

# CERN POLICY ON THE USE OF PATENTS AS A TOOL FOR KNOWLEDGE TRANSFER

Knowledge Transfer Group

*v. 24 September 2019*

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## 1. Introduction

### *Context*

CERN's mission is to provide for collaboration in particle physics research of a pure scientific and fundamental character and in research essentially related thereto. Article 2 of the CERN Convention requires the Organization to make the results of its research generally available.

In application of the above, and responding to wishes expressed by its Member States, in 2010 CERN adopted a policy on the management of intellectual property<sup>1</sup> (the "CERN IP Policy"), which sets out the principles forming the basis for the management of intellectual property in knowledge transfer activities at CERN for the benefit of both research institutes outside particle physics and industry.

In the CERN IP Policy, CERN sets out general principles around its patenting practices. The protection of *technologies* by way of patenting is one way of supporting the dissemination of CERN *technologies*, in addition to publishing, providing consultancy or services based on its expertise and making *technology* available through other channels, such as open source.

### *Objectives*

CERN started filing *patents* in 1988<sup>2</sup> to support the dissemination of its *technologies* to European Industry. In 1999, CERN presented to the Finance Committee a strategy to support Technology Transfer in the Organisation based on the licensing of intellectual property rights.<sup>3</sup> With 20 years of experience filing *patents* and licensing *technologies*, CERN now wishes to document some of its practices and lay them down for reference.

This document has thus been drawn up to supplement the CERN IP Policy by detailing the rationale, approach, and strategies used by the Organization in the matter of patents.

This should also increase the general awareness of CERN personnel about this subject and, as a result, stimulate the dissemination of CERN *technologies*.

This document sets out the scope and general principles underlying the use of patent protection as a tool for knowledge transfer. It details the criteria underpinning patenting decisions taken by the Organization, including as regards process, with a constant view of making the most cost-effective use of the global patent system to ensure the required protection is obtained for the *technology* to support its dissemination strategy.

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<sup>1</sup> CERN/FC/5434/RA – Policy on the management of intellectual property in technology transfer activities at CERN, available at <https://cds.cern.ch/record/1288946?ln=en>.

<sup>2</sup> There is a record of the *patent* 'Device and method for measuring a short light pulse or a short electrical pulse', filed on 22nd Jan 1988 with CEA and CERN as applicants. It is possible there are earlier *patents* filed under a different name for CERN. Nonetheless, it appears that the question of patenting was proactively addressed by CERN around a decade after this *patent*.

<sup>3</sup> CERN/FC/4126 – Technology Transfer Policy at CERN, available at <https://cds.cern.ch/record/35061?ln=en>.

## 2. Why does CERN file *patents*?

The CERN Convention states that “[t]he results of its experimental and theoretical work shall be published or otherwise be made generally available”. The Organization generates intellectual property (“IP”) that may have applications in research domains other than High Energy Physics (“HEP”) or that may be commercially exploited by industry. The CERN Member States have expressed the wish that such *IP* be made available for the benefit of its non-HEP research institutes and its industry. It is therefore essential that CERN uses all necessary tools and routes to enable this transfer of technology.

A *patent* is considered a strategic tool to facilitate commercialization of *inventions*. Experience from technology transfer shows that patent protection increases the attractiveness of *inventions* for industrial partners, and *patents* are considered by many investors as a pre-requisite to financing. A *patent* provides a legal mechanism by which its owner can prevent others from using the *invention* for a period of 20 years. During this period, the owner has more control over who can use or manufacture the *invention*, and under which conditions. CERN therefore uses patent protection for some of its *technologies* in order to facilitate knowledge transfer outside the field of HEP. Being a costly tool, their use is strictly limited to cases where knowledge transfer without them would be impossible or very difficult, or where not owning the *patent* would be detrimental to the Organization.

### ***Publish or Patent?***

The formal patentability requirement of novelty is absolute. This means that the *invention* must not have been made known to the public anywhere in the world before the initial patent application is filed. This includes oral and written disclosures at public conferences and seminars (whether held inside or outside CERN), and also includes any meetings inside CERN if there are non-CERN personnel present that are not bound by a formal confidentiality agreement. Notwithstanding, publishing and patenting are not mutually exclusive - the simple rule is: patent first, publish after. As soon as a patent application is filed the *invention* may be published without putting the *invention's* novelty in jeopardy. A *patent* itself being a form of publication, patenting is therefore entirely in line with CERN's mission.

