The Entry into Force of the Convention on the Law of the Sea: A Redistribution of Competences in Relation to the Management of the International Commons?

The Transfer of Technology under the Implementation Agreement

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Abbreviations: GATT = General Agreement on Tariffs and Trade; ILM = International Legal Materials; LOS = Law of the Sea; NILR = Netherlands International Law Reports; ODILA = Ocean Development and International Law; TRIPs = Trade-related Aspects of Intellectual Property Rights; UNCLOS III = Third United Nations Conference on the Law of the Sea. Unless otherwise indicated, all documents referred to are those of the United Nations.

Introduction

There is good reason to believe that the ten year deadlock in the process of entry into force of the United Nations Conference on the Law of the Sea[1] was mainly due to the resistance of industrialized countries to the provisions of Chapter XI of the Convention which govern the activities in the Area.[2] The technology transfer provisions of that Chapter[3] – mainly the rules of Art. 5 paras. 1–4 of Annex III, which had been understood to provide for a "mandatory transfer of technology"[4] im-

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[1] United Nations Convention on the Law of the Sea, A/Conf. 62/122, 7 October 1982, reprinted in: ILM 21 (1982), 1261, hereinafter: LOS Convention. For discussion on its entry into force see: Rüdiger Wolfrum (ed.), Law of the Sea at the Crossroads: The Continuing Search for a Universally Accepted Régime, Proceedings of an Interdisciplinary Symposium of the Kiel Institute of International Law, July 1990, Berlin 1991.

[2] René-Jean Dupuy/Daniel Vignes (eds.), A Handbook on the New Law of the Sea, 2 vols., Hague Academy of International Law, Dordrecht, Boston, Lancaster 1991; Gregory Alan French, Der Tiefseebergbau, Köln [etc.] 1990; Jens-Lienhard Gaster, Der Meeresbodenbergbau unter der Hohen See, Köln [etc.] 1987; Said Mahmoudi, The Law of Deep Sea-Bed Mining, Stockholm 1987; Rüdiger Wolfrum, Die Internationalisierung staatsfreier Räume, Berlin [etc.] 1984; 328 et seq.; Wolfgang Hauser, Die rechtliche Gestaltung des Tiefseebergbaus nach der Seerechtskonvention, Frankfurt/M. 1982.

[3] See generally: M.C.W. Pinto, Transfer of Technology under the UN Convention on the Law of the Sea, Ocean YB 6 (1986), 241–270; id., Droit de la mer et transferts de technologie, in: L'État Moderne: Horizon 2000, Mélanges offerts à P.-F. Gonidec, Paris 1985, 26–53; Douglas Yarn, The Transfer of Technology and UNCLOS III, Georgia Journal of International and Comparative Law 14 (1984), 121–153; Maria Eduarda Goncalves, Eléments pour l'étude de la contribution du nouveau Droit de la Mer au droit international en matière de transfert de technologie, in: Rafael Gutièrrez Girandot [et al.] (eds.), New Directions in International Law, Essays in Honor of Wolfgang Abendroth, Frankfurt/M., New York 1982, 234–256; Norbert J. Prill, Technologietransfer und Meeresnutzung, ZaöRV 38 (1978), 801–847; Wolfrum, ibid., 455 et seq.; Hauser, ibid., 158 et seq.

[4] See for instance, Proclamation of U.S. President Reagan who gave six different reasons for the U.S. not to sign the Convention, and *inter alia* referred to the "stipulations relating to mandatory transfer of private technology", Proclamation of 9 July 1982, reprinted in: U.S. State Department Bureau of Public Affairs Current Policy, No. 416; see

posed on commercial mining operations obviously were understood to reflect the very essence of the "New International Economic Order" approach[5] that characterized Chapter XI and in the end was firmly rejected by industrialized States.[6] The Implementation Agreement,[7] which has general legal implications which are discussed elsewhere,[8] has greatly modified that system on the transfer of technology. This article will briefly describe the context of those technology transfer provisions which relate to a more general discussion about technical cooperation and technology transfer in international relations (*infra*, Part II), discuss the different technology transfer provisions of the Convention (Part III) and then turn to the transfer regime of Chapter XI (Part IV) and its modifications by the Implementation Agreement (Part V).

II. International Cooperation and Technology Transfer: The General Political Background

A predominant feature of the contemporary international system as constituted by international law is the element of cooperation.[9] Cooperation between States marks a departure from the classical international law, which was supposed to serve to coordinate the interests of individual States. Cooperation, in turn, is understood to define a kind of relationship in which States set a common goal and undertake to act jointly to

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J.M. van Dyke/D.L. Teichmann, Transfer of Seabed Mining Technology: A Stumbling Block to U.S. Ratification of the Law of the Sea Convention, ODILA 13 (1984), 427–455 at 428.

[5] See Rüdiger Wolfrum, Die UN-Seerechtskonvention in der Neuen Weltwirtschaftsordnung, in: Jost Delbrück (ed.), Das Neue Seerecht, Berlin 1984, 97–118; Prill (note 3), 817, 822; and – generally – Progressive Development of the Principles and Norms of International Law to the New International Economic Order, Report of the Secretary General, Annex III: Analytical Study, prepared by Georges Abi-Saab, A/39/504, 23 October 1984; Mohammed Bedjaoui, Towards a New International Economic Order, New York 1979; Jagdish N. Bhagwati (ed.), The New International Economic Order: The North-South Debate, Cambridge, Mass., London 1977.

[6] David L. Larson, The Reagan Rejection of the U.N. Convention, ODILA 14 (1984), 337–361 at 340 et seq.; Pinto, Transfer (note 3), 244; van Dyke/Teichmann (note 4), 427 et seq.; L.S. Ratiner, The Law of the Sea: A Crossroads for American Foreign Policy, Foreign Affairs 60 (1982), 1006–1021 (1015).

[7] Agreement Relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982, GA res. 48/263 of 17 August 1994, Annex, reprinted in: ILM 33 (1994), 1309, hereinafter called: Implementation Agreement.

[8] See in this volume .

[9] Rüdiger Wolfrum, International Law of Cooperation, in: Rudolf Bernhardt (ed.), Encyclopedia of Public International Law, Vol. II (1995), 1242–1247.

that end. Cooperation takes place for various ends and by different means. Technical cooperation[10] is one of those means. It is to be found in the area of development cooperation[11] as well as in respect of the peaceful uses of nuclear energy,[12] the use of outer space,[13] and in modern regimes for the protection of the environment.[14]

The notion of technology transfer evolved in this area of international relations. It refers to technology in the sense of information, know how and skills and includes the aspect of legal rights to use and to transfer technology.[15] The introduction of the term "technology transfer"[16] signifies a shift in the approach towards discussing questions of technology

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[10] See generally: Peter-Tobias Stoll, Technical Assistance, in: Rüdiger Wolfrum (ed.), United Nations: Law, Policies and Practice, 2 vols., München [etc.] 1995, 1209–1219. Technical cooperation was previously known by the name "technical assistance". It can be distinguished from "financial cooperation", which refers to capital transfers. The term "technical" is not confined to the notion of "technology" in the sense of modern sciences and technology (para. 1); Guy B. Gresford/Bertrand H. Châtel, Science and Technology in the United Nations, World Development 2 (1974), 43–48.

[11] See Stoll, ibid., para. 10 et seq.

[12] L. Manning Muntzing (ed.), International Instruments for Nuclear Technology Transfer, La Grange Park 1978; Prill (note 3), 827 et seq.; Norbert J. Prill, Völkerrechtliche Aspekte der internationalen Verbreitung ziviler Kernenergienutzung, Berlin 1980, 34 et seq.; Rudolf Dolzer, International Nuclear Cooperation: Obligations, Conditions and Options, Indian Journal of International Law 20 (1980), 366–394 (372ff.).

