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## EXPORT CONTROLS AFFECTING SPACE OPERATIONS

ARTHUR M. DULA\*

**T**HE UNITED STATES exports across unfortified borders with Canada to the north and Mexico to the south. The Atlantic and Pacific oceans provide avenues of trade to our east and west. A new border has developed above all United States territory. America now exports to space.

Despite twenty-eight years of space activity, hundreds of space flights, and the expenditure of over three hundred billion dollars on development of military and commercial space assets,<sup>1</sup> the spacefaring nations have not agreed on the boundaries of space.<sup>2</sup> Under principles of international law, the United States border with space lies

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<sup>1</sup> P.B. STARES, *THE MILITARIZATION OF SPACE, U.S. POLICY, 1945-84*, at 258-59 (Cornell University Press 1985).

<sup>2</sup> The definition/delimitation of outer space and the controversy engendered by that subject and the use of geostationary orbit positions are discussed in C. CHRISTOL, *THE MODERN INTERNATIONAL LAW OF OUTER SPACE* 435-546 (1982)[hereinafter cited as CHRISTOL].

The Soviets disclosed their position that outer space consists of the region above 100-110 kilometers altitude above sea level on Earth in a presentation by G.P. Zhukov. See Zhukov, *Delimitation of Outer Space*, PROCEEDINGS OF THE TWENTY-THIRD COLLOQUIUM ON THE LAW OF OUTER SPACE (1981) [hereinafter cited as Zhukov]. The various arguments for alternative definitions were discussed, but Zhukov insisted that the upper altitude limit of State sovereignty must not depend upon factual capacity of States to exercise an effective control on their air space up to that latitude. The Soviets consider the delimitation between air space (which is subject to State sovereignty through the Chicago Convention and Transit Agreement) and outer space as fundamental to establishing a functional legal regime of outer space. The orbital space of geostationary satellites and the right of space

somewhere below the altitude where satellites may freely orbit.<sup>3</sup> According to an international treaty on space activity, the United States has a duty to authorize, supervise, and bear international responsibility for the actions of its corporations and citizens in outer space.<sup>4</sup> In order

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objects to pass through air space territory of other states for the purpose of reaching outer space are inseparable parts of outer space as a whole. *Id.* at 221-22.

<sup>3</sup> Under the Roman law, some things were deemed capable of private ownership while others were considered by natural law to be common to all and not subject to individual ownership. Air, running water, the sea, and the seashore were among the things constituting common property. INST. JUST. 67 (T. Cooper trans. 1812); 158 (T. Sanders trans. 1876). *Et quidem naturali jure communia sunt omnium haec, aer aqua profluens, mare et per hoc littora maris.* INST. JUST. 67 (T. Cooper trans. 1812); INST. JUST. (T. Sanders trans. 1876).

The concept that subjects incapable of division are thereby held in common was illustrated by Gaius who contrasted "Ocean, air, and light, as physical subjects, subjects incapable of appropriation, with the earth, a physical subject capable of appropriation." Gaius considered ocean, air, and light to be *res communes*, meaning items that are incapable of appropriation that are held in communism. GAIUS, ELEMENTS OF ROMAN LAW, 152 (E. Poste, trans. 3rd ed. Oxford 1890). It should be noted, however, that this maxim applies to those subjects incapable of being appropriated for individual use, and not to subjects as to which individual appropriation would be undesirable. In *United States v. Causby*, 328 U.S. 256 (1946), the Supreme Court stated that, although airspace is a public highway, a landowner's use and enjoyment of the land requires exclusive control of at least as much space above the ground as he can occupy or use in connection with the land. *Id.* at 264. The law protects the landowner from invasions of this space even though he does not physically occupy or make use of this stratum in the conventional sense. *Id.* at 265.

For a discussion of the same subject by a socialist writer, see GORBIEL, OUTER SPACE IN INTERNATIONAL LAW (1981).

<sup>4</sup> Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, *opened for signature* January 27, 1967, 18 U.S.T. 2410, T.I.A.S. 6347, 610 U.N.T.S. 205 [hereinafter cited as The Outer Space Treaty].

