tolerance&quot;</td>
<td>Filed</td>
</tr>
<tr>
<td>Cryogenic Optical Fibre Temperature Sensor using Brillouin Scattering</td>
<td>CERN+EPFL</td>
<td>May 2001, UK</td>
<td>Filed</td>
</tr>
<tr>
<td>High Sensitive Crystal in Dual Layer Positron Emission Tomography Camera.</td>
<td>CERN</td>
<td>UK &amp; USA, priority date: 26-6-2001, UK Patent Application N. 0115596.9, USA Patent Application N. 09/892,201</td>
<td>Filed</td>
</tr>
<tr>
<td>Cathode for producing intense modulated one or multichannel electron beams</td>
<td>RIEGE</td>
<td>23-Nov-89 Germany with title &quot;KATHODE ZUR GROSSFLAECHIGEN ERZEUGUNG VON INTENSIVEN, MODULIERTEN EIN- ODER MEHRKANAL-ELEKTRONENSTRAHLEN&quot;</td>
<td></td>
</tr>
<tr>
<td>PET SCANNER</td>
<td>Paul Lecoq</td>
<td>Patent filed in UK and USA</td>
<td>Filed</td>
</tr>
<tr>
<td>Flowmeter</td>
<td>Michel Bosteels</td>
<td>Prior art found by the IPR group (similar invention already patented) The inventor will try to improve his invention and we will contact again the Patent Attorney.</td>
<td>being filed</td>
</tr>
<tr>
<td>Device for calibration of magnetic sensors in three dimensions</td>
<td>Felix Bergsma</td>
<td>First draft sent to the German patent attorney for considerations and feedback.</td>
<td>being filed</td>
</tr>
<tr>
<td>Multi Chip Module Lamin</td>
<td>Rui De Oliveira</td>
<td>Sent to the French Patent attorney for the filing procedure</td>
<td>being filed</td>
</tr>
<tr>
<td>MONOPIX</td>
<td>Pierre Jarron</td>
<td>Sent to the UK Patent attorney for the filing procedure. Final draft of the patent by Monday 3/Dec/01</td>
<td>being filed</td>
</tr>
<tr>
<td>Micropump for cryogenic fluids</td>
<td>CERN: Steffen Grohmann Tapio Niinikoski ILK: Ralf Herzog Eberhard Wobst HNP: Gerald Voegel</td>
<td>Agreement ready for approval. Patent will be requested by ILK</td>
<td>being filed</td>
</tr>
<tr>
<td>Cryogenic cooling unit</td>
<td>CERN: Steffen Grohmann Tapio Niinikoski ILK: Ralf Herzog Eberhard Wobst</td>
<td>Agreement ready for approval. Patent will be requested by ILK</td>
<td>being filed</td>
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