POTENTIAL PATENT PROBLEMS ON THE ISS

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ABSTRACT

Due to the jurisdictional arrangement of the ISS coordinating patent protection for inventions developed on the ISS will be challenging. This paper will look at the three countries with a lab on the ISS and how their different standards for granting a patent will affect work on the ISS. And how the countries recognize different patent holders, which can lead to infringement problems when planning an experiment. Companies working on the ISS will need to be aware of these potential problems throughout the process of planning and conducting an experiment on the ISS.

INTRODUCTION

There are two main concerns when dealing with patents: receiving the patent and preventing infringement of the patent. The patent requirements are similar in most countries.[1] The three major regimes, which concern most inventors, are the US Patent and Trademark Office (PTO), the Japanese Patent Office (JPO), and the European Patent Office (EPO).[2] They govern most technological developments and handle the majority of the patent applications filed world-wide. Their influence extends beyond their borders, since a majority of the world's patent applications are filed with them. This influence is about to be extended to space. These regimes will have jurisdiction over the research modules of the International Space Station (ISS). Due to the differences in the three regimes obtaining a patent and preventing infringement are going to be problems on the ISS.

The governments' agreement for the ISS deals with the issue of patents in a cursory manner.[3] It waives exclusive filing requirements[4] and makes all transmissions from the station to any participating country confidential.[5] Beyond exempting inventors from a few filing requirements the countries do not make any patent protection guarantees.

The jurisdictional arrangement will dictate how to deal with patent applications; meaning whichever country registers the element has jurisdiction.[6] The potential for confusion is a result of unharmonized patent requirements and the unique environment of the ISS. Since patent protection has few extra-territorial effects, then by nature, patents are very state specific.[7] The one extraterritorial effect of a patent is it can preempt others from claiming the patent in a different country because prior art published in another country will prevent a claim of novelty.[8]

The US, Japan and the European Space Agency (ESA) will have jurisdiction over the main research modules.[9] Therefore it is important to understand how the different patent systems will affect the patent rights to experiments conducted in the modules.

The ISS presents new problems due to the unique configuration of jurisdiction and access. Information on earth can be controlled to prevent disclosure. On the ISS the researchers will be astronauts selected by the space agencies, and an experiment may be assigned to a module according to space available or equipment needed. This creates new circumstances regarding information sharing, analysis, original research and inventions. Issues of disclosure and public use will be raised by research on the ISS.[10]

It is important that the countries involved with the ISS and the industries that contract

with them to do research on the ISS are aware of the potential problems before beginning a relationship. Both the ESA and US are actively soliciting industrial involvement.[11] The ESA goes as far as to guarantee all intellectual property rights will go to corporations that work with them[12], but it is important to know what intellectual property rights are being offered and potential problems or limits to those rights. This paper can not solve the potential problems nor offer accurate speculation on how the ambiguities will be worked out, but it starts to identify the issues at stake on the ISS.

This paper will briefly survey the United States, European, and Japanese patent systems focusing on standards of patentability and other differences relevant to this discussion. Then the paper will consider how these differences will cause patent problems on the ISS, especially concerning biotech, computer and discovery research. And finally discuss a few possible solutions to the patent problems for companies wanting to minimize their risk when researching on the ISS.

This paper will not try not to rehash the debate about harmonization of the world patent standards, since that has been done extensively in other articles and books.[13] The discussion here will try to limit itself to problems caused by working on the ISS.

I. PATENT REGIMES OF THE 3 EXPERIMENT MODULES

A. Goals

The United States and the European Union both have set up their patent system to given an incentive to the inventor to invest time and money into creating useful inventions.[14] They protect the ability of the inventor to market and reap the profits of the invention, while ensuring the use of new invention by industry. While their methods may differ, the common goal ensures that a careful inventor can coordinate simultaneous patent applications.

Japan differs, since a patent is not granted to reward the individual inventor, but to encourage development for the industry and communities benefit.[15] Therefore Japan has lower standards of invention and a strict disclosure policy.[16] The JPO grants patents in a manner that encourages patent flooding, so many different corporations can utilize advances.[17] The differing goal of the Japanese patent system makes a unified approach to patenting an invention in different countries challenging to coordinate.

B. Filing

To patent an invention in several countries the filing requirements must be coordinated carefully. The challenges include establishing who has the priority claim to file the application and what can be disclosed about the invention.