The Outer Space Treaty consists of 17 articles. Article I provides that the exploration and use of outer space should be for the benefit of all states, regardless of the level of their economic or scientific development. Articles II and III require that outer space, the moon, and other celestial bodies remain free from any claim of national appropriation, whether by occupation or other means. Space exploration is governed by international law, including the Charter of the United Nations. Article IV prohibits the installation of nuclear weapons and weapons of mass destruction in outer space, on the moon, or on any celestial bodies. Article V provides that astronauts give all possible assistance to astronauts of other states while conducting activities in outer space. Also, states must return astronauts who accidentally land in their territory. Article VI provides that states bear international responsibility for national activities in space, whether these activities are done by governmental or nongovernmental entities. The Outer Space Treaty also requires actions of nongovernmental entities in outer space to be authorized and

to comply with this treaty, the United States maintains a

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supervised by the state. Article VII places responsibility for damage done by spacecraft or component parts on the state that launches the spacecraft. Damage to property or persons are compensable whether occurring on earth or in outer space. Also, in the event that the spacecraft launch was procured by a state other than the location of the launch, the launcher and procurer are jointly liable. State jurisdiction and control over spacecraft and personnel continues into space. Ownership is not affected by travel into space or subsequent return to the earth. Article IX requires states to confer before undertaking an activity in space that could harm the earth or interfere with the actions of another state in space.

Installations and equipment in space are open to inspection on grounds of reciprocity and reasonable notice. The Outer Space Treaty, *supra* this note. Undefined phrases in the Outer Space Treaty give it a comfortable looseness that may be an advantage as it evolves to meet the needs of future space activities. Terms such as outer space, weapons of mass destruction, and others were not defined and no interpretation of their meanings has been agreed on in the decade since the Treaty's promulgation. Judicial interpretation may define these terms with precision when the need for clarification becomes pressing. Future treaties may provide better definitions. Careful legal analysis will be needed over the next few decades to develop the issues affected by these definitions. The greatest limitation of the Outer Space Treaty is that it was written and adopted by a multinational committee. Thus it was intellectually forged out of high ideals rather than pragmatically developed from previous experience. Additional problems arise as a result of the provision regarding use, occupation, and national appropriation, which attempts to fundamentally reverse traditional international law. Historically, occupation has always equalled national appropriation. In fact, eight equatorial nations, including Brazil, have claimed control of the part of space used by communications satellites over their territory as a natural resource. Despite these difficulties, the Outer Space Treaty is more concrete than the customary international law from which it developed and it has served as a touchstone for the development of more specific treaties.

Since 1967, the United States has acceded to three multinational treaties that develop principles from The Outer Space Treaty into specific international law. The first agreement reached in 1968 provided for the rescue and return of astronauts. The First Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched into Outer Space, April 22, 1968, 19 U.S.T. 7570, T.I.A.S. 6599 [hereinafter cited as the Rescue and Return Treaty]. In 1972, the major space states agreed on a convention covering international liability for damage caused by space objects. The convention established a standard of unlimited absolute liability, requiring a launching state to pay compensation for damage caused by its space object on the earth's surface or to an aircraft in flight. If the damage is done in space or to another spacecraft, the launching state is liable only if the damage is due to its fault or the fault of persons for whom it is responsible. Convention on International Liability for Damage Caused by Space Objects, March 29, 1972, 24 U.S.T. 2389, T.I.A.S. 7762.

The 1972 convention also establishes rules distributing liability among states engaged in joint space ventures. Generally, each state is jointly and severally liable for the entire amount. A one-year statute of limitations for presenting a claim runs from the time of the damage or such time as the damage should have been discovered had the damaged state exercised due diligence. Finally, the conven-

national registry of space objects.<sup>5</sup> Registered objects are under United States jurisdiction and United States law applies to them and their personnel.<sup>6</sup> This demonstrates the evolution of space law, which began as vague multinational treaties and has developed into statutes enacted by the United States Congress to govern specific areas of space activity.<sup>7</sup> These statutes control the application of

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tion outlines the procedure for presenting a claim and authorizes a claim commission. Only a nation may bring a claim under this convention. *Id.*

<sup>5</sup> The 1976 Registration Convention provides a mechanism for registering a space object on a national register. Convention on the Registration of Objects Launched into Outer Space, *opened for signature*, January 14, 1975, 28 U.S.T. 695, T.I.A.S. 8480. This is important to businesses because the national registration of a space object, such as a space factory, determines which nation's law applies to the object. If a space factory is enrolled on the United States' registry, then American laws and American courts have jurisdiction over the factory and all events that transpire aboard it. Specifically, such a space object should be subject to United States patent, antitrust, and tax law as well as all other federal statutes.

<sup>6</sup> See Dula, *Regulation of Private Commercial Space Activities*, 23 JURIMETRICS J. 156 (1983). For a discussion of the law that will apply to activities conducted on the United States space shuttle, see generally GOROVE, *SPACE SHUTTLE AND THE LAW* (1980); DeSaussure, *The New Era in Outer Space*, 13 AKRON L.REV. 593 (1980); Michener, *The Role of Private Enterprise in Outer Space — International Legal Implications*, 2 HOUS. J. INT'L L. 1 (1979); SENATE COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION, 98TH CONG., 1ST SESS., *POLICY AND LEGAL ISSUES INVOLVED IN THE COMMERCIALIZATION OF SPACE* (Comm. Print 1983).

