The Territorial Boundaries of Patent Protection on Land and at Sea, in the Air and in Space

by Wolfram Schlimme *

Abstract

Mankind's exploration of unexplored spaces such as the underwater world of the oceans and outer space, which has so far been predominantly scientific, will increasingly be replaced by commercial ventures, because the ongoing developments in the fields of robotics and artificial intelligence will make human presence in these inhospitable places increasingly superfluous. For the protection of the innovations associated with these technologies, the question will arise as to how far patent protection extends and whether, in particular, processes carried out automatically by robots in these places are protectable under patent law. This article deals with the spatial scope of patent protection, which is usually established on a national level.

A. The Territorial Effect of Patent Law

In order to determine which law could apply to patent protection of inventions in a given place, the scope of effect of corresponding patent laws must be determined. This first requires an understanding of the principle of a state's territorial jurisdiction under international law.

I. The Principle of Territoriality

The principle of territoriality is a concept of public international law that describes the exclusive competence of a sovereign state to exercise jurisdiction and control over natural and legal persons residing on a given territory. *Jellinek* already considered a state territory as a necessary prerequisite for the existence of a state; a state thus needs a territory "on which the state power can develop its specific activity, that of ruling"[1]. As a legal entity under international law, the state is the bearer of rights and obligations under international law and, as a sovereign state, it has unlimited capacity to act under international law, i.e. it can generate legal effects through its own actions[2]. Ac-

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1 *Jellinek*, Allgemeine Staatslehre (General State Theory), 3. ed., Berlin, 1914, p. 394 et seq.

2 *Von Liszt/Fleischmann*, Das Völkerrecht (The Public International Law), 12. ed., Berlin, 1925, p. 94.

cording to the competence theory of present public international law, this territorial area of jurisdiction of a state defines the territory of the state[3]. National laws are thus linked to the territory of competence of the legislating state or the legislating community of states in order to determine their territory of effect. The expression "territory of effect" does not refer to a territory in the narrower sense (as a land mass), but in the broader sense (as a space of legal effect)[4].

Industrial property rights, including patents, are subject to the principle of territoriality[5], so that a patent only exerts its monopolizing effect, namely the right to prohibit, in the state or in a community of states unified with regard to patent law, in which it has been applied for and granted or registered. Accordingly, a patent-infringing act can only be carried out effectively, i.e. unlawfully violating a patent, where the respective patent has its legal effect.

The question of patent protection and its enforceability is thus to be examined under the law of the territory of effect.

II. National Patent Law and its Scope of Extension

The effect of a national patent is thus limited to the sovereign territory of the patenting state[6], i.e. to the area of effect of the respective national patent law, e.g. a German patent only has legal effects in Germany[7] and foreign patents do not have effect in Germany. Consequently, an infringement of a German patent can only be enforced

3 *Kau*, Der Staat und der Einzelne als Völkerrechtssubjekte (The State and the Individual as Subjects of Public International Law), in: *Vitzthum/Proelß* (ed.), Völkerrecht (Public International Law), 7. ed., Berlin, Boston, 2015, (hereinafter cited as: *Kau*, 2015), margin no. 131.

4 *Schlimme*, Patentschutz im Weltraum (Patent Protection in Outer Space), Mitteilungen der deutschen Patentanwälte, 2014, (hereinafter cited as: *Schlimme*, 2014), p. 365 et seq.

5 *Ullmann/Deichfuß*, in: *Benkard*, Patentgesetz (German Patent Act), 11. ed., 2015, (hereinafter cited as: *Ullmann/Deichfuß*, 2015), Einleitung PatG (Introduction Patent Act), margin no. 73; c.f. also *Staudinger/Fezer/Koos*, Internationales Wirtschaftsrecht (International Business Law), 2010, margin no. 887; c.f. also *Adam/Grabinski*, in: *Benkard*, EPÜ - Europäisches Patentübereinkommen (EPC - European Patent Convention) legal commentary, 3. ed., 2019, vor Präambel (preceding preamble), margin no. 1.

6 *Scharen*, in: *Benkard*, Patentgesetz (German Patent Act), 11. ed., 2015, (hereinafter cited as *Scharen*, 2015), § 9 PatG, margin no. 8.

7 *Ullmann/Deichfuß*, 2015, margin no. 73.

in the territory of effect of German patent law; this also applies *mutatis mutandis* to patents of other national jurisdictions in their countries.

According to the principle of territoriality, a national patent law of a state is first applicable to the state territory in the narrower sense, i.e. the state territory within the political borders of the state (domestic). This comprises the land territory[8] including the land mass and the soil below, associated islands in the territorial sea of this state and in foreign states (exclaves) as well as overseas territories (continental land and islands) belonging to this state, the territorial sea of the state, the space below the earth's surface of the land territory (subsoil) and of the territorial sea (seabed)[9] as well as the airspace above the land territory and above the territorial sea[10]. The scope of the domestic concept has already been discussed in detail by *Benkard*[11].

In addition to this connection of national law according to territorial sovereignty, a connection of national law on the basis of functional sovereignty must also be taken into account[12], according to which national law also extends to places or objects that do not belong to the state territory in the narrower sense but which are functionally connected to that state; this includes, for example, ships and aircraft that are registered in a corresponding register of that state (flag statute)[13]. The national law of a state may, under certain conditions, also extend to space objects registered in that state as well as artificial islands, installations and structures in the exclusive economic zone in the sea allocated to that state, which will be discussed in more detail in section B.

8 *Bruchhausen*, in: *Benkard*, Patentgesetz (German Patent Law), 8. ed., 1988, Einleitung PatG (Introduction Patent Act), (hereinafter cited as: *Bruchhausen,* 1988), margin nos. 8, 9; c.f. also: *Scharen*, 2015, § 9 margin no. 9.

9 *Crawford*, Brownlie's Principles of Public International Law, 9. ed., Oxford, 2019, (hereinafter cited as: *Crawford*, 2019), p. 191.

10 *Schlimme*, 2014, pp. 365, 366.

11 *Benkard*, Inlandsbegriffe im Gewerblichen Rechtsschutz (Domestic Terms in Intellectual Property Law), GRUR, 1951, pp. 177 – 182.

12 *Proelß*, Raum und Umwelt im Völkerrecht (Spatial and Environmental Issues in International Law), in: *Vitzthum/Proelß* (ed.), Völkerrecht (Public International Law), 7. ed., 2016, (hereinafter cited as: *Proelß*, 2016), 5th section, margin no. 12.

13 For flag law, c.f. also: *Hepper/Müller*, Das Registerprinzip im See-, Luft- und Weltraumrecht – eine rechtsvergleichende Betrachtung (The Register Principle in Maritime Law, Air Law and Outer Space Law - A Comparative Legal Analysis), in: Zeitschrift für Luft- und Weltraumrecht (ZLW), 1990, p. 256.

Finally, for the sake of completeness, reference should also be made to the third type of connection provided for in public international law, the personal connection, which, however, only plays a subordinate role in patent law and is not relevant to the question of the extension of patent protection.

Territorial sovereignty and functional sovereignty predominantly determine the area of applicability of a state's patent law and thus a national patent's territory of effect.