## 3. General principles

The principles spelled out in the CERN IP Policy remain applicable<sup>4</sup> to guide patenting decisions at CERN. In addition, the following principles apply.

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<sup>4</sup> From the CERN IP Policy: “CERN considers patent protection for its *inventions* when the following conditions are met:

- the formal requirements for patentability are met;
- the inventor(s) is(are) clearly identified and there is no dispute over the ownership of the *invention*;
- the *invention* has an established potential for commercial exploitation;
- the patent protection facilitates the transfer or the *patent* makes the *invention* more attractive to companies; [for example where substantial R&D investment is needed]

CERN files *patents* where:

- 1) Patent protection serves as a tool for knowledge transfer from CERN to fields outside HEP;<sup>5</sup>
- 2) Patent protection serves as a lever to maximise the exploitation of non-patented intellectual property of the Organization;<sup>6</sup>
- 3) It considers granting licences with exclusivity on this *technology*.

Furthermore, CERN endeavours to make the patent portfolio cost neutral for the Organization, i.e. the revenues generated from licences on *patents* should collectively exceed the costs of the patent portfolio. The Knowledge Transfer Group (“KT Group”) holds a dedicated budget for covering patent costs, and administers all matters relating thereto, including in cases where *patents* are jointly owned.

Finally, no patents should be filed in fields where patents are controversial and would therefore put the Organization’s reputation at risk.

#### 4. Procedure and decision criteria

The KT Group manages the CERN patent portfolio. Details of the internal procedure the KT Group follows, including a diagram with an overview of the lifecycle of a patent application, are set out in Annex 3. Below are the criteria considered when taking decisions related to patent filing and maintenance.

##### a) Pre-requisites

Prior to considering filing for patent protection for a *technology*, the KT Group ensures the following criteria are fulfilled:

- 1) The *technology* is patentable, i.e. it a priori meets the criteria set out in Annex 2;
- 2) There is an interest for CERN to patent the *technology*: it has commercial potential for industry, *spin-off companies*, or other institutions, primarily in Member States, and licensing of a *patent* has been identified as the most effective mode of transferring the *technology* to industry;
- 3) The *technology* has been partially or entirely invented by a CERN member of personnel and (co-)ownership of the *technology* by CERN is undisputed;
- 4) If the *technology* has been developed in the execution of a contract or of an externally funded research project, any additional criteria defined in the legal framework of the contract or the project are fulfilled;

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- the inventor(s) or (an)other knowledgeable expert(s) is(are) available to provide technical support for the transfer of the future *patent*.”

<sup>5</sup> In other words, CERN does not take ‘defensive *patents*’. Furthermore, *patents* are not a Key Performance Indicator (KPI) for the organization or employees.

<sup>6</sup> For instance in cases where the know-how would otherwise go unused.

- 5) Where the *technology* is jointly owned with a third party, either the property rights are transferred so as to result in sole ownership (either in CERN or in the third party), or the terms for the exercise of the joint ownership have been undisputedly agreed with the third party;
- 6) Full collaboration of the CERN inventor is foreseen.<sup>7</sup>

In order to ascertain the points above, the KT Group carries out, before filing a *patent*, a technology assessment and a market assessment for the *technology*.

It may be that a publication by CERN personnel concerning the invention is planned before all the pre-requisite steps are completed. In that case, the KT Group will consider filing a patent application before the thorough assessments are completed. As there are costs associated with drafting a patent application, this exceptional procedure is chosen at the discretion of the KT Group taking into account all the relevant factors (date of publication, likelihood of dissemination to industry, potential issues arising out of projects and/or contracts in the context of which the *technology* has been developed).

#### b) Filing route

Several patent filing routes are possible. In order to determine the most appropriate route, the following criteria are usually taken into consideration: initial costs, total costs, fulfilment of patentability criteria of national and regional instances, language of filing, nationality, maturity of invention at filing date, foreseen market, authority issuing the search report, etc.

By default, CERN will use the filing route which allows the delay of the main costs as long as possible while keeping them limited, and allowing the definitive selection of countries in which to protect to be deferred. An international patent application (PCT) claiming priority allows for this. In that scheme, a regional or national application is filed with a request for a search report,<sup>8</sup> followed by a PCT application within the following 12 months, and an entry in the regional or national phase of examination at month 30. This allows for extra time to find licensees before the costly decisions must be taken.

#### c) International phase

Twelve months after filing the initial patent application, a decision must be taken whether or not to convert it to an international patent application.