<sup>7</sup> In the past, the major space States, particularly the United States and the Soviet Union, have influenced, either by action or inaction, the development of international space law at the United Nations. The General Assembly established the Ad Hoc Committee on the Peaceful Uses of Outer Space (COPUOS) in 1958. COPUOS originally consisted of eighteen members including three Soviet bloc states, namely, the Soviet Union, Czechoslovakia, and Poland. The other committee members were Argentina, Australia, Belgium, Brazil, Canada, France, India, Iran, Italy, Japan, Mexico, Poland, Sweden, the United Arab Republic (UAR), the United Kingdom and the United States. The Soviet bloc refused to participate in the early meetings because they considered COPOUS to be heavily weighed in favor of the Western powers. India and the UAR boycotted the early meetings on the ground that the committee could not usefully serve its purpose in the absence of the Soviet Union. CHRISTOL, *supra* note 2, 14-15.

The adoption of General Assembly Resolution 1472 (XIV) of December 12, 1959, made COPUOS a permanent body of the General Assembly. Albania, Bulgaria, Hungary, and Rumania of the socialist bloc and Austria and Lebanon were added to the membership. The expanded membership included seven Soviet bloc states and seventeen non-Soviet bloc states. *Id.* at 15.

The committee was again enlarged in 1961 when Chad, Mongolia, Morocco, and Sierra Leone were added. The twenty-eight became thirty-seven on December 18, 1973, with the adoption of General Assembly Resolution 3182 (XXVIII). Added as new members were Chile, the German Democratic Republic, the Federal Republic of Germany, Indonesia, Kenya, Nigeria, Pakistan, Sudan, and Vene-

general treaty principles to United States business.<sup>8</sup>

zuela. Then, on December 20, 1977, the thirty-seven became forty-seven with the adoption of General Assembly Resolution 32/196B. New members were Benin, Colombia, Ecuador, Iraq, Netherlands, Niger, Philippines, Turkey, United Republic of Cameroon, and Yugoslavia. *Id.* Two facts stand out in the augmentation of membership. First, the space resource states were joined by representatives of the less developed countries. Second, the equatorial states received strong representation. With the admission of Nauru to the United Nations in 1976 there were twelve equatorial states as members. Of these five, namely Brazil, Colombia, Ecuador, Indonesia, and Kenya are committee members. Congo, Gabon, Nauru, Peru, Somalia, Uganda, and Zaire have not been appointed to the committee. *Id.* at 16, 914 App. Since geostationary space objects find an orbital position above the Equator to be congenial the named states have a particular interest in this subject. *Id.* at 465-68.

There are currently fifty-three members of COPUOS, including: Albania, Argentina, Australia, Austria, Belgium, Benin, Brazil, Bulgaria, Canada, Chad, Chile, China, Colombia, Czechoslovakia, Ecuador, Egypt, Federal Republic of Germany, France, German Democratic Republic, Greece, Hungary, India, Indonesia, Iran, Iraq, Italy, Japan, Kenya, Lebanon, Mexico, Mongolia, Morocco, Netherlands, Niger, Nigeria, Pakistan, Philippines, Poland, Rumania, Sierra Leone, Spain, Sudan, Sweden, Syrian Arab Republic, Union of Soviet Socialist Republics, United Kingdom of Great Britain and Northern Ireland, United Republic of Cameroon, United States of America, Upper Volta, Uruguay, Venezuela, Viet Nam, and Yugoslavia. *Id.* at 915 app.

\* The Outer Space Treaty requires that the United States government provide authorization and supervision of space activities undertaken by business under United States jurisdiction. The Outer Space Treaty, *supra* note 4, at Art. IV. The United States has the right to determine the extent of authorization and supervision of business sponsored space activities.

Federal statutes and treaties are of equal authority. If there is a conflict between a statute and a treaty, the later-promulgated instrument controls. 87 C.J.S. *Treaties* § 9 (Supp. 1985). Federal statutes and the regulations made under a treaty control the activities of United States business in space, even to the extent of revoking any portion of an earlier international treaty that conflicts with the national law.