[13] Stephan Frhr. v. Welck, Erforschung und Nutzung des Weltraums: technische Möglichkeiten und politische Konflikte im Schnittpunkt von internationaler Wirtschafts- und Sicherheitspolitik, in: Beate Kohler-Koch (ed.), Technik und internationale Politik, Baden-Baden 1986, 323–339; Kurt P. Tudyka, Die Folgen des Einsatzes von Weltraum-Technik für das internationale System, in: Kohler-Koch, ibid., 341–355; Prill (note 3), 827 et seq.

[14] See, for instance, Art. 4 para. 1 *lit.* c and para. 5 of the Framework Convention on Climate Change, ILM 31 (1992), 849; Art. 16 of the Convention on Biological Diversity, ILM 31 (1992), 818; Principle 9 of the Rio Declaration on Environment and Development of the United Nations Conference on Environment and Development, UN Doc.A/CONF.151/5/Rev. 1, June 13, 1992, reprinted in: ILM 31 (1992), 874. See also: Barbados Declaration of the Global Conference on the Sustainable Development of Small Island Developing States, UN Doc. A/Conf. 167/9, which demanded *inter alia* "facilitating the transfer of environmentally sound technology ..."; see Ulrich Beyerlin, New Developments in the Protection of the Marine Environment: Potential Effects of the Rio Process, in this issue, p. 544 et seq.

[15] A quite similar definition is given in Art. 5 Annex III para. 8 of the Convention, see below note 47.

[16] See Peter-Tobias Stoll, Transfer of Technology, in Wolfrum (note 10), 1229–1238; id., Technologietransfer. Internationalisierungs- und Nationalisierungstendenzen, Berlin [etc.]. 1994, 5 et seq.; Pedro Roffe, Technology Issues in the International Agenda: A Review of Two Decades of Multilateral Deliberations in the United Nations and GATT; Wolfrum (note 1), 285–314.

in international relations. "Technical cooperation" without much questioning has always been understood to be limited to contributions that States were willing to make in pursuit of their foreign relations policies. The term "technology transfer" was introduced at a stage of international discussion, when claims to cooperation were voiced which went beyond the inherent confines of the concept of technical cooperation.[17] Technology now was perceived as an economic resource, necessary for economic and business activities and especially for industrialization. Thus, the question now was one of the international economic order. When the developing States and the Group of 77 started their initiative for a "New International Economic Order", technology transfer became a keyword, referring to the question of how to distribute, use, transfer and benefit from technological advances.[18] The "New International Economic Order" tried to foster technology dissemination and transfer by limiting the exclusionary rights of technology holders. Two main projects were initiated in this regard. An International Code of Conduct on the Transfer of Technology[19] was drafted within UNCTAD which was supposed to serve as a general legal basis for technology transfer transactions around the world.[20] Additionally, a revision Conference of the Paris Convention[21] was initiated which mainly aimed at facilitating the granting of compulsory licenses by developing States.[22] The discussions within the LOS Conference to some extent referred to those projects and the transfer of technology provisions were considered as a model in this regard.[23]

Due to a number of changes within international economic relations, concepts of international economic and trade diplomacy changed considerably. With the GATT Uruguay Round, a new era began and intellectual property rights were considerably reinforced around the world.[24]

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[17] Stoll, Transfer, ibid., para. 3, and id., Technologietransfer, ibid., 14 et seq.

[18] Stoll, Technologietransfer, ibid., 12 et seq.

[19] United Nations Conference on a Code of Conduct on the Transfer of Technology, Draft International Code of Conduct on the Transfer of Technology as of June 5, 1985, TD/CODE TOT/47; see Stoll, Technologietransfer, ibid., 88 et seq.; Roffe (note 16), 299.

[20] Prill (note 3), 825; Gaster (note 2), 220.

[21] Paris Convention for the Protection of Industrial Property, as revised at Stockholm, 1967; Prill (note 3), 826; Wolfrum (note 2), 478 et seq.; Stoll, Technologietransfer (note 16), 214.

[22] Roffe (note 16), 296 et seq.; Stoll, ibid., at 214 et seq.

[23] See Hauser (note 2), 158; van Dyke/Teichman (note 4), 430 et seq.

[24] Stoll, Technologietransfer (note 16), 49 et seq., 324 et seq.; Roffe (note 16), 290 et seq.

This, in turn, had repercussions on the negotiations on the entry into force of the Convention.

III. The LOS Convention and Technology Transfer: Diversity of Models

For a long time, the law of the sea basically has been a law of coordination. It was mainly concerned with managing possibly conflicting claims for national sovereignty and to organize the independent use of the high seas by ships of different nations. The LOS Convention developed the principle of cooperation as a new model to reconcile conflicting interests and to achieve common goals.[25] This is especially true for some areas like the use of living resources, the protection of the marine environment and – most famous – the regime for the Area. Moreover, the Convention refers extensively to technical cooperation and technology transfer.
The Convention contains a number of provisions on technology:

A. Coastal States: Legitimate Linkage between Access to Living Resources and Transfer of Fisheries Technologies

Art. 62 para. 4 *lit.* j, for instance, empowers coastal States to introduce national legislation on the access of foreigners to fishing in the exclusive economic zone and to provide for "requirements for the training of personnel and the transfer of fisheries technology, including enhancement of the coastal State's capability of undertaking fisheries research; ...". This provision is to be understood to legitimize a State to establish a linkage between the access to those living resources and a technology transfer.[26] It has to be seen in the broader perspective of distribution of rights to fishing resources, which the Convention attributed to the coastal States.[27] It empowers those States to capture technology in return for granting access to living resources.[28]

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[25] Wolfrum (note 2), 111 et seq.

[26] For an overview of the issue of technology transfer in this regard see: Vlad M. Kaczynski, In Search of Self-Reliance: Problems of Marine Technology Transfer to the Developing Countries: The Case of West Africa, ODILA 20 (1989), 623–636.

[27] Wolfrum (note 2), 665 et seq.

[28] It has to be noted that in international relations the attribution of resources to certain states and the claim for technology transfer sometimes have been linked. Pinto, Transfer (note 3), 243, stresses this point in saying: "... negotiators for the developing countries at the Conference ... urged the inclusion of technology-transfer provisions in the Convention whenever an issue offered them advantage, namely – and most often – whenever they had ... a measure of resource jurisdiction and thus something to offer in exchange for technol-

B. Protection of the Marine Environment, Cooperation and Technology

A far more interesting provision relates to technology in the context of the marine environment[29] and is to be found in Art. 202. The LOS Convention imposes an obligation upon States to protect and preserve the marine environment (Art. 192) and stipulates that States should cooperate in this regard (Art. 197). In this vein, Art. 202 provides for "scientific and technical assistance to developing States" and lists some measures in this regard. Aside from assistance in training, research, monitoring and education – Art. 202 *lit.* a (i) and (v) – a supply of necessary equipment and facilities (iii) and the enhancement of developing State's capacities to manufacture such equipment (iv) are mentioned. Additionally, a preference for developing States in the allocation of funds and assistance by international organizations is mentioned (Art. 203). Here, emphasis is clearly on the benefit of the developing States, which thereby shall be enabled to effectively meet their obligations as to the protection of the marine environment.

C. The General System for the Development and Transfer of Marine Technology in Part XIV

Part XIV of the LOS Convention deals in more general terms with the development and transfer of marine technology.[30] The provisions, however, can be understood as a comprehensive system to advance technology, technological capabilities and technological interchange on a global level by a system of institutionalized state cooperation. The objectives of that system are far-reaching and *inter alia* refer to a better distribution and use of information about technology, and enhanced structures within technology recipient countries to acquire and to absorb technologies. Art. 266 provides for general cooperation in regard to the promotion of the

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ogy. Thus, having recognized coastal state jurisdiction over the Exclusive Economic Zone, the Convention requires nationals of other states fishing in the zone to comply with the coastal State's laws and regulations, including those relating to 'requirements for the training of personnel and the transfer of fisheries technologies, including enhancement of the coastal State's capability of undertaking fisheries research' ...".