The ISS agreement decides patent issues to the extent of waiving any prior permission requirements for nationals wishing to first file in a foreign country.[18] Under normal patent laws, the US requires any citizen working in the US, who wants to first file in another country, to get permission to be exempted from the secrecy rules surrounding a US application.[19] The ISS agreement eliminates the need to get prior approval for a simultaneous filing, though it only covers the activities before an application is filed.[20]

a. Priority The United States has a 'first to invent' priority system.[21] This means that whoever can prove they were the first to develop the invention has priority in obtaining the patent, even if someone else files first. This places an onus on the inventor to keep detailed and verifiable records of their work.[22] During the patent review process others will have the opportunity to challenge a patent and prove that the inventor is not the first person to develop the invention.[23]

The EPO and Japan have a 'first to file' priority system.[24] The presumption of priority under a first to file rule cannot be challenged.[25] This means that whoever organizes the material to be patentable will qualify for the patent if they file first. Research, which will be patented, must be done discretely so that others do not gain access to the information before the filing date. On the ISS, secrecy may not be possible among the inhabitants and others monitoring activity on the ISS.[26]

b. Disclosure The next filing problem is disclosure. All three countries require that a patent be filed before public disclosure of the invention. The US will allow a patent to be filed within a year if there were specific types of disclosure.[27] The EPO and JPO consider public disclosure a bar to a patent claim.[28] The conflicts for disclosure after filings are harmonization problems. The ISS disclosure problems center around what will be considered a public disclosure if information is shared among astronauts, lab technicians and the governments.

Transmissions back to Earth are considered confidential, but security exceptions allow for agencies to monitor the transmissions.[29] The ISS agreement does not address when astronauts consult with expert on earth about experiments their conducting, nor are these types of transmissions required to be kept confidential. Likely the information will not be just communicated back to earth stations and delivered to the corporations or inventors, but discussions will occur among the scientist at the space agencies and between station monitors, who have to coordinate safety issues and other concerns. Establishing whether disclosure has occurred will be difficult if confidentiality agreements do not include everyone, who will review the information.

Related to the disclosure problem is how to address research known by the astronauts on the ISS. What if information related to a patent is in use on the ISS in a different experiment or by the astronauts? Does this amount to public disclosure?[30] These questions do not have any answers currently. They are risks that inventors must weigh when deciding if they should conduct the experiments on the ISS.

If an experiment provides a particularly useful adaptation for equipment or possible biological growth, it is likely the astronauts will want to use the adaptation in other experiments to provide for better results or efficiencies. On Earth public disclosure occurs if the adaptation is used in public or if another inventor or company uses it.[31] In space the circumstances are not as clear. If the experiment's sponsor has filed a patent, the astronaut, who worked on the project, has a joint claim and can use it within his scope of work; this use, arguably, does not amount to public disclosure. In Japan and the EPO there is no joint claim under the first to file system, so their treatment would entirely depend on interpretation of their stricter prior disclosure rules. How the patent systems deal with this sort of scenario could lead to different treatment in the three countries, since this is a matter of interpreting conflicting regulations.

On Earth the corporations arrange for the patent rights to be assigned to them by their employees. The astronaut working on the experiment will probably be required to do more than just wait for the results to be returned to earth to be analyzed. This involvement makes them an inventor, who has equal claim to the patented invention. It is important to include an assignment in the contract with the space agency to cover work done by the astronauts.

II. STANDARDS OF PATENTABILITY

The patentability standard determines if an invention is patentable or non-patentable. The patentability criteria requires identifying if an invention is useful, creative and new.[32] Each regime applies the test in a slightly different manner, though several patent treaties have created similar terminology and approaches.

A. Background

The EPO's and US's patentability standards were developed from the same model. Both regimes require an invention, to be technical and not abstract.[33] Both have designed a standard of "concrete and [having] a technical character."[34] Special categories allow process, which are technical but not concrete, to be patented.[35] An example of particular interest to the research on the ISS is the treatment of the discovery and isolation of new substances. A patent can be given for the technical process of isolating or developing the new material, even if the actual material may not be patentable.