III. Supranational Patent Law and its Scope of Extension

For the application, grant and/or enforcement of patents, bilateral or multilateral intergovernmental agreements and treaties under international law may be applicable instead of or in addition to national patent laws.

1. Bilateral Patent Law

Bilateral patent law agreements between two states can lead to a common and uniform patent law that is applicable in both states involved, so that granted patents have the same patent protection in both states.

An example for such a bilateral patent system is Switzerland and the Principality of Liechtenstein, wherein Liechtenstein adopted the Swiss legislation with respect to industrial property.[14] This regulation was later also extended to European patents[15], wherein it was explicitly regulated that the Principality of Liechtenstein and Switzerland form a unitary territory of protection for patents for inventions (Art. 1). For the purposes of the patent legislation, the uniform territory of protection is deemed to be domestic territory (Art. 5 para. 2). However, not only Swiss courts but also Liechtenstein courts have first and second instance jurisdiction for infringements of the Patent Act (Art. 10 para. 2), although only the Swiss Federal Supreme Court has appellate jurisdiction (Art. 11). The respective court decisions of the Swiss courts and of the

14 Vertrag vom 29. März 1923 zwischen der Schweiz und Liechtenstein über den Anschluss des Fürstentums Liechtenstein an das schweizerische Zollgebiet (Treaty of March 29, 1923 between Switzerland and Liechtenstein on the affiliation of the Principality of Liechtenstein to the Swiss customs territory), Liechtensteinisches Landesgesetzblatt, 1923, no. 24 of December 28, 1923, Art. 5 (1) no. 1.

15 Vertrag zwischen dem Fürstentum Liechtenstein und der Schweizerischen Eidgenossenschaft über den Schutz der Erfindungspatente (Treaty between the Principality of Liechtenstein and the Swiss Confederation on the Protection of Patents for Inventions), Liechtensteinisches Landesgesetzblatt, 1980, no. 31 of May 7, 1980, Art. 2.

Liechtenstein courts are enforceable in the entire territory of protection, i.e. in both states (Art. 13 para. 1).

2. Multilateral Patent Law

The legal protection of industrial property including patent law has a long tradition of international legal relations. As early as 1873, international negotiations were initiated to enable the cross-border acquisition of industrial property rights (e.g. patents, trade marks and designs) required for cross-border economic relations, which finally led to the conclusion of the Paris Convention in 1883 (c.f. below).

This multilateral agreement formed the basis for a large number of international treaties that (still) exist today, also in the field of patents.

a. Regional Patent Law

Regional agreements on the protection of inventions were made in order to simplify and standardize the acquisition of patent protection for inventions in a plurality of states and thus also to be able to reduce costs.

aa. European Patent (EPC)

The European Patent Convention (EPC) is a multilateral agreement that was signed by 16 European states at a conference in Munich in 1973 and which established the European Patent Organisation. It initially entered into force only for Belgium, France, Germany, Luxembourg, the Netherlands, Switzerland and the United Kingdom in 1977[16]. In the meantime, 38 states have joined the EPC[17]. A granted European Patent may be extended to Bosnia and Herzegovina and to Montenegro and may be validated in Morocco, Moldova, Tunisia and Cambodia[18].

The operational organ of the European Patent Organisation is the European Patent Office (EPO) with its seat in Munich and offices in The Hague, Berlin and Vienna.

16 Website of the European Patent Office "Legal Foundations" (https://www.epo.org/about-us/foundation.html - retrieved on May 8, 2021).

17 The 27 national states of the European Union (EU) plus Iceland, Norway, the United Kingdom, Switzerland, Liechtenstein, Monaco, San Marino, Serbia, Albania, Northern Macedonia and Turkey; the European Union itself is not a member.

18 Website of the European Patent Office, Member States of the EPO (https://www.epo.org/about-us/foundation/member-states.html - retrieved on May 5, 2021); a validation agreement has also been signed with Georgia, but it has not yet entered into force.

A European patent application is examined by the EPO and, if successful, a European patent is granted on it. However, a granted European patent exists only for a virtual second, because in the moment of grant it becomes a bundle of national patents in the EPC contracting states[19]. That is why the European patent is called a bundle patent. The grant of a European patent may be requested for one or more of the contracting states (Art. 3 EPC) and a granted European patent must be validated in those EPC member states for which patent protection is sought; in some states, validation takes place automatically, while other states have special requirements such as the filing of translations in an official national language (Art. 65 EPC). A European patent has in each of the contracting states for which it is granted, the same effect as a national patent granted by that state (Art. 2 para. 2 EPC). A European patent confers on the patent proprietor in each EPC member state the same rights as a national patent in that member state (Art. 64 para. 1 EPC).

In the case of an infringement of a European patent, its enforcement must always be conducted at national level before the competent courts[20], e.g. of the state in which the act of infringement took place, and a patent infringement action must be based on the relevant national part of the European patent (Art. 64 para. 3 EPC). A court decision on an infringement is thus limited to the state where the decision was held.

An invalidity attack can also only be directed against a national part of a European patent (Art. 138 para. 1 EPC), so that in order to completely invalidate a European patent, invalidity proceedings must be conducted in all EPC member states in which the European patent to be invalidated is in force, which is, to be honest, extremely expensive. For this purpose, the grounds for invalidity provided for in the EPC (Art. 138 para. 1 EPC) had to be implemented in the national law of the member states, which, however, has not been fully accomplished in all countries[21]. The national authorities and courts which have jurisdiction over patent revocation proceedings are inde-

19 *Kolle*, in: *Benkard*, EPÜ - Europäisches Patentübereinkommen (EPC - European Patent Convention) legal commentary, 3. ed., 2019, Art. 2, margin no. 2.

20 *Osterrieth/Henke,* in: *Benkard*, EPÜ - Europäisches Patentübereinkommen (EPC - European Patent Convention) legal commentary, 3. ed., 2019, Art. 64, margin no. 29.

21 *Keukenschrijver*, Patentnichtigkeitsverfahren (Patent Invalidity Proceedings), 6. ed., 2016, (hereinafter cited as: *Keukenschrijver*, 2016), margin no. 58 with further references.

pendent and not bound by the ruling practice of the European Patent Office and its Boards of Appeal[22].

bb. Unitary European Patent (EU)

The disadvantages of the European (EPC) patent, i.e. the high overall costs due to necessary translations, as well as the only on national level possible enforcement and also the only on national level achievable invalidation of a European (EPC) patent have led to efforts for a unitary patent for the European Union (EU).

Since 1975, several attempts have been undertaken to establish a unitary patent in the former European Community (Community Patent Convention, first attempt[23] and second attempt[24]), but all attempts failed. Currently, a regulation for an EU patent based on enhanced cooperation of nearly all EU states (except Spain and Croatia) is about to enter into force (Unitary Patent Regulation[25]) together with an installation of a European Patent Court system (Unified Patent Court[26]). Two requests for urgent action on two constitutional complaints[27] which had stopped the ratification by Germany were recently rejected by the German Federal Constitutional Court (BVerfG). Thus, it can be expected that the UPC Agreement will soon enter into force and that the way towards the Unitary European Patent is now open.

