I. Introduction.

Although transponder agreements are of utmost importance to the space industry, especially to the telecommunications sector, they have not yet been given much attention by space law scholars. Furthermore, these contracts involving transactions for over millions of dollars are sometimes negotiated and drafted by non-outer space attorneys.

This article intends to analyze different agreements concerning satellite transponders with a view toward providing a basis for further discussion and analysis of unresolved issues. Since most of these agreements are governed by United States law, special reference will be made to U.S. legal and tax rules.

II. Transponders

Basically, a satellite communications system is made up of (1) a space segment and (2) a ground segment. In general, the ground segment is used for establishing communication with the satellites by transmitting and receiving signals by means of equipment located on earth, whether fixed or mobile. The ground segment consists of the earth stations, the terrestrial distribution and the network control facility. Earth stations in their most common configuration use an antenna system with a solid dish, a

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[14] The first potential site is east of the metropolitan Phoenix area. The second is located between Phoenix and Tucson. The third is situated southwest of Tucson. All of these potential sites are less than two hours drive from a major population center.

microwave feed, a pedestal, and equipment for adjusting the dish orientation.[15]

The space segment may comprise one or several satellites, which in turn may each have one or several transponders. As regards communications satellites, their space segment includes the following subsystems: (i) antennas; (ii) communications; (iii) telemetry, tracking and command; (iv) electric power; (v) thermal control; and (vi) secondary propulsion.[16] The most important subsystem and the most relevant to this article is the communications subsystem.

Signals transmitted from the Earth (uplink phase) are received by the satellite antennas at a certain bandwith. These signals, which may include television, telephone, facsimile, and digital information, are processed and enhanced and then re-transmitted back to earth (downlink phase) through the transmitting antennas, generally at a different bandwith to prevent interference. The whole process of a repeater, including all the equipment which process the signals from the exit from the receiving antennas up to the entrance to the transmitting antennas is known as *transponders*.[17]

In general, a communications subsystem consists of many transponders, whose number depends on the design of the satellite. In the Federal Communications Commission's words, a transponder is the device on a communications satellite which amplifies and relays transmissions between 'transmit' and 'receive' earth stations. Transponders were conceived in order to increase the capacity and transmission power of the satellite by segmenting the broadcast spectrum into several (transponder) units.[18]

III. Main Agreements

Although the most frequently used legal instrument regarding transponders is the *Lease Agreement*, other contracts are also used, depending on the needs of the operator. Indeed, a satellite operator may

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15 EMANUEL FTHENAKIS, MANUAL OF SATELLITE COMMUNICATIONS 21 (McGraw Hill, 1984).

16 RODOLFO NERI VELA, SATÉLITES DE COMUNICACIONES 27 (McGraw Hill, 1991). The antennas are used to send and transmit radiofrequency signals. The telemetry, tracking and command stations are meant to follow the satellite, and to exchange information with the Earth. Solar energy is the main source of power in communications satellites. Energy from the sun is converted to electricity and stored in batteries to provide energy to the satellite while it is in the earth's shadow. The thermal control subsystem aims at regulating the temperature of the whole system and the secondary propulsion is designed to keep and correct the position of the satellite.

17 RODOLFO NERI VELA, *supra* note 2, at 31.

18 "*Communications Satellite.*" Microsoft (R) Encarta. Copyright (c) 1994 Microsoft Corp., Copyright (c) 1994 Funk & Wagnall's Corp.

also resort to *Purchase Agreements* and *Sales and Lease Back Contracts*, among other arrangements.

The decision to opt between these different legal alternatives is dependent on the financial necessities and possibilities of the operator rather than on strict legal issues. Thus, the Purchase Agreement provides the operator with funds sooner than a Lease Agreement. However, the sale price will usually be lower than the aggregate amount the operator may collect under a Lease contract. Indeed, the proceeds of a sale of transponders may aid the operator to pay off the liabilities incurred in connection with the purchase of the satellite, its launching and insurance at a much earlier stage. Such costs usually range from approximately $140 to 200 million.[19] For the customer, the purchase of a transponder means the assurance of a stable price and supply.

Another possibility for the operator confronting the costs associated with the purchase and launch of a satellite is to obtain financing through *Transponder Sale and Lease Back Agreements*.[20] Under these agreements the operator sells several transponders to banks or other financial institutions with the view towards recovering part of the investment made and to obtain funds to operate and market the satellite capacity without losing control of the transponders.