Amendment X of the United States Constitution provides that powers not delegated nor prohibited to the United States by the Constitution are reserved to the states. In addition to treaties, federal statutes, and the regulations made under them, the laws of the several states governing the regulation of business help determine the United States authorization and supervision of private space activities. Statutorily, Congress may repeal, supersede, or render the provisions of a treaty ineffectual. The courts must construe the statute according to its manifest intent. If there is a conflict and the legislation was passed later, the statute must be recognized by the courts regardless of political consequences. DULA, *Regulation of Private Commercial Space Activities*, PROCEEDINGS OF THE TWENTY-FOURTH COLLOQUIUM ON THE LAW OF OUTER SPACE (1982) (citing *Mosar v. United States*, 341 U.S. 41 (1951); *Fong Yue Ting v. United States*, 149 U.S. 698 (1893); *Chae Chan Ping v. United States*, 130 U.S. 581 (1889); *Petition of Georgakopoulos*, 81 F. Supp. 411 (E.D. Pa. 1948), *petition dismissed*, 85 F. Supp. 37 (E.D. Pa. 1949); and *United States ex rel Pfefer v. Bell*, 248 F.Supp. 992 (E.D.N.Y. 1918). See also Dula, *Private Sector*

## OUTER SPACE ACTIVITY SUBJECTED TO EXPORT CONTROLS

On September 9, 1982, Space Services Incorporated, a Texas corporation, launched the first privately owned expendable launch vehicle.<sup>9</sup> The *Conestoga I* flew one hundred and ninety-three miles into outer space.<sup>10</sup> This space object was the first to receive an export license from the federal government. The State Department issued the license under the authority of the Arms Export Control Act.<sup>11</sup> The license was subject to very strict limitations.<sup>12</sup>

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*Activities in Outer Space*, 19 INT'L LAW. 159 (1985); and 87 C.J.S. *Treaties* § 1 (Supp. 1985).

<sup>9</sup> For the *Conestoga I* launch in September 1982, Space Services Incorporated of America (SSIA) requested an exemption from the Federal Aviation Administration (FAA) regulations permitting a sub-orbital launch with a splash-down in the Gulf of Mexico. The exemption was granted after interagency consultation and coordination. The FAA also issued an order designating temporary restricted airspace and promulgated appropriate notices to airmen concerning the launch. While NASA did not exercise any regulatory authority over the launch, NASA did agree to provide a *Minuteman I* M56A-1 rocket motor which powered the *Conestoga I* rocket. As part of the process of deciding whether and how to permit the use of the M56A-1 rocket motor, NASA carefully reviewed the technical and safety aspects of the proposed *Conestoga I* launch. For a complete discussion of the *Conestoga I* launch see Dula, *Private Section Activities in Outer Space*, 19 INT'L LAW. 15a (1985).

<sup>10</sup> N. Y. Times, Sept. 10, 1982, at 1, col. 4.

<sup>11</sup> 22 U.S.C. §§ 2752-94 (1982).

<sup>12</sup> The various treaties discussed above imposed obligations on the federal government but not directly on SSIA. The State Department exercised its responsibilities under the treaties described above by requiring SSIA to obtain an export license. The State Department exercised authority for control and licensing of arms exports contained in the Arms Export Control Act. On April 16, 1982, SSIA requested "any authorization necessary" from the State Department for the *Conestoga I* launch. On September 7, 1982, the State Department issued a letter approving the launch under the Arms Control Act, subject to the following conditions and limitations;

1. The authorization was confined to the proposed prototype launch only. Subsequent launches would require a separate review and approval.
2. The authorization was based on the understanding that SSIA agreed to comply with certain safety requirements imposed by NASA and the FAA on the *Conestoga* launch.
3. The authorization was subject to the understanding that SSIA had obtained insurance in the amount of \$100 million for any damages or expenses that might arise in connection with the launch, including any payments for which the United States may be responsible under any treaty.

Letter from the United States State Department to Space Services Incorporated of

The Commercial Space Launch Act of 1984 empowers the Department of Transportation with licensing private, commercial, expendable space vehicle launches.<sup>13</sup> The Secretary of Transportation is required to consult with

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America (Sept. 7, 1982). See also Dula, *supra* note 8, at 77, for a list of the license restrictions.

<sup>13</sup> Commercial Space Launch Act of 1984, 49 U.S.C.A. §§ 2601, 2623 (Supp. II 1984) [hereinafter cited as the Space Launch Act]. The Act designated the Department of Transportation (DOT) as the lead agency for private commercial launches. The Act requires any person engaged in non-government launch operations in the United States to obtain a license pursuant to the terms, conditions, rules, and requirements established by the Secretary of Transportation in consultation with other federal agencies. *Id.* § 2606. United States citizens, defined in Section 2603(8), engaged in non-government launch operations outside the United States are required to be licensed. *Id.* § 2605. Government launch activities are exempt from the provisions of the Act. *Id.* § 2620(c).