22 *Keukenschrijver*, 2016, margin no. 60.

23 Convention for the European Patent for the Common Market (Community Patent Convention) (76/76/EEC), Official Journal of the European Communities No L 17/ 1 to 28 of 26.01.1976 (https://op.europa.eu/en/publication-detail/-/publication/b884b73a-8a0b-4c34-b1de-f4de8c5fa6df/language-de - retrieved on May 8, 2021).

24 Agreement relating to Community Patents (89/695/EEC), Official Journal of the European Communities No L 401/1 to 27 of 30.12.1989 (https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:41989A0695(01)&from=ES – retrieved on May, 8, 2021).

25 Regulation (EU) No 1257/2012 of the European Parliament and of the Council of 17 December 2012 implementing enhanced cooperation in the area of the creation of unitary patent protection, Official Journal of the European Union L 361/1 to 8 of 31.12.2012 (https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:361:0001:0008:EN:PDF – retrieved on May 8, 2021).

26 Agreement on a Unified Patent Court (2013/C 175/01), Official Journal of the European Union C 175/1 to 40 of 20.06.2013 (https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2013:175:0001:0040:EN:PDF – retrieved on May, 8 2021).

27 Status: July 28, 2021 BVerfG 2 BvR 2216/20 and 2 BvR 2217/20 (https://www.bundesverfassungsgericht.de/SharedDocs/Entscheidungen/DE/2021/06/rs20210623_2bvr221620.html - retrieved on July 28, 2021).

The European patent with unitary effect to be introduced by this legislative act is intended to be enforceable and also invalidity actionable in an independent European patent jurisdiction[28], the Unified Patent Court (UPC) of First Instance with a central division having its seat in Paris and sections in Munich and London (uncertain due to the Brexit) as well as local and regional divisions (Art. 7 UPC Agreement), i.e. special court chambers at civil courts of the participating states. A Court of Appeal will be installed in Luxembourg (Art. 9 UPC Agreement). The UPC decisions will have effect for the common territory of the contracting member states and will be enforceable in every contracting member state (Art. 23, Art. 82 UPC Agreement).

cc. Eurasian Patent

The Eurasian Patent Convention (EAPC)[29] was signed in 1994 and entered into force in 1995[30]. The seat of the EAPC Patent Office, the Eurasian Patent Office (EAPO), is Moscow. Presently, the EAPC has eight member states[31] and Eurasian Patents may be extended also to Moldova[32].

Similar to the European (EPC) patent, a Eurasian patent application is centrally examined by the EAPO and, if successful, a Eurasian patent is granted. It will have effect on the entire territory of all EAPC member states[33] (Art. 15 para. 11 EAPC). Patent infringement proceedings and invalidity proceedings are to be conducted before the competent national authority of the EAPC member state concerned, whose decision is then only effective for the territory of this EAPC member state (Art. 13 para. 1 EAPC).

28 Agreement on a Unified Patent Court (UPC Agreement), OJ of the European Union C 175/1 of 20.6.2013 (https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2013:175:0001:0040:En:PDF – retrieved on May 8, 2021).

29 EAPO website "Eurasian Patent Convention", official English language translation from the Russian language (https://www.eapo.org/en/documents/norm/convention_txt.html - retrieved on May 6, 2021).

30 EAPO website "States Party to the Convention", (https://www.eapo.org/en/members.html - retrieved on May 6, 2021).

31 Armenia, Azerbaijan, Belarus, Kyrgyzstan, Kazakhstan, Russian Federation, Tajikistan and Turkmenistan - source: EAPO Website "States Party to the Convention", *ibid*.

32 EAPO website "Republic of Moldova" (https://www.eapo.org/en/md.html - retrieved on May 6, 2021).

33 The third recital of the Eurasian Patent Convention states: "Striving to establish an interstate system for obtaining such protection on the basis of a common patent having legal effect on the territory of all the Contracting States".

dd. ARIPO Patent

Cooperation among English-speaking African states in the field of intellectual property goes back to the early 1970s and led to the Lusaka Agreement[34] on the African Regional Intellectual Property Organization (ARIPO) in 1976, the current version of which, following the Harare Protocol (HP)[35] adopted in 1982, includes 17 African states[36]. One of the considerations for this contract was the pooling of resources in respect of intellectual property administration[37]. The ARIPO Office with its seat in Harare (Zimbabwe) is competent, among other things, for the central filing and examination of patent applications and the granting of ARIPO patents that can be requested for one or more of the contracting states (sec. 1bis para. 1 HP). A granted ARIPO patent provides protection in all designated contracting states, provided that no objections to the patenting had been raised by these contracting states (sec. 3 para. 7 HP). A granted ARIPO patent is subject to the respective national law in the designated contracting states with regard to compulsory licenses, forfeiture or the use of patented inventions in the public interest (sec. 3 para. 12 HP).

An ARIPO patent confers on the proprietor of the patent in each contracting state the same rights as would be conferred by a national patent in that contracting state (sec. 3 para. 14 lit. b HP) and, in the event of infringement, it is enforceable in accordance with the national law of that contracting state (sec. 3 para. 14 lit. d HP).

ee. OAPI Patent

As early as the early 1960s, French-speaking African states came together with the aim of cooperating in the field of intellectual property. Twelve African States established in 1962 with the Agreement of Libreville (Gabon) the African and Malagasy Office of Industrial Property (OAMPI). This Agreement was revised in Bangui (Cen-

34 WIPO website "Lusaka Agreement on the Creation of the African Regional Intellectual Property Organization (ARIPO)" (https://wipolex.wipo.int/en/treaties/details/202 - retrieved on May 8, 2021).

35 ARIPO-website "Harare Protocol on Patents and Industrial Designs Within the Framework of the African Regional Industrial Property Organization (ARIPO)", (https://www.aripo.org/wp-content/uploads/2020/01/Harare-Protocol-2020-Edition-1.pdf - retrieved on May, 8, 2021).

36 Botswana, Eswatini, Gambia, Ghana, Kenya, Lesotho, Liberia, Malawi, Mozambique, Namibia, Rwanda, Sierra Leone, Sudan, Uganda, United Republic of Tanzania, Zambia, Zimbabwe - source: WIPO website "IP Treaties Collection", (https://wipolex.wipo.int/en/treaties/parties/204 - retrieved on May 8, 2021).

37 Fifth recital in the preamble of the Harare Protocol.

tral African Republic) in 1977[38], to establish the African Intellectual Property Organization (OAPI)[39]. Currently, OAPI has 17 member states[40]. The Bangui Agreement (BA) covers the full scale of intellectual property including patent law.

According to the Bangui Agreement (BA) the OAPI Office with its seat in Yaoundé (Cameroon) (Art. 39 BA) serves for each member state as a national intellectual property office, e.g. as a national patent office (Art. 3 para. 1 BA). Intellectual property rights granted or registered by the OAPI Office become independent national rights subject to the legislation of each OAPI member state in which they have effect (Art. 5 para. 1 BA). Consequently, an OAPI patent has legal effect in each member state (Art. 10 para. 4 BA).