[29] Cf. generally Wolfrum (note 2), id., The Protection of the Marine Environment after the Rio Conference: Progress or Stalemate, in: Beyerlin/Bothe/Hofmann/Petersmann (Hrsg.), Recht zwischen Umbruch und Bewahrung; Festschrift für Rudolf Bernhardt, Berlin–Heidelberg–New York etc. 1995, 1003–1017. See Beyerlin (note 14), et seq.

[30] van Dyke/Teichman (note 4), 433 et seq.

development and transfer of marine technology, which mainly includes the obligation that "States ... shall co-operate ... to promote actively the development of marine science and marine technology on fair and reasonable terms and conditions" (para. 1). It is understood that States "shall endeavour to foster favourable economic and legal conditions ... for the benefit of all parties concerned on an equitable basis" (para. 3). Moreover, Art. 267 makes it clear that due regard shall be paid to legitimate interests, "*inter alia*, the rights and duties of holders, suppliers and recipients of marine technology...".

D. Summary

The variety of provisions in the Convention which are relevant to technology transfer is due to the fact that the various areas are characterized differently in terms of the degree of cooperation envisaged, the common interests involved and the economic significance and market opportunities of the relevant technologies at stake. There are two basic parameters of definition of a state's contribution under those clauses: first, there is a definition of the degree of obligations in terms of the state action required; and second, there are often definitions as to the *quid pro quo* of the transfer envisaged. With the exception of Art. 62 para. 4 *lit.* j, they are mainly addressed to States and do not directly concern private parties. This may be the reason why those provisions were not subject to much dispute during and after the end of the LOS Conference.

IV. Technology Transfer and Deep Seabed Mining

The contrary, however, holds true for the technology transfer provisions of Chapter XI. To understand the disputes, it is necessary to look into the general structure of the deep seabed mining regime.

A. Reconciling Equal Participation and Free Entrepreneurship: The Parallel System and Joint Ventures

The new challenge which the United Nations Conference on the Law of the Sea had to face was the discovery of resources on the deep sea floor. Based on scientific data and economic predictions within the Conference, it was expected that the exploitation of those resources would be a good business and could start within a short time. The resources on the deep seabed by no means could be attributed to a single State and thus

were considered to represent an international common. The question of how access to those resources should be organized, and who was going to benefit from mining operations, accordingly had to be resolved by the international community as represented at the Conference.

Initially, some States voiced the idea of applying a "freedom of access" principle to those resources, as applied to the high seas. This, however, was found to be inappropriate for two reasons. First: the resources of the deep seabed were vast, but clearly not unlimited. Second, and most importantly, deep seabed mining requires technology in the form of equipment and skills. At the time of the Conference, the necessary technology[31] was in an early stage of development, seemed to be rather sophisticated and only a small number of companies and research institutions in the industrialized countries were understood to be capable of developing and applying it.[32]

A regime for the use of deep seabed resources had to take into account the scarcity of the resources and this unequal distribution of technology. There were two simple ways of organizing deep seabed mining around those basic requirements: first, one could allow mining on a commercial scale, levy taxes and distribute the revenues among the States.[33] The very first proposals of the industrialized States indeed referred to this model and envisaged a licensing system administered by an international entity on the basis of a first-come, first-served principle.[34] Second, the international community could have taken the mining operations into its own hands with the help of commercial industrial partners. The profits again could have been distributed as mentioned above. This was the starting point of the developing States, which wanted to set up a strong international institution in this regard.[35] There were many objections to those

[31] For a description of the technology see: Maasamichi Fujimori, Evaluation of Deep Seabed Mining Technology: Past, Present, and Future, in: Tadao Kuribayashi/Edward L. Miles (eds.), The Law of the Sea in the 1990s: A Framework for Further International Cooperation, Hawaii 1992, 293–311; Mahmoudi (note 2), 31 et seq.; French (note 2), 46 et seq; S.Z. Quasim, Deep-Sea Minerals, in: John Vandermeulen/Susan Walker (eds.), Ocean Technology, Development, Technology Transfer, International Ocean Institute, Proceedings of Pacem in Maribus XVI, 1988, Oxford [etc.] 1991, 75–81.

[32] The question, whether the technology is available in the sense that it can be acquired on the market on acceptable conditions has been the crucial question of the whole technology transfer regime, see in detail below, at note 59.

[33] See Pinto, Transfer (note 3), 241.

[34] French (note 2), 219; Wolfrum (note 2), 417.

[35] See Draft Statute for an International Sea-Bed Authority, submitted by the United Republic of Tanzania, A/AC. 138/33; S. Rama Rao, Towards a System for Deep-Seabed

ideas. Basically, they referred to two points: On the side of the State community, the kind of participation demanded in the exploitation of those resources, which in the meanwhile were declared the "common heritage of mankind"[36], was no longer confined to the idea of a financial sharing. On the contrary, the claim for participation now amounted to the demand for an equal opportunity for all States to directly and fully participate in mining operations.[37] Mainly political reasons were voiced in this regard. Moreover, the idea of a technology spin-off in the sense that participating in the technical side of mining operations would somehow foster the general technological development of a society in other areas might have played a role.[38] On the other hand, the industrialized States were not willing to allow an international entity to exclusively conduct mining operations, but wanted to guarantee an access to mining operations on the basis of free entrepreneurship for their companies[39] engaged in the business.

In order to achieve both ends – full and direct participation of interested States and free entrepreneurship – the LOS Conference developed two mechanisms. First, somewhat on a "macro-level" the so-called parallel system[40] was developed, which was based on a division of the deep seabed: One part was to be open for commercial mining operations, whereas the other part was reserved for mining operations in the interest of the State community as a whole and those of developing States. This was understood to guarantee commercial mining in free entrepreneurship and at the same time to safeguard a part of the resources for the purposes of active participation of developing States and the Enterprise. However, it became clear that such a system of parallel and concurring

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Exploitation: A Study of Participants, Methods and Effects, Indian Yearbook of World Affairs 1986, 303–322 (307); Wolfrum (note 2), 418.

[36] Thomas Fitschen, Common Heritage of Mankind, in: Wolfrum (note 10), 149–159, para. 7 et seq.; Rüdiger Wolfrum, The Principle of the Common Heritage of Mankind, ZaöRV 43 (1983), 312–337; id. (note 2), 389 et seq.

[37] Wolfrum (note 2), 447 et seq.; 445 et seq.; id. (note 36), 321 et seq.; Prill (note 3), 809 et seq., 821 et seq.

[38] See, for instance, for an optimistic statement: Ascensio C. Lara, Ocean Structures: New Possibilities for Industrial Development, in: Vandermeulen/Walker (note 31), 92–116, who voiced "catalytic effects of ocean engineering" (p. 110) and stressed: "... Potential technologies will allow the extension of industrial development benefits even to the most isolated populations ..." (p. 113).

[39] There were some international consortia founded for future mining operations, see Mahmoudi (note 2), 33 et seq.

[40] French (note 2), 221; Wolfrum (note 2), 420 et seq.; Gaster (note 2), 193 et seq.

activities presupposes that both kinds of operation can really take place and thus necessitates that the technological, financial and managerial bases for conducting mining operations are secured. In the Convention, different mechanisms are provided for in order to secure a start of mining in the reserved area. A common feature of those mechanisms is that they are structured in such a way as to impose certain obligations on the private contractors to benefit the Enterprise and the developing States.

A potential contractor, for example, has to submit data about an area sufficiently large to allow two mining operations to the Authority in order to apply for an authorization of commercial mining operations, Annex III, Art. 8. On the basis of those data, the Authority chooses one of the parts to be reserved. It to the more may transfer the data relating to the reserved field to the Enterprise, even if they are deemed to be of a proprietary nature.[41] In sum, the potential applicant has to conduct prospecting activities for the interest of the Enterprise.[42]

Technology, however, was considered to be the most critical factor in designing a regime of parallel activities in the area. This was the starting point of the discussions of a technology transfer regime within Chapter XI,[43] which led to the technology transfer mechanism as provided for in Arts. 144 and 5 of Annex III of the Convention.

On the scale of single mining projects – the "micro-level" – the Convention offers another model for reconciling claims for full participation and free entrepreneurship: joint ventures[44] are suggested in this regard and in some way are privileged.

