

# Patent Cooperation Treaty

Procedural Aspects & Recent Trends



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**PG Diploma In Patents**

**NALSAR University of Law, Hyderabad**

**Contact Class; March, 2022.**



**The Patent Cooperation Treaty is an agreement for international cooperation in the field of patents.**

**It is a treaty for rationalization and cooperation with regard to the filing, searching and examination of patent applications and the dissemination of the technical information contained therein.**

**The PCT does not provide for the grant of “international patents”: the task of and responsibility for granting patents remains exclusively in the hands of the patent Offices of, or acting for, the countries where protection is sought (the “designated Offices”).**



The Patent Cooperation Treaty or “PCT” entered into force on **24 January 1978**, and became operational on **01 June 1978**, with an initial **18** Contracting States.

Presently **155** Contracting States had adhered to the PCT.

Came into force for India on  
**07 December, 1998.**

**Filing and not granting.**

# PCT Contracting States (155)



Regional Protection

## EA Eurasian Patent

AM Armenia  
AZ Azerbaijan  
BY Belarus  
KG Kyrgyzstan  
KZ Kazakhstan  
RU Russian Federation  
TJ Tajikistan  
TM Turkmenistan

## EP European Patent

AL Albania<sup>1</sup>  
AT Austria  
\* BE Belgium  
BG Bulgaria  
CH Switzerland  
\* CY Cyprus  
CZ Czech Republic  
DE Germany  
DK Denmark  
EE Estonia  
ES Spain  
FI Finland  
\* FR France  
GB United Kingdom  
\* GR Greece  
HR Croatia<sup>1</sup>  
HU Hungary  
\* IE Ireland  
IS Iceland  
\* IT Italy

LI Liechtenstein  
\* LT Lithuania  
LU Luxembourg  
\* LV Latvia  
\* MC Monaco  
MK The former Yugoslav  
Republic of Macedonia<sup>1</sup>  
\* MT Malta  
\* NL Netherlands  
NO Norway  
PL Poland  
PT Portugal  
RO Romania  
RS Serbia<sup>1</sup>  
SE Sweden  
\* SI Slovenia  
SK Slovakia  
SM San Marino  
TR Turkey



European  
Patent  
Office

Regional patent only

Extension agreement continues to apply to applications filed before 1 January 2008  
(for HR), 1 January 2009 (for MK), 1 May 2010 (for AL) or 1 October 2010 (for RS)

# PCT Contracting States (155)

## AP ARIPO Patent

|      |                             |
|------|-----------------------------|
| BW   | Botswana                    |
| GH   | Ghana                       |
| GM   | Gambia                      |
| KE   | Kenya                       |
| LR   | Liberia                     |
| LS   | Lesotho                     |
| MW   | Malawi                      |
| MZ   | Mozambique                  |
| NA   | Namibia                     |
| RW   | Rwanda                      |
| SD   | Sudan                       |
| SL   | Sierra Leone                |
| ST   | Sao Tome and Principe       |
| * SZ | Swaziland                   |
| TZ   | United Republic of Tanzania |
| UG   | Uganda                      |
| ZM   | Zambia                      |
| ZW   | Zimbabwe                    |

## OA OAPI Patent

|      |                          |
|------|--------------------------|
| * BF | Burkina Faso             |
| * BJ | Benin                    |
| * CF | Central African Republic |
| * CG | Congo                    |
| * CI | Côte d'Ivoire            |
| * CM | Cameroon                 |
| * GA | Gabon                    |
| * GN | Guinea                   |
| * GQ | Equatorial Guinea        |
| * GW | Guinea-Bissau            |
| * KM | Comoros                  |
| * ML | Mali                     |
| * MR | Mauritania               |
| * NE | Niger                    |
| * SN | Senegal                  |
| * TD | Chad                     |
| * TG | Togo                     |



Regional Protection



\* Regional patent only

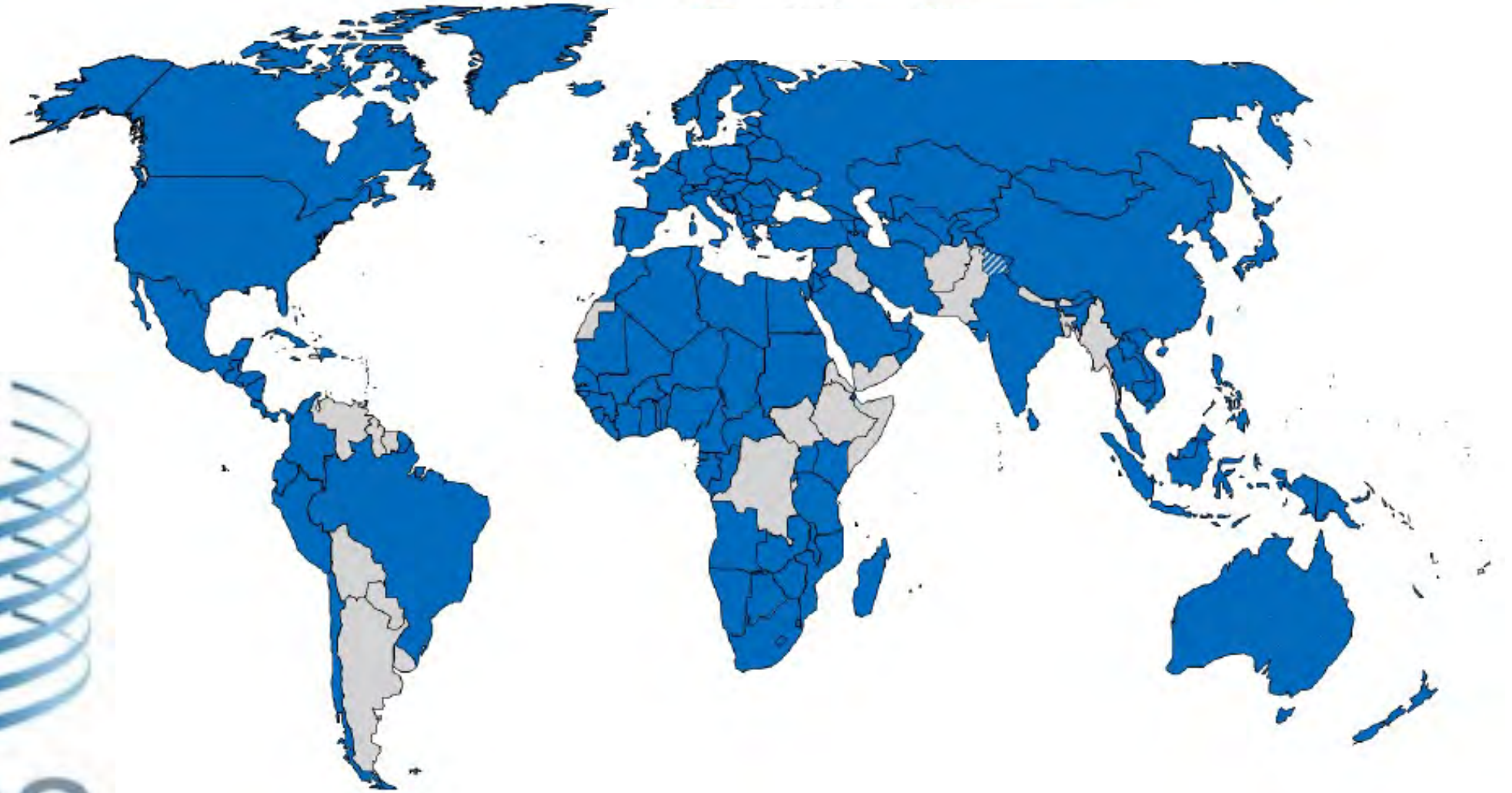
# PCT Contracting States (155)

|                           |                                          |                                     |
|---------------------------|------------------------------------------|-------------------------------------|
| AE United Arab Emirates   | HN Honduras                              | NG Nigeria                          |
| AG Antigua and Barbuda    | ID Indonesia                             | NI Nicaragua                        |
| AO Angola                 | IL Israel                                | NZ New Zealand                      |
| AU Australia              | IN India                                 | OM Oman                             |
| BA Bosnia and Herzegovina | IR Islamic Republic of Iran              | PA Panama                           |
| BB Barbados               | JP Japan                                 | PE Peru                             |
| BH Bahrain                | <i>KH CAMBODIA (as from 8 Dec. 2016)</i> | PG Papua New Guinea                 |
| BN Brunei Darussalam      | KM Union of the Comoros                  | PH Philippines                      |
| BR Brazil                 | KN Saint Kitts and Nevis                 | QA Qatar                            |
| BZ Belize                 | KP Democratic People's Republic of Korea | SA Saudi Arabia                     |
| CA Canada                 | KR Republic of Korea                     | SC Seychelles                       |
| CL Chile                  | KW Kuwait                                | SG Singapore                        |
| CN China                  | LA Lao People's Democratic Republic      | ST Sao Tome and Principe            |
| CO Colombia               | LC Saint Lucia                           | SV El Salvador                      |
| CR Costa Rica             | LK Sri Lanka                             | SY Syrian Arab Republic             |
| CU Cuba                   | LY Libya                                 | TH Thailand                         |
| DJ Djibouti               | ** MA Morocco                            | TN Tunisia                          |
| DM Dominica               | ** MD Republic of Moldova                | TT Trinidad and Tobago              |
| DO Dominican Republic     | * ME Montenegro                          | UA Ukraine                          |
| DZ Algeria                | MG Madagascar                            | US United States of America         |
| EC Ecuador                | MN Mongolia                              | UZ Uzbekistan                       |
| EG Egypt                  | MX Mexico                                | VC Saint Vincent and the Grenadines |
| GD Grenada                | MY Malaysia                              | VN Viet Nam                         |
| GE Georgia                |                                          | ZA South Africa                     |
| GT Guatemala              |                                          |                                     |