Patent infringement actions must be brought before the competent domestic court of a member state (Art. 59 para. 1 BA Annex I). An invalidity or forfeiture action against an OAPI patent is to be brought before a competent domestic court (Art. 47 para. 1 BA) of a member state, i.e. the respective proceedings are to be carried out on a national basis, and a respective invalidity or forfeiture decision is effective in this state (Art. 48 BA).

b. International Patent Law

International agreements in the field of intellectual property protection form the legal basis for international protection of intellectual property and provide the framework for national and regional legal standards in the field of intellectual property protection including patent protection. These agreements are governed by WIPO[41] in Geneva (Switzerland) which is a UN associated International Organization for Intellectual Property.

38 Current Version: "Bangui Agreement Instituting an African Intellectual Property Organization, of December 14, 2015", OAPI website (http://www.oapi.int/Ressources/accord_bangui/2020/anglais.pdf - retrieved on May 9, 2021).

39 OAPI website "Historique" (history), (http://www.oapi.int/index.php/en/oapi/presentation/historique - retrieved on May 9, 2021).

40 Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Congo, Ivory Coast, Equatorial Guinea, Gabon, Guinea, Guinea-Bissau, Mali, Mauritania, Niger, Senegal, Togo and Comoro - source: OAPI website "États membres" (member states), (http://www.oapi.int/index.php/fr/oapi/presentation/etats-membres - retrieved on May 9, 2021).

41 World Intellectual Property Organization - WIPO (www.wipo.int).

aa. Paris Convention (PC)

The "Paris Convention for the Protection of Industrial Property" – or "Paris Convention" (PC) for short – of 1883 established a worldwide union for the protection of industrial property[42]. At present, the Paris Convention has 177 member states[43]. The Paris Convention defines guidelines in the field of industrial property protection and contains provisions that are to be implemented in national law in the respective legislation of the Paris Convention member states. This has, in essence, led to a worldwide harmonization of the relevant national and regional industrial property laws over the past 138 years. In addition, the Paris Convention establishes rules which must be respected by each member state and which govern, in particular, cross-border traffic and trade in goods and services protected by industrial property rights. Art. 5ter of the Paris Convention is such a predominant norm of international law, which punctually erodes the enforceability of national or regional patent protection. This will be discussed later in detail in section B below.

bb. Patent Cooperation Treaty (PCT)

The Patent Cooperation Treaty (PCT) is administered by WIPO and has currently 153 member states and organizations[44]. It enables centralized filing of patent and utility model applications simultaneously for a large number of states and regional patent organizations. For such an international PCT application, a prior art search (PCT chapter I) and, upon request, a preliminary examination procedure (PCT chapter II) are carried out centrally. After a given period of time, the PCT application must be converted into a national or regional application. The final grant procedures are then carried out by the competent national and/or regional patent authorities. Here, too, the end results are patents or utility models with only national or regional effect.

IV. Intermediate Result

The principle of territoriality is thus determinative in patent law nearly all over the world and limits the enforceability of patents granted in or for a state to the territory of effect of that state's patent law[45], so that e.g. German patents and European patents

42 Paris Convention for the Protection of Industrial Property (https://wipolex.wipo.int/en/text/287556 - retrieved on May, 9, 2021).

43 Status of May 1, 2021; members to the PC c.f. WIPO (https://wipolex.wipo.int/en/treaties/ShowResults?search_what=C&treaty_id=2 – retrieved on May 9, 2021).

44 WIPO PCT (https://www.wipo.int/pct/de/pct_contracting_states.html - retrieved on May 9, 2021).

45 *Schlimme*, 2014, p. 365.

granted for Germany are enforceable only in Germany. This will also apply to future "Unitary EU Patents" with respect to the entire territories of the participating member states[46].

B. The Territorial and Functional Connections of Patent Law

As explained above, patents, including regionally granted patents, are in the end predominantly national rights with a spatial extension to the territory of effect of the respective state's national patent law. Consequently, patents must be enforced at the national level. This fact raises the question of how far the territory of effect of patent law extends with respect to enforcing a patent against patent infringements – on land, at sea, in the air and in space.

I. On Land

As already explained above in chapter A.II., due to a state's sovereignty the national patent law of that state is applicable on the land territory of said state[47] including the land mass and the soil below, associated islands in the territorial sea and own exclaves in foreign states as well as overseas territories (continental land and islands) belonging to that state. The sovereignty over a state's land mass also applies to the state's internal waters which include lagoons, rivers, inland lakes, inland waterways and maritime waterways[48], as all these areas lie within the political borders of a state. The canals within a state's territory that connect maritime waters (e.g. Panama Canal, Suez Canal, Kiel Canal) are part of the internal waters of a coastal state[49].

This territorial area of applicability of national patent law of a coastal state can be overlaid by the overriding provisions of international law in Art. 5ter of the Paris Convention with respect to vessels, aircraft and land vehicles registered in a foreign state and in Art. 27 of the Convention on International Civil Aviation[50] (Chicago Con-

46 Art. 5 para. 1 of the Regulation EU No. 1257/2012 implementing enhanced cooperation in the area of the creation of unitary patent protection.

47 *Bruchhausen,* 1988, Einleitung PatG (Introduction Patent Act), margin nos. 8, 9; c.f., also: *Scharen*, 2015, § 9 margin no. 9.

48 In Germany: Seeschifffahrtstraßen, i.e. certain canals and seaward sections of river waterways listed in § 1 of the German Seeschifffahrtsstraßen-Ordnung (Maritime Roads Regulations) (http://www.gesetze-im-internet.de/seeschstro_1971/1.html – retrieved on May 10, 2021).

49 *Vitzthum*, 2006, chapter 2, margin no. 7 with further reference.

50 Convention on International Civil Aviation (Chicago Convention) (https://www.icao.int/publications/Documents/7300_cons.pdf - retrieved on May 10, 2021).

vention) of ICAO[51] with respect to civil aircraft registered in a foreign state, provided that the coastal state and the foreign state are both member states of the respective convention.

Art. 5ter of the Paris Convention provides:

> "In any country of the Union the following shall not be considered as infringements of the rights of a patentee:
> 1. the use on board vessels of other countries of the Union of devices forming the subject of his patent in the body of the vessel, in the machinery, tackle, gear and other accessories, when such vessels temporarily or accidentally enter the waters of the said country, provided that such devices are used there exclusively for the needs of the vessel;
> 2. the use of devices forming the subject of the patent in the construction or operation of aircraft or land vehicles of other countries of the Union, or of accessories of such aircraft or land vehicles, when those aircraft or land vehicles temporarily or accidentally enter the said country."

Thus, if vessels, aircraft or land vehicles only stay temporarily or accidentally in a member state of the Paris Convention foreign to their state of registry, they may be quasi-immune from this Paris Convention member state's patent law as far as it concerns devices being part of and/or necessary for the operation of the respective vehicle. A similar norm for civil aircraft is also to be found in Art. 27 of the Chicago Convention which explicitly regulates the exemption of a civil aircraft registered in one state from seizure for patent infringement in another state on whose ground territory the civil aircraft is currently staying, provided that the aircraft is engaged in international air navigation.