B. Equal Participation vs. Free Entrepreneurship: Technology Advances and Transfer

There were many debates on deep seabed mining technology during the Conference. It was agreed that in principle the acquisition of technology should be by market principles and that the principle of free entre-

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[41] Annex III, Art. 14 para. 3.

[42] Francisco Orrego Vicuña, Chapter 14, The Régime for the Exploration and Exploitation of Sea-Bed Mineral Resources, in: Dupuy/Vignes (note 2), 635–688 at 670.

[43] Prill (note 3), 813 et seq.; Pinto, Transfer (note 3), 242; Gaster (note 2), 215 et seq.; Mahmoudi (note 2), 210: "Bearing in mind that the suggestion of the parallel system by the industrialized countries was tied to the perception of the permanence of that system, it may be concluded that the restricted technology transfer was a foreseeable measure, even though some of these countries have declared the convention provisions in this regard as unacceptable ...".

[44] For details see below, V. D.

preneurship should apply. Thus, in general, it was understood that the Contractors as well as the Enterprises and developing States, on an equal footing would acquire the technology necessary from a number of technology providers, which would compete by means of price and quality and would be interested in selling or licensing their technology to as many potential mining operators as possible.[45] However, especially those States, which did not have the technologies at hand were sceptical whether these understandings would ever become reality. It was asserted that in the real world potential commercial contractors would very likely exercise some control upon technology and try to bar the Enterprise and developing States from acquiring it.[46] In order to secure their equal participation in mining operations as envisaged by the common heritage principle,[47] therefore, a mechanism for the transfer of technology for the benefit of the Enterprise and developing States was demanded.

A complex system has been developed on the basis of those considerations to assure an adequate supply of deep seabed mining technology.[48] It mainly can be characterized as a system of institutionalized cooperation, which is centred within the Authority. It was originally based on Art. 144, supplemented by Arts. 274[49] and 5 of Annex III. There are numerous different means and measures mentioned in order to "promote and facilitate" technology transfer. Aside from provisions about information, participation and training, Art. 144 para. 1 (a) and (b) empowered the Authority to acquire technology and to transfer it to the Enterprise and

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[45] Indeed, the developed States originally saw no necessity to provide for any rules on technology transfer in the Convention, French (note 2), 231; Hauser (note 2), 158.

[46] Hauser, ibid., 158; Rao (note 35), 311.

[47] See above at note 36.

[48] See for a description: Gaster (note 2), 216 et seq.; the development of the technology transfer provisions: Prill (note 3), 801 et seq., 806 et seq. The provisions have a limited scope. According to Art. 144 para. 1 (a), they refer to "technology ... relating to activities in the Area ... ". An even more detailed definition has been that of Art. 5 para. 8 of Annex III, which reads: "For the purposes of this article, 'technology' means the specialized equipment and technical know how, including manuals, designs, operating instructions, training and technical advice and assistance, necessary to assemble, maintain and operate a viable system and the legal right to use these items for that purpose on a non-exclusive basis". It may be relevant for the purposes of interpretation even though Art. 5 of Annex III is no longer applicable, see below text accompanying note 60. The new provision of Section 5 para. 1, Annex of the Implementation Agreement, refers to "deep seabed mining technology". Therefore, the provisions only refer to technologies necessitated for mining operations. Transport and processing technologies are not included, see French (note 2), 222.

[49] See Prill (note 3), 841.

developing States.[50] Correspondingly, there are obligations of States Parties to cooperate in this regard. It was not difficult to draft this provisions at the LOS Conference.

The political dispute about the technology transfer regime within Chapter XI relates to an additional element of that system. It is based on the idea that transfer of technology to the Enterprise and to developing States should be at least on "fair and reasonable commercial terms and conditions".[51] This term is understood as a guideline for programmes for the transfer of technology that the States Parties and the Authority shall initiate and promote in cooperation (Art. 144 para. 2 (a)). Taking only this rather broadly defined obligation, there would not have been much controversy about those "fair and reasonable commercial terms and conditions". The *casus belli* has been Art. 5 of Annex III of the Convention which refers to the latter as a trigger for applying much more explicit obligations on the side of private contractors and States.

According to Art. 5 para. 3 of Annex III, access to mining operations was linked to a transfer of technology in such a way that any potential contractor had to undertake to transfer to the Enterprise any technology applied on "fair and reasonable commercial terms and conditions" if the Enterprise finds itself unable to acquire such technology on such conditions on the open market. This undertaking had to be given in the contract to be concluded with the Authority. The same undertaking was requested on behalf of developing States.[52] The drafters of those provisions devoted much legal professionalism and care to ensure that no legal loophole could hamper the complete transfer of the technology and respective rights, once the undertaking was invoked.[53]

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[50] See Wolfrum (note 2), 457 et seq.

[51] For details, see below V. A.

[52] Annex III, Art. 5 para. 3 *lit.* e. This clause has been named "brazilian clause", Gaster (note 2), 218 note 247, and at 220. It has to be emphasized, however, that technology transfer on the basis of that provision was limited in three ways: first, transfer was "limited to the exploitation of the part of the area proposed by the Contractor which has been reserved pursuant to art. 8 of the Annex ..." (cf: text accompanying notes 40, 41), second, it was understood, that it should not involve "... transfer of technology to third States or nationals of a third State ..." and third, the transfer according to Art. 5 para. 3 *lit.* e could only be invoked, "... where technology has not been requested by the Enterprise or transferred by that Contractor to the Enterprise ...", cf. French (note 2), 234.

[53] See generally van Dyke/Teichman (note 4), 435 et seq. For instance, there was an extensive ruling on technology applied by the Contractor, which was subject to rights of third parties, Art. 5 para. 3 (b) and (c) of Annex III; see French, ibid., 233.

In addition to the duties of private Contractors, Art. 5 para. 5 of Annex III provided for a responsibility of States in respect of technology transfer, which can be named a "special group cooperation". It is based on the cooperation of a group of States that the Authority or the Council was empowered to convene if the Enterprise was held to be unable to obtain technology on fair and reasonable commercial terms. Therefore, the same kind of trigger applies as is true for the private undertakings to transfer technology as mentioned before. This group was to be composed of States Parties directly or indirectly engaged in mining operations and "States Parties having access to such technology". They were supposed to consult and to take measures in order to ensure that technology is made available on – again – "fair and reasonable commercial terms and conditions" including "all feasible measures to this end within [a State Party's] own legal system".[54]

It is important to note that both mechanisms – technology transfer on the basis of undertakings by Contractors and this special group cooperation – were limited in terms of time to that effect that they only applied to secure the technology supply to the Enterprise[55] to initially start its own mining operations. As far as the undertakings of Contractors are concerned, Art. 5 para. 7 states that undertakings have to be included in contracts and may be invoked "until 10 years after the commencement of commercial production by the Enterprise".[56] The special cooperation procedure as stipulated in para. 5 of Art. 5 according to that provision is explicitly confined to the purpose "to enable [the Enterprise] to commence in a timely manner the recovery and processing of minerals from the Area ...".

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[54] Gaster (note 2), 219 et seq.

[55] Prill (note 3), 819.

[56] Mahmoudi (note 2), 210, voiced a concern common to developing States in this regard, which is that after that time span, the private investors will go on in improving their technologies and may reach a "supremacy" of their technology pool as compared to the Enterprise and developing States. This argument, however, does not properly take into account the possibility to acquire new technologies on the market. To the more, it has to be emphasized, that the Authority, according to Art. 144 para. 3 *lit.* b, is called for to "... foster measures directed towards the advancement of the technology of the Enterprise and the domestic technology of developing States ...", see also Wolfrum (note 36), 329.