\* Extension of European patent possible  
 \*\* Validation of European patent possible

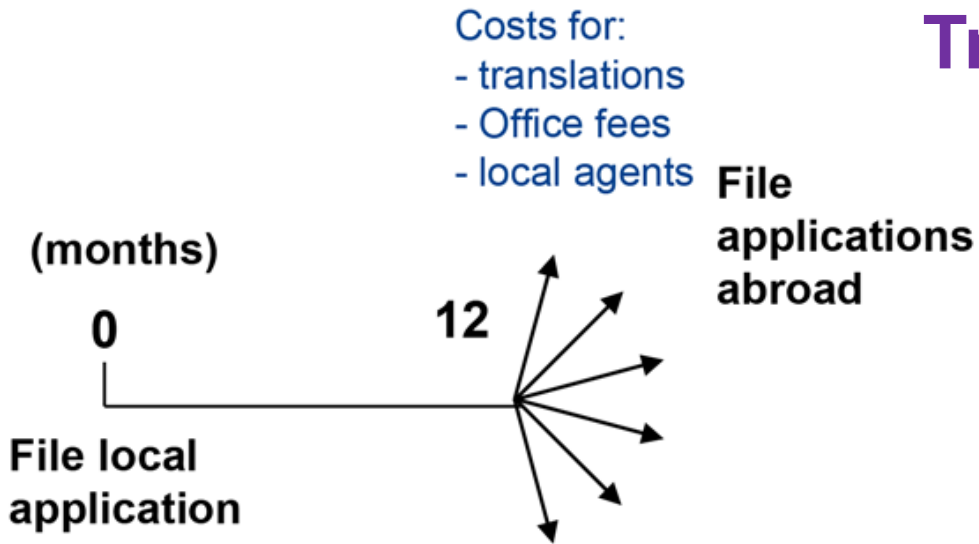
National Protection

# PCT Contracting States

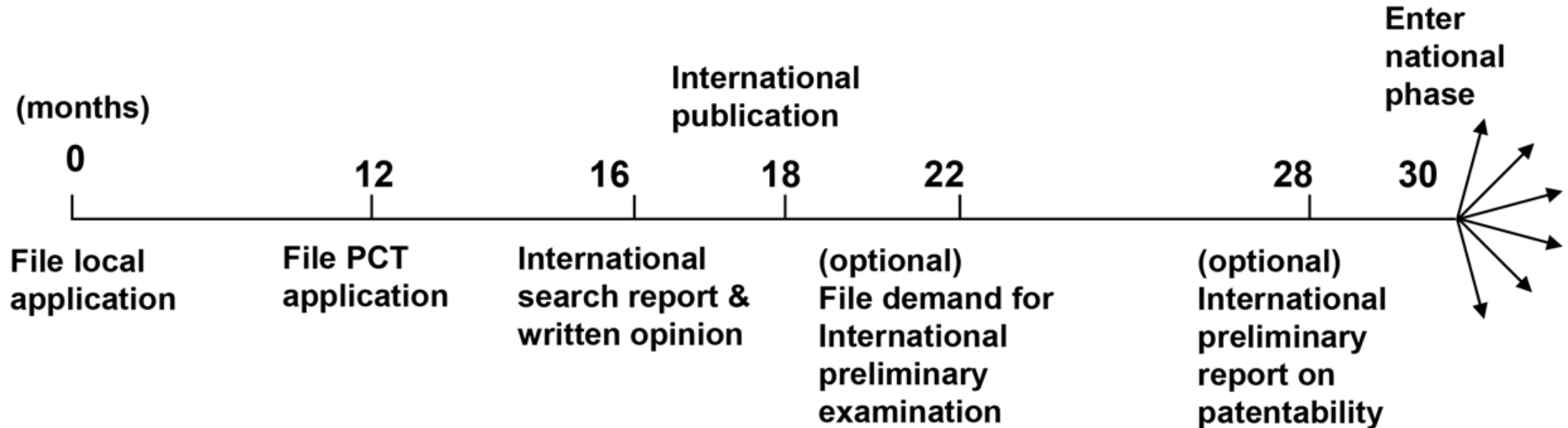


# Traditional v PCT System

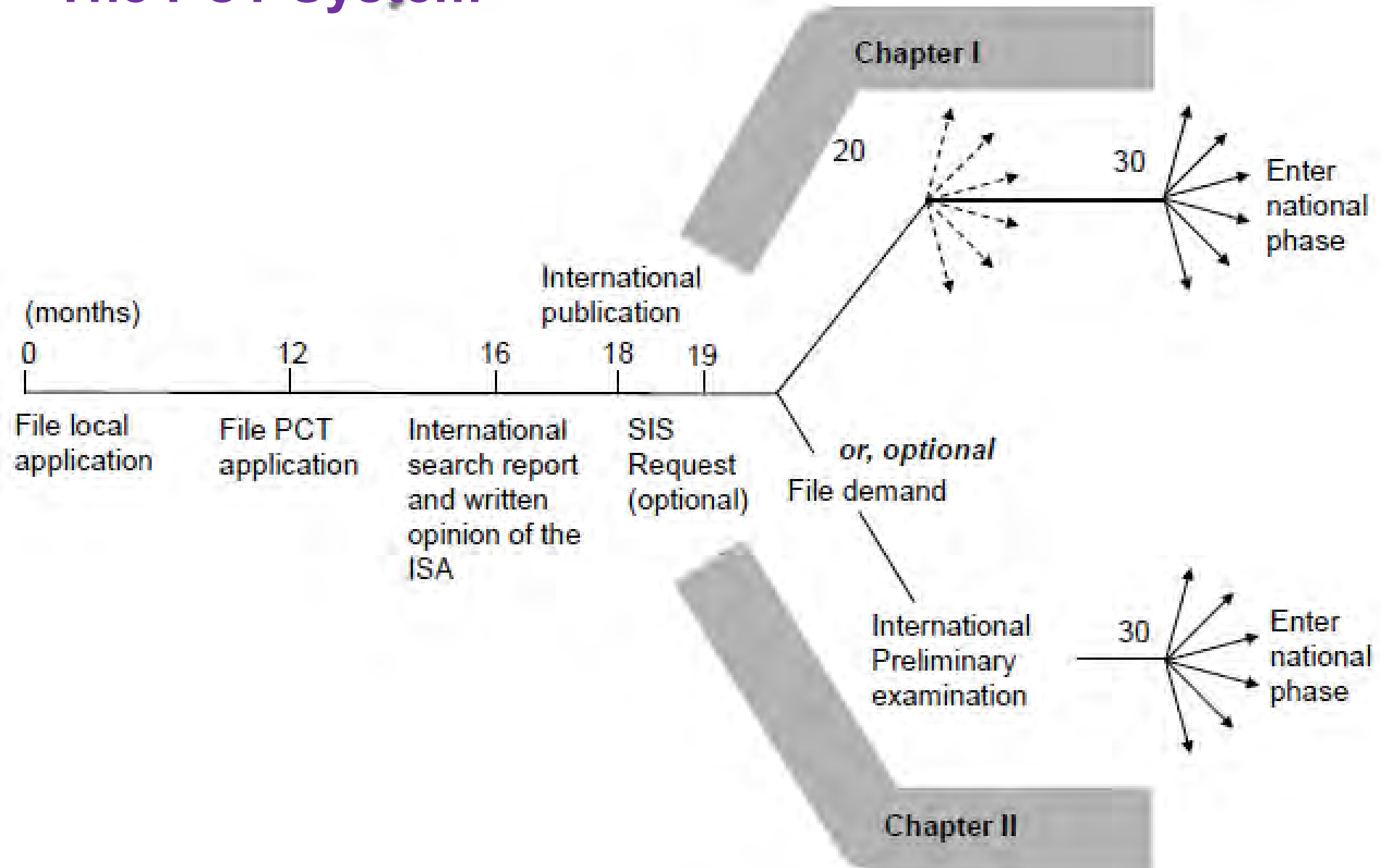
Paris



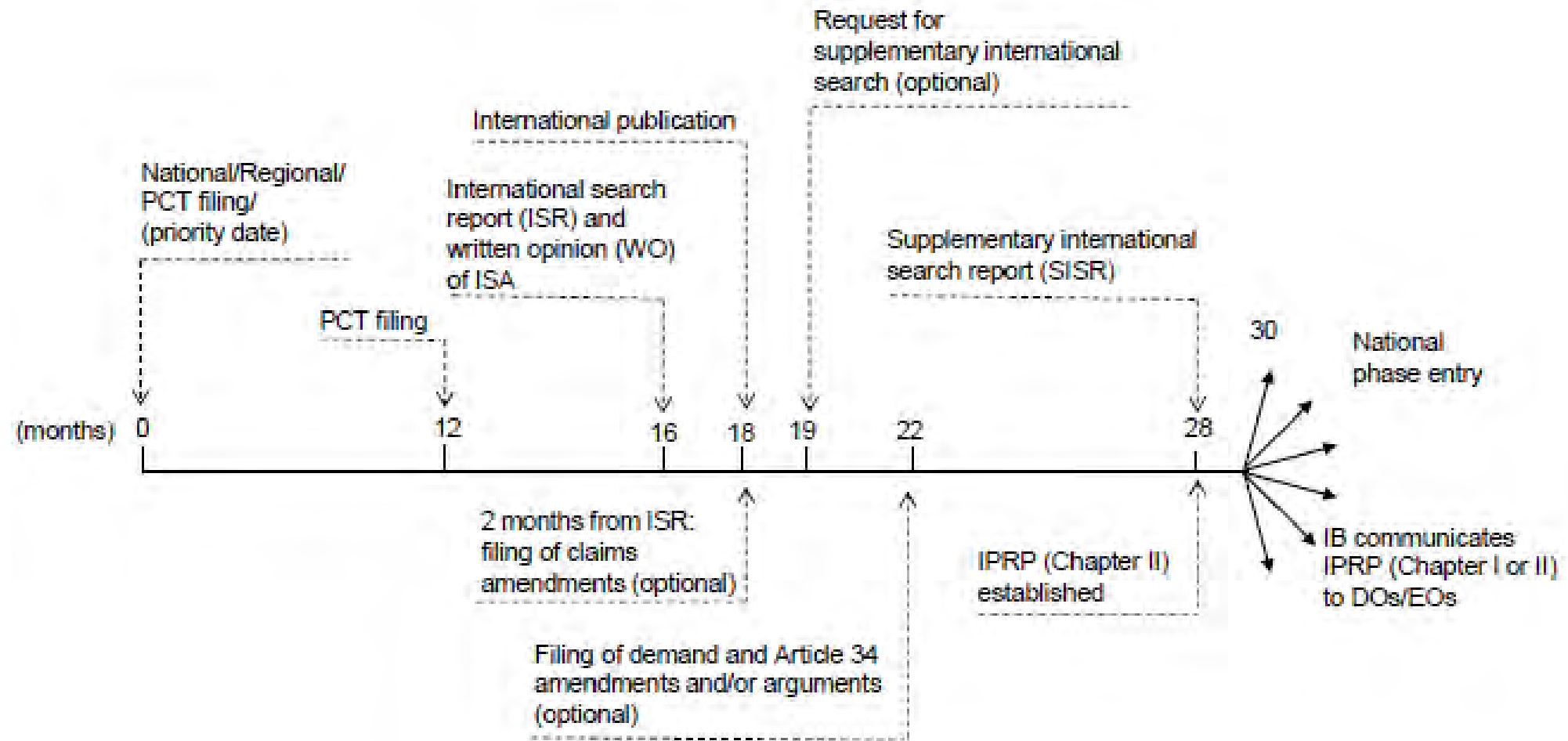
PCT



# The PCT System



# The PCT Timeline



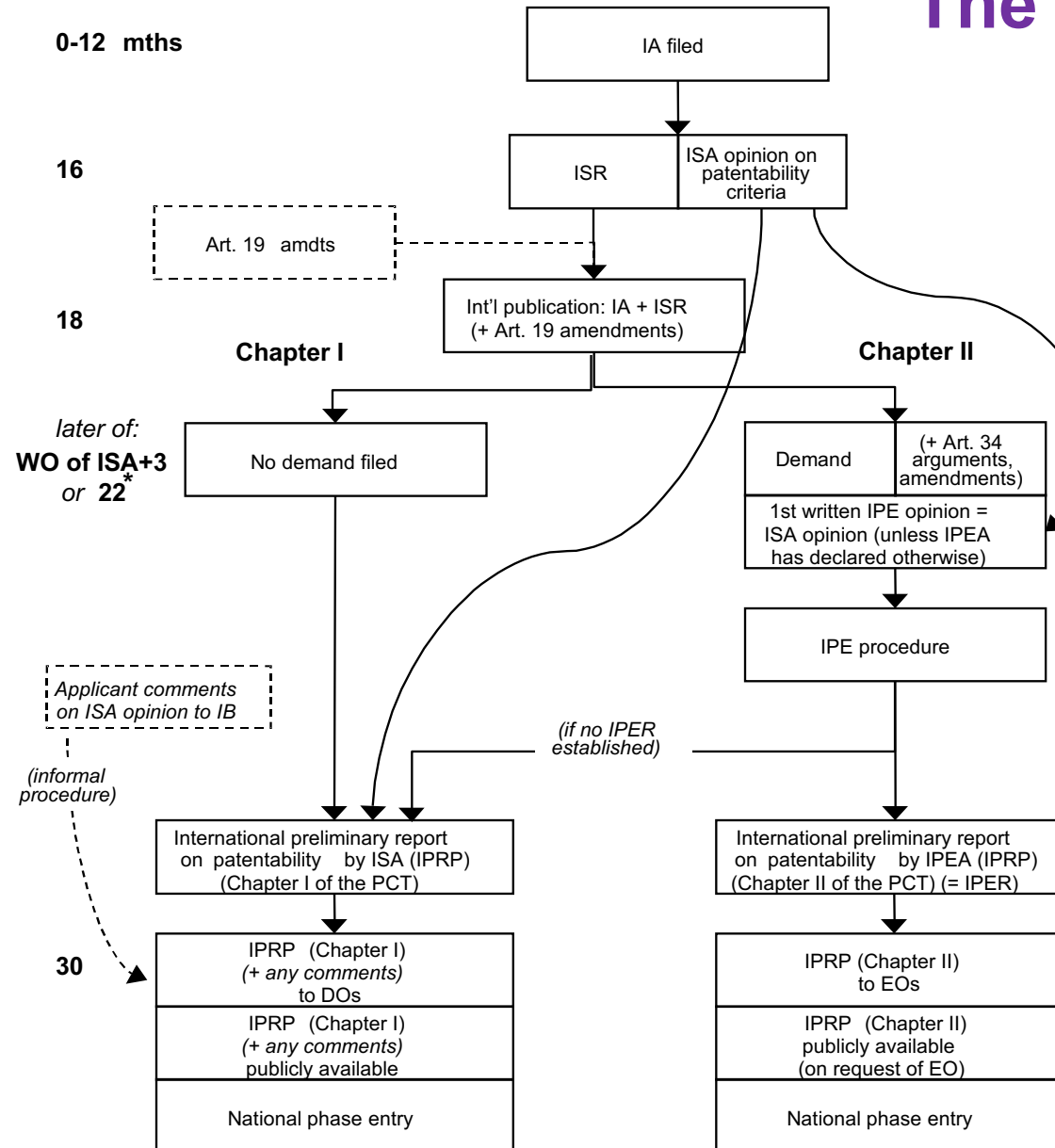
## Non-applicability of time limit of 30 months under Article 22(1)

- The Offices of the following States have notified the International Bureau that they will not apply the 30 month time limit under Chapter I, as of 1 April 2002, for as long as modified Article 22(1) is not compatible with their national law:

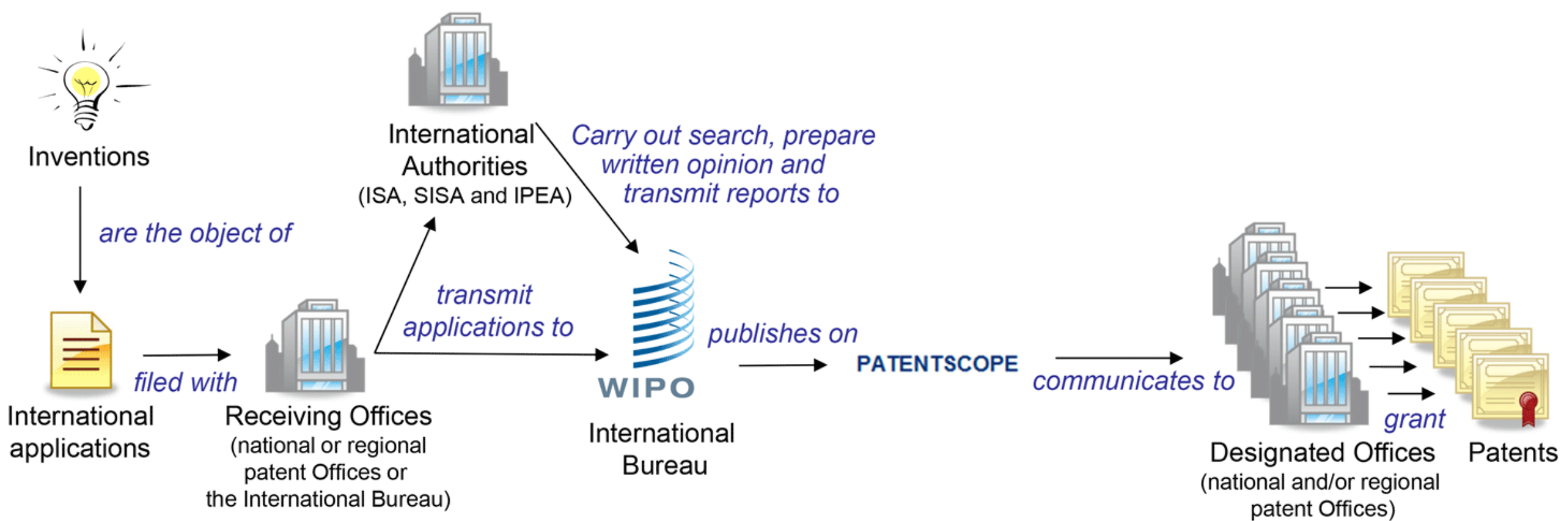
|    |                             |
|----|-----------------------------|
| LU | Luxembourg                  |
| TZ | United Republic of Tanzania |

- Where one of these States has been designated for the purposes of a regional patent, the applicable time limit is 31 months
- If no demand for international preliminary examination is filed before the expiration of 19 months in respect of above States, the national phase will have to be entered before the expiration of 20 or 21 months from the priority date

