A review of Technology Transfer at CERN

Juan Antonio Rubio
Education and Technology Transfer Division

Paris, June 2002

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

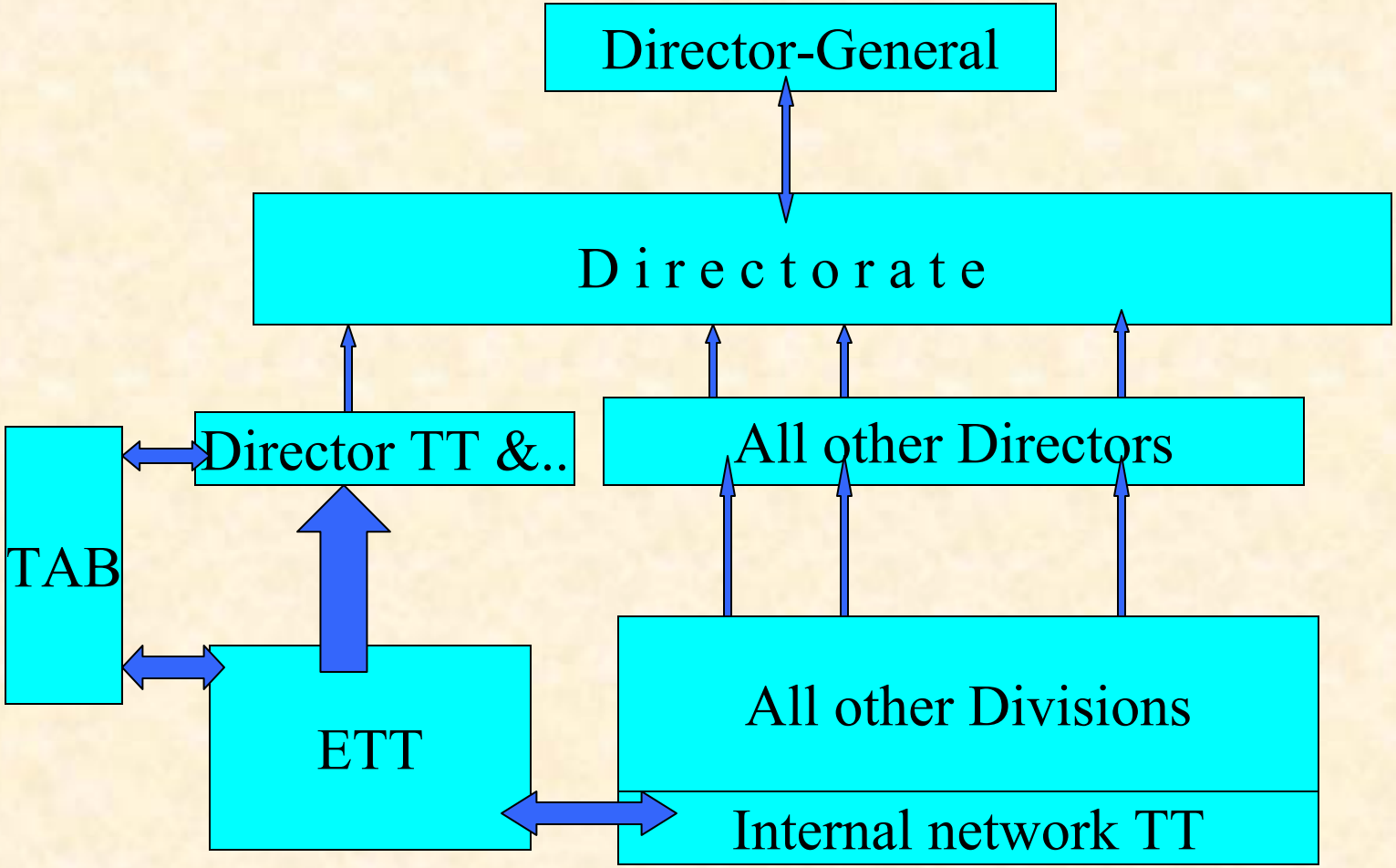
First results based on the new TT policy.