It is worth adding that another category of agreements related to transponders is Marketing Agreements. These are arrangements between the satellite operator and a marketing firm to commercialize the satellite facilities. Specialized marketing skills and experience in space business are essential for the successful commercialization of transponders. In order to fulfill this task the operator may decide to market the satellite capacity by itself - - usually through another division or a related company - - or it may rely on the services of highly specialized marketing firms. In the latter case, a careful drafting of the Marketing Agreement becomes of fundamental importance for the satellite operator.

IV. Lease Agreements

Transponder lease agreements may be defined as the understanding between the operator and the customer, under which the former agrees to provide transponder capacity in a communications satellite and render services which permit an acceptable use of such capacity by the customer in consideration for a periodic payment of a stipulated price.

As pointed out by Craig Eadie,[21] despite of its denomination, the lease agreement belongs to the category of service supply contracts, and no control or possession ever passes to the lessee. The operator may be the

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19 Av. Wk. & Space Tech. 22 (Jan. 20, 1992).

20 PAMELA L. MEREDITH & GEORGE S., ROBINSON, SPACE LAW: A CASE STUDY FOR THE PRACTITIONER 15 (Martinus Nijhoff, Dordrecht, 1992).

21 Craig Eadie, *Satellite Transponder Agreements*, 1 TELECOMM. & SPACE J. 315 (1994).

owner of the satellite or it may be a lessee with full power to sublease the transponder capacity granted by the satellite owner in their underlying contract.

The Lease Agreement may be executed either before the satellite is launched or once it has been placed in the geostationary orbit. In the first case, the contract will become effective when the satellite on which the transponder in question is located becomes operational, *i.e.*, when the satellite is ready to provide commercial service. In the latter alternative, the parties to the agreement may designate the beginning of the contract by focusing on the necessities of the user.

The end of the term of the Lease Agreement may be any period agreed by the parties. Under no circumstances should the term exceed the life of the satellite as warranted by the operator. This has given rise to disputes and litigation. Indeed, in 1984 Western Union sold four transponders to Public Broadcasting Service (PBS) warranting that each had at least a ten-year life. However, before the warranty expired the satellite (Westar IV) consumed its fuel faster than as calculated by the manufacturer of the satellite, Hughes Aircraft Co.[22] Public Broadcasting Service demanded the payment of compensation from both Western Union and Hughes. While the satellite operator settled the claim, the manufacturer informed PBS that it would not honor it, and thus PBS subsequently filed suit against Hughes.[23]

The Lease Agreement should foresee different alternatives to termination in the event of technical failures of leased transponders. A transponder always has redundant equipment, *i.e.*, devices which have the same functions. They are installed so that in the event of a failure of one of them, another one may be put into work without affecting the performance of the transponder. Thus, the agreement generally specifies that in the event of a failure in the equipment of the transponder, the operator is not liable to the customer if the transponder can continue to work with a redundant device.

In order to assure the continuance of service in the case of transponder failure the operator could also choose to replace the whole transponder with a reserved one, *i.e.*, a transponder which is not operational unless switched into service by the operator. This may be implemented either by a specific provision in the Agreement whereby the lessor undertakes to replace the transponder in the case of a total failure to operate, usually as the sole remedy, or by the lessor's undertaking to provide for transponder capacity instead of designating a specific transponder in the Lease Agreement, so that it can change the lessee's transponder for any reason or for no reason at all. Thus, if one transponder fails, or for any other reason the operator needs it, such as for

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22 This dispute arose out of a Purchase Agreement. *See* Phillip D. Bostwick, *Liability of Aerospace Manufacturers: MacPherson v. Buick Sputters into the Space Age*, 22 J. SPACE L. 89 (1994).

23 Public Broadcasting Services v. Hughes Aircraft Co., CA No. 90-0736 WDK (Bx) (C.D. Cal.), quoted by Phillip D. Bostwick, *supra* note 8, at 89.

re-allocating it to another user, the operator will be able to replace this transponder with a spare one, provided of course it assures the user the conditions agreed to for this circumstance in the contract. Needless to say, repair work of a transponder in outer space, although technically feasible, is unthinkable from a financial standpoint, at least at the present stage of technology.