V. The Transfer of Mining Technology under the Implementation Agreement

The Implementation Agreement considerably changed the transfer of technology provisions. These changes obviously were due to the fact that industrialized States made it clear that acceptance of the Convention as a whole depended upon a change of this regime, which has been severely criticized.[57] Additionally, the technology transfer projects of the New International Economic Order in general failed and a reverse tendency of enhancing intellectual property rights on a high standard could be observed, which succeeded with the conclusion of the Agreement on Trade-related Aspects of Intellectual Property Rights as part of the GATT Uruguay Round.[58] Moreover, concerns about the availability of mining technology might have eased and in general, the commercial attractiveness of deep seabed mining diminished.[59]

The Implementation Agreement, most importantly, provides for the inapplicability of Art. 5 and thus *inter alia* for the obligation of Contractors to be prepared to transfer their technology (Art. 5 para. 1–4).[60] Instead, a new provision is annexed to Art. 144, which is drafted on the basis of the "special group cooperation" mechanism, as previously provided for in para. 5 of Art. 5 of Annex III.[61] This mechanism is modified in a number of ways: first, the composition of the group to be convened has been changed. Instead of a "group of States Parties"[62], it now includes contractors, their respective sponsoring States which are held to be responsible for them and other States.[63] The wording no longer refers to "States Parties having access to such technology"[64]. In practice, however, the "other" States concerned will be those which have such access. On the side of the beneficiaries, developing States have been added to the

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[57] See above, notes 4, 6.

[58] See above, text accompanying note 24 and below, note 78.

[59] Today, the relevant technology for deep seabed mining is considered to be available on the open market, see Jan Magne Markussen, Commentary, in: Kuribayashi/Miles (note 31), 336–350; Jan Magne Markussen, Exploitation of Polymetallic Modules: Availability of Technology and Economic Feasibility, in: Vandermeulen/Walker (note 31), 82–91 at 83 et seq.; French (note 2), 235.

[60] Implementation Agreement, Annex, Section 5, para. 2.

[61] Implementation Agreement, Annex, Section 5, para. 1 *lit.* b.

[62] Art. 5 para. 5, Annex III of the LOS Convention.

[63] Implementation Agreement, Annex, Section 5, para. 1 *lit.* b: "... may request all or any of the contractors and their respective State or States ...".

[64] Cf. Art. 5 para. 5 of Annex III and above at note 54.

Enterprise.[65] The efforts that this group is obliged to undertake are more generally circumscribed[66]. On the other hand, there are no time limits any longer.[67]

A. The Trigger of the Transfer Mechanism: "Terms and Conditions" Revisited

The crucial question of the old and the new technology transfer regime of Chapter XI of the Convention is that of the "fair and reasonable commercial terms and conditions".[68] This criterion has been and still is the trigger for the transfer of technology mechanisms. The function of the whole mechanism depends on the interpretation of that formula. It is clear that it indicates that there shall be no obligation to transfer free of charge, as was originally demanded during the Conference.[69] The positive meaning of the formula, however, is not yet clear.

1. The general structure: market failure remedy or participatory claim for preferential treatment?

Two general concepts may be distinguished in this regard. First, one may suggest that the "fair and reasonable" standard refers to market economy principles as can be derived from the economic law of market economy systems. One could argue that the concerns of developing States

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[65] Art. 5 para. 5 of Annex III LOS Convention only related to efforts "... to ensure that such technology is made available to the Enterprise ..."; Section 5, para. 1 *lit.* b, Implementation Agreement, Annex, now expressly refers to "... the Enterprise or developing States ...".

[66] Originally, Art. 5 para. 5 of Annex III, LOS Convention, stated that the group "shall consult together and shall take effective measures to ensure that such technology is made available to the Enterprise on fair and reasonable commercial terms and conditions. Each such State Party shall take all feasible measures to this end within its own legal system ...". Cf. above, at note 54. Section 5, para. 1 *lit.* b, Implementation Agreement, Annex, now stipulates that the group shall "cooperate with [the Authority] in facilitating the acquisition of ... technology ..." and that "... States Parties undertake to cooperate fully and effectively with the Authority for this purpose and to ensure that contractors sponsored by them also cooperate fully ...".

[67] For the time limits set by Annex III, see above note 56.

[68] Hauser (note 2), 165.

[69] J.A. Walkate, Developments in Special Commission 3 of the Preparatory Commission for the International Sea-Bed Authority and for the International Tribunal for the Law of the Sea: Drafting the Future Deep Sea-Bed Mining Code, NILR 36 (1989), 153–178, at 161.

in regard to the possible withholding of technologies complies with the notion of restrictions, which can be remedied under antitrust and intellectual property law in a number of States. While supporting the proprietary claims of technology holders and their exclusionary power, especially by granting intellectual property rights, most sophisticated market economy systems provide for some mechanisms to prevent the abuse of those legal positions.[70] Antitrust laws sometimes refer to the refusal to deal with the abuse of a dominant market position and with excessive restrictions. Patent law often provides for compulsory licenses in cases where a patent holder refuses to voluntarily license a patent to third parties under certain circumstances.[71] The technology transfer provisions of Chapter XI obviously reflect this approach. They thus could be deemed to set a standard of competition according to market principles and to qualify as a sort of a special international antitrust provision. An interpretation of the provisions accordingly could refer to the respective provisions of national economic law.[72]

Yet the transfer of technology regime of Chapter XI is somehow different. Whereas all market economy mechanisms just mentioned address the business actor that allegedly has acted in abuse of its powers, the regime provides for a liability of third parties in this regard: the possible members of the special group are held liable for the failure of any other market participant to transfer technology on a "fair and reasonable" standard. In the end, this amounts to a liability of Contractors and States to guarantee the willingness of the relevant group of technology providers within the business community to act on such "fair and reasonable commercial terms and conditions".

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[70] See for an actual analysis and description of those policies: U.S. Department of Justice and the Federal Trade Commission, Guidelines for the Licensing of Intellectual Property, adopted and published on April 6, 1995, reprinted in: Bureau of National Affairs, Antitrust and Trade Regulations Reporter, Vol. 68, No. 1708, Special Supplement; see also: OECD, Restrictive Business Practices Relating to Patents and Licences. Report by the Committee of Experts on Restrictive Business Practices, OECD-Doc. RBP (71) 3 (2nd Revision), Paris 1973; OECD, Restrictive Business Practices of Multinational Enterprises, Paris 1977; OECD, Competition Policy and Intellectual Property Rights, Paris 1989, OECD Publications 44783; Stoll, Technologietransfer (note 16), 3 et seq., 99 et seq.

[71] Stoll, ibid., 248 et seq.

[72] The United States, during the LOS Conference, issued an interpretational statement on "fair and reasonable terms and conditions", which indeed referred to common business practices in technology licensing which are well known in antitrust law and *inter alia* proposed to take into account: provisions on termination of agreement (4); grant-back clauses (5), limitations to use (3) and (7), validity of patents (9), reprinted in: Wolfrum (note 2), 466 note 374.

This kind of special responsibility of Contractors and sponsoring States may also be deemed the starting point of the other way of interpreting the "fair and reasonable" formula. One could argue that in the end, due to their engagement in mining, Contractors and States have a special duty to cooperate with those willing to do so. Fairness, seen in this perspective, would be based on a specific duty to enable others to start mining operations. Defining "fair and reasonable commercial terms and conditions" thus would not be confined to market economy standards. Additionally, the interest in participation would have to be taken into account and obviously would lead to a standard more favourable to technology recipients.[73] If this were the case, the technology transfer mechanism would work quite differently. As technology owners on the open market would not be prepared to act on those preferential standards, the transfer obligation would almost always be triggered, and in the end Contractors and sponsoring States would be called upon to transfer most of the technology. The transfer of technology mechanism would then function as a means of redistribution between Contractors and their sponsoring States on the one hand and the Enterprise and interested developing States on the other hand. In other words, this would amount to a subsidization.

The Implementing Agreement expressly states that the "Enterprise, and developing States wishing to obtain deep seabed mining technology, shall seek to obtain such technology on fair and reasonable commercial terms and conditions on the open market ..."[74], [75] the first mode of interpretation of the "fair and reasonable commercial" standard is thus now more explicitly favoured as reference is made expressly

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[73] Hauser (note 2), 167 et seq., who indicates that the term "commercial terms and conditions" may in the end not counter this tendency. The contrary is stated by van Dyke/Teichman (note 4), 438. See, however, Wolfrum (note 36), 329: "The technology has to be transferred not on market conditions but on fair and reasonable commercial terms and conditions ...".