TT Vectors

Technology Transfer through:

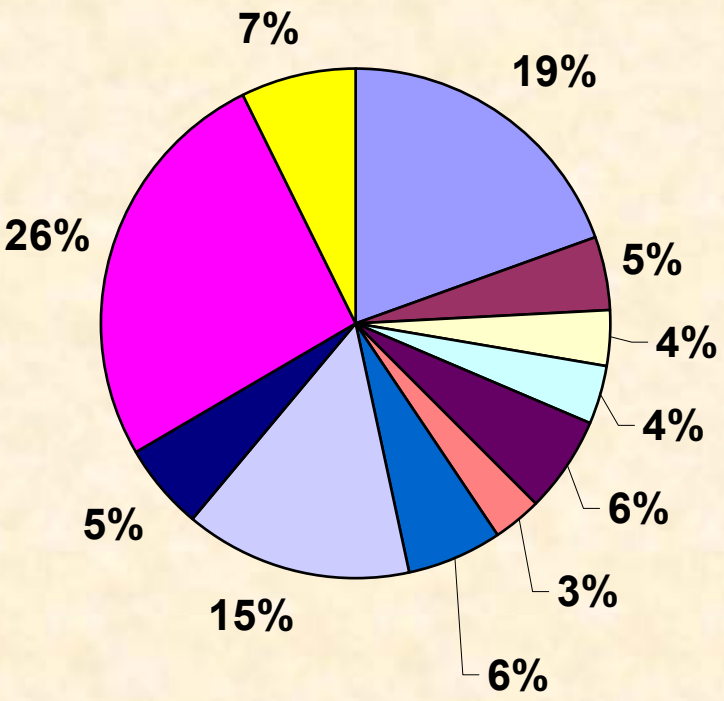
- People
- Purchasing.
- Collaborative development agreements.
- Patents and licensing.
- TT projects.
- Start-ups.
- Services and Consultancy.
- Standardization and Benchmarking.
- Partnership.
- Topical Conferences and CERN schools.

Technology Transfer Structure



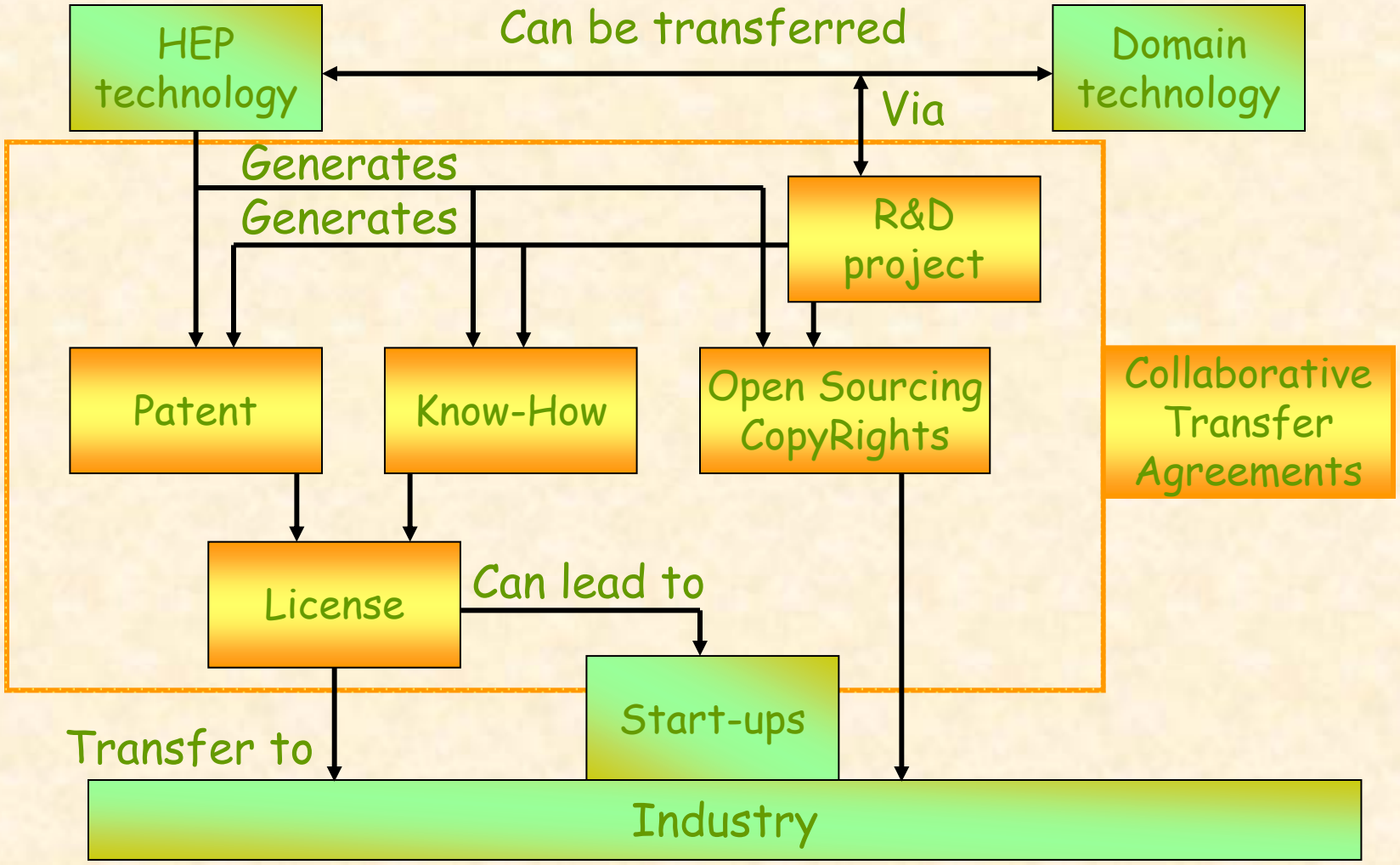
Technology Description in the TT Database