II. At Sea

The sovereign rights and jurisdiction of coastal states in the adjoining sea are fundamentally defined in the United Nations International Convention on the Law of the Sea (UNCLOS)[52]. The UN Convention on the Law of the Sea has been signed by

51 The International Civil Aviation Organization (ICAO) is a specialized agency of the United Nations (www.icao.int – retrieved on May 10, 2021).

52 Art. 87 of the United Nations Convention on the Law of the Sea (UNCLOS) (https://www.un.org/depts/los/convention_agreements/texts/unclos/unclos_e.pdf - retrieved on May 9, 2021).

168 states including Germany and all the other EU states, but not by the USA and not by Turkey[53]. Earlier international agreements apply to the USA[54] and only the international customary law applies to Turkey[55].

According to the United Nations International Convention on the Law of the Sea the high seas are open to all states and are thus an extraterritorial zone with the absence of territorial sovereignty and the prohibition of states occupation[56]; no state may subject any part of the high seas to its sovereignty (Art. 89 UNCLOS).

1. Territorial Sea

The sovereignty of a coastal State extends, beyond its land territory and its internal waters and, in the case of an archipelagic state, its archipelagic waters to an adjacent belt of sea, designated as the territorial sea (Art. 2 no. 1 UNCLOS). Internal waters, territorial sea and archipelagic waters form the maritime part of the territory of coastal states and archipelagic states respectively[57]. The territorial sea of a coastal state belongs thus to its sovereign territory and it extends up to 12 nautical miles out to sea (Art. 3 UNCLOS). This sovereign territory of the coastal state includes the airspace over the territorial sea as well as the territorial sea bed and subsoil (Art. 2 no. 2 UNCLOS). The coastal state therefore has sovereign rights here and can enact and enforce

53 United Nations Treaty Collection, available on the UN (https://treaties.un.org/pages/ViewDetailsIII.aspx?src=TREATY&mtdsg_no=XXI-6&chapter=21&Temp=mtdsg3&clang=_en – retrieved on May 19, 2020).

54 E.g. the UN Convention on the Continental Shelf of June 10, 1964 (https://legal.un.org/ilc/texts/instruments/english/conventions/8_1_1958_continental_shelf.pdf - retrieved on May 16, 2021), the UN Convention on the Territorial Sea and the Contiguous Zone of September 10, 1964, (https://legal.un.org/ilc/texts/instruments/english/conventions/8_1_1958_territorial_sea.pdf - retrieved on May 16, 2021), and the UN Convention on the High Seas of September 30, 1962 (https://legal.un.org/ilc/texts/instruments/english/conventions/8_1_1958_high_seas.pdf - retrieved on May 16, 2021).

55 *Lagoni*, Festlandsockel und ausschließliche Wirtschaftszone (Continental Shelf and Exclusive Economic Zone), in: *Vitzthum* (ed.), Handbuch des Seerechts (Handbook of the Law of the Sea), 2006, (hereinafter cited as: *Lagoni*, 2006), chapter 3, margin no. 53.

56 *Wolfrum*, Hohe See und Tiefseeboden (High Seas and Deep Seabed), in: *Vitzthum* (ed.), Handbuch des Seerechts (Handbook of the Law of the Sea), 2006, (hereinafter cited as: *Wolfrum*, 2006), chapter 4, margin no. 9.

57 *Vitzthum*, Maritimes Aquitorium und Anschlusszone (Maritime Aquitorium and Contiguous Zone), in: *Vitzthum* (ed.), Handbuch des Seerechts (Handbook of the Law of the Sea), 2006, (hereinafter cited as: *Vitzthum*, 2006), chapter 2, margin no. 1.

laws[58]. The patent law of the coastal state is thus applicable in the territorial sea and in the airspace above it. However, it is to be considered that ships of all States enjoy the right of innocent passage through the territorial sea (Art. 17 UNCLOS).

2. Continental Shelf

The continental shelf of a coastal state comprises the seabed and subsoil of the submarine areas that extend beyond its territorial sea throughout the natural prolongation of its land territory to the outer edge of the continental margin, or to a distance of 200 nautical miles (Art. 76 para. 1 UNCLOS). The coastal state has no general sovereignty over its continental shelf but exercises over the continental shelf exclusive sovereign rights for the purpose of exploring it and exploiting its natural resources (Art. 77 UNCLOS). These exclusive sovereign rights also cover *inter alia* the construction of artificial islands, installations and structures on the seabed of the continental shelf (Art. 80 UNCLOS).

As the coastal state has no general sovereignty over its continental shelf but only exclusive sovereign rights, the laws of the coastal state do not automatically extend to the continental shelf, however, the coastal state is empowered to extend its laws including the patent law to matters on its continental shelf as far as this is in line with the mentioned exclusive sovereign rights of the coastal state[59].

Germany did not extend its patent law to the German continental shelf – neither in the North Sea nor in the Baltic Sea.

3. Exclusive Economic Zone

Art. 78 para. 1 UNCLOS provides that the rights of a coastal state over the continental shelf do not affect the legal status of the superjacent waters or of the airspace above these waters, i.e. the no-man's-land status of the high seas.

However, the waters above the continental shelf of a coastal state (up to 200 nautical miles out to sea) may be claimed by the coastal state as its exclusive economic zone

58 *Proelß*, 2016, chapter 5, margin nos. 7, 13.

59 *Schlimme*, Patentschutz in der Ausschließlichen Wirtschaftszone am Beispiel von Offshore-Weltraumstartanlagen (Patent Protection in the Exclusive Economic Zone on the Example of Offshore Space Launch Facilities), Mitteilungen der deutschen Patentanwälte, 2021, p. 314 et seq. (hereinafter cited as: *Schlimme*, 2021), p. 314 with further references.

(EEZ). The exclusive economic zone is a maritime area beyond and adjacent to the territorial sea on the seaward side thereof (Art. 55 UNCLOS). But a coastal state must explicitly claim such an exclusive economic zone in the sea beyond its territorial sea superjacent its continental shelf in order to benefit from EEZ rights[60].

A coastal state has in the EEZ no general sovereignty but only certain purpose-bound sovereign rights and use-bound jurisdiction, the latter with regard to the establishment and use of artificial islands, installations and structures also for economic purposes, to marine scientific research and to the protection and preservation of the marine environment (Art. 56 UNCLOS). In the EEZ all states have the freedom of navigation and overflight and of the laying of submarine cables and pipelines, and other internationally lawful uses of the sea related to these freedoms (Art. 58 para. 1 UNCLOS).

The rights (and duties) of a coastal state are not directly territorially connected to the EEZ in the spatial sense, but functionally connected to the resources that are available in the EEZ[61]. As the coastal state has no general sovereignty over its EEZ, the laws of the coastal state do not automatically extend to the EEZ, however, the coastal state is empowered to extend its laws, including patent law, to matters within its EEZ, in particular to artificial islands, installations and structures in its EEZ, as far as this is in line with the mentioned sovereign rights and jurisdiction of the coastal state and as far as it does not conflict with the rights of other states in the EEZ as laid down in Art. 58 UNCLOS[62].