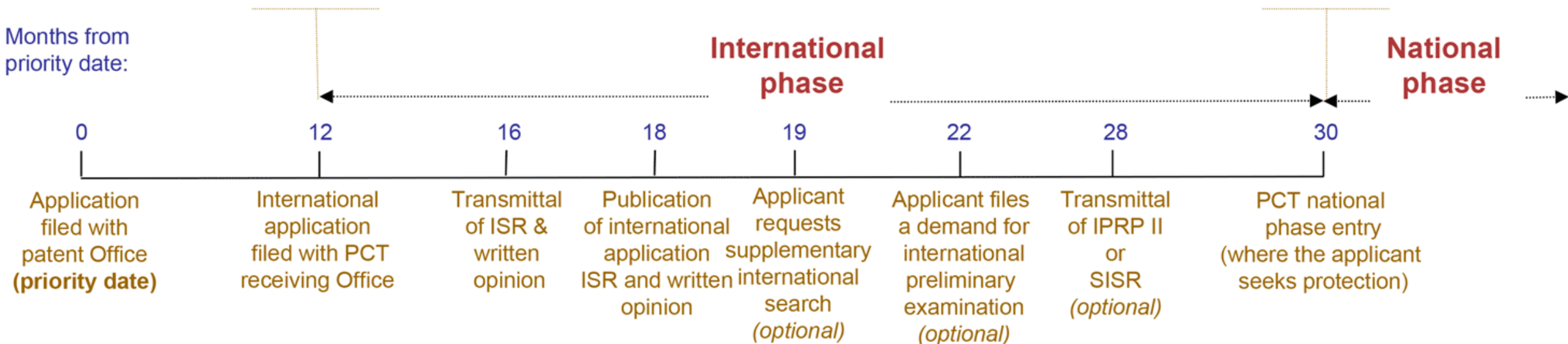
# The PCT System



\* must in practice file demand by 19 months for Article 22 transitional reservation countries



Months from priority date:



## ISA / IPEA

- |                  |                                                                                       |
|------------------|---------------------------------------------------------------------------------------|
| ■ AT – Austria   | ■ KR – Republic of Korea                                                              |
| ■ AU – Australia | ■ RU – Russian Federation                                                             |
| ■ BR – Brazil    | ■ SE – Sweden                                                                         |
| ■ CA – Canada    | ■ SG – Singapore                                                                      |
| ■ CL – Chile     | ■ TR – Turkey                                                                         |
| ■ CN – China     | ■ UA – Ukraine                                                                        |
| ■ EG – Egypt     | ■ US – United States of America                                                       |
| ■ ES – Spain     | ■ EP – European Patent Office                                                         |
| ■ FI – Finland   | ■ XN – Nordic Patent Institute<br>(Denmark, Iceland, Norway)                          |
| ■ IL – Israel    | ■ XV – Visegrad Patent Institute (VPI)<br>(Czech Republic, Hungary, Poland, Slovakia) |
| ■ IN – India     |                                                                                       |
| ■ JP – Japan     |                                                                                       |

# ISA - Functions

- Checks unity of invention (Rule 40)
- Checks title (Rule 37); checks abstract (Rule 38)
- Searches claimed invention (Article 15(3), Rule 33.3)
- Authorizes rectification of obvious errors if the error is:
  - in any part of the international application other than the request or
  - in any paper submitted to that Authority (Rule 91.1(e))
- Establishes international search report (ISR) (Rules 42 and 43) and written opinion (WO) (Rule 43*bis*) and /or declaration that no international search report will be established (Article 17(2))



# ISR – International Search Report

## It contains:

- IPC (International Patent Classification) symbols
- Indications of the technical areas searched
- Indications relating to any finding of lack of unity
- A list of the relevant prior art documents
- Indications relating to any finding that a meaningful search could not be carried out in respect of certain (but not all) claims



## Prior Art

- Made available to public
- Anywhere in the world
- By written disclosure
- Assisting in determining the claimed invention is new and involves an inventive step
- Prior to international filing date

# Written Opinion of the ISA

Non binding opinion on:

- Novelty
- Inventive Step
- Industrial Applicability

Sent to the applicant with the ISR

Not published with the application

No provision of formal response



**Demand not filed** - IPRP established on the basis of WO of ISA

**Demand Filed** - WO of ISA treated as the first WO of the IPEA

# International Preliminary Examination

- ❑ The purpose of the international preliminary examination is to provide a preliminary non-binding opinion on
  - novelty (not anticipated) (Article 33(2) and Rule 64)
  - inventive step (not obvious) (Article 33(3) and Rule 65)
  - industrial applicability (Article 33(4))
- ❑ Relevant prior art: absolute novelty (Rule 64, see also Rule 33)
- ❑ Only claims relating to the invention(s) searched by the ISA will be examined by the IPEA (Rule 66.1(e) and 66.2(a)(vi))
- ❑ Finding of lack of unity of invention (Rule 68)
  - Same criteria as for international search (Rule 13 and Annex B of the Administrative Instructions)
  - Invitation by the IPEA to restrict the claims or to pay additional fees (which can be paid under protest)
  - Applicant can select invention as “main invention” and those inventions for which additional fees are paid

# IPRP - International Preliminary Report on Patentability

- ❑ Must be established by the IPEA within:
  - 28 months from the priority date
  - 6 months from date of payment of fees
  - 6 months from date of receipt by IPEA of translation under Rule 55.2, whichever expires last (Rule 69.2)
- ❑ May contain “annexes” which comprise all sheets containing amendments or rectifications (that is, rectifications of obvious errors authorized under Rule 91 by the IPEA) which have been used as a basis for the report (Rule 70.16)
- ❑ Correspondence (such as letters) or copies of amendments superseded by later amendments are not annexed to the report (Rule 70.16)

# IPRP - International Preliminary Report on Patentability

- ❑ No provisions for appeal or further proceedings during the international phase before the International Authorities
- ❑ Sent to the applicant and the IB (Rule 71.1)
- ❑ IB forwards copies of the report, and any required translation of the report into English (prepared by the IB), to the elected Offices (Article 36(3)(a) and Rule 72.1)
- ❑ The annexes are not translated by the IB (Article 36(3)(b))

## PCT System – The Extra Edge

- Control Cost - Delay filing decision
- Growing geographical interests
- Finalize/develop the market
- Study probable competition

**EXTRA**

**COST**  
**# Filing**  
**# Issuing**  
**#Attorney**  
**#Maintenance**

**Cost of Obtaining & Maintaining  
Patents in 40+ major countries is  
> US\$ 700,000**

## PCT System - Benefits

- ☐ Single filing procedure for all countries
- ☐ Sufficient time for translations
- ☐ Drafted in accordance to PCT is valid everywhere
- ☐ Flexibility of payment of fees
- ☐ Advantage of maximum designation
- ☐ Transmittal of Priority needn't be monitored
- ☐ Provision for withdrawals
- ☐ Quality ISR and IPRP
- ☐ Provision of amendments
- ☐ Last minute foreign filings



## PCT System - Challenges

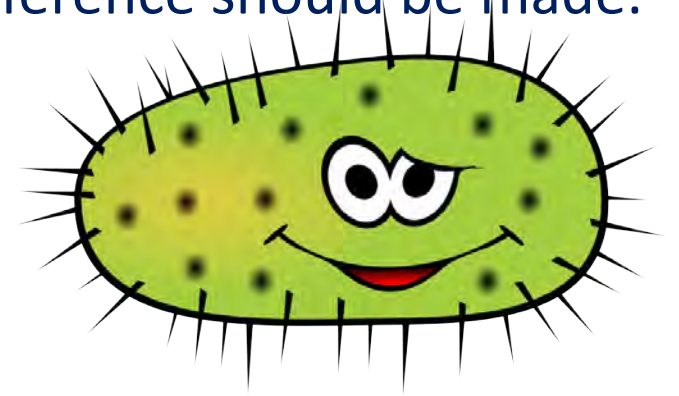
- ❑ The prosecution needs to be known
- ❑ Fully time line depended
- ❑ Often calls for clarifications and reminders



**Docketing should be an habit**

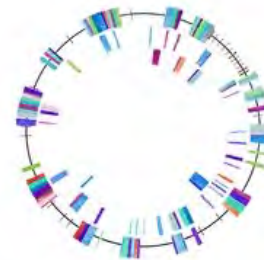
# Reference to Deposited Microorganism or Other Biological Material

- ❑ Required in a PCT application only when the national law of a designated State provides for it. Usually needed for full disclosure of the invention.
- ❑ Annex L of Volume I of the *PCT Applicant's Guide* contains the list of the designated States whose national law provides for a reference to deposited microorganisms or other biological material and indicates when and how such reference should be made.
- ❑ The reference must indicate:
  - the name and address of the depositary institution
  - the date of deposit of the microorganism/biological material with that institution
  - the accession number given to the deposit by that institution
  - any additional indication, if applicable (see Annex L)



# Reference to Deposited Microorganism or Other Biological Material

- ☐ The indications may be made in the description or on form PCT/RO/134.
- ☐ Certain designated Offices require that such indications be part of the description. In such a case, if form PCT/RO/134 is used, it should be numbered as a sheet of the description.
- ☐ In respect of certain designated Offices, the applicant is entitled to request that a sample be issued only to an expert nominated by the requester (a space is provided in form PCT/RO/134 to make such indication).