Distribution of Technologies listed in the Database

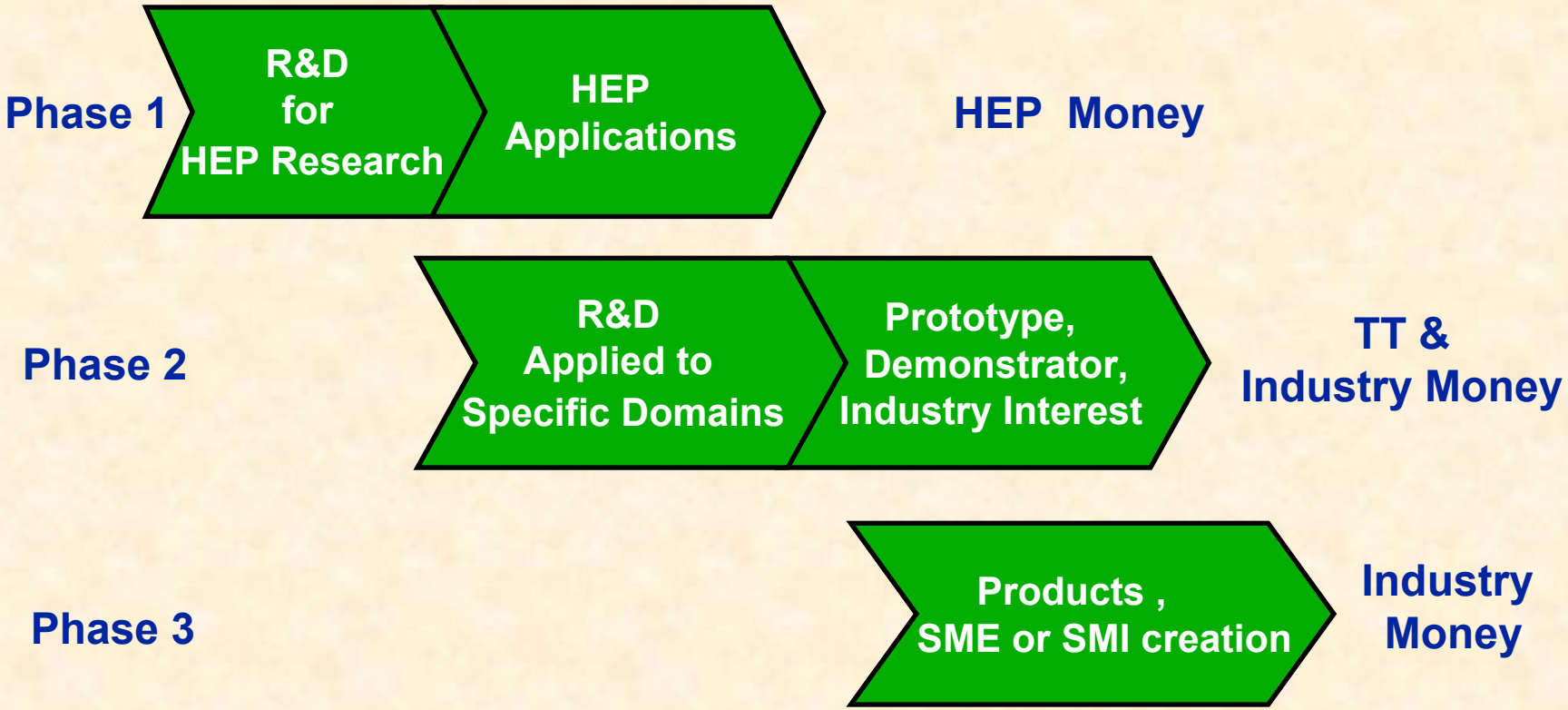


160 technologies are currently listed in the Technology Transfer Database

TT Process


HEP technology
Can be transferred
Domain technology
Via
Generates
Generates
R&D project
Patent
Know-How
Open Sourcing CopyRights
Collaborative Transfer Agreements
License
Can lead to
Start-ups
Transfer to
Industry