Germany did not extend its patent law to the German EEZ – neither in the North Sea nor in the Baltic Sea[63]. An application of national German law to issues in the EEZ by way of analogy or interpretation of German law, as suggested by some authors[64],

60 *Proelß*, 2006, chapter 3, margin no. 220.

61 *Proelß*, 2006, chapter 3, margin no. 216.

62 *Schlimme*, 2021, p. 324/325 with further references.

63 LG Mannheim, Urteil of 05.07.2016 – 2 O 96/15; c.f. also LG Hamburg, Urteil of 26.04.2018 – 327 O 479/16 (appeal pending: Hanseat. OLG: 3 U 89/18).

64 *Czybulka*, Natur und Recht (Journal), 1999, p. 562 et seq. und Natur und Recht 2001, p. 367 et seq. – cited after *Papenbrock*, Die Anwendung des deutschen Sachenrechts auf Windenergieanlagen im Bereich der deutschen Ausschließlichen Wirtschaftszone (The application of German private property law to wind turbines in the area of the German Exclusive Economic Zone), Baden-Baden, 2017, (hereinafter cited as *Papenbrock*, 2017), p. 84; c.f. also *Kahle*, Zeitschrift für Umweltrecht, 2004, p. 80

without a statutory extension to the EEZ or without another legal basis, is considered improper, as authorities and courts of a state cannot make decisions that have an effect beyond the territory of effect outside the national territory; such an extension of national law is reserved to the legislator[65].

4. Vessels of Foreign States

The nationality of ships is determined by their flag state in the register of which they are entered (Art. 91 UNCLOS). The assignment of a ship to a flag state is unambiguous (Art. 92 UNCLOS) which is understood as a "genuine link" between a ship and its flag state. In principle, the flag state exercises jurisdiction and control over the ships flying its flag (Art. 94 UNCLOS), whereby the flag state's jurisdiction over the ship on the high seas is exclusive (Art. 92 para. 1 UNCLOS). This also applies to the patent law of the flag state. According to *Proelß*[66], this flag sovereignty is not based on a territorial sovereignty claim, but is to be institutionally classified as a functional sovereignty, since the sovereignty of the state is linked to the registration of the ship in this state.

Even if a ship stays in the territorial sea or in the exclusive economic zone of a third state, the flag status of the ship remains unchanged and the law of the flag state continues to apply to the ship. However, the laws of the coastal state may also apply to a foreign ship and its crew in the territorial sea of the coastal state and also in the exclusive economic zone thereof[67].

As already mentioned above, Art. 5ter of the Paris Convention has an effect in favor of a vessel which is staying temporarily or accidentally in the waters of a member state

et seq. – cited after *Papenbrock*, 2017, p. 84; c.f. also *Krieger*, Deutsches Verwaltungsblatt (Journal), 2002, p. 300 et seq. – cited after *Papenbrock*, 2017, p. 84.

65 *Lagoni*, Natur und Recht (Journal), 2002, p. 121 et seq. – cited after *Papenbrock*, 2017, p. 91 with further references; c.f. also According to *Risch*, Windenergieanlagen in der Ausschließlichen Wirtschaftszone – Verfassungs-rechtliche Anforderungen an die Zulassung von Windenergieanlagen in der Ausschließlichen Wirtschaftszone (AWZ), (Wind turbines in the Exclusive Economic Zone - Constitutional requirements for the approval of wind turbines in the Exclusive Economic Zone (EEZ)), Diss., Berlin, 2006, "the scope of applicability of a law is reserved to the legislator" – cited after *Papenbrock*, 2017, p. 92.

66 *Proelß*, 2016, 5th section, margin no. 12.

67 *Proelß*, Ausschließliche Wirtschaftszone (Exclusive Economic Zone), in: *Vitzthum* (ed.), Handbuch des Seerechts (Handbook of the Law of the Sea), 2006, (hereinafter cited as: *Proelß*, 2006), chapter 3, margin nos. 272, 273.

of the Paris Convention which is foreign to its (Paris Convention member) flag state. A stay can only be considered temporary if it is in the course of traffic activity[68]. The territorial sea of a coastal state belongs to its waters, which however is not the case for its exclusive economic zone. Moreover, the provision of Art. 5ter of the Paris Convention only applies to devices used exclusively for the needs of the vessel. Payloads of the vessel, for example rocket launching systems, are not covered by this override of the coastal state's patent protection[69].

Consequently, the laws of a costal state can also be applicable to a foreign ship in the territorial sea of the coastal state and, in case of an extension of the coastal state's law to its exclusive economic zone, in this exclusive economic zone. The German Federal Administrative Court has ruled, for example, that German residence law applies to foreign crew members who pursue gainful employment in the German territorial sea on a foreign-flagged offshore supply ship[70].

It should also be noted here that Art. 5ter of the Paris Convention uses the more general term "vessel", which is broader than the term "ship" and which includes other water vessels like submarines, for example, whereas UNCLOS always uses the more specific term "ship" with regard to freedom of navigation. However, Art. 20 UNCLOS provides that submarines may only navigate in the territorial waters of a coastal state while being surfaced (i.e. as a ship) and must fly the flag of their state of registry but there is no comparable regulation for the exclusive economic zone in the UN Convention of the Law of the Sea.

Civilian submarines which are not on an innocent passage through the territorial sea or the exclusive economic zone of a coastal state, but which operate commercially there (including while working there submerged) are subject to the patent law of the coastal state in its territorial sea and, if the latter has extended its patent law to the exclusive economic zone, also there, provided that their operation is not covered by the freedoms granted in Art. 58 para. 1 UNCLOS.

68 *Kühnen*, Handbuch der Patentverletzung (Manual of Patent Infringement), 13. ed., 2020, (hereinafter cited as: *Kühnen*, 2020), chapter E, margin no. 906.

69 *Schlimme*, 2021, p. 325.

70 BVerwG Urteil of 27.4.2021 – 1 C 13.19, margin nos. 26 to 29 (https://www.bverwg.de/270421U1C13.19.0 - retrieved on July 28, 2021).

III. In the Air

Patent infringements can not only occur on land or water, but can also be realised in the air, for example in aircraft or other aerial vehicles such as e.g. weather balloons. Therefore, the question arises as to which patent law can apply in airspace. However, the above-mentioned provisions of Art. 5ter of the Paris Convention as well as Art. 27 of the Chicago Convention are to be considered.

1. Above a State's Land Mass

Proelß defines the territory of a state as "the space within the boundaries of which the state exercises its territorial sovereignty, over which it has free disposal, the development of which it organizes and in which it primarily exercises its legal regime"[71]. This "state space" includes the land, the territorial sea, the archipelagic waters and internal waters of the state[72] as well as the 3rd dimension, i.e. the underground below the land and the territorial sea and the state's airspace above the land and the territorial sea[73]. As the territorial sovereignty of a state includes its airspace, the patent law of said state is also applicable in the state's airspace above said state's land territory.