The Agreement should provide for the priority in the re-allocation of capacity among different customers. In this respect, there are different contractual categories of customers in the Lease Agreements. Indeed, the highest rank in the priority scale is for customers with *protected status*. Customers without such status are designated as *pre-emptible customers*. Protected users are entitled to re-allocation of transponder capacity in the event of loss of facility even to the expense of other customers. [24]

Another key issue in Lease Agreements is the provision for dealing with the operator's possible loss of its license to operate the satellite. Such loss would trigger off the termination of the Lease Agreement. Generally, termination due to the loss of the operator's license or other events which do not occur through any negligent act or omission on the part of the operator do not entitle the customer to receive payment of damages or any other compensation. It must be pointed out, however, that the validity of these clauses has not yet been tested in any court.

Other provisions usually found in a Lease Agreement concern other rights and obligations of both the customer and the operator, such as the operator's conveyance to the lessee of the rights to use the frequency associated with the transponder, and the possibility or impossibility of the lessee to assign transponder capacity to third parties. Additionally, each party represents and warrants to the other that it has obtained all authorizations, permits, and approvals from international, federal and local authorities, to execute the agreement and to conduct its business as agreed in the contract.

V. Transponder Purchase Agreements

A Transponder Purchase Agreement constitutes an understanding by the seller and buyer, whereby the seller conveys to the purchaser, for valuable consideration, ownership and title of a specific transponder, including equipment installed expressly to deliver in combined form the aggregate communications signals from and to the receive and transmit antenna feed arrays on the satellite. Indeed, by virtue of a Purchase Agreement, in contradistinction with a Lease Agreement, the buyer of a transponder acquires *full title to specific, physical facilities*, assumes risk of loss, enjoys the tax consequences of ownership, and has authority to convey, lease, assign and encumber its designated ownership interest.[25]

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24 Craig Eadie, *supra* note 7, at 319.

25 Domestic Fixed-Satellite Transponder Sales, Memorandum Opinion, Order and Authorization, 90 FCC 2d.1238 (1982). *See* STEPHEN GOROVE, UNITED STATES

Essentially, a purchase agreement entails an alternative method of obtaining significant capital necessary to underwrite the costs of satellite system development, launch and operation.

The Purchase Agreement stipulates that the seller transfers to the buyer the rights of access to use the frequency associated with their transponder. However, as pointed out above, this right does not differ from the one conveyed to the user under a Lease Agreement. In all purchase agreements, the seller maintains the operation of the telemetry, tracking and control subsystems of the satellite,[26] and is responsible in general for the operation of the satellite in orbit.

A frequent alternative in a Purchase Agreement is the possibility of acquiring a protected transponder. Indeed, in the event the designated transponder fails during the warranted period of life, the seller will replace it with a spare transponder on the same satellite. This does not mean, as in the Lease Agreements, that the operator merely provides transponder capacity and service rather than actual ownership rights on a determined transponder. On the contrary, the purchaser does acquire full title and ownership rights of a specific transponder. However, if the transponder does not meet the agreed performance in any moment during its life, the seller will substitute it with another one, in which the buyer will again hold proprietary interest. So long as these spare transponders are not in use, the seller may allocate them to a user under a Lease Agreement on a pre-emptible basis as explained above.

Simultaneously with the execution of the Purchase Agreement, the seller - - the operator of the satellite - - may enter into a Service Agreement for the proper maintenance of the satellite during the warranted period of the transponder's life.

In the United States of America, as a result of the scarcity of satellite capacity in the early 1980s, several corporations, *i.e.*, Western Union Telegraph Company, RCA American Communications, and Southern Pacific Communications Company, sought authorization from the Federal Communications Commission to engage in transponder sale transactions.[27] Thus the FCC issued a notice in February 1982 inviting public comment on the requests.[28]

The parties opposed to the transponder sales contended that sale transactions were inconsistent with the common carrier obligations and that the domestic satellite licensee would obtain supra normal profits, thus limiting the transponder access to only those customers who could afford above-the-market prices. This was argued to be inconsistent with the provisions of the Federal Communications Act of 1934.

SPACE LAW- NATIONAL AND INTERNATIONAL REGULATION (Oceana, Binder II, I.A.5. (6-a), at 6 (1993).

26 *Cf. supra* note 2.

27 *Cf. supra* note 11, at 2.