Before converting to an international patent application, the KT Group must be satisfied that the following criteria are met:

- 1) At least one company has expressed interest in exploiting the *technology*; or

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<sup>7</sup> I.e. he/she is 1) supportive of the patent protection process, and 2) available at CERN, or responsive if not at CERN. If the inventor(s) is not available, then another person with sufficient knowledge of the *invention* must have been identified and declared their willingness to support the patenting process in place of the inventor(s).

<sup>8</sup> A search report is a document, produced by the patent office, that cites any relevant *prior art* documents that may be taken into consideration in deciding whether the *invention* is new and inventive.

- 2) At least one spin-off company has been established on the basis of the *technology* covered by the provisional patent application.

In addition to the above, the KT Group must be satisfied – based on the search report of the initial patent application – that there is a reasonable basis upon which patentability can be argued once patent examination begins.

#### d) Regional/national phase

Thirty months after filing the initial patent application, a decision must be taken whether or not to convert the international patent application into regional and/or national patent applications and which geographical regions to choose for continuing prosecution.

In order to continue prosecution after the international phase, the KT Group must be satisfied that at least one royalty-bearing licence agreement on the *technology* covered by the patent application has been concluded, or is close to conclusion, with a company (including a *spin-off company*);

In order to designate a specific region for the regional/national phase, the following criteria are considered by the KT Group:

- 1) The above-mentioned licensee(s) intends to commercially exploit the *technology* in the geographic region concerned and has provided a business plan and/or financial information sufficient to justify the payment of patent expenses in this region(s); or
- 2) At least one company has expressed interest in exploiting the *technology* in the geographic region concerned and the commercial potential has been assessed as sufficient to justify the payment of patent expenses in this region(s).

#### e) Grant of *patents*

After entry into the regional/national phase, and following patent examination procedures, a decision will eventually be taken by the patent office on the grant of the *patent*. Depending on the speed of patent examination in the region(s) chosen, this process can take several years to complete. If a *patent* is granted, CERN must decide (i) whether to proceed with accepting the grant of the *patent* and, (ii) in the case of an European patent application, after the date of grant, on the individual contracting states in which to validate the *patent*. Accepting the grant implies the payment of a translation, grant, and/or issue fees.

In order to accept the grant of a *patent*, the KT Group must be satisfied that at least one licensee has commercialization plans in the geographical region in which the *patent* will be granted and that these plans are sufficient to justify the payment of patent expenses.

#### f) Maintenance and abandonment of *patents*

The KT Group continuously reviews CERN's patent portfolio to ensure compliance with this policy, and conducts regular in-depth reviews.

In order to decide on the maintenance of the *patent* the following criteria must be met:

- 1) If the *patent* is less than 7 years old (from the date of priority), revenues must be generated under at least one licence agreement in the year of the review of the patent

portfolio. If the revenues generated are less than the cost of maintenance of the *patent*, the income from royalties must have at least increased as compared to the previous year;

- 2) If the *patent* is 7 years old or more (from the date of priority), the revenues generated by licences on the *patent* must at least exceed the cost of the maintenance of the *patent* or there is at least a likely prospect given by the licensees that this will be the case.

In all other cases, the *patent* should be abandoned.



# Annex 1

## Relevant definitions

including under CERN/FC/5434/RA

- The term “**Intellectual Property or IP**” means creations of the human mind that benefit from the legal protection of a property right. The major legal mechanisms for protecting *IP* are copyrights, *patents*, and trademarks. *IP* rights enable owners to control access to, and use of their *IP*.
- The term “**invention**” means a product or process providing a novel solution to a technological problem.
- The term “**patent family**” means a set of *patents* taken in various countries to protect a single invention claiming the same priority/priorities.
- The term “**technology**” or “**technologies**” means know-how, inventions, hardware, software, reports, drawings, design documents, processes and protocols having a potential for research and/or commercial exploitation.
- The term “**patent**” means a property right granted by a government office (or regional office acting for several countries) which provides the patent owner exclusive rights on the patented invention (manufacture, use, sale, import).
- The term “**prior art**” means all the knowledge that existed prior to the relevant filing or priority date of a patent application, whether it existed by way of written and oral disclosure.

# Annex 2

## Introduction to Patents

### I. What is a *patent*?

A *patent* is a type of intellectual property right that protects *inventions* and covers how things work, what they do, how they do it, what they are made of or how they are made. It gives the owner the right to prevent others from making, using, selling, offering for sale or importing a product or process based on the patented *invention* without permission.