In creating a one-stop licensing process within DOT for commercial space launch activities, the Space Launch Act does not abrogate or repeal any existing federal law or requirement. The Act does instruct the Secretary of Transportation to consult other federal agencies whose existing authority applies to launch or launch-operation activities. *Id.* § 2604. In conjunction with other agencies, the Secretary may establish procedures that expedite the processing of applications for commercial launch and launch operation licenses. The consultation requirement permits the Secretary and the involved federal agencies to revise and review their regulations and procedures to eliminate launch operations. Agency consultation should ensure that those regulations and procedures found essential are administered as efficiently as possible. The Act is consistent with Exec. Order No. 12,465, 3 C.F.R. 163 (1984), reprinted in 42 U.S.C.A. § 2465 at 175-76 (1986).

The Space Launch Act is not meant to affect excising payload licensing authority, particularly the authority of the FAA under the Communication Act of 1934, 47 U.S.C. §§ 5151-5610 (1982), or the authority of the Secretary of Commerce under the Land Remote Sensing Commercialization Act of 1984, 15 U.S.C. §§ 4201-4292 (Supp. II 1984). Pursuant to the Space Launch Act, the Secretary of Transportation may neither require a recertification process nor review the action of another agency to issue a payload license, authorization, or permit. The Act does address payloads as an applicant must be able to receive a launch license. Where a license, authorization, or permit is not required for a payload, the Secretary is granted a broader authority to ensure that the payload does not jeopardize public health and safety, safety of property, national security, or foreign policy interests.

The Act authorizes the Secretary of Transportation to issue or transfer a license for launch activities where activities are consistent with public health and safety, safety of property, national security, and foreign policy interests and where necessary payload licenses, authorizations, or permits have been obtained. The Secretary may waive the application of any requirement for a license if the Secretary determines that the waiver is in public interest and will not jeopardize the public health and safety, safety of property, or any national security or foreign policy interest. 49 U.S.C.A. § 2605 (Supp. II 1984). To ensure adherence to this standard, the Secretary is instructed to notify the applicant of any pending issues after



other federal agencies, including the Departments of Commerce, Defense, and State, to establish procedures for obtaining a commercial launch license.<sup>14</sup>

The Act provides that payloads launched by a licensed expendable vehicle are not exported.<sup>15</sup> Recent regulations require that these payloads be reviewed for national security and foreign policy purposes.<sup>16</sup> Thus, they are subject to export control, but the standards for this control have not been defined. As of mid-1986 no payload has been launched under a launch license.

The Act has a very narrow application. It does not effect the vast majority of international activities required to provide the goods, services, and technical data used to design, build, and operate a commercial, multinational space project. More critically, it fails to address the future multinational activities that will be conducted by private

120 days. *Id.* § 2608. This requirement should allow adequate opportunity for the applicant to provide necessary information resolving any outstanding issues.

The Act authorizes the Secretary of Transportation to suspend, revoke, or terminate any license and/or launch activity immediately, unless otherwise specified. *Id.* § 2609. If the Secretary finds that the licensee has substantially failed to comply with any requirement of the Act, license, or regulation or if suspension is required to protect public health, property, or national security or foreign policy interests, the Secretary may terminate launch proceedings. To determine compliance with the license, the Secretary is permitted to place federal officers, employees, or other individuals, including contractor personnel, at any launch site, production facility, or assembly site used by a contractor of the licensee. *Id.* § 2616.

By facilitating and encouraging the acquisition of government launch property and government launch services by the private sector, the Act promotes commercial space launches. The Secretary, in consultation with the Attorney General, establishes a minimum level of liability insurance as a requirement for a license. The Secretary may delegate enforcement authority to any officer or employee of DOT or, with approval of another agency's head, any officer or employee of that agency. The Secretary is required under the Act to consult with the State Department, Department of Defense, and other appropriate federal agencies to carry out the provisions of the Act. *Id.* § 2604. The Act preempts any state law, rules, regulations, standards, or orders inconsistent with the Act. *Id.* § 2620. Reporting requirements are found in § 2621 of the Act. The Act authorizes appropriations of \$4 million for the fiscal year 1985. *Id.* § 2623.

<sup>14</sup> 49 U.S.C. § 2604 (Supp. II 1984).

<sup>15</sup> *Id.* at § 2620(b).

<sup>16</sup> Commercial Space Transportation Licensing Regulations, 51 Fed. Reg. 6870 (1986)(to be codified at 14 C.F.R. Ch. III).

business in space on a space station or other crewed facility.