# IDA Status

39

Authorities

**AU** (NMI)

**BE** (BCCM)

**BG** (NBIMCC)

**CA** (NMLHC)

**CL** (CChRGM)

**CN** (CCTCC; CGMCC)

**CZ** (CCM)

**DE** (DSMZ)

**ES** (BNA; CECT)

**FI** (VTTCC)

**FR** (CNCM)

**IN** (MTCC)

**HU** (NCAIM)

**IT** (ABC; DBVPG)

**JP** (IPOD; AIST)

**KR** (KCLRF; KCTC; KCCM)

**LV** (MSCL)

**NL** (CBS)

**PL** (IAFB; PCM)

**RU** (NRCA; VKM; VKPM)

**SK** (CCY)

**UK** (CCAP; ECACC; IMI;  
NIBSC; NCTC; NCYC; NCIMB)

**US** (NRRL; ATCC)

23

Countries



# PCT Sequence Listing Standard

❑ Where the sequence listing is filed together with the international application, it:

- must be presented as a separate “Sequence Listing Part” of the description
- must be placed at the end of the application
- must begin on a new page
- should preferably have independent page numbering

❑ The Standard provides further details as to:

- the symbols and the format which must be used for the presentation of nucleotide and/or amino acid sequences
- with regard to other available information to be included in the sequence listing, the mandatory items which must, and the optional item which may, be included, and the order in which those items must appear
- the presentation of features of sequences
- the presentation of “free text”

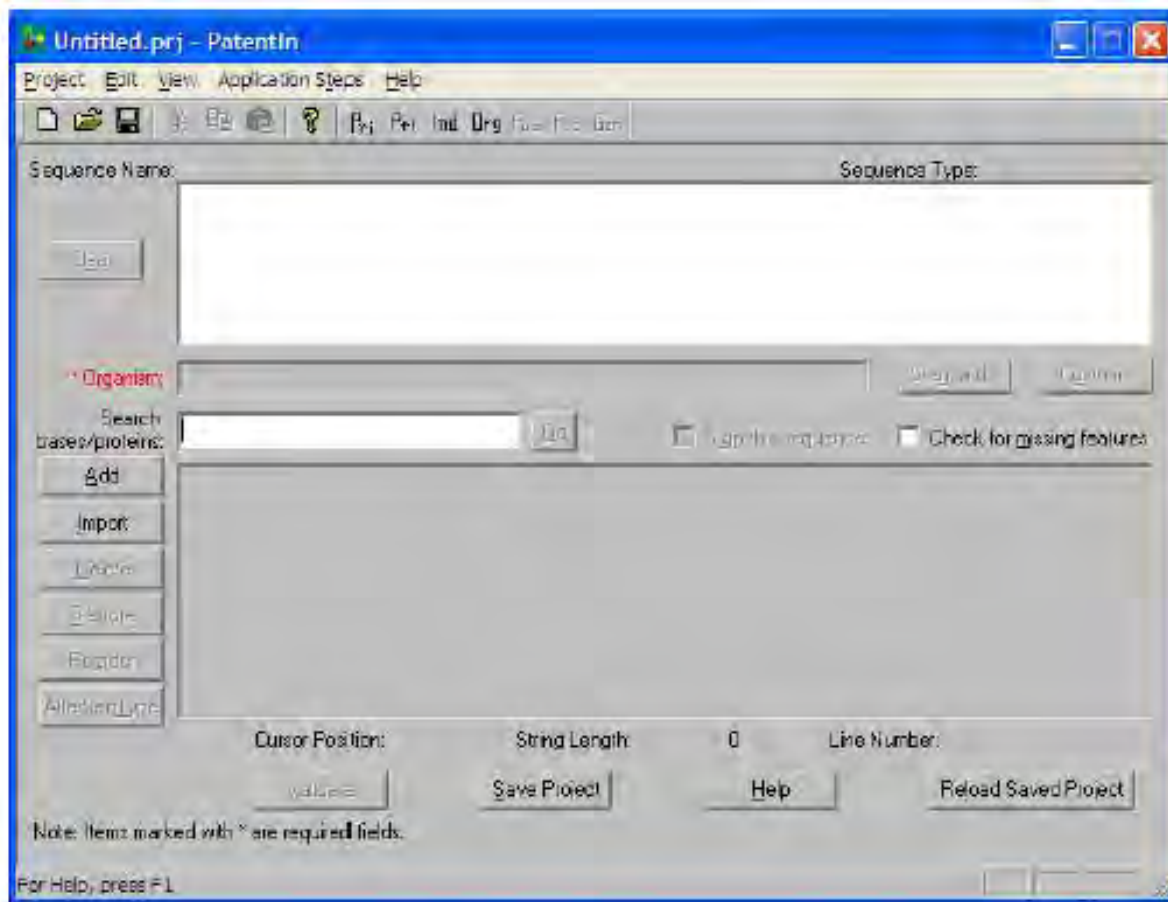
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```

# PCT Sequence Listing Standard

## Presentation of Free Text

- ❑ The Standard defines “free text” as a wording describing characteristics of the sequence which does not use “language neutral vocabulary”, that is, controlled vocabulary used in the sequence listing that represents scientific terms as prescribed by sequence database providers (including scientific names, qualifiers and their controlled vocabulary values, the symbols and the feature keys appearing in the Appendices to the Standard).
- ❑ Where the sequence listing part of the international application contains free text, that free text:
  - may, and preferably should, be in English (irrespective of the language of the main part of the description) (Rule 12.1(d))
  - must be repeated in the main part of the description (“Sequence Listing Free Text”) in the language thereof (ISA invites to furnish correction if not contained in main part of description as filed) (Rules 5.2(b) and 13*ter*.1(d))
- ❑ For the purposes of the national phase (Rule 49.5(a-*bis*)), no designated Office is entitled to require the applicant to furnish to it a translation of any text matter contained in the sequence listing part of the description if such text matter:
  - is presented in accordance with the Standard
  - is repeated in the main part of the description (and hence in any translation thereof)

# PatentIn Software



- ❑ Windows-based version (available free of charge from the JPO, the USPTO and the EPO) designed to expedite the process of preparing sequence listings in a standardized computer readable format complying with the PCT Sequence Listing Standard
- ❑ Helps in creating a database of patent-disclosed sequences
- ❑ Supports the exchange of published sequence data between the European Patent Office, the Japan Patent Office and the United States Patent and Trademark Office in a Trilateral Sequence Exchange Project

# PCT – SAFE

## Secured Application Filed Electronically

**PCT-RO-101 Electronic Request - ol.p008pv**

File Edit View Tools Help

**Check List**

Type of filing: ☒ PCT-EASY ☐ Fully electronic

| Document                               | Details | Pages | Electronic File | Val. |
|----------------------------------------|---------|-------|-----------------|------|
| Request (including declaration sheets) |         | 3     |                 | ✓    |
| Description                            |         | 1     |                 | ✓    |
| Claims                                 |         | 1     |                 | ✓    |
| Abstract                               |         | 1     |                 | ✓    |
| Drawings                               |         | 3     |                 | ?    |

| Document         | Details | Pages | Electronic File      | Val. |
|------------------|---------|-------|----------------------|------|
| Application body |         | 6     | application-body.xml | ✓    |

Open

Recalculate total: 9 pages

International Application Accompanying Items

In total: 7 documents 3 files

## PCT-SAFE: two options

Fully electronic filing of application:

- ☐ entire application in electronic form (image or character-coded), electronically signed
- ☐ transmitted via secure internet connection or on physical media

Preparing request in "PCT-EASY mode"

- ☐ entire application in paper form (legal copy) including the PCT-EASY request form printout
- ☐ plus physical medium with electronic request form and

## PCT-SAFE: fee reductions

- "PCT-EASY" type of filing (on paper + request and abstract on physical medium)  
CHF 100 (EUR 66 or equivalent amount)
- Fully electronic type of filing with application body in image format (for example PDF, TIFF attachments) and only the request in character coded format (XML)  
CHF 200 (EUR 132 or equivalent amount)
- Fully electronic type of filing with application body and request in character coded format (XML)  
CHF 300 (EUR 198 or equivalent amount)

# ePCT Filing



- ❑ Web-based filing of PCT applications available to all PCT applicants
- ❑ Available with 43 receiving Offices
  - Direct: AT, AU, AZ, BG, BN, BR, CL, CO, CU, CZ, DK, DZ, EA, EE, EP, FI, HU, IB, ID, IN, IR, IS, KR, LV, MX, MY, NO, NZ, OM, PH, PL, PT, QA, RU, SA, SE, SG, SK, TR and ZA (40)
  - Upload package: CA, IL, US (3)
- ❑ Real-time online payment to the International Bureau of filing fees by credit card or by debiting a WIPO Current Account (only for filings with RO/IB)
  - Visa, MasterCard/Eurocard, American Express, Diners Club
  - Payment can be made at or after the time of filing

# eOLF / CMS Filing

## European Patent Office



**PCT**  
The International Patent System

WORLD INTELLECTUAL PROPERTY ORGANIZATION

DEMO

Current time in Geneva, Switzerland  Wednesday, 19 February 2014, 11:16 CET

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International Application Number \* :

International Filing Date \* :

Confirmation Code \*    
only for unpublished IAs

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Request eOwnership Code  
for use at the time of filing a new application

[Request Code](#)

# List of PCT Fees

## At RO

- **transmittal fee**
- **international filing fee (for IB)**
- **search fee (for ISA)**
- **supplement per sheet in excess of 30 (for IB)**
- *fee for priority document*
- *late payment fee*
- *late furnishing fee (translation of international application)*
- *fee for requesting restoration of the right of priority*
- *fee for copies of documents*

## At ISA

- *additional search fee*
- *protest fee (where applicable)*
- *fee for copies of documents*
- *late furnishing fee (furnishing of a sequence listing)*

*Fees indicated in italics are payable only in certain circumstances*



## At IB

- *fee for early publication (before issuance of ISR)*
- *fee for publication of refused request for rectification of obvious mistake*
- *fee for publication of late request for correction/addition of priority claim*
- *fee for copies of documents*
- *supplementary search fee (for the SISA)*
- *supplementary search handling fee*

## At IPEA

- **preliminary examination fee**
- **handling fee (for IB)**
- *late payment fee*
- *additional examination fee*
- *protest fee (where applicable)*
- *fee for copies of documents*
- *late furnishing fee (furnishing of a sequence listing)*

# Cost Considerations



February, 2022

## EXAMPLE OF PCT FEES TO BE PAID BY CORPORATE APPLICANTS FROM INDIA

|                             |       |             |                     |                |
|-----------------------------|-------|-------------|---------------------|----------------|
| • Transmittal fee:          | US\$  | 108 (RO/IB) | INR 17,600 (RO/INp) | INR 0 (RO/INe) |
| • International Filing fee: | US\$  | 1,437       |                     |                |
| • Less PCT-SAFE (Max.):     | US \$ | (324)       |                     |                |
| • Less 75% Reduction:       | US\$  | 0           |                     |                |
| • Search fee:               | US\$. | 2,180       | (ISA=US)            |                |
| • Examination fee:          | US\$  | 640         | (IPEA=US)           |                |
| • Handling fee:             | US\$  | 218         |                     |                |