A patent is granted by the national patent office of a country based on national patent laws. Thus, it does not arise automatically: the owner of the *invention* needs to apply for the patent, and the patent may or may not be granted following a process of examination of the patent application. The normal life time of a patent is 20 years from the day the application is filed. A patent is a territorial right: issued by a national patent office, it gives the owner rights in that country only. Despite this territorial nature, international treaties have allowed a certain degree of harmonisation across countries, but differences remain.

### II. What can be patented?

Evaluation of patentability is subject to national jurisdiction and the interpretation varies to a certain degree from country to country. However, in general an *invention* can only be patented if it is:

- novel – not already known to the public before the date a *patent* is applied for,
- inventive – not an obvious modification of what is already known, and
- capable of industrial application – can be made or used in at least one kind of industry.

Furthermore, certain subject matters are not patentable either due to their very nature, or as a matter of public policy. The following is a non-exhaustive list:

- scientific or mathematical discoveries, theories or methods;
- literary, dramatic, musical or artistic works;
- schemes, rules or methods for performing a mental act;
- methods of medical treatment;
- ideas.

In other words, an *invention* must make a ‘technical contribution’. This excludes a patent on a business method, for example, unless it involves some technical *invention*. *Inventions* relating to computer software may be patentable, but there is no harmonized approach to this and the rules vary widely from country to country.

### III. Patent application procedures

Through the Patent Cooperation Treaty (PCT), and/or various regional systems like the European Patent Convention, the application procedure when applying for patent protection

in various countries has been simplified. It is possible to file an international patent application which will then be centrally searched and examined by the chosen examination authorities. However, the final grant of an application is still subject to approval based on national legislation, and finally a *patent* can only be granted by a national patent office in each country where protection is sought.

The different national and regional extensions of applications relating to the same *invention* are grouped in a *patent family*.

#### IV. How long does it take to get a *patent*?

To obtain a *patent* may take several years depending on a number of factors, such as the geographical coverage, application scheme, complexity of *invention*, and whether the application has to be amended during examination. Through an international patent application (PCT), it will typically take at least 4 years to have a *patent* granted. If one files directly to one or more countries a *patent* might be issued within a few years.

#### V. How much does it cost?

All costs related to the patent application depend on factors such as the number of pages in the application, number of patent claims, filing route, and number of countries. The latter does not only imply multiple filing and examination fees, but may also require a translation of the document to the national language.

An example scenario for obtaining and maintaining a *patent* could be:

##### *File a patent application:*

Prepare and file an international application:	CHF 10-15'000.
Translation, filing, search and examination in a country:	CHF 5-10'000.

##### *Issue a granted patent:*

Payment of issue fee and translations in a country:	CHF 2-6'000.
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##### *Maintain a patent application or a granted patent:*

Maintaining the application in one country per year:	CHF 500-1'500.
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In this example, a *patent family* consisting of 10 national extensions could thus easily have a total cost of 250'000 CHF over a lifetime of 20 years.