2. Above the Sea

While the extension of a state's patent law to the airspace above its land territory may seem obvious, this is not necessarily the case for the airspace above the sea. The airspace above the high seas is – like the high seas itself – extraterritorial zone in which the legislative power with respect to air traffic lies with the ICAO Council[74]; Art. 87 UNCLOS expressly mentions the freedom of overflight over the high seas; but what about the airspace above the territorial seas and above the exclusive economic zones?

a. Above the Territorial Sea

Art. 2 para. 2 UNCLOS establishes that the sovereignty of a coastal state also extends to the airspace above its territorial sea. The coastal state's patent law is thus also applicable to the airspace above its territorial sea. This sovereignty is limited with regard to the free overflight of archipelagic states in accordance with Art. 53 UNCLOS along air routes defined by the archipelagic state[75].

71 *Proelß*, 2016, 5th section, margin no. 7.

72 *Crawford*, 2019, p. 191.

73 *Schlimme*, 2014, p. 366.

74 *Wolfrum*, 2006, chapter 4, margin no. 94.

75 *Vitzthum*, 2006, chapter 2, margin nos. 151, 153, 156.

b. Above the Continental Shelf and the EEZ

While the UN Convention on the Law of the Sea grants a coastal state sovereign rights over the continental shelf and sovereign rights and jurisdiction over the exclusive economic zone (EEZ), there is no such grant of rights for the airspace over the continental shelf and over the EEZ.

As the EEZ is a territorial no-man's-land that may be functionally claimed by its adjacent coastal state, it is in principle subject to the rules for the high seas[76]. Consequently, the exclusive sovereign rights of the coastal state over its continental shelf do not extend to the airspace above the continental shelf, which is thus in principle extraterritorial like the airspace above the high seas (Art. 78 para. 1 UNCLOS). However, if the coastal state has claimed an EEZ and an overflight or other aircraft operation over the EEZ is related to the exploitation of resources or the exercise of rights reserved to the coastal state in the EEZ, the sovereign rights and jurisdiction of the coastal State in the EEZ shall also apply in the airspace above the EEZ according to Art. 56 UNCLOS[77].

With regard to the freedom of aircraft navigation over the high seas resulting from Art. 12 of the Chicago Convention in relation to the airspace over the EEZ, *Proelß* states that the EEZ overflight is governed by the ICAO rules, possibly modified by the exclusive sovereign rights and jurisdiction of the coastal state[78].

Thus, the patent law of a coastal state could apply also to aircraft navigating over the EEZ of the coastal state, provided that the overflight of or the aircraft operation above the EEZ is related to the exploitation of resources or the exercise of rights reserved to the coastal state in the EEZ.

IV. In Space

The increasing exploration of space by private companies and commercial ideas of building habitats and human outposts on the Moon or on other planets and plans for extraterrestrial mining raise the question of whether space-related technical developments can be protected by patents with effect in outer space or even on extraterrestrial celestial bodies.

76 *Proelß*, 2006, chapter 3, margin no. 275.

77 *Proelß*, 2006, chapter 3, margin no. 274.

78 *Proelß*, 2006, chapter 3, margin no. 275.

1. Freedom of Outer Space

The United Nations "Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies" of January 27, 1967 (Outer Space Treaty – OST)[79], to which 111 states are currently parties[80], determines in Article I the general basic rules for the use of outer space. Article I thereof reads:

> "The exploration and use of outer space, including the Moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind."

In Article II, the Outer Space Treaty becomes more specific:

> "Outer space, including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means."

The guarantee of free access for all states (Art. I para. 2 OST) and the prohibition of national appropriation by extension of sovereignty to outer space (Art. II OST) clearly and unambiguously exclude the monopolisation of outer space, of the Moon and other extraterrestrial celestial bodies by one state over the other states. Consequently, no state party to the OST is allowed or able to effectively extend its patent law generally to outer space[81].

With regard to a specific case, *Böckstiegel* et al. come to the conclusion that an unilateral extension of the scope of national patent protection of a state to the operation of a satellite system in a certain area of space is inadmissible because it would violate the right of third parties to free use of space without justification under international

79 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies (Outer Space Treaty – OST) (https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/outerspacetreaty.html - retrieved on May 19, 2021).

80 Status on January 1, 2021 (https://www.unoosa.org/res/oosadoc/data/documents/2021/aac_105c_22021crp/aac_105c_22021crp_10_0_html/AC105_C2_2021_CRP10E.pdf - retrieved on July 29, 2021).

81 *Schlimme*, 2014, p. 373.

law and would also violate the prohibition of appropriation under space law[82]. *Bouvet*[83] reports on a patent infringement case in Los Angeles[84] concerning a comparable issue and sees the patent in question (US 5,433,726) as a clear violation of the Outer Space Treaty, as the patent exclusively reserves an orbital area for the patent holder[85]. However, the existence of intellectual property rights, i.e. also patents, in outer space is generally considered to be in conformity with the UN Outer Space Treaty[86].

2. Upper Boundary of Airspace

An important question is how far upwards the airspace extends from the Earth's surface and where extraterritorial outer space begins.

The Kármán line at an altitude of about 100 km above mean sea level (AMSL) is internationally regarded as the boundary between airspace and outer space (except by the USA, which defines this boundary at 50 nm AMSL). In this altitude range, the atmospheric density is so low that, in order to generate the lift necessary to maintain this altitude, an aircraft would theoretically have to fly at a speed so high that it is approximately equal to the orbital velocity[87]. This altitude range has been termed "fron-

82 *Böckstiegel/Krämer/Polley*, Kann der Betrieb von Satelliten im Weltraum patentrechtlich geschützt werden? (Can the operation of satellites in space be protected by patent law?), in: GRUR 1999, (hereinafter cited as: *Böckstiegel* et al., 1999), p. 1 et. seq., p. 10; c.f. also *Böckstiegel/Krämer/Polley*, Patent Protection for the Operation of Telecommunication Satellite Systems in Outer Space?, in: Zeitschrift für Luft- und Weltraumrecht (ZLW), 1998, (hereinafter cited as: *Böckstiegel* et al., 1998), p. 10 et seq., p. 166 et seq.

83 *Bouvet*, Certain Aspects of Intellectual Property Rights In Outer Space, Master Thesis, Faculty of Law, Air and Space Law Institute, McGill University, Montreal, 1999, p. 33.

84 *Prichett*, TRW Inc. Files Patent Infringement Lawsuit against ICO Global Communications, in: Business Wire, May 13, 1996 (http://www.thefreelibrary.com/TRW+Inc.+Files+Patent+Infringement+Lawsuit+Against+ICO+Global...- a018276629 – retrieved on December 29, 2013).

85 For more details c.f.: *Schlimme*, 2014, p. 376.

86 *Freeland/Jakhu*, in: *Hobe/Schmidt-Tedd/Schrogl* (ed.): Cologne Commentary on Space Law (CoCoSL), Vol. 1: "Outer Space Treaty" (OST), Cologne 2009, (hereinafter cited as: *Freeland/Jakhu*, 2009), Art. II, margin no. 44: "It should also be noted that Article II does not exclude the possibility that other forms of rights and interests, such as intellectual property rights, may also exist in relation to activities in outer space." With reference to the ISS Treaty.

87 Fédération Aéronautique Internationale (FAI), "100 km Altitude Boundary for Astronautics", (https://www.fai.org/page/icare-boundary - retrieved on May 20, 2021).

tier orbit" by the *author* and should be considered as the boundary between national airspace and outer space[88].