Legally, space is outside the United States. On the other hand, space is not considered within the territory of any other nation. Thus, goods manufactured, property owned, and activities conducted in space are currently considered to be outside the United States for tax, patent, customs, and export purposes.

### *Commercial Space Activity*

Outer space borders all nations. Thus, it is inherently international. Corporations that do business in space are therefore inherently multinational. While the end product of their work is considered a space activity, the vast majority of commercial space operations take place on earth. Congress has declared that "activities in space should be devoted to peaceful purposes for the benefit of all mankind."<sup>17</sup> This policy has, for decades, promoted a strong sense of international cooperation in commercial space activities. Multinational and international projects, including communications, remote sensing, materials processing, and scientific research have been the rule rather than the exception.<sup>18</sup>

A period of rapid commercial space development has begun.<sup>19</sup> The routine access to space made possible by the United States Space Transportation System (the Shuttle)

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<sup>17</sup> 42 U.S.C. § 2451(a) (1958).

<sup>18</sup> International Cooperation and Competition in Civilian Space Activities, Office of Technology Assessment, U.S. Congress, Washington, D.C. OTA-ISC-239 (*passim*) (July 1985). See also *Unispace/82, A Context for International Cooperation and Competition* (March 1983). This page report analyzes the international policy issues discussed at last year's UNISPACE conference in Vienna, Austria. Conference topics included militarization of outer space, direct broadcasting by satellite, remote sensing, geostationary orbit, transfer of technology, and the role of the United Nations in space affairs. NASA has entered numerous bilateral agreements for joint space projects. See GOROVE, UNITED STATES SPACE LAW (1983). For a view of international cooperation from the Soviet perspective, see V.S. Versher, OPSUMER COMPYGRUREAMBA (1982) (Orbits of Cooperation in Russia).

<sup>19</sup> *Civilian Space Stations and the U.S. Future in Space*, Office of Technology Assessment, (OTA-STI-241) (*passim*) (November 1984), [hereinafter cited as *Civilian Space Stations*].

and President Reagan's support for a permanently manned space station has catalyzed this era. The Shuttle and the space station programs actively seek international participation.<sup>20</sup> The first reusable space laboratory, "SPACELAB," is a multinational project of the European Space Agency in cooperation with the National Aeronautics and Space Administration of the United States.<sup>21</sup> Other nations, including the Soviet Union, China, Japan, and France (through the European Space Agency) have announced that they intend to conduct commercial operations in space.<sup>22</sup> Their success on the space frontier will lead to tens of billions of dollars in revenue projected from commercial space activities in the future.<sup>23</sup>

All industrialized nations sell high technology commodities and services on the international market to support both their national space programs and the multinational programs in which they participate.<sup>24</sup> France has a national marketing organization, PROSPACE, specifically oriented to the international sale of French aerospace hardware and services.<sup>25</sup> The Soviet Union has also formed a marketing organization, GLAVCOSMOS, to sell Soviet space goods and services.<sup>26</sup> The United States has no similar international sales program. Its export rules are far more complicated and more harsh than those of its international competitors. As commercial space activities

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<sup>20</sup> Beggs, *The Issue is Leadership*, 23 *AEROSPACE AMERICA* 45, 57 (Sept. 1985).

<sup>21</sup> COLLET & MELLORS, *EUROPEAN INTEREST IN THE SPACE STATION* 191 (1985).

<sup>22</sup> Civilian Space Stations, *supra* note 19, at 33.

<sup>23</sup> The markets are estimated to be as follows: communications — \$10-100 billion; remote sensing — \$1 billion; materials and manufacturing — \$20-40 billion; and orbital transport — \$4-6 billion. McDonnell Douglas Corp. marketing reports. Charts, McDonnell Douglas — NASA Headquarters Studies, Pre-Phase B, 1983 Other studies estimate that the space-produced drug market will be \$27 billion by 1995. See *Houston Post*, Aug. 30, 1984, at 3B. There will be a \$30-35 billion benefit from remote sensing by 1995; see 1983 GAO ANN. REP. III.

<sup>24</sup> See Civilian Space Stations, *supra* note 19, at 65.

<sup>25</sup> See PROSPACE Catalog (1985).

<sup>26</sup> Conversation between the author and Boris Majorski of the Soviet delegation to the International Institute of Space Law, 28th Colloquium, Stockholm Sweden, October 1, 1985.

become economically significant, export policies will become a key competitive barrier to United States industry.