Stages in development of technologies and projects

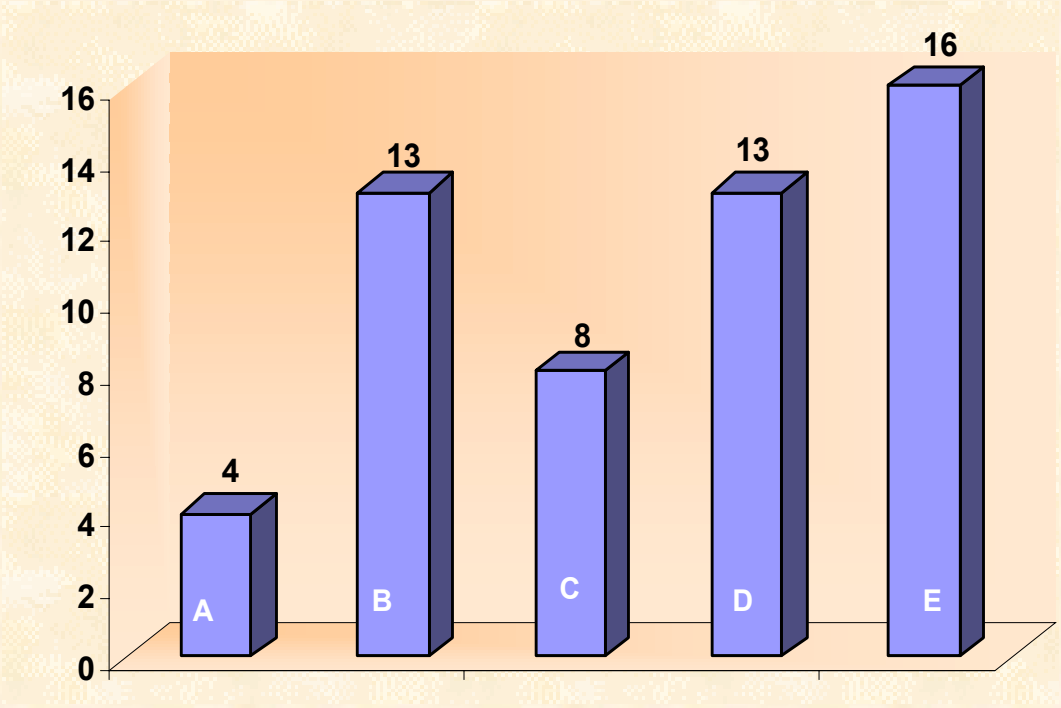


CERN Favored domains of TT

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

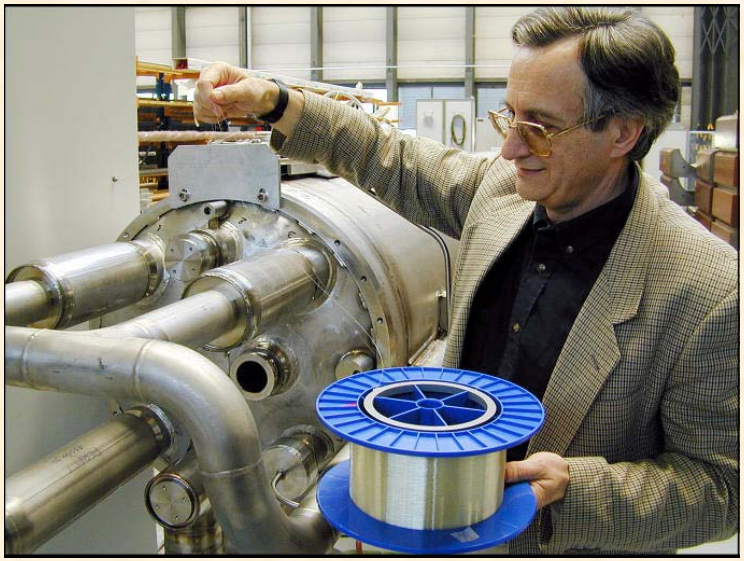
Start-ups

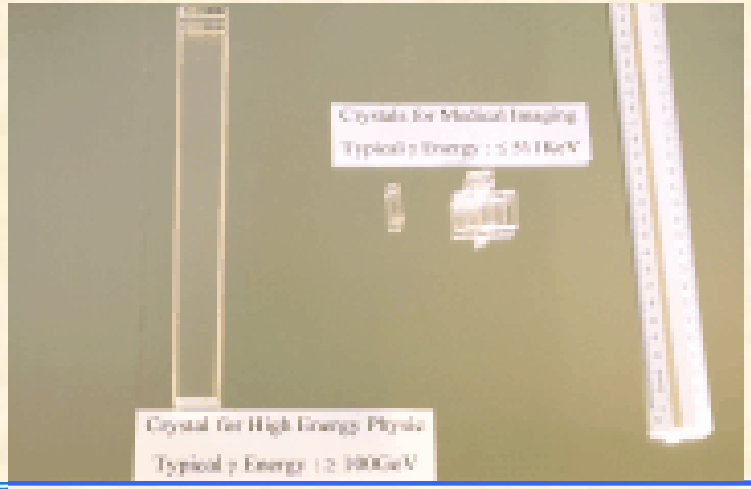
5 since 2000: IT (3), pharmacology (1), micro-electronics (1)

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)*

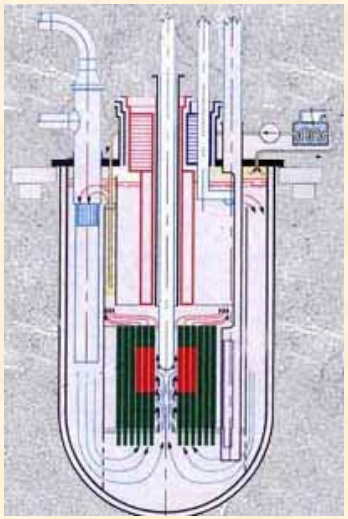