Standards of patentability in Japan are less rigorous than in other regimes. Since Japan's goal is to promote the advancement of industry, there is no incentive to make a patent difficult to obtain.[36] Section 29 of Japanese patent law identifies the requirements for an invention to be patentable as, "an invention which is industrially applicable."[37] The only restriction in this section is the invention must not be publicly known or worked in Japan.[38]

In all three systems the test for establishing patentability contains three elements. Those elements are inventive step, novelty, and usefulness.

B. Inventive Step

The United States requires innovation in the form of an inventive or 'unobvious' step.[39] The inventive step requirement considers what is done to make the invention or process an improvement or advancement over prior art.[40] The standard is that the development must not be obvious to others with similar knowledge and experience in the field.[41] The current test considers obviousness as closely related to the particular art of the invention.[42]

The EPO standard focuses less on the 'unobvious' standard and deals more with creativity and work added to advance the invention.[43] Inventive step inquisitions seem to be trying to reward an inventor for their effort and creativity. The inventive step examination intertwines the novelty test during an EPO examination.[44] The finding of novelty seems to create a presumption of inventive step.

In Japan the amount of change required for an inventive step is relatively low.[45] This allows several corporations to develop the same technology with just minor differences. So with small modifications another person can be granted an entirely separate patent.[46]

C. Novelty

No patents are granted for inventions that are known and in use by others.[47] The 'novelty' requirement in all the regimes require a novelty search for other inventions that would preempt the current application.[48] If a novelty search is not thorough an infringement suit can have the patent declared invalid due to prior art.[49] The patent systems provides an opportunity for the public to challenge the patent as not novel before a patent is issued.[50] The novelty challenge does not substantially differ between the regimes, except in timing and accessibility.

In the United States an inventor has to file within a year of the invention's released to the public, and the release must not have been extensive.[51] In EPO and Japan there is no one year grace period, and a release in another country can preempt a patent.[52]

D. Industrial Application/ Useful

The 'useful for an industrial purpose' requirement is almost identical in all three regimes. To patent an invention it must be capable of being made or used in some kind of industry.[53]

In the United State courts have held that an invention must prove a beneficial use, and it is insufficient to allege that an invention might offer potential advantages.[54] The EPO simply requires an allegation that the invention will have a practical utility.[55] In Japan they are likely to give a patent for an item that can be developed to have a commercial utility.[56] This relaxed standard is partly a result of their compulsory licensing regime, which ensures that a company can not patent a development

and then hold the patent to prevent competition. If a patent is not being worked and developed for commercial use, then a competitor can arrange for a compulsory license to be granted, and they can develop the commercial utility.

3. Patent Issues Relevant to the ISS

A. Inventive Step

This is the patent requirement most likely to cause problems on the ISS. The first problem will be the tendency of Japan to grant a patent for minor changes. A Japanese company holding a Japanese patent for a device could want use this device in research in a different lab. There the device could infringe another patent.[57] If the infringed patented is held in the jurisdiction of the lab where the experiment occur, then an action for infringement could be brought against the Japanese company. The company would have to license and pay to use a device for which they own a patent.

Secondly, how will countries decide issues of 'non-obviousness', because things not obvious in an earth lab could be obvious on the ISS. As researchers adjust to working in space modifications and specific improvements will become obvious which were not previously known. Will these adaptations be innovative? They are new to the field and not obvious on earth, but they are obvious to the researcher working in space. These questions have no answers and ultimately the answer could be different in the three regimes.

B. Discoveries

A discovery of an unknown scientific principle or material is not patentable if it could occur in nature.[58] However a process for refining or isolating the material is patentable.[59] The ability to patent a newly developed material turns on whether the material requires human intervention to exist as opposed to intervention to simply isolate the material.[60]

On the ISS there is potential that new materials will be isolated and created. There are two possible problems unique to the ISS. If the material could not be isolated on earth, there is a question of whether it is "naturally occurring" for patent standards.[61] Contrasting the space lab process to natural activities on earth is difficult due to the very different environments. There is the possibility that patent agencies will decide that if the process cannot be replicated on earth, it is a discovery, and only the isolation process can be patented. There is no precedence for distinguishing between naturally occurring events on earth and in space. There is the potential for different views to be taken on the patentability of a substance.

C. Biotechnology

One field expected to benefit from work done on the ISS is biotechnology. The potential developments in genetics, medicine, and microbiology create an opportunity to market the research done on the ISS. However, the problems companies face reaping the benefits of the research should be considered before working on the ISS.