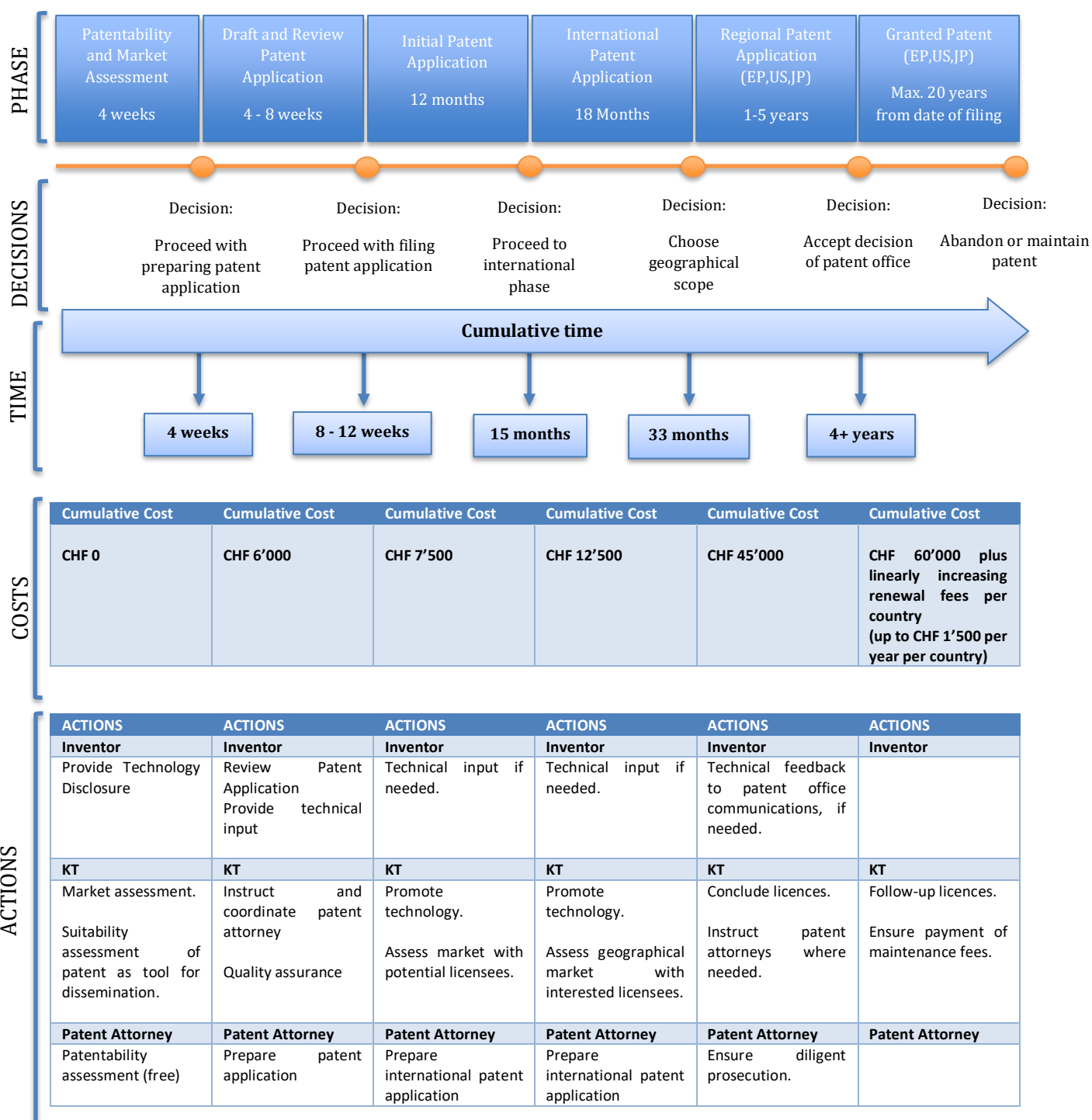
It is possible to abandon a patent application or a granted patent at any time. After the patent application or the *patent* is abandoned, no further costs will incur. The *invention* will be open for anyone to use if the application/granted *patent* was abandoned after publication of the application.

# Annex 3

## Indicative timeline

To facilitate the reading of this document, the following diagram gives an overview of the lifecycle of a patent application, as well as indicative costs for a typical patent application with coverage extending to Europe, US and Japan.

Approximate (minimum) timelines, actions, decision points and cumulative costs for the default filing route:



## Patenting process at CERN

### Initial filing

Timings are indicative only and depend on a number of factors including complexity of the subject matter being filed, inventor availability, KTO availability, availability of joint owners (if applicable), etc.

Action	Responsible	Time	Cumulative
<b>1. Inform KT Group of invention</b>	Technical Expert		
<b>2. Complete Invention Disclosure Form</b>	Technical Expert, support by KTO	1 week	<b>1 week</b>
<b>3. a. Perform patentability assessment</b>	PPM (partially outsourced)	2 – 3 weeks	
<b>b. Perform dissemination assessment</b>	KTO	2 – 3 weeks	
<b>c. Perform legal assessment (if relevant)</b>	KT Legal Advisor	1 week	
			<b>4 weeks</b>
<b>4. Draft claims</b>	PPM (outsourced)	2 weeks	<b>6 weeks</b>
<b>5. Hold decision meeting with:</b>	KTO		<b>6 weeks</b>
- KT Group Leader			
- PPM			
- KTO			
- Technical Expert / Inventor (if considered necessary)			
- Group Leader or Project Leader of Technical expert (if considered necessary)			
<b>6. Draft patent application</b>	PPM (outsourced)	2 – 4 weeks	<b>8 – 10 weeks</b>
<b>7. Review and finalize patent application</b>	Technical Expert	1 – 2 weeks	<b>8 – 12 weeks</b>

### Roles Acronyms:

KTO: Knowledge Transfer Officer

PPM: Patent Portfolio Manger