Standard optical fibre used to measure temperatures down to 1.4 K by mean of Brillouin scattering. Very cheap method. A single fibre can replace thousands of measuring points.

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.

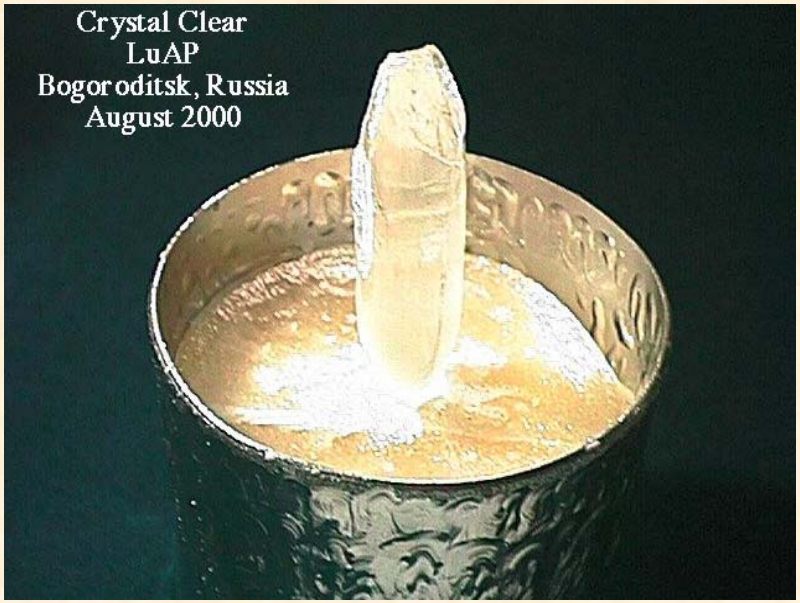
Pumping Device by Non Vaporisable Getter and method to use it *(CERN, C. Benvenuti)*

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.

AN example of Startup candidate@CERN ex:

okdoo

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

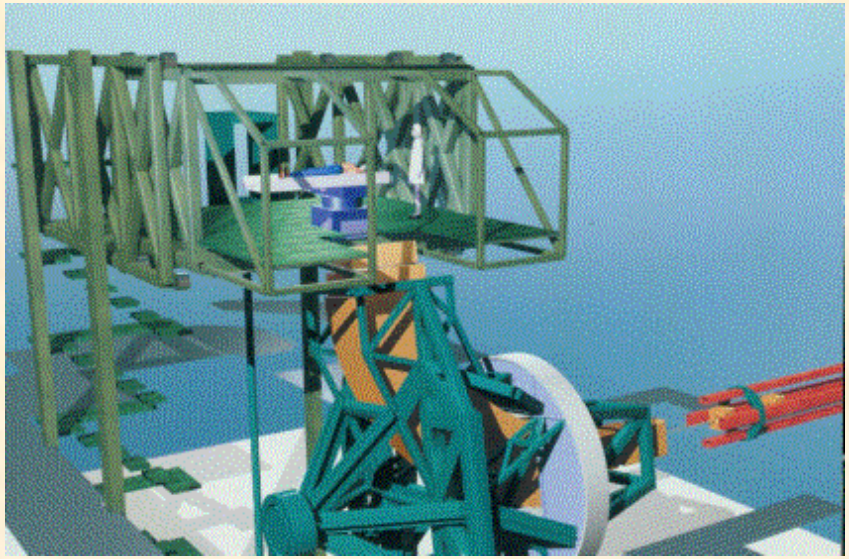
Present situation:

- 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;

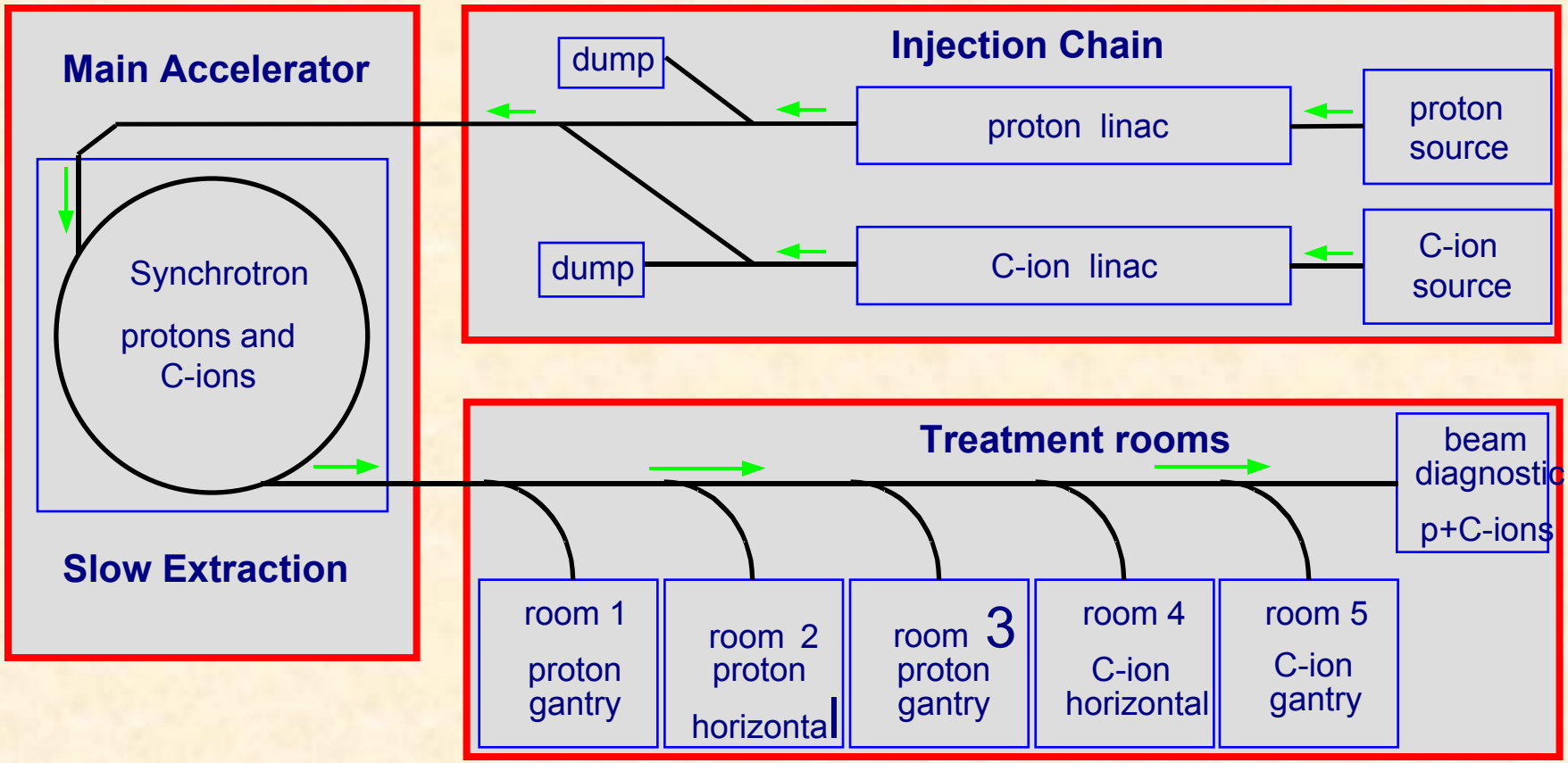
Partnership Main Domains

GRIDS

HADRON THERAPY



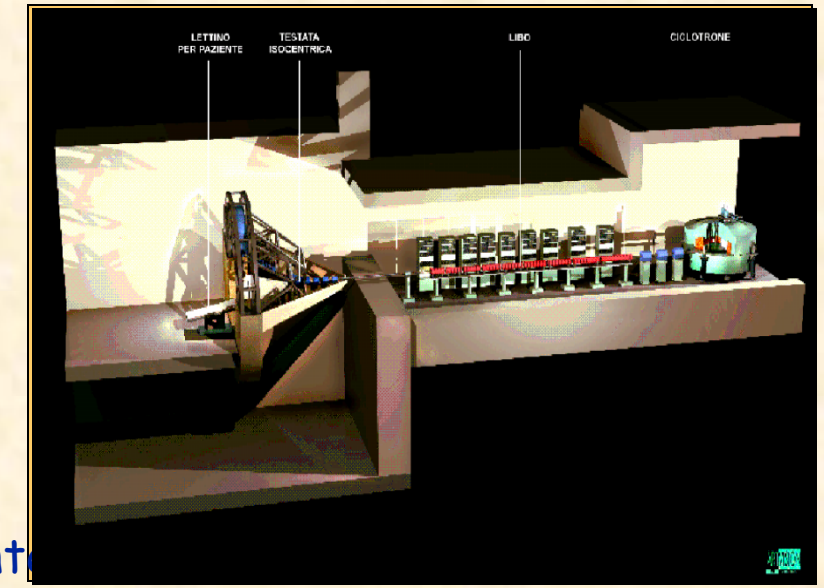