[74] Section 5, para. 1 *lit.* a, Implementation Agreement, Annex, emphasis added.

[75] The "trigger" according to the plain wording of the provision of Section 5, para. 1 (b), Annex, of the Implementation Agreement is now phrased "... unable to obtain deep seabed mining technology ...". This does not in itself exclude an interpretation in that way that the clause would become effective only in those cases where an attempt to acquire technology failed on any possible conditions. As the provision, however, in the following refers to the acquisition of technology by the Enterprise or developing States "seeking to acquire such technology on fair and reasonable commercial terms and conditions, ..." it may be assumed that the clause in its entirety does apply in all cases where attempts to obtain technology on such standards have been frustrated. The requirement that the Enterprise should undertake efforts in good faith before invoking the transfer mechanism has already been deemed part of the old provisions, van Dyke/Teichman (note 4), 438.

to the open market. The most important change, however, may be seen in the fact that the phrase "effective protection of intellectual property rights" has been added. This can be said to indicate that the standard now is such as to entitle the technology supplier to realize the full remuneration which is due to innovative activity under market economy conditions.

It may be summarized that the "fair and reasonable" formula refers to market economy standards and may be qualified as a peculiar instrument by which the commercial actors in deep seabed mining, their sponsoring States and third States are held liable for the failure of the business community as a whole to act on those standards. When interpreting the formula, therefore, it is possible to refer to general standards as provided for by market economy considerations and national economic law.

2. The format of transactions: factors to be considered and interpretational guidelines

On the basis of those considerations, one can consider in more detail the possible interpretation of "fair and reasonable commercial terms and conditions".

To start with, it may be recalled that there are two different ways to transfer technology. Most commonly, technology is transferred when a donor, alongside the provision of the necessary information, materials and training, authorizes a recipient to use the technology within certain limitations which may refer to time, place and field of use. This is the normal type of licensing contract.[76] In rare cases, on the other hand, the technology may be sold as such, which is to say that the transferor will transfer all the rights vested in the technology in their entirety to the recipient, sometimes retaining for himself the right to use it for his own purposes. The technology donor is thus excluded from any further profits and benefits accruing to that technology arising from its application or transfer to third parties.

The remuneration to be paid in the two cases is calculated differently. License fees in many cases are determined by a certain percentage of the turnover that the licensee achieves due to the licensed technology. If the

[76] See generally: Wolfgang Fikentscher, The Typology of International Licensing Agreements, in: Norbert Horn/Clive M. Schmitthoff (eds.), Legal Problems of Codes of Conduct, Vol. 2, Deventer [etc.] 1980, 211–222; Herbert Stumpf/Hannes Hesse, Der Lizenzvertrag, 5. Aufl. 1985.

technology is sold in its entirety, the remuneration is defined as a sum, which represents the total market value of the technology. This price will be defined in a complicated bargaining process. The technology recipient will probably take into account the price of substituting technological solutions and the estimated costs of developing the technology independently. The technology donor will take into account the total expenditures for research and development and the estimated gains from other kinds of use of the technology, i.e. licensing. In normal business, technology acquisitions will be mainly on the basis of a licensing contract, because it may well be much cheaper. A purchase of technology in its entirety is normally only considered if the potential buyer is definitely interested in acquiring the full legal control over a certain technology, or if the technology owner considers that any transaction will have the effect of entirely losing control of the technology.

Obviously, often transfers relating to deep seabed mining technology under the transfer of technology regime of Chapter XI have been understood to fall in the second category. Accordingly, suggestions have been made on the interpretation of the "fair and reasonable" clause which refer to the total costs of research and development and mostly concentrate on their proper definition. Probably, this is due to the fact that the original provisions of the Convention were understood to contain a loophole, by which the Enterprise would be free to pass on technology to third parties once it had acquired it by means of the technology transfer mechanism. This was concluded from the wording of Art. 5 para. 3, which explicitly bars developing States from passing on such technology to third parties,[77] whereas a similar provision in regard to the Enterprise was missing. None of the new provisions of the Implementation Agreement deals with the question. It is therefore open to interpretation, whether the Enterprise or developing States may pass on technology. The more interesting question, however, is, whether such prohibition to transfer to third parties may be included in a transfer of technology agreement.

[77] Art. 5 para. 3 *lit.* (e) with regard to "developing State[s] or group of developing States" stated that technology transfer "... be limited to the exploitation of the part of the area proposed by the contractor which has been reserved pursuant to article 8 of this Annex and provided that activities under the contract sought by the developing State or group of developing States would not involve transfer of technology to a third State or the nationals of a third State ...", see above, note 52.

B. The Extent of Obligation under Section 5, para. 1 (b), Annex, of the Implementation Agreement

Another important aspect of the new provisions on technology transfer is the change in the extent of obligation. Art. 5 para. 5 of Annex III, in this regard, envisaged effective measures to ensure a transfer and went on to include "all feasible measures to this end within [a State's] own legal system ...". This theoretically may have covered even rather hard measures such as the granting of compulsory licenses or even an expropriation. Section 5, para. 1 (b), Annex, of the Implementation Agreement is considerably less explicit on this point and simply states that those requested by the Authority should cooperate with the latter. The new "intellectual property clause" added to the standard definition here is relevant again: the claim for consistency with the effective protection of intellectual property rights also means that the obligation to cooperate does not include measures which are contrary to international standards on intellectual property rights. Here, the TRIPs agreement has to be mentioned, as it set procedural and material standards, for instance for compulsory licensing.[78]

C. Dispute Settlement

The far-reaching and complicated provisions on the transfer of technology may easily lead to disputes. A decision of the Authority to request the cooperation of a special group may meet objections on the part of Contractors and States involved. The refusal to cooperate may, on the other hand, be questioned by the Enterprise and developing States. In principle, those disputes are subject to the compulsory jurisdiction of the Sea Bed Disputes Chamber of the International Tribunal for the Law of

[78] The general ratio of the TRIPs Agreement can be considered to be exemplified by Art. 30, which refers to "Exceptions to Rights Conferred" as far as patents are concerned and reads: "Members may provide limited exceptions to the exclusive rights conferred by a patent, provided that such exceptions do not unreasonably conflict with a normal exploitation of the patent and do not unreasonably prejudice the legitimate interests of the patent owner, taking account of the legitimate interests of third parties". Additionally, Art. 31 deals with compulsory licenses in more detail and states on the material and procedural requirements in this regard.

the Sea according to Art. 186 et seq.[79], [80] As the convening of a special group or its refusal may be deemed "an act or omission of the Authority", jurisdiction of the Chamber may be based on Art. 187 (b). In this procedure, States Parties have standing to claim that the Authority did not act lawful in either requesting or in refusing to request such a special group cooperation procedure.

Contractors might object to being made participants of such a special group on the basis of Art. 187 (c) (iii). The request to participate in such cooperation is based on the fact that those entities are contractors and thus have concluded a contract with the Authority according to Art. 153 para. 3. The request for participation therefore is based on the contractual relationship between those entities and the Authority. It therefore seems to be clear that such a request represents "an act ... of a party to the contract relating to activities in the area, directed to the other party or directly affecting its legitimate interest" in the sense of Art. 187 (c) (ii). This is especially true, as "... the interpretation or application of a relevant contract" *strictu sensu* is expressly dealt with in Art. 187 (c) (i). From this perspective, the proper function of Art. 187 (c) (ii) seems to be to extend this kind of jurisdiction to legal rights and relationships which arise from the contractual relationship without necessarily being part of it.