Biotechnology is a controversial area of science and there is an on-going debate about the patentability of biotechnology. The core of the debate is how to encourage advancement, yet limit biotechnology from work in certain areas to avoid ethical concerns.[62] In some countries there is a moratorium on certain types of research and development, for instance Europe has imposed restrictions on biotech developments involving human genomes as contrary to the public morale.[63]

The US has a special plant patent for new varietals, but biotechnology goes beyond new plants.[64] The US has liberal biotech patent policies. Almost any biotech development is patentable, including genetic markers and other isolated and identifiable genes.[65] The challenge in the US biotech patents occurs when establishing the utility of the invention or process.[66] The courts have found it is not enough to allege that the work will help to treat a disease or produce a certain advantage in other organisms, but evidence must be offered

to show its usefulness in fulfilling these claims.[67]

The EPO in interpreting Art 53(b), which excludes "plant or animal varieties or essentially biological processes for the production of plants or animals," has created a test of whether the process is 'essentially biological'.[68] The test balances the degree of technical control over the process with the amount of natural selection allowed in the process.[69] If intervention plays a significant part in determining or controlling the result that is intended then the process would not be excluded.[70] Most experiments in the ISS would probably be patentable by the EPO since a process of treating plants or animals to improve its properties or yield or to promote or suppress growth is identified as patentable in the guidelines. However observation experiments might not be, since the responses are biological even if they occur entirely within a controlled environment and the stimulus is provided through human intervention.

In Japan if the biological work is based upon common process for genetic manipulation or isolation of biological matter then the JPO and EPO agree that it is generally obvious, because anyone using the state of the art process in the field would yield the same results.[71] However if the work produces an unexpected result or develops a protein with unexpected characteristics, then there is novelty and non-obviousness.[72] Since they focus on the process, small overlaps in results will likely undermine the position of the patent holder who brings a challenge.[73]

D. Infringement Problems

The most immediate problem with patents on the ISS will be infringement issues. It is possible for different people to have a patent for the same or a similar invention granted by different countries. Since Japan has a minimal inventive step requirement it possible that several people in Japan could hold a patent to an invention, which would be considered infringing someone else's patent in other countries. Since patents are territorial, this has little impact on further research or manufacturing on earth. On the ISS this will be a problem since only one patent will be enforceable.

While the countries involved in the ISS have signed cross-waiver agreements, intellectual property was exempted from the waiver.[74] Therefore if one country would like to conduct an experiment in another country's lab, which utilizes a patent they do not have a license to use, then their experiment could be challenged as infringing. Once a country grants a patent they can enforce the patent within their territory regardless of another country's ability to give a different person the patent. Since part of infringement enforcement is injunctive relief,[75] experiments could be preempted from being conducted in a module where they infringe. Companies should consider this possibility before deciding in which lab they will work.

Infringement will also be an issue if one country issues a patent for an invention other countries consider unpatenable. This is especially likely in the field of biotech. Biotechnology interplays here since the US patents many things other countries deem unpatenable, like genetic markers and DNA sequences. It is likely research will be done that is considered infringing, since the genetic markers and DNA sequences are found in multiple sample sources. On the ISS infringement could exclude the research from proceeding.

E. Computer Software

Computer software is an art difficult to categorize. The software is not tangible, so it is hard to call it an invention. The purpose of a program is to simulate a person's thinking process at rapid speeds for efficiency gains. Since a thought process is not patentable it is hard to say that when a computer imitates the human thought process it should be patentable.

Still there are some good reasons to patent computer programs including encouraging the development of computer software. Most countries only offer copyright protection. But many inventors prefer to get patent protection for their computer developments, because the patent system does not allow 'fair use' infringement.