Partnership - Schematic Layout of the PIMMS (Proton Ion Machine Medical Study) Design



LIBO

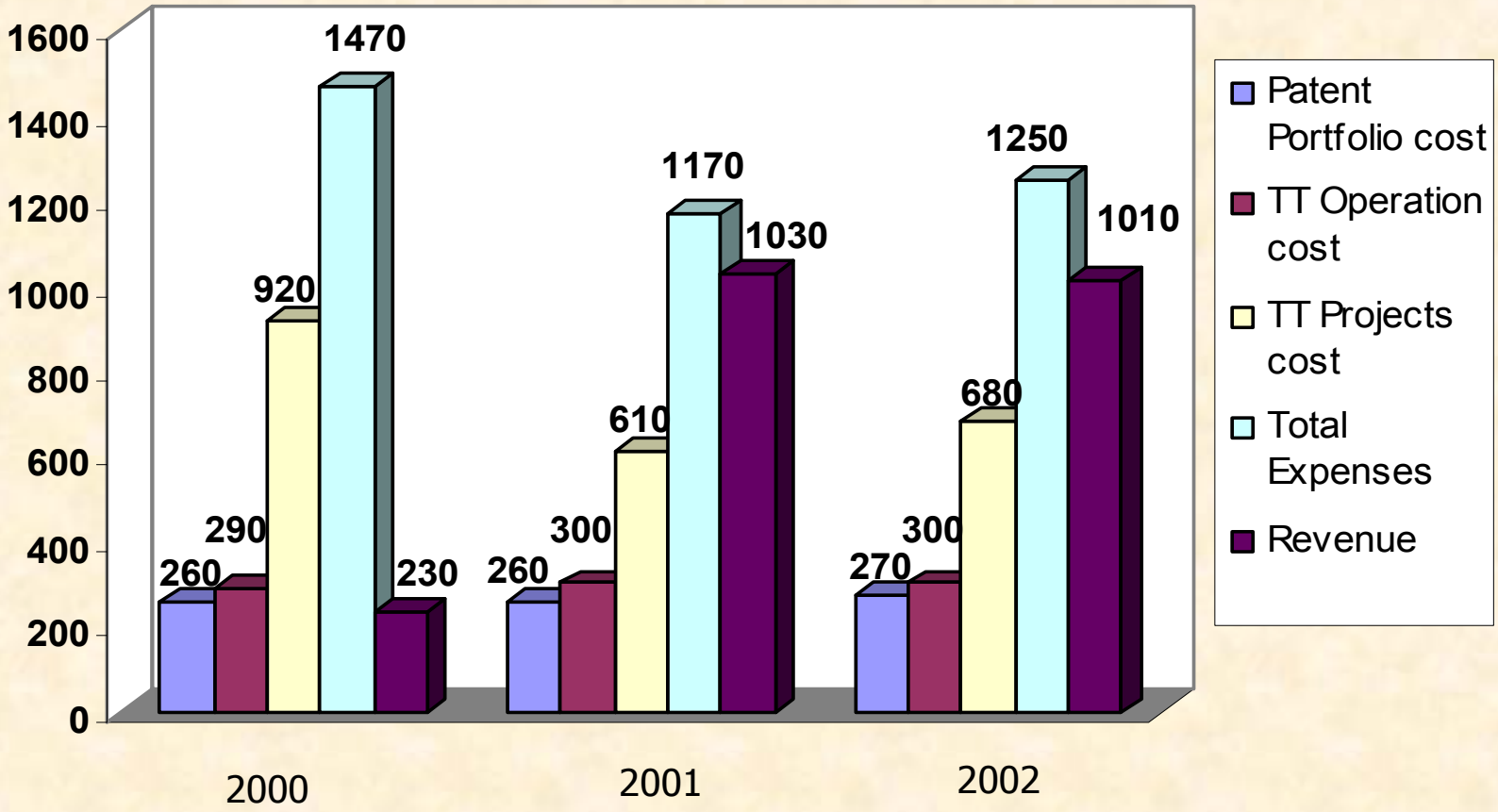
3 GHZ proton LInac BOoster for cancer treatment