Today, multinational aerospace transactions are big business for many countries. Due to the vision of government and strong private investment during the development of aeronautical technology, the United States is the world leader in the sale of aircraft. The sale of aircraft, including spare parts, support services, and aeronautical technology, is a major source of positive trade payments for the United States. The market for space goods and services could quickly exceed the aeronautical market. Many nations realize this fact and actively seek a place for their industries on this frontier of capital investment and profit. Each transaction contemplated by any United States commercial organization, or individual, who would sell aerospace goods, technology or services requires several regulated export actions. First, data is exported to allow a potential customer to evaluate the product. Then, the service or commodity itself is exported. Later, spare parts and technical improvements must be exported to allow the customer the benefit of his bargain.

### *Military Space Activity*

Space has great military potential. Many strategic weapons, such as ballistic missiles, operate at least partially in space. All modern military establishments require significant space assets for intelligence, command, control, and communications functions. Both the Soviet Union and the United States spend the majority of their space related funds on military projects.<sup>27</sup> The high technology components of military space systems, such as sensors, computers, and computer programs that operate remote sensing, communication, and navigation satellites constitute the critical military technology of the late 20th century. The components of launch vehicles that transport these spacecraft into orbit are the national munitions

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<sup>27</sup> See Civilian Space Stations, *supra* note 19, at 65.

of the modern age. These components include items such as rocket engines, high pressure/low temperature pumps, and light-weight structural materials, together with the computer programs and sophisticated test equipment that are required to successfully design, test, evaluate, and fabricate launch vehicles.

Current United States law views most space commerce, including all sales of rockets, spacecraft, space electronics, guidance systems, and related technical data and services, as munitions and will license these items under strict requirements of national security. Although some industrial nations have virtually no formal export controls, private space businesses in the United States will find United States export controls pervasive and detailed. Some commercial transactions will be licensed as ordinary international trade, whose control is mitigated by recognition that United States industry must sell well in international markets. Other transactions will be limited as munitions under strict controls. Coping with these controls will be critical to the success of any United States commercial venture in space.

### UNITED STATES EXPORT CONTROLS

Three mechanisms control exports from the United States:<sup>28</sup> First, commodities and technical data on the commodities control list are subject to the licensing requirement of the Export Administration Act of 1979.<sup>29</sup> Although this Act expired in 1983, its provisions were reimposed under the International Emergency Economic Powers Act.<sup>30</sup> The Office of Export Administration (OEA) of the Department of Commerce administers this program of licensing under a series of detailed export ad-

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<sup>28</sup> Export Administration Act of 1979, 50 U.S.C. §§ 1701-1706 (1982) (original version at Ch. 11, § 3, 63 Stat. 7 (1949)).

<sup>29</sup> *Id.*

<sup>30</sup> See Exec. Order No. 12,470, 3 C.F.R. 168 (1984); International Emergency Economic Powers Act, 50 U.S.C. §§ 1701-1706 (1982).

ministration regulations.<sup>31</sup> Second, items on the United States Munitions list, which includes computer programs and many other items not traditionally thought of as weapons, are subject to the licensing requirements of the Arms Export Control Act<sup>32</sup> administered by the Office of Munitions Control (OMC) of the Department of State.<sup>33</sup> The State Department has considerable discretion in determining whether a license will be issued in a particular case under this Act.<sup>34</sup> Third, when a patent whose subject matter is military technology is filed in the United States, the application is inspected by both the Department of Energy and the Department of Defense, either of which may direct that the technology be kept secret.<sup>35</sup> This third mechanism is beyond the scope of this article and will not be discussed.

All of these requirements and restrictions apply to exports of space-related products, data, and services. However, any export license can be arbitrarily revoked or restricted at any time after its issue. A change in national security policies can have an uncontrollable adverse effect on completed export transactions by imposition of embargoes.<sup>36</sup>

### *The OEA Requirements*

The Export Administration Act of 1979 authorizes the Department of Commerce to restrict exportation of certain controlled commodities. This duty is carried out by the Office of Export Administration (OEA). The OEA requires specific authorization for the export of any controlled commodity or technical data to any destination

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<sup>31</sup> 15 C.F.R. §§ 368-399 (1985).

<sup>32</sup> Arms Export Control Act, 22 U.S.C. §§ 2751-2796(c)(1982).

<sup>33</sup> *Id.* § 2778.

<sup>34</sup> 22 C.F.R. § 123.7 (1985).

<sup>35</sup> 50 U.S.C. §§ 2401-2420 (1982).