In the United States if a computer program has a technical component that does more than simulate the human thought process it could be patentable.[76] However the PTO has not established guidelines about how to determine if a computer development combined with the software is patentable. Previous standards held that software intensive inventions were patentable and even that novel and unobvious algorithms could be patented, if essential to the functioning of an invention.[77]

In Europe the EPO's guidelines distinguish a computer program claimed as a physical record from a computer program combined with the hardware to allow the computer to operate in a technical way.[78] To clarify, the EPO identifies process, machines, and manufacturing controlled by computer programs as patentable. The patent will includes the computer program to the extent it can not be separated.[79]

Japan has taken the approach of strengthening their copyright laws to protect the literal expression of a computer program and limiting the fair use provisions for computer programs.[80] Any ideas embedded in the computer program must qualify for a patent to be protected, by meeting the standards of novelty, non-obviousness and a technical industrial use.[81] Companies find it easier to gain patent protection for computer programs in Japan. Because of the extensive protection given, the Japanese lab may have difficulty avoiding infringing computer work.

On the space station computer software is necessary to run the experimental environments. Often this software is novel since it must be adapted to deal with the special conditions that exist on the space station. There is also the potential that computer programs will be developed on the space station to deal with unexpected circumstances. If some countries only offer copyright protection for these adaptations and others provide patent protection then there is a danger that 'fair use'[82] or 'compulsory licensing' agreements[83] would effectively negate the marketability of any developments.

IV. POSSIBLE SOLUTIONS

The most probable solution to these potential problems will require the companies who research on the ISS to contract with the space agency carefully. If enough companies decide the risk is worth seeking a legislative or governmental fix then there is the potential to have a wide-spread solution. This section will briefly discuss a few of the potential solutions.

A. New ISS agreements

This has the most potential to ensure a standard treatment of issues unique to work in space. However it would not solve the different standards of patentability. Those are problems that are fundamental to the patent systems and changes could affect patents for inventions not related to the ISS. Each country has a political stake in maintaining its current patentability standard, even if the standard will change over time. The problems with patents related to the ISS are unlikely to result in a treaty that will solve the problems.

B. Cross-Waivers and Compulsory Licensing

There are some simple solutions to the infringement problem. One would be another set of cross-waivers that preempt liability in infringement suits for experiments conducted on the ISS. If the liability exemption is kept narrow to deal with the specific problem of using infringing inventions in experimental research then this is a viable solution and a politically simple fix. Some patent owners will object, but cross-waivers only cover work on

the ISS and should not result in significant damage to their patent claim.

The other option is a legislative fix where a compulsory licensing system is set-up to allow foreign nationals to gain a license from the patent owner from the country in whose lab they will be working in the ISS. This means if someone outside the United States would like to use an invention that is patented within the US, they could license the patent for use only in the ISS lab. Japan already has a compulsory licensing system, but that takes time to qualify and there are few guarantees that another person could gain the license for use on the ISS. Their system would only need a small provision for ISS compulsory licensing, while the US and Europe would need to develop a system for the licensing.[84] Getting any legislation passed is difficult, especially when there are few groups to lobby for the change this early in the ISS program. Until more business start to care about this problem it is unlikely that any legislative fix will happen.

CONCLUSION

The onus to deal with the potential patent problems is on the corporation planing to do research on the ISS, since it is unlikely that the governments or space agencies will provide a solution. When deciding to invest in research on the ISS a company will have to weigh the risk and uncertainty of the patentability of the results against the potential benefits. A few strategies and clarified goals can assist a company in making a good investment decision.

First a corporation should decide if their main concern is to develop a patentable product on the ISS or if the research will only provide the beginnings of their research. If they believe the work will result in an almost finished product then they need to design their experiment carefully to provide the most protection to the patentability of the research. If the research is providing a basic background then the corporation will want to design their experiment in a manner to minimize the potential infringement challenges. For example a new biological organism should be developed in the US lab to increase the chances it will be patentable.

Once a company decides they want their experiment's results to be patentable, then they need to decide where on earth they wish to patent the invention. At this point a patent attorney should be consulted to help guide the country around the harmonization problems of filings and avoiding public disclosure before a patent has been secured.

When contracting with the space agency to conduct an experiment in their lab or using some of their allocated time in another country's lab there are a few contractual provisions that might help avoid problems. First a corporation might need to consider a separate contract with the astronaut and others on the ISS to ensure that they can be assigned all intellectual property rights. Secondly, the corporation should provide for a right to license use of any modification or process, which might be developed when working on their experiment, but put to use elsewhere in the ISS on other projects. By licensing the ability to use the intellectual property on the ISS, the corporation can maintain a claim that they still had control over the disclosure of the invention and that it was a limited use and not a public disclosure. Thirdly the corporation will want to address in greater detail the control of information relayed from the ISS to the agency and their scientist and managers. By providing a provision barring disclosure to the general public by any personnel authorized by the agency to monitor and have access to information transmitted from the ISS the corporation will be protecting its investment from being publicly disclosed before it can be patented.