28 Domestic Fixed Satellite Transponder Sales, 88 FCC 2d. 1419 (1982).

Nonetheless, the Federal Communications Commission found that the transponder sale proposals presented a positive market development that would enhance the provision of satellite services to the public and that these transactions were consistent with the public interest and all outstanding legal and regulatory policy.[29] Therefore, the Commission granted authorization to provide noncommon carrier service by means of the sale of transponders.[30]

As to the tax treatment of transponder sales, it must be pointed out that in the United States the Federal Congress enacted in 1988 specific legislation concerning space activities applicable to transponder transactions. Indeed, section 863 of the Internal Revenue Code dealing with special rules for determining source of income now prescribes that *space activities performed in Outer Space are to be deemed to be performed within the United States.* This means that income derived from space activities is taxed as U.S.-source income, and expenses arising from such activities may be deducted pursuant to the provisions set forth for U.S. income deductions instead of being deducted according to the set of rules governing outbound-income deduction.[31] Additionally, the purchaser of a transponder is entitled to use the depreciation method established for satellites by section 168 of the Internal Revenue Code, which allows, for tax depreciation purposes, the recovery of the cost of the satellite in a period shorter than the satellite's life.[32]

VI. Sales and Lease Back Contracts

As pointed out above, the Sales and Lease Back Contracts offer the satellite owner an alternative to finance its investment. These agreements are arrangements made by the satellite operator and a bank or a financial

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29 *Cf. supra* note 11, at 24.

30 The FCC thus overturned traditional common carrier policy. Prior to its decision, however, the Federal Communications Commission had long permitted companies to lease whole transponders on a satellite, by maintaining the fiction of common carriers with respect to the owner of the entire satellite. NATHAN D. GOLDMAN, AMERICAN SPACE LAW 158 (Iowa St. Univ. Press 1988).

31 Said section 863 provides as follows:

"(d) Source rules for space and certain ocean activities.

(1) In general. Except as provided in regulations, *any income derived from a space* or ocean *activity* - (A) *if derived by a United States person, shall be sourced in the United States*, and (B) if derived by a person other than a United States person, shall be sourced outside the United States. (2) Space or ocean activity. For purposes of paragraph (1) - (A) In general. *The term 'space* or ocean *activity' means* - (i) *any activity conducted in space*, and (ii) any activity conducted on or under water not within the jurisdiction (as recognized by the United States) of a foreign country, possession of the United States, or the United States. Such term includes any activity conducted in Antarctica." (Emphasis added.)

32 PAMELA L. MEREDITH & GEORGE S. ROBINSON, *supra* note 6, at 15.

institution by means of which the satellite operator sells one or several transponders to the bank or financial institution and simultaneously leases the transponders back for its own use. Generally, this includes the possibility of subleasing the transponders so transferred.

As in any other sale and leaseback contract, the main objective for the satellite owner's execution of the agreement is to free cash in the amount of the purchase price paid by the bank to cover the satellite owner's necessities. Such needs include the payment of liabilities incurred in connection with the manufacture and deployment of the satellite, as well as the costs for the immediate future marketing and operation of the satellite.

The Sales and Lease Back Agreement is comprised of two separate agreements: (i) a sales contract, and (ii) a lease agreement. By means of the sales contract the satellite operator conveys to the bank the ownership of certain transponders for a fixed price. The lease agreement, which is part of this transaction does not resemble the Transponder Lease Agreement analyzed above since it does not constitute a service supply agreement. The bank leases back the acquired transponders to the former owner who can exploit them commercially. Thus, the bank will not provide any kind of technical services. Although the lease actually follows the sale, both contracts are conceived and agreed to as part of the same transaction.

A key issue which has to be borne in mind while drafting Sales and Lease Back Contracts is that the bank should grant the satellite owner the right to sublease the transponders to any third party. This is advantageous for both parties, since it fosters the satellite owner's obtention of funds, which will consequently enable the owner to meet the obligations incurred with the bank.

VII. Conclusions

Choosing between the different types of transponder agreements depends largely on the financial needs and possibilities of the satellite operator. As in any other major transaction, tax implications are of great importance. Each type of contract entails different tax consequences, which should be carefully considered before embarking on a project of this nature.

Market fluctuations concerning satellite manufacturing costs, general satellite capacity and demand of communications services also influence the decision to elect the best type of agreement for each situation. In addition to the contracts analyzed above, marketing agreements also entail an essential aspect of transponder transactions.

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