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|                               |             |              |                            |                       |
|-------------------------------|-------------|--------------|----------------------------|-----------------------|
| <b>TOTAL PCT FEE (Ch.I):</b>  | <b>US\$</b> | <b>3,401</b> | <b>INR 17,600 (RO/INp)</b> | <b>INR 0 (RO/INe)</b> |
| <b>TOTAL PCT FEE (Ch.II):</b> | <b>US\$</b> | <b>4,259</b> |                            |                       |

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- *Not exceeding 30 pages + US\$ 16/page*
- *Applicant not Small or Micro entity*

# Benefits from using the PCT – Unique Procedure

- ❑ One application, in one language, filed with one Office, replaces multiple foreign filings until entry into the national phase
- ❑ Permits last minute foreign filing (before expiration of priority year)
- ❑ International filing date has the effect of national filing date in all designated Offices
- ❑ Uniform formal requirements accepted by all designated Offices
- ❑ Greater home control of the prosecution
- ❑ Decision on foreign filings can be postponed up to 30 months from the priority date at minimal cost
- ❑ Enables assessment of economic value of the invention and the chances of obtaining a patent before entering national phase



# Benefits from using the PCT – Greater Flexibility

- ❑ Keep options open by making multiple designations
- ❑ Various possibilities for withdrawal
- ❑ International publication can be prevented or postponed until as late as 15 days before the actual publication date – conditional withdrawal possible
- ❑ Further expenses can be avoided simply by no longer prosecuting the application or not entering the national phase
- ❑ Amendments made during the international phase have effect in all designated/elected States
- ❑ More time for better quality translation for the national phase
- ❑ Better planning of the expenditures for the national phase



# Benefits from using the PCT – Further Features



- ☐ Postponing national filings costs earns interest on capital
- ☐ Fee reductions in national phase in certain national Offices
- ☐ More straightforward and rapid national patent granting
- ☐ Less restrictive unity of invention requirements permit a reduced number of applications in the US
- ☐ Provisional protection after publication at 18 months from the priority date (in countries which afford such protection)
- ☐ 75% reduction in PCT fees for applicants from certain Contracting States

## Evolution of Practice

- Carefully comply with all formal requirements
- Select ISA and IPEA for maximum benefits
- Reserve all market options - designate all
- Docket & track all events
- File early Demands
- Respond to Written Opinions
- Integrate PCT into Portfolio Management Program
- Make final decisions using all information
- Allow your agents sufficient time



# Decisions

- Is filing a PCT application right?
- Where is the market of the invention?
- Who are the customers?
- Who is the competition?
- How easy (or difficult) would it be to design around the claims?
- Is there an incentive to copy in unprotected countries?
- What is the marketing strategy?
- What is important - exclusivity, freedom to practice or both?
- What is your budget?



Key numbers for 2020

# PCT Statistics - 2020

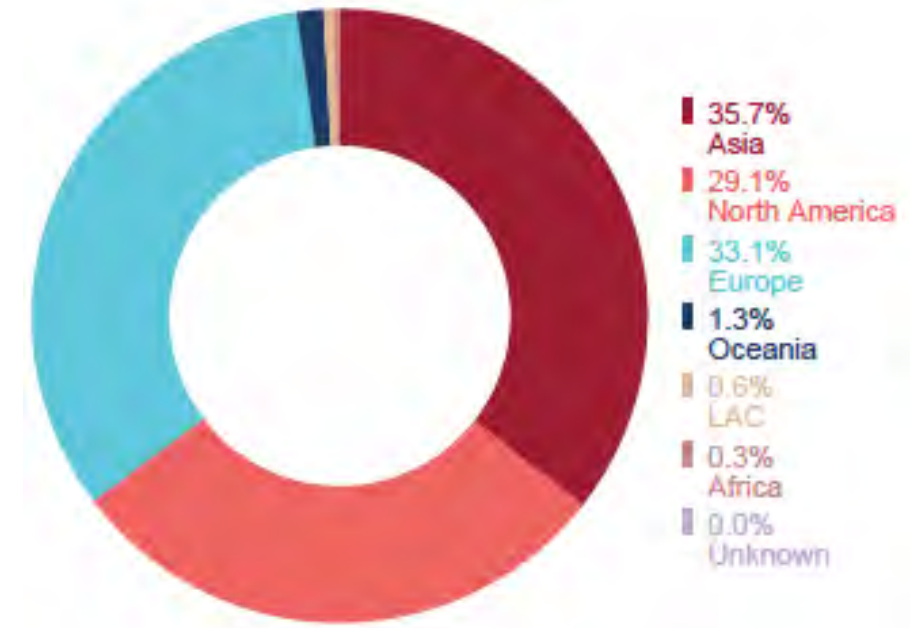
**675,200** (+4.3%)  
PCT national phase entries

**275,900** (+4%)  
PCT applications filed

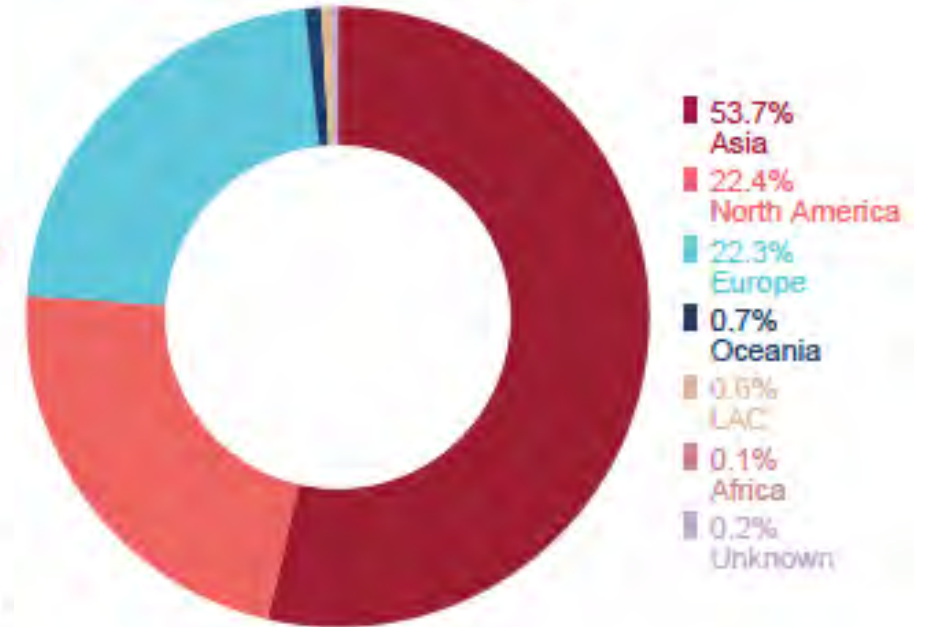
**125** (-3)  
Countries in which PCT applications were filed

**56.7%** (-0.2 percentage point)  
Share of PCT national phase entries in worldwide non-resident patent application filings

**16.5%** (+0.8 percentage point)  
Share of women among PCT inventors

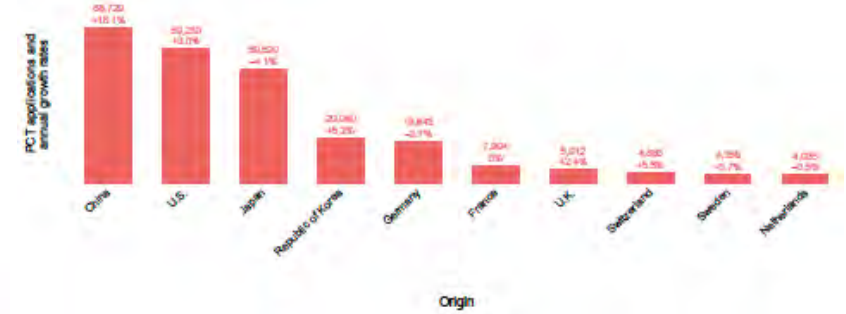
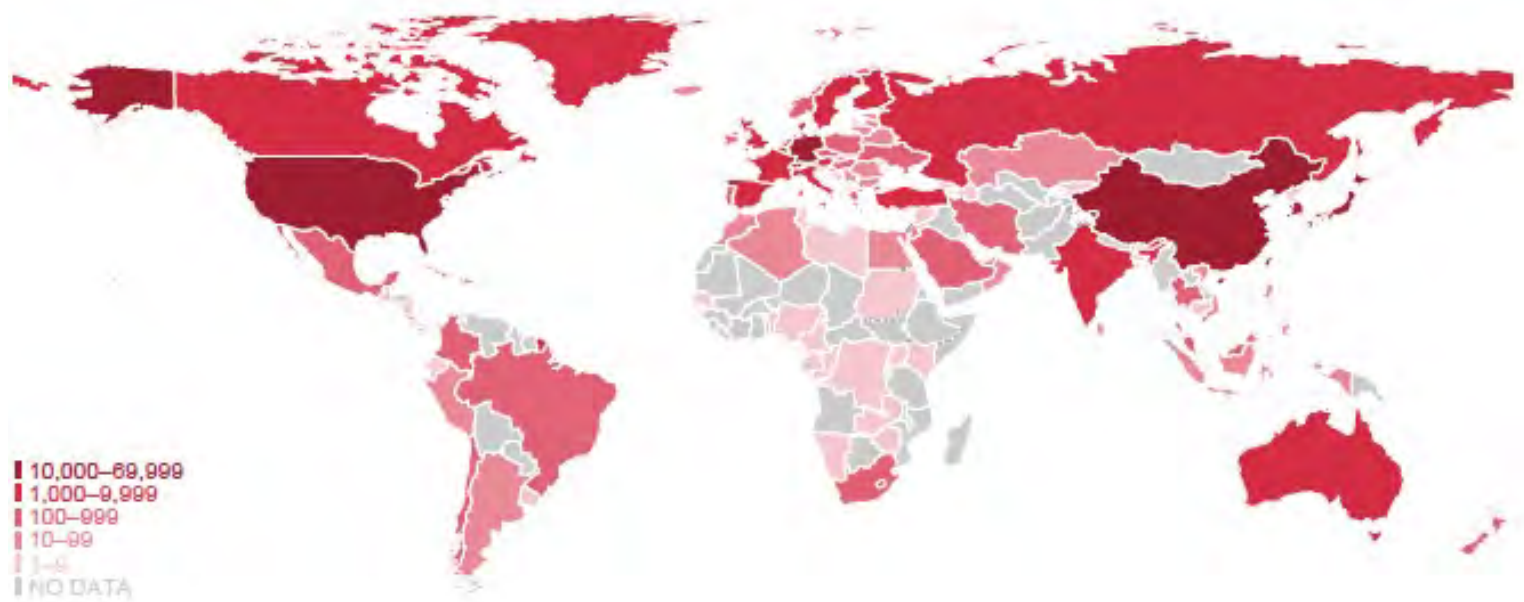