These contract provisions will not solve the patent problems of doing research on the ISS, but they will help protect the patentability

of the research. The final decision of how to proceed with creating experiments for the ISS labs will need to be reviewed with a patent attorney, who is experienced with securing patents in multiple countries. And the decision to invest in ISS research will involve some unavoidable risks until some of the potential problems have been addressed by the different patent regimes controlling the ISS. The ISS is new territory for research and invention and entering new territory during its early phases is always risky.

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[1] Due to treaty negotiations there are three basic elements of a patent; countries differ in interpreting and applying these elements.

[2] The European Patent Convention was signed on October 5, 1973. *See, European Paten Office Treaty Collection* (update July 1997) <http://www.european-patent-office.org/epc97/epc97-e.htm>. An EPO application must specify in which countries the patent will be registered and pay a fee for each country.

[3] See Agreement Among the Government of the United States of America, Governments of Member States of the European Space Agency, the Government of Japan, and the Government of Canada on Cooperation in the Detailed Design, Development, Operation, and Utilization of the Permanently Manned Civil Space Station, KAV No. 2382, Jan. 30, 1992[hereinafter ISS Agreement]. The membership of the EPO and ESA are not identical, but the relevant patenting regime for most work in the ESA module will be the EPO. Unfortunately this paper can not review all patent regimes, but the scope of such an undertaking is more suitable to a book.

[4] *Id* at art 21(3).

[5] *See* ISS Agreement, *supra* 3, at art. 13(3).

[6] *Id*,at art. 21(2).

[7] The expense of patenting in multiple countries precludes many inventors from securing a patent in more than a few countries.

[8] See the discussion on these standards and on novelty, *infra* p.8 and p.16.

[9] Russia is scheduled to have two smaller research facilities, but including them in this discussion would be cumbersome. The Russian patent system has enforcement problems and is changing, they would require another paper.

[10] In the shuttle there were fewer concerns, since most experiments were conducted in space and then brought back to earth to be analyzed.

[11] *See, ESA ISS Frequently Asked Questions* (updated March, 3, 1999) <www.estec.esa.nl/spaceflight/issfaq25.htm>. NASA plans to assign one-third of their ISS research time to the private sector. *See, Boeing Science on the ISS: Space Product Development* (last visited July 26, 1999) < http://www.boeing.com/defense-space/space/spacestation/science/space_product_development.html >.

[12] *See generally, ESA ISS Frequently Asked Questions* (updated March, 3, 1999) <www.estec.esa.nl/spaceflight/issfaq25.htm>.

[13] There are some good surveys of intellectual property treaties and harmonization problems in these sources: Margret A. Boulware, Jeffery A. Pyle, and Frank C. Turner, *An Overview of Intellectual Property Rights Abroad*, 16 HOUS. J. INT'L L. 441 (1994); Anthony D. Sabatelli, *Impediments to Global Patent Law Harmonization*, 22 N. KY. L. REV. (1995); IAN MUIR, MATTHIAS BRANDI-DOHRN, and STEPHAN GRUBER, EUROPEAN PATENT LAW: LAW AND PROCEDURE UNDER THE EPC AND PCT(1999)[hereinafter EUROPEAN PATENT LAW].

[14] U.S. Const. art. I, §8.

[15] See LAW NO. 121, Chapt. 1 §1 (1998) (Japan)[hereinafter JPO Law]. Available in English at the Japanese Patent Office's website, <http://www.jpo-miti.go.jp/shoukaie/patent.htm>. *See also,* MINDY L. KOTLER and GARY W. HAMILTON, A GUIDE TO JAPAN'S PATENT SYSTEM, 47 (1995).

[16] *See* JPO Law, *supra* note 19, at Chapt. 2 §29-§32 and 3bis §64-§65.

[17] *See* A GUIDE TO JAPAN'S PATENT SYSTEM, *supra* note 19, at 47.

[18] *See* ISS Agreement, *supra* note 4, art.21(3).