The Enterprise, in principle, would also qualify for having standing under Art. 187 (c) (ii). A claim that the Authority should convene a special group in order to effectuate a transfer of technology to the Enterprise, however, would presuppose that doing so would be in any way a matter specifically related to the contractual relationship between the Authority and the Enterprise. Whereas the reference to "Contractors" in Section 5 para. 1 (b) is clearly based on such contractual relationships, the Enterprise and developing States are mentioned in that provision only on the basis of the general intention of the Convention to organize technology transfers to their benefit. The conclusion of a contract on mining

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[79] See Karin Oellers-Frahm, Arbitration – A Promising Alternative of Dispute Settlement under the Law of the Sea Convention?, in this issue, p. 457 et seq.; Tullio Treves, The Law of the Sea Tribunal: Its Status and Scope of Jurisdiction after November 16, 1994, in this issue, p. 421 et seq.; Felipe H. Paolillo, Chapter 15, Institutional Arrangements, in: Dupuy/Vignes (note 2), Section 10: The judicial review of the acts of the Authority, 777–795.

[80] The special reference to international arbitration as provided for in Art. 5 para. 4 of Annex III regarding the question, whether offers made by the Contractor are within the range of fair and reasonable commercial terms and conditions is no longer applicable.

operations does not in any way add to or substract from this general beneficiary legal position. As there is no link to a contractual relationship between the Enterprise and the Authority, the Enterprise cannot claim an alleged inactivity of the Authority on those grounds.

Aside from the question of standing, another problem of the judicial review by the Sea Bed Disputes Chamber relates to the scope of jurisdiction. The request for special group cooperation according to Art. 144 and Section 5, para. 1 (b) of the Implementation Agreement represents a two-step decision-making process. At first, the Authority has to ascertain that the Enterprise and developing States are unable to obtain the technology on such conditions as discussed earlier. In a second step, the Authority has to decide on the convening of a special group. Clearly, this element of the decision-making process is discretionary ("... may request to cooperate ..."). Under Art. 189 of the Convention, however, the Chamber has "no jurisdiction with regard to the exercise by the Authority of its discretionary powers".[81] Therefore, there is no judicial review of the discretionary decision of the Authority to request or not to request special group cooperation.

It is highly questionable if the preceding determination by the Authority of the inability to obtain technology can be challenged in itself. This decision clearly is not discretionary and therefore is not *per se* excluded from jurisdiction according to Art. 189. Doubts arise, however, as to whether the two steps of the procedure can be clearly divided. Moreover, the establishment of the inability to obtain technology is a highly technical question which involves difficult economic and political implications. A full review of this difficult question could easily amount to a distortion in the division of powers between the administrative functions of the Authority and the power of judicial review conferred on the Chamber. It could contravene the *ratio* of Art. 189, which is to accept a proper range of administrative decision-making, which by its very nature does not qualify for a full judicial review. Here, it may be useful to refer to Art. 187 (b) (ii). According to that provision, any "acts of the Authority alleged to be in excess of jurisdiction or a misuse of power" are subject to the jurisdiction of the Chamber. This provision is applicable even in cases of discretionary decisions of the Authority.[82]

Taken together, Arts. 189 and 187 (b) (ii) may indicate that the structure of the judicial review by the Chamber as envisaged by Art. 186 et

[81] See Paolillo (note 79), 789.
[82] Treves (note 79), 444.

seq. takes into consideration the need for a restraint of jurisdiction on the one hand and, on the other hand, provides for criteria for a limited review of acts of the Authority. In conclusion, it may be advisable to find a way to restrict the jurisdiction of the Chamber in this case to the question, whether the Authority, in establishing inability to obtain technology, applied reasonable standards and procedures, including the necessary economic reasoning and did not act in a way that could be deemed a misuse of its powers.

D. Technology Transfer and Joint Ventures

As mentioned above, the regime for the Area proposes joint ventures as a means to reconcile the principles of free entrepreneurship and full participation on a project-level basis.[83] The underlying concept of joint ventures in this regard is that partners of such undertakings can be expected to share all their capabilities and resources in order to achieve at best their common goals. Thus, it is understood that this kind of joint activity will by its very nature achieve the ends of free entrepreneurship and full participation without necessitating any further regulation. Art. 5 para. 6 of Annex III, which now, according to the Implementation Agreement, will not be applied any longer, reflected this approach in respect of technology:[84] Technology transfer in such cases, it was stated, was to be governed by the terms of the joint venture instead of Art. 5 paras. 1–4 of Annex III. The Implementation Agreement also refers to joint ventures in saying that the Enterprise and developing states shall seek to obtain technology on the open market "... or through joint venture arrangements ..." (Annex, Section 5 para. 1 (a)). In order to find out whether the expectations concerning joint ventures are justified and this kind of transaction really facilitates a technology transfer, it is necessary to inquire under what circumstances joint ventures may be concluded and how the transfer of technology is organized in such ventures.

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[83] Cf. Günther Jaenicke, Joint Ventures for Deep Seabed Mining Operations, in this issue, p. 329 et seq.; id., Joint Ventures for Sea-Bed Activities: A Viable Alternative, in: Wolfrum (note 1), 165–173; Günther Jaenicke/Erich Schanze/Wolfgang Hauser, A Joint Venture Agreement for Seabed Mining, Deventer, Frankfurt/M. 1981, 9 et seq.; Volker Röben, A Case Study on a Joint Venture Project, in this issue, p. 348 et seq.

[84] See French (note 2), 237.

1. The formation of Joint Ventures: Prospects

Probably due to their said ability to balance conflicting interests in mining operations, the Implementation Agreement focuses on joint ventures. Section 2 para. 2 of the Annex stipulates that the Enterprise "... shall conduct its initial ... operations through joint ventures ...". To the more, according to Art. 13 para. 1 (d) of Annex III, the Authority, in determining and regulating the financial terms of contracts, shall consider the objective "... to provide incentives on a uniform and non-discriminatory basis for contractors to undertake joint agreements with the Enterprise and developing States or their nationals, to stimulate the transfer of technology thereto, and to train the personnel of the Authority and of developing States ...". The Authority therefore can give further incentives to the conclusion of joint ventures by accordingly drafting the financial terms of contracts.

As regards technology transfer, the Implementation Agreement now clearly states that "the Enterprise and developing States ... shall seek to obtain such technology on fair and reasonable commercial terms and conditions on the open market, or through joint venture agreements".[85] Thus, joint ventures now are recognized as a regular means of technology acquisition.

2. Technology Transfer within a Joint Venture

Given the friendly attitude towards joint ventures,[86] it has to be questioned what impact such ventures may have on a technology transfer. It seems to be one of the characteristics of joint ventures that they are flexible and can be structured in many ways. This is also true for the question how technology shall be contributed, used and transferred. It can be assumed that technology inputs will be the most important contribution that the "industrialized" partner of a joint venture will be prepared to make.[87] There are, however, quite different ways to do so,

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[85] Section 5 para. 1, Annex, emphasis added.

[86] See generally, Jaenicke/Schanze/Hauser (note 83), 9 et seq.; Jaenicke, Joint Ventures (note 83), 166 et seq.

[87] Jaenicke/Schanze/Hauser, ibid., 50, in their model agreement propose the following clauses: "Part B Art. 1: The Investor assures that he will use his best efforts to make available to the Operating Company all technological and managerial information and know how necessary for the carrying out of efficient seabed mining in accordance with Part C, Articles 16–18 of this Agreement" (for Articles referred to see below note 88); Part C, Art. 16 para. 1: "Throughout the operation, the Investor shall make available to the

which have a decisively different impact on a possible technology transfer. Those differences mainly are due to the fact that the notion of technology is rather complex. "Technology" may be understood as the entirety of information, skills, legal rights, equipment and machinery, which enables and entitles a natural or juridical person to start, maintain and control a certain planned, useful and economically viable process. The variety of means to contribute technology is thus due to the fact that the notion of technology itself is complex.

First, technology may be contributed to a venture when a partner simply undertakes to apply its technological capabilities to the common goal. This would mean that one of the participants takes care of the operational and industrial activities of a venture. Such a model can be found quite often in practice. It perfectly serves the common end of conducting mining operations and ensures that the joint venture has at its disposal the technology needed. Yet, this model does not imply that a single blueprint has to be communicated between the participants or that any person involved will be informed about or even allowed to participate in the application of the technology in question.