3. Space Objects

As with ships, the nationality principle is also considered applicable to space objects[89]. Art. VIII OST provides that a space object is subject to the sovereignty of the state of registry in which register it is entered and which exercises "jurisdiction and control" over it. The term "space objects" is more general than the term "space vehicles" and is therefore not limited to vehicles and includes e.g. also satellites and space stations.

The term "state of registry" is ambiguously defined in Art. I lit. (c) of the Convention on Registration of Objects Launched into Outer Space[90]. As there is no unambiguous connection of a space object to a register state due to the alternatives provided in Art. I lit. (c) of the Convention on Registration of Objects Launched into Outer Space there exists no "genuine link" between a space object and its register state. Thus, the laws of the registry state do not automatically extend to space objects and an explicit statutory extension is therefore required, in particular of patent law to space objects[91]. The view expressed in the literature that national law could be extended to space objects registered in a state by analogy with the UN Convention on the Law of the Sea[92] cannot be followed due to the lack of a "genuine link" of the space objects to their

88 *Schlimme*, 2014, pp. 367, 368 with further references.

89 *Menthe*, Jurisdiction in Cyberspace: A Theory of International Spaces, in: Michigan Telecommunications and Technology Law Review, 1998, p. 69 et seq., p. 92.

90 Convention on Registration of Objects Launched into Outer Space, UNOOSA (https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/registration-convention.html - retrieved on May 14, 2021).

91 *Schlimme*, Weltraumgegenstände als Objekte eines nationalen Patentschutzes – Teil 1 (Space objects as objects of national patent protection – part 1), in: Mitteilungen der deutschen Patentanwälte, 2020, p. 113 et seq. (hereinafter cited as: *Schlimme*, 2020-1); c.f. also *Schlimme*, Weltraumgegenstände als Objekte eines nationalen Patentschutzes – Teil 2 (Space objects as objects of national patent protection – part 2), in: Mitteilungen der deutschen Patentanwälte, 2020, p. 298 et seq. (hereinafter cited as: *Schlimme*, 2020-2).

92 *Ro* et al., Patent Infringement In Outer Space In Light of 35 U.S.C. § 105: Following the White Rabbit Down the Rabbit Loophole, in: Journal of Science & Technology Law, Vol. 17/2, p. 202 ff., Section II.B Boston, 2011; c.f. also *Reynolds*, Legislative Comment: The Patents In Space Act, in: Harvard Journal of Law and Technology, Vol. 3, pp. 13 - 29, p. 19, Cambridge MA, 1990; c.f. also *Böckstiegel* et al., 1999, p. 6.

state of registry[93] – unlike in the case of ships – rather, an explicit statutory extension is required, which has not yet taken place in Germany[94].

The multilateral treaty on the International Space Station[95] (ISS Treaty) provides in Art. 5 for the applicable sovereign laws and in Art. 21 for intellectual property, including patent law, with regard to the individual modules of the ISS and the personnel of the ISS.

4. National Space Patent Regulations

The United States patent law, with 35 U.S.C. § 105[96], which entered into force as early as 1990, contains a provision that relates directly to outer space, namely the creation, use and sale of an invention in outer space, on an outer space object or a component thereof under the jurisdiction or control of the United States. US patent law is thus applicable to space objects registered in the US or which are simply under its control.

The French Intellectual Property Law[97] comprises a provision in Art. L 611-1, the fourth paragraph of which regulates the relationship between national patent law and space objects. Accordingly, French patent law extends not only to space objects under French jurisdiction, but also to outer space in general, including celestial bodies. However, this general extension of French national patent law is limited by the provision "unless otherwise provided by an international obligation to which France is a party", e.g. the OST.

93 *Schmidt-Tedd/Mick*, in: *Hobe/Schmidt-Tedd/Schrogl* (ed.): Cologne Commentary on Space Law (CoCoSL), Vol. 1: Outer Space Treaty (OST), Cologne, 2009, Art. VIII, margin no. 57; c.f. also *Schlimme*, 2020-2, p. 301 to 303.

94 *Schlimme*, 2020-1, p. 118.

95 "Agreement among the Government of Canada, Governments of Member States of the European Space Agency, the Government of Japan, the Government of the Russian Federation, and the Government of the United States of America concerning cooperation on the Civil International Space Station" of January 29, 1998 (https://www.state.gov/wp-content/uploads/2019/02/12927-Multilateral-Space-Space-Station-1.29.1998.pdf - retrieved on May 21, 2021).

96 35 U.S.C. § 105, in: US PTO MPEP (https://mpep.uspto.gov/RDMS/MPEP/e8r9#/e8r9/d0e302614.html - retrieved on May 14, 2021).

97 Code de la propriété intellectuelle, Livre VI: Protection des inventions et des connaissances techniques, Titre 1er: Brevets d'invention, (https://www.legifrance.gouv.fr/affichCode.do?cidTexte=LEGITEXT000006069414 - retrieved on July 8, 2019).

It should be mentioned that the draft regulation on the European Community Patent[98], which never entered into force, foresaw in Art. 3 provisions for the application of the regulation in extraterritorial spaces, with paragraph 2 expressly providing for the applicability to space vehicles[99]. The present Unitary Patent Regulation for the EU, however, does not contain such a provision.

So far, no space law has entered yet into force in Germany and, in particular, no general extension of German patent law to matters relating to space, including space objects registered in Germany, has been implemented.

C. Summary

Patents that have been issued on the basis of national or regional grant procedures can – with a few exceptions such as Switzerland/Liechtenstein and the future Unitary European Patent – only be enforced at national level and with national legal effect. But even with these exceptions the respective national territory is part of the common territory of effect. Therefore, the territory of effect of the respective patent law is to be considered for the territorial scope of patent protection. This territory of effect includes the respective domestic territory within the political borders of a state including the soil below and the airspace above it and, in the case of a coastal state, the territorial sea, the underground below the sea bed of the territorial sea and the airspace above the territorial sea. The territory of effect of national patent law also includes, on the basis of a functional connection, ships and aircraft registered in the relevant state.

The applicability of patents granted for a coastal state in its exclusive economic zone requires a statutory extension of the coastal state's patent law to the exclusive economic zone. Furthermore, if a state has statutory extended its patent law to space objects registered in its register, the national patent protection also extends to such space objects. Extraterritorial areas such as the high seas, the airspace above the high seas and outer space as well as the Moon and other extraterrestrial celestial bodies

98 Proposal for a Council Regulation on the Community patent (2000/C 337 E/45), OJ EC C 337 E, p. 278 et seq. of November 28, 2000, (https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52000PC0412&from=EN – retrieved on May 21, 2021).

99 Art. 3 para. 2 reads: "This Regulation shall apply to inventions created or used in outer space, including on celestial bodies or on spacecraft, which are under the jurisdiction and control of one or more Member States in accordance with international law." Proposal for a Council Regulation on the Community patent, Official Journal of the European Communities C 337 E/279 of November 28, 2000.

are free from any state sovereignty, so that there – with the exception of ships, aircraft and, where applicable, space objects on which the law of the state of registry applies – national or regional patents do not develop any patent protection.