[19] 35 U.S.C. §102(d). This is because US secrecy rules prohibit full disclosure of the invention for which a patent application is filed, while the EPO and Japan require full public disclosure within 18 months after filing a patent application. The EPO and JPO do not have restrictions on simultaneous filings, so this provision will not change their systems.

[20] After the first application normal patent laws apply to all the inventor's actions.

[21] 35 U.S.C. § 102(g); *see also,* Peter D. Rosenberg, *Patent Law Basics*, West Group Intellectual Property, §10.01 (1992).

[22] *Id*, at §10.03[2].

[23] *Id*, at §10.03[1](discussing rules PTO rules under 37 CFR §1.601). The rationale is to ensure that the original inventor reaps the benefits of his work and to discourage

research espionage, since without priority a patent will not be obtainable.

[24] See JPO Law, *supra* note 17, at Chapt. 3 §39; European Patent Convention, date, art. 87[hereinafter EPC]. Available in english at <http://www.epo.co.at/epc97/english/toc/a_ind_e.htm>.

[25] *See Patent Law Basics*, *supra* note 21, at §10.01. *See also*, A GUIDE TO JAPAN'S PATENT SYSTEM, *supra* note 17, at 48.

[26] *See* discussion, *infra* p.10 and p.16.

[27] 35 U.S.C. §102(b).

[28] *See* JPO Law, *supra* note 17, at Chapt. 2 §29-§29bis; EPC, *supra* note 25, at art.54-55. *See e.g. Patent Law Basics*, *supra* note 22, at §7.08.

[29] ISS Agreement, *supra* note 4, at art.13(3) and art 20.

[30] There are few examples upon which to try an extrapolate answers. It is notable that actions taken by one inventor, which are unknown to the other inventors will affect everyone's ability to claim a patent. For a discussion about public disclosure relating to activities by an inventor see *Patent Law Basics*, *supra* note 22, at §7.02 and §7.08[1].

[31] *See, Patent Law Basics, supra* note 22, at §7.08[1]. *See also*, JPO Laws, *supra* note 17, at §30; EPC, *supra* note 25, at art. 54(2).

[32] 35 U.S.C. §101; JPO Laws, *supra* note 17, at Chapt. 2 §29; Guidelines for Examination in the European Patent Office, Part C, Chapt 5 §1.1(1999) <http://www.epo.co.at/guidelines/english/gui_lin/gl-c0401.htm>[hereinafter EPO Guidelines].

[33] 35 U.S.C. § 101; EPO Guidelines, *supra* note 46, at §2.1.

[34] *See Patent Law Basics, supra* note 22, at §6.01 and §6.01[3]; EPO Guidelines, *supra* note 46, at §2.2.

[35] *See Patent Law Basics, supra* note 22, at §6.01[1][a]-[c]; EPO Guidelines, *supra* note 46, at §2.2.

[36] *See*, A GUIDE TO JAPAN'S PATENT SYSTEM, *supra* note 17, at 47.

[37] PTO Laws, *supra* note 17, at Chapt. 2 §29.

[38] There is an exception for displays in specific forums. *Id*, at Chapt. 2 §30.

[39] 35 U.S.C. §103.

[40] *See Patent Law Basics, supra* note 22, at §9.03[2][i]-[iii]. Prior art is the known information or processes used in the field. If an invention is not distinguishable from prior art it will be declared not novel.

[41] *Id.*

[42] If the step is obvious in other arts, but not in the art in question then an inventive step exists.

[43] *See* EPO Guidelines, *supra* note 46, at §1.3. *See also*, EUROPEAN PATENT LAW, *supra* note 14, at 162-66.

[44] *Id.* at 163.

[45] *See*, A GUIDE TO JAPAN'S PATENT SYSTEM, *supra* note 17, at 47.

[46] *Id.*

[47] 35 U.S.C. §102; JPO Laws, *supra* note 17, at Chapt. 2 §29; EPC, *supra* note 25, at art. 53. The rationale is so if others are using the invention, infringement or licensing issues do not arise.

[48] *See* 37 C.F.R. §1.56;JPO Laws, *supra* note 17, at Chapt. 3bis §6;EPC, *supra* note 25, at art. 93.

[49] Prior art is the same or a substantially similar invention which would be obvious to anyone who works in the field.