Obviously, this kind of a joint venture will not produce any technology flows at all. To achieve the latter, especially in the offshore petroleum business, special obligations are often included in joint venture agreements. These include, for instance: an obligation to give detailed information about the technology applied and the undertaking to give real opportunities to participate in the operations to persons involved in the venture and to provide for training.[88] The importance of those elements may be highlighted by the fact that they are all mentioned in the Convention.[89] The effectiveness of those provisions in regard to a technology transfer decisively depends upon the ability of the personnel of the non-technology partner to the venture to learn about the technology in a way that enables him to independently and productively make use of the information. This, of course, depends on many parameters, mainly on the

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Operating Company all equipment, technical knowledge and assistance to create, maintain and implement a seabed mining operation at the best available standards of technological, logistical, managerial and commercial practice"; see also French (note 2), 240.

[88] Part C, Arts. 17 and 18 of the model agreement proposed by Jaenicke/Schanze/Hauser, ibid., at 83 et seq.

[89] See Art. 144 para. 2 *lit.* b of the Convention (training, participation in activities in the area) and the following provisions of Annex III, which are still in force: Art. 14 ("Transfer of Data"), Art. 15 ("Training programmes", including participation in activities in the area).

prior and general state of knowledge and skills in the field of engineering and natural sciences of the persons involved.

On a more general level, however, it has to be kept in mind that this channel of technology is quite limited in scope. Referring to the more specific differentiations of the notion of technology transfer as suggested earlier, these triple obligations may lead to a transfer of information about technology and to a communication of skills by participation and training. However, it clearly does not amount to the transfer of any proprietary right as to the equipment or machinery or any technology embodied therein or accompanying it. Forming a joint venture in order to jointly conduct mining operations and related processing and marketing activities does not necessitate the transfer of those assets and related rights.

It would be even less conclusive to assume that a joint venture by its very nature could form a basis for a supply of technology for its partners to be used outside the operations of the venture. Of course, skills and know how acquired by participating in the venture will lead to a human resources development, which is valuable for other mining projects as well. Also, the participation in joint venture activities may promote and foster such full transfer of mining technology as the potential technology recipients will possibly have a better information base and a climate of mutual confidence may be generated, which will facilitate the bargaining process. There is however no inherent interest generated by this specific kind of business formation, which could persuade the technology holder to transfer its technology with all the legal rights involved to the other venture participants for their proper use in other mining activities.

VI. Conclusion

The LOS Conference was inspired by the spirit of the mid 1970s which – far from the scepticism that was voiced later – saw technology as a key to the future progress of mankind. This spirit contributed greatly to the expectation that man was poised to reach for the very remotest areas of the oceans and its resources and thus to obtain a source of considerable wealth. The claim for full participation in operations in the Area – and the necessary technologies – was based on a sense for the political and economic power vested in control over technology. It was also based on the expectation that, basically, technology would produce its beneficial effects at any place in the world irrespective of the economic, social and political environment and could be made to be transferred to that end by

law. These ideas were greatly influenced by the attempts to constitute a "New International Economic Order" which was a subject of discussion at that time in the General Assembly and the United Nations Conference on Trade and Development.

The LOS Convention contains some provisions on technical cooperation and technology transfer. Some of them are in line with other developments in the new international law of cooperation and especially, new international regimes for the protection of the environment.

The very essence of the technology transfer policies as voiced within the Conference, however, is to be found in Chapter XI. The core of those provisions can be summarized as follows: those engaged in mining operations are held liable to guarantee that the Enterprise and developing States, if they are willing to start mining operations, are supplied with the necessary technology on "commercial terms and conditions", which are at least "fair and reasonable". It can be assumed that this standard of fairness takes into account cases which would be in line with market economy mechanisms to prevent abuse of exclusionary control over technology.

It has been shown, however, that the wording does not by any means preclude an interpretation of this standard of fairness, which will additionally refer to the principle of full participation in the area and lead to a standard more favourable to the beneficiaries – the Enterprise and developing States.

The main modifications to this system as provided for by the Implementation Agreement refer to the liability of Contractors and to the definition of the standards of fairness. Originally, Art. 5 para. 3 mandated that Contractors had to issue a contractual undertaking to transfer technology on terms of fairness to the Enterprise and developing States, if the business community altogether failed to do so. The Implementation Agreement instead organized the liability of Contractors within a mechanism previously designed to provide for an additional liability of States. Now States, alongside with Contractors, can be requested by the Authority to cooperate to facilitate a transfer of technology to the Enterprise and developing States on those standards of fairness. This standard of fairness in itself was modified by adding an intellectual property clause. This clause has an impact on the system in two ways: first, it reflects the market economy principle that exclusionary control over technology and the subsequent restraint of competition as well as the concluding of transactions which accord to this position are legitimate. This can be concluded to mean that it is clearly not contrary to the stan-

dard of fairness to request the full remuneration due to innovative activities as a *quid pro quo* of technology transfer transactions. Moreover, the "intellectual property clause" limits the scope of cooperative efforts that States are due to make according to their obligation to cooperate with the Authority: Whereas originally they were held to be obliged to take any effective measure within their legal system, the "intellectual property clause" now clarifies that the effective protection of intellectual property rights has to be respected.

Joint ventures have always been suggested as a means to balance the conflicting aims of free entrepreneurship and full participation with regard to activities in the Area. The Implementation Agreement emphasizes this point. Due to their very structure, joint ventures may assure that the necessary technology will be made readily available for the operations to be undertaken jointly. All participants to the joint venture thereby have control over the use of technology. According to commercial practices, it will be relatively easy to safeguard that information about the technology applied will be circulated and that the personnel of all the participants may be trained and allowed to participate in the operations. This may lead to a human resources development and personnel from developing States and the Enterprise may acquire valuable skills. The joint venture, however, by its very structure does not inherently provide for an incentive to the "industrial partner" to transfer the proprietary rights to the equipment and the technologies embodied therein and accompanying it to the joint venture. It is even less conclusive to assume that a joint venture by its very nature would persuade such an "industrial partner" to transfer such property rights to the other partners for the purpose of conducting other mining operations outside the venture. However, experience within a joint venture may produce a climate of confidence and provide for a sound information basis that may foster the negotiation and conclusion of technology transfers. Additionally, it may be possible to create incentives to transfer technology in the context of joint ventures by accordingly designing the financial terms of contract according to Art. 13 para. 1 (d) of Annex IV.

From today's perspective it may be considered somewhat overdone to expend such enormous efforts in order to regulate the transfer of a very specific and sophisticated technology for a type of mining operation, which now is viewed with increasing scepticism in economic and environmental terms. The legal and economic conditions of the commercial generation, use and transfer of technology in general have changed considerably in the meanwhile and those changes might be a much more grave

concern to States which cannot be considered to be technology leaders. The Uruguay Round of the GATT and especially the TRIPs agreement countered all previous attempts within UNCTAD to change the rules of the game by countering some of their shortcomings and – inserting an element of redistribution.

The Implementation Agreement cancelled Art. 5 of Annex III, which had been designed along those lines. It is due to the consideration that commercial activities can be burdened with obligations to contribute to participatory claims only to the extent that they remain profitable. From a free entrepreneurship perspective, the provisions remain doubtful, as they impose a liability on those engaged in mining operations for the possible refusal of others to supply the Enterprise and developing States with the necessary technology. From the point of view of full participation in activities in the Area, the chances to obtain technology are now less secure, as they depend upon a Contractor's or State's willingness to cooperate and cannot be based any more on a contractual obligation of the Contractor. It was certainly a good idea to amend Art. 5 Annex III and thereby to remove one of the highest obstacles from the road towards entry into force of the Convention. The provisions of technology transfer within the Implementation Agreement cannot be deemed to be perfect, neither from the free entrepreneurship nor from the full participation perspective. Perfection, however, could never seriously have been expected.