High Energy Physics original development:
Particle and ions accelerator technology



Main properties:
Compact design
Low cost
Reduced commissioning operation and maint

Distribution of costs and revenue



Costs and revenue for 2000-2001.
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.

TITLE	Ownership	Comments	Status	Licensing
A Thermal Management Device and Method of Making such a Device	CERN+ Queen Mary and Westfield College, University of London	Initialy filed in UK (8-Jul-98) with title: "A Thermal Management Board" PCT (8-jul-99)	PCT in National phase	Proceeding
Radiation detector of very high performance and planispherical parallax-free X-ray imager comprising such a radiation detector	CERN	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 & Europe	PCT in National phase	Proceeding
Coquille de reniflage	CERN	France, 15-dec-1999. PCT requested.	PCT in International Preliminary Examination phase	Proceeding
Cryogenic Monolithic Semiconductor Detector	CERN+ **Universit□t Bern,** Laboratorium f□r Hochenergie Physik	Initialy filed in United Kingdom, 01-Jul-1999 ; PCT word coverage filed on July 3, 2000 with title: "A Monolithic Semiconductor Detector"	PCT filed: answering to objections from EPO	
Polissage ˇlectrochimique titane	CERN	Initialy 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 "BATH COMPOSITION FOR ELECTROPOLISHING OF TITANIUM AND METHOD FOR USING SAME"	PCT in National phase	Proceeding
Pumping device by non-vaporisable getter and method for using this getter (Neg Surfacique)	CERN	Initialy filed in France, 19-jun-1996 (refered by PLASSERAUD as "Neg Surfacique"); world PCT on June 18, 1997. French title "DISPOSITIF DE POMPAGE PAR GETTER NON EVAPORABLE ET PROCEDE DE MISE EN OEUVRE DE CE GETTER"	PCT in National phase	
Arrangement and method for improving vacuum in a very high vacuum system (Catalyseur surfacique)	CERN	Initially filed in France, 26-feb-1997; title "AGENCEMENT ET PROCEDE POUR AMELIORER LE VIDE DANS UN SYSTEME A VIDE TRES POUSSE" (refered by PLASSERAUD as Catalyseur surfacique) ; world PCT		
Neutron-Driven Element Transmuter	CERN	Initialy filed on 19-jun-1997 . All PCT contracting countries.	PCT in National phase	YES
Diaphragm System	CERN	Priority date: 21-oct-1999 (EP). **EP0399123** covers the European countries (AT, BE, CH, CY, DE, DK, ES, FI, FR, TR, GR, IE, IT, LI, LU, MC, NL, PT, SE, GB); **WO0129471** covers CA, CN, JP, RU and US.	Europe + PCT application published. Entering National phase in October 2001.	
Device and method to measure a short radiation pulse or an electric pulse	CERN+CEA	Initialy filed in France 22-jan-1988, with title " DISPOSITIF ET PROCEDE DE MESURE D'UNE IMPULSION BREVE DE RAYONNEMENT OU D'UNE IMPULSION BREVE ELECTRIQUE" PCT requested and actually France, Germany, Suisse, Liechenstein, USA are maintained.	Granted.	No
Tete + support interchargeables	CERN	18-apr-2000 France	PCT filed on 12-April-2001	Proceeding

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