2010

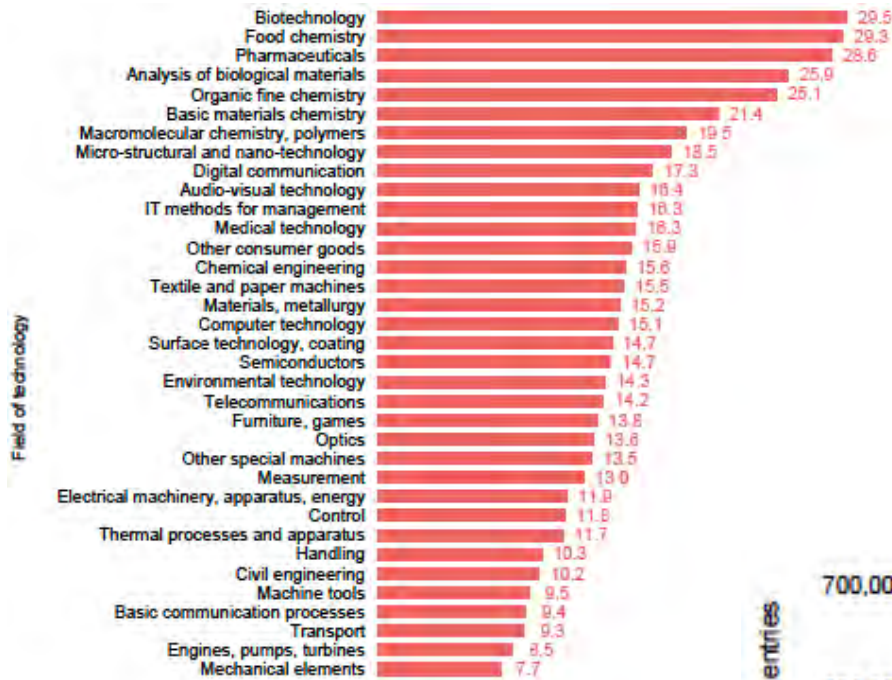


2020

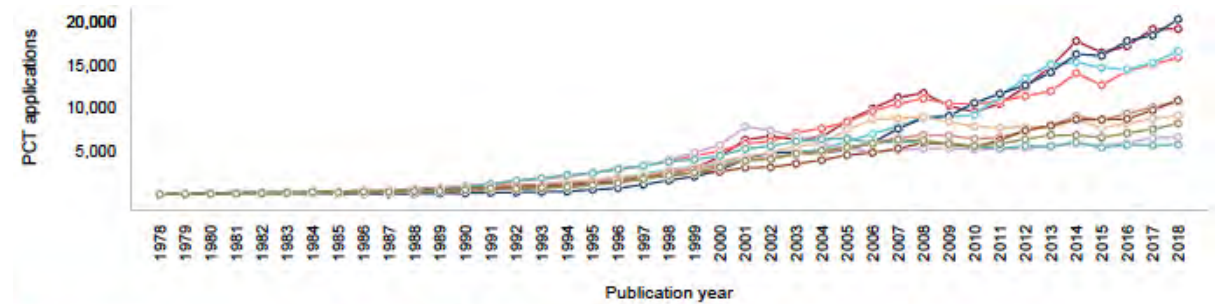
# PCT Trends - 2020



# Top Applicants - 2020



Share of applications with women inventors (%)



WIPO | PCT

The International  
Patent System

PCT NATIONAL PHASE ENTRIES ANNUAL GROWTH RATE (%)

Source: WIPO Statistics Database

# Top Applicants (Corporates) - 2020

| Overall ranking | Change in position from 2019 | Applicant                                            | Origin            | Published PCT applications |       |       |
|-----------------|------------------------------|------------------------------------------------------|-------------------|----------------------------|-------|-------|
|                 |                              |                                                      |                   | 2018                       | 2019  | 2020  |
| 1               | 0                            | HUAWEI TECHNOLOGIES CO., LTD.                        | China             | 5,405                      | 4,411 | 5,464 |
| 2               | 1                            | SAMSUNG ELECTRONICS CO., LTD.                        | Republic of Korea | 1,997                      | 2,334 | 3,093 |
| 3               | -1                           | MITSUBISHI ELECTRIC CORPORATION                      | Japan             | 2,812                      | 2,661 | 2,810 |
| 4               | 6                            | LG ELECTRONICS INC.                                  | Republic of Korea | 1,697                      | 1,646 | 2,759 |
| 5               | -1                           | QUALCOMM INCORPORATED                                | U.S.              | 2,405                      | 2,127 | 2,173 |
| 6               | 1                            | TELEFONAKTIEBOLAGET LM ERICSSON (PUBL)               | Sweden            | 1,645                      | 1,698 | 1,989 |
| 7               | -1                           | BOE TECHNOLOGY GROUP CO.,LTD                         | China             | 1,813                      | 1,864 | 1,892 |
| 8               | -3                           | GUANG DONG OPPO MOBILE TELECOMMUNICATIONS CORP., LTD | China             | 1,042                      | 1,927 | 1,801 |
| 9               | 4                            | SONY CORPORATION                                     | Japan             | 1,342                      | 1,566 | 1,793 |
| 10              | 2                            | PANASONIC INTELLECTUAL PROPERTY MANAGEMENT CO., LTD. | Japan             | 1,465                      | 1,567 | 1,611 |
| 11              | 3                            | HEWLETT-PACKARD DEVELOPMENT COMPANY, L. P.           | U.S.              | 1,170                      | 1,510 | 1,595 |
| 12              | 3                            | MICROSOFT TECHNOLOGY LICENSING, LLC                  | U.S.              | 1,476                      | 1,370 | 1,529 |
| 13              | -4                           | ROBERT BOSCH CORPORATION                             | Germany           | 1,525                      | 1,687 | 1,375 |
| 14              | -3                           | LG CHEM, LTD.                                        | Republic of Korea | 969                        | 1,624 | 1,374 |
| 15              | 12                           | NIPPON TELEGRAPH AND TELEPHONE CORPORATION           | Japan             | 138                        | 703   | 1,372 |
| 16              | 2                            | ZTE CORPORATION                                      | China             | 2,080                      | 1,085 | 1,316 |
| 17              | -9                           | PING AN TECHNOLOGY (SHENZHEN) CO., LTD.              | China             | 336                        | 1,691 | 1,304 |
| 18              | -1                           | SIEMENS AKTIENGESELLSCHAFT                           | Germany           | 1,211                      | 1,153 | 1,202 |
| 19              | -3                           | FUJIFILM CORPORATION                                 | Japan             | 962                        | 1,158 | 1,128 |
| 20              | 0                            | NEC CORPORATION                                      | Japan             | 947                        | 1,024 | 1,121 |
| 21              | 2                            | SZ DJI TECHNOLOGY CO., LTD                           | China             | 766                        | 875   | 1,073 |