<sup>36</sup> For a discussion of the 1982 retroactive embargo, see Comment, *The Siberian Pipeline Dispute and the Export Administration Act: What's Left of Extraterritorial Limits and the Act of State Doctrine?*, 6 Hous. J. INT'L L. 63 (1983).

where controls are applicable.<sup>37</sup> The commodities that are subject to controls are specified in the Commodity Control List which is part of the Code of Federal Regulations.<sup>38</sup> Controlled technical data is defined as "information of any kind that can be used, or adapted for use, in the design, production, manufacture, utilization, or reconstruction of articles or materials."<sup>39</sup> The data may be tangible, such as a model, prototype, blueprint, or operating manual, or they may be intangible, such as technical service.<sup>40</sup> The export of this technical data means either "(i) actual shipment or transmission of technical data out of the United States; (ii) any release of technical data in the United States with the knowledge or intent that the data will be shipped or transmitted from the United States to a foreign country; or (iii) any release of technical data of U.S. origin in a foreign country."<sup>41</sup> The release of technical data specifically includes "[v]isual inspection by foreign nationals of U.S. origin equipment and facilities;" or "[o]ral exchanges of information in the United States or abroad. . . ."<sup>42</sup>

For purposes of administering this licensing program, the nations of the world have been divided into seven country groups. There are varying licensing requirements and policies with respect to the different countries.<sup>43</sup> The countries are grouped as follows: Country Group T includes North, South, and Central America, and the nations of the Caribbean (except Cuba); Country Group V includes Western Europe, the Middle East, Africa, noncommunist Asia, Australia, New Zealand, and the People's Republic of China (with some restrictions); Country Group Q consists of Romania; Country Group S

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<sup>37</sup> 15 C.F.R. §§ 372.1-13 (1985).

<sup>38</sup> *Id.* § 399.1.

<sup>39</sup> *Id.* § 379.1(a) Note that this does not apply to "classified technical data". *Id.* § 379.1(a) n.2.

<sup>40</sup> *Id.* § 279.1(a).

<sup>41</sup> *Id.* § 379.1(b)(1).

<sup>42</sup> *Id.* § 379.1(b)(2).

<sup>43</sup> *Id.* § 370 (Supp. 1 1985).

consists of Libya; Country Group W includes Poland and Hungary; Country Group Y includes the Soviet Union, the communist countries of Eastern Europe, Laos, and Outer Mongolia; and Country Group Z includes Cuba, Kampuchea, North Korea, and Vietnam.<sup>44</sup>

### *Controlled Commodities*

Generally, commodities subject to export controls for national security reasons (generally, the items identified by the code letters "A" and "B" in the Commodity Control List) require a validated export license for export to any destination, except Canada.<sup>45</sup> However, the OEA uses a diversion test to decide whether or not an export license will be issued for controlled commodities destined for Country Groups S, T and V. In granting or denying applications for exports of controlled commodities to Country Groups T and V, the OEA decides if there is a significant risk that the commodities will be diverted from their destination to a potentially hostile country. There is particular concern over diversion to Country Groups Q, S, W, Y, and Z.<sup>46</sup>

The OEA reviews applications for exports of controlled commodities to destinations in Country Groups Q, S, W, and Y under a military potential test. This test is based on whether the commodities may make a significant contribution to the military potential of the country of destination. The nations of Country Group Z are subject to an absolute embargo.<sup>47</sup>

The Export Administration Regulations (EARs) establish a series of general export licenses that permit the export of United States commodities to some or all destinations without a specific validated export license.<sup>48</sup> Among these export general licenses is the general li-

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<sup>44</sup> *Id.*

<sup>45</sup> *Id.* § 399.1.

<sup>46</sup> *Id.* §§ 371(c)(5), 379.4(f).

<sup>47</sup> *Id.* § 370 (Supp. 1 1985), 50 U.S.C. § 2403(a) (1979).

<sup>48</sup> 15 C.F.R. § 371 (1985).



cense GLV, which permits the export of controlled commodities in limited amount (generally, in values of \$1,000 or less) to destinations in Country Groups T and V.<sup>49</sup> The Commodity Control List specifies a general license GLV maximum value for each entry. This value limit is \$100, \$250, \$500, or \$1,000, depending upon the particular commodity.<sup>50</sup> Certain commodities, however, which are controlled for nuclear nonproliferation reasons, have a general license GLV value limit of zero for all destinations.<sup>51</sup>

To facilitate multiple export transactions involving commodities for which a validated license is required, the EARs create a series of special licensing procedures. These procedures are used under certain specified conditions and in limited circumstances in lieu of individual validated export licenses.<sup>52</sup> Of these special licensing procedures, the most important is the distribution license. The distribution license permits the exporter to make repeated exports, over a period of one year (subject to renewal for up to two years), of controlled commodities to approved consignees in specified destinations, pursuant to an international marketing program.<sup>53</sup>

The Peoples Republic of