[50] In Japan challenges are solicited when the application is laid open. JPO Laws, *supra* note 17, at Chapt. 5 §113. In Europe there is also an opposition process allowed. EPC, *supra* note 25, at art. 99.

[51] 35 U.S.C. §102(b).

[52] *See e.g. Patent Law Basics*, *supra* note 22, at §7.08.

[53] *See* JPO Laws, *supra* note 17, at Chapt. 3 §29; EPC, *supra* note 25, at art. 57; 35 U.S.C. §101.

[54] E.I. DuPont de Nemours & Co. v. Berkley & co., 620 F.2d 1247, 1260 (8th Cir. 1980).

[55] *See* EUROPEAN PATENT LAW, *supra* note 14, at 125.

[56] *See*, A GUIDE TO JAPAN'S PATENT SYSTEM, *supra* note 17, at 47.

[57] This conflict could exist since the Japanese requirement for inventive step is minimal, so Japanese companies can have patents on similar items to encourage market competition.

[58] *See* EPO Guidelines, *supra* note 46, at §2.3. *See also* Patent Law Basics, *supra* note 22, at §6.02[2].

[59] *Id.*

[60] If human intervention is needed to make the substance then it is patentable. If it could exist in nature then it is not novel and is unpatenable. Only the process that of isolation is patentable.

[61] *See* EPO Guidelines, *supra* note 46, at §2.3. *See also* Patent Law Basics, *supra* note 22, at §6.02[2].

[62] While each country has different areas of concern, most are concerned with human genetic manipulation, cloning non-plant subjects, and the effects genetically manipulated plants and animals will have if released into the environment.

[63] The European Parliament has severely limited patent protection for biological research and has strict reporting requirements. *See generally, The Proposal for a European Directive on the Legal Protection of Biotechnological Inventions*, PARLIAMENT AND COUNCIL DIRECTIVE 98/44, 1998 O.J. (L 213) 13.

[64] *See* Patent Basic Law, *supra* note 22, at §6.01[4].

[65] This approach is controversial, since the genes in theory are naturally occurring and identification is

simply a discovery. The problem in allowing a patent on a gene is that others conducting related genetic research could inadvertently infringe in the course of researching related genes.

[66] *See* Patent Basic Law, *supra* note 22, at §8.08 and §6.01[4].

[67] *Id.*

[68] *See* EUROPEAN PATENT LAW, *supra* note 14, at 123-24.

[69] *Id.*

[70] *See* EPO Guidelines, *supra* note 46, at §3.4.

[71] The JPO goes through a series of questions about genetic and biological claims on its website contrasting the positions of the three regimes. *See generally, JPO FAQ Biological Claims,* <http://www.jpo-miti.go.jp/>.

[72] *Id.*

[73] A defense to an infringement challenge is that the patent should not have been granted. If common practice in the field yields similar or the same results then it will be hard for the patent holder to maintain that their invention was non-obvious and the original patent could be declared invalid.

[74] *See* ISS Agreement, *supra* note 4, at art.17.

[75] 35 U.S.C.A. § 283; JPO Laws, *supra* note 17, at Chapt. 4 §100. The EPO treaty does not provide for injunctive relief, but the member countries usually have national laws that allow injunctive relief when a patent is infringed.

[76] *See* Patent Basic Law, *supra* note 22, at §6.01[1][a].

[77] *Id.*

[78] *See* EUROPEAN PATENT LAW, *supra* note 14, at 119.

[79] *Id.* So a program that extends the working memory of hardware to make it function beyond the normal technical parameters is inseparable from the new memory and might support a patent.

[80] *See* Rieko Mashima, *Examination Of The Interrelationship Among The Software Industry Structure, Keiretsu, And Japanese Intellectual Property Protection For Software*, 33 INT'L LAW. 119, 141, (1999).

[81] *Id.*

[82] The copyright fair use doctrine allows another person to take part of a work and use it in certain circumstances. Examples of fair uses are scholarly works, news reports, derivative works, and research.

[83] Many countries have compulsory licensing systems to ensure that authors receive some compensation for works used under the fair use doctrines.

[84] The US government would be exposing themselves to a takings challenge, but such a law would be a choice about allocating risk. On the ISS someone will ultimately have to be accountable for potential infringing actions. If the governments provide a compulsory licensing program or cross-waiver protection, it is a decision to shift the potential liability away from the commercial user.