# Top Applicants (Universities) - 2020

| Overall ranking | Change in position from 2019 | Applicant                                          | Origin            | Published PCT applications |      |      |
|-----------------|------------------------------|----------------------------------------------------|-------------------|----------------------------|------|------|
|                 |                              |                                                    |                   | 2018                       | 2019 | 2020 |
| 44              | 2                            | UNIVERSITY OF CALIFORNIA                           | U.S.              | 501                        | 470  | 559  |
| 99              | 8                            | MASSACHUSETTS INSTITUTE OF TECHNOLOGY              | U.S.              | 216                        | 230  | 269  |
| 107             | -3                           | SHENZHEN UNIVERSITY                                | China             | 201                        | 247  | 252  |
| 118             | -25                          | TSINGHUA UNIVERSITY                                | China             | 137                        | 265  | 231  |
| 136             | 266                          | ZHEJIANG UNIVERSITY                                | China             | 41                         | 69   | 209  |
| 154             | 15                           | BOARD OF REGENTS OF THE UNIVERSITY OF TEXAS SYSTEM | U.S.              | 159                        | 161  | 184  |
| 177             | 12                           | DALIAN UNIVERSITY OF TECHNOLOGY                    | China             | 53                         | 141  | 159  |
| 183             | -20                          | SOUTH CHINA UNIVERSITY OF TECHNOLOGY               | China             | 170                        | 165  | 157  |
| 190             | 19                           | LELAND STANFORD JUNIOR UNIVERSITY                  | U.S.              | 121                        | 132  | 154  |
| 202             | 33                           | UNIVERSITY OF TOKYO                                | Japan             | 92                         | 119  | 149  |
| 204             | 75                           | CHINA UNIVERSITY OF MINING AND TECHNOLOGY          | China             | 114                        | 100  | 148  |
| 206             | -5                           | SEOUL NATIONAL UNIVERSITY                          | Republic of Korea | 113                        | 136  | 146  |
| 223             | 183                          | NORTHEASTERN UNIVERSITY                            | China             | 51                         | 83   | 132  |
| 225             | 15                           | JIANGNAN UNIVERSITY                                | China             | 74                         | 118  | 131  |
| 232             | 40                           | OSAKA UNIVERSITY                                   | Japan             | 105                        | 105  | 128  |
| 239             | 79                           | SOUTHEAST UNIVERSITY                               | China             | 47                         | 89   | 125  |
| 240             | 15                           | HANYANG UNIVERSITY                                 | Republic of Korea | 89                         | 113  | 124  |
| 246             | 80                           | JOHNS HOPKINS UNIVERSITY                           | U.S.              | 99                         | 87   | 121  |
| 248             | -56                          | HARVARD UNIVERSITY                                 | U.S.              | 169                        | 140  | 118  |
| 248             | 57                           | KOREA UNIVERSITY                                   | Republic of Korea | 72                         | 93   | 118  |
| 260             | 169                          | SHANDONG UNIVERSITY OF SCIENCE AND TECHNOLOGY      | China             | 13                         | 64   | 111  |
| 270             | 291                          | YONSEI UNIVERSITY                                  | Republic of Korea | 65                         | 48   | 108  |
| 270             | 17                           | NORTHWESTERN UNIVERSITY                            | U.S.              | 71                         | 98   | 108  |
| 280             | 307                          | TIANJIN UNIVERSITY                                 | China             | 23                         | 46   | 104  |
| 280             | 56                           | COLUMBIA UNIVERSITY                                | U.S.              | 59                         | 84   | 104  |
| 302             | -75                          | KING ABDULLAH UNIVERSITY OF SCIENCE AND TECHNOLOGY | Saudi Arabia      | 78                         | 123  | 97   |
| 308             | 48                           | NATIONAL UNIVERSITY OF SINGAPORE                   | Singapore         | 70                         | 79   | 96   |

# Top Applicants (Govt. / Research Institutes) - 2020

| Overall ranking | Change in position from 2019 | Applicant                                                                   | Origin            | Published PCT applications |      |      |
|-----------------|------------------------------|-----------------------------------------------------------------------------|-------------------|----------------------------|------|------|
|                 |                              |                                                                             |                   | 2018                       | 2019 | 2020 |
| 61              | 13                           | FRAUNHOFER-GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V.        | Germany           | 345                        | 331  | 428  |
| 70              | 110                          | SHENZHEN INSTITUTE OF ADVANCED TECHNOLOGY                                   | China             | 128                        | 152  | 362  |
| 80              | 9                            | CHINA ACADEMY OF TELECOMMUNICATIONS TECHNOLOGY                              | China             | 304                        | 276  | 321  |
| 137             | -28                          | COMMISSARIAT À L'ÉNERGIE ATOMIQUE ET AUX ÉNERGIES ALTERNATIVES              | France            | 289                        | 229  | 208  |
| 170             | 60                           | INSTITUT NATIONAL DE LA SANTÉ ET DE LA RECHERCHE MÉDICALE (INSERM)          | France            | 149                        | 122  | 167  |
| 211             | -8                           | AGENCY FOR SCIENCE, TECHNOLOGY AND RESEARCH                                 | Singapore         | 130                        | 135  | 142  |
| 246             | -33                          | CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE (CNRS)                         | France            | 139                        | 130  | 121  |
| 300             | -69                          | NATIONAL INSTITUTE OF ADVANCED INDUSTRIAL SCIENCE AND TECHNOLOGY            | Japan             | 139                        | 121  | 98   |
| 348             | 46                           | KOREA ELECTRONICS TECHNOLOGY INSTITUTE                                      | Republic of Korea | 65                         | 70   | 83   |
| 367             | 149                          | ELECTRONICS AND TELECOMMUNICATIONS RESEARCH INSTITUTE OF KOREA              | Republic of Korea | 56                         | 53   | 79   |
| 384             | 10                           | NEDERLANDSE ORGANISATIE VOOR TOEGEPAST-NATUURWETENSCHAPPELIJK ONDERZOEK TNO | Netherlands       | 48                         | 70   | 76   |
| 404             | -82                          | MAYO FOUNDATION FOR MEDICAL EDUCATION AND RESEARCH                          | U.S.              | 71                         | 88   | 73   |
| 448             | 34                           | CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS (CSIC)                      | Spain             | 44                         | 56   | 66   |
| 474             | 1204                         | MIMOS BERHAD                                                                | Malaysia          | 1                          | 15   | 62   |
| 515             | -14                          | KOREA RESEARCH INSTITUTE OF CHEMICAL TECHNOLOGY                             | Republic of Korea | 51                         | 54   | 58   |
| 532             | 47                           | MAX-PLANCK-GESELLSCHAFT ZUR FÖRDERUNG DER WISSENSCHAFTEN E.V.               | Germany           | 41                         | 47   | 55   |
| 538             | -79                          | SLOAN-KETTERING INSTITUTE FOR CANCER RESEARCH                               | U.S.              | 56                         | 60   | 54   |
| 548             | 336                          | BATTELLE MEMORIAL INSTITUTE                                                 | U.S.              | 27                         | 30   | 52   |
| 584             | -309                         | U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES                                | U.S.              | 99                         | 103  | 48   |
| 605             | -1                           | COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH                               | India             | 48                         | 45   | 46   |

Source: WIPO Statistics Database

-1-



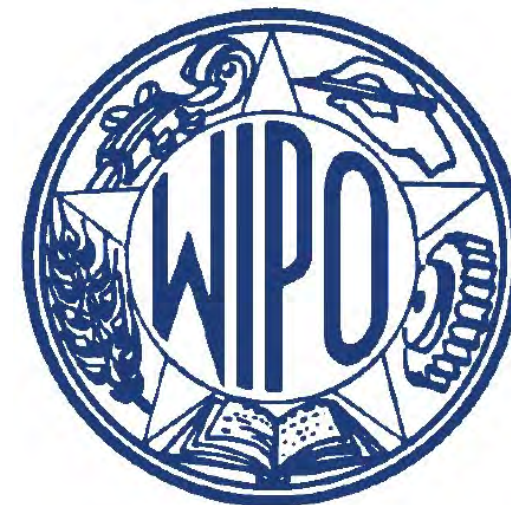
LOW TEMPERATURE SYNTHESIS OF VITREOUS  
BODIES AND THEIR INTERMEDIATES

FIELD OF THE INVENTION

This invention relates to a novel method for making a  
5 vitreous body and its intermediates. More particularly, the  
method relates to a low temperature production of a vitreous body  
via synthesis of a self-supporting body by solution deposition.

DESCRIPTION OF THE PRIOR ART

In recent years, the most commonly employed commercial  
10 process for the manufacture of glass is the direct melting  
process. This process is somewhat tedious and has not been very  
successful in the melting of easily devitrifiable and high refrac-  
tory glass. Many of the latest technological advances demand  
glass to be in a state of high purity which is seldom met in a



**PCT**

WORLD INTELLECTUAL PROPERTY ORGANIZATION  
International Bureau



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |           |                                                                                                                                                                                                                                               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>(51) International Patent Classification <sup>6</sup> :</b><br><b>D01D 5/42, F16J 15/22, D01F 6/12</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>A1</b> | <b>(11) International Publication Number:</b> <b>WO 99/60191</b><br><b>(43) International Publication Date:</b> 25 November 1999 (25.11.99)                                                                                                   |
| <b>(21) International Application Number:</b> PCT/IN98/00001<br><b>(22) International Filing Date:</b> 29 December 1998 (29.12.98)<br><br><b>(30) Priority Data:</b><br>318/Bom/98                      20 May 1998 (20.05.98)                      IN<br><br><b>(71)(72) Applicant and Inventor:</b> PANDEY, Raj, Kumar [IN/IN];<br>Plot No. A/465, Road No. 28, Wagle Industrial Estate,<br>Thane 400 604, Mumbai, Maharashtra (IN).<br><br><b>(74) Agent:</b> BHATNAGAR, Mahendra, Prasad; Lall Lahiri &<br>Salhotra, N-128, Panchsheel Park, New Delhi 110 017 (IN). |           | <b>(81) Designated States:</b> US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).<br><br><b>Published</b><br><i>With international search report.</i><br><i>With amended claims and statement.</i> |
| <b>(54) Title:</b> EXPANDED SINGLE MOLECULAR ALIGNED TEMPERATURE TREATED YARN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |                                                                                                                                                                                                                                               |



# When to use PCT?



- Ease of filing
- Gain additional time to make final filing decisions
- To get information, licensees, capital, partners
- Preserve the right to continue prosecution in any PCT member country
- Get global publicity for your invention via PCT publication
- Delay costs
- Receive a single search report and written opinion

- I know I need foreign patent protection
- I think I may need foreign patent protection
- I have no idea whether or not I need foreign patent protection
- I think I may be on to something big, but....
- I want an active filing strategy but need to spread my costs

## When Not to use PCT?



- I have no interest in obtaining foreign patent rights
- I know I only want protection in *X* countries, and
- Those countries allow me to file in English or
- I am prepared to produce the necessary translations by 12 months
- I am prepared to pay national filing fees right away
- I have received sufficient information to give me confidence to proceed
- I have designated foreign counsel who are able to prosecute the application
- I need protection in a non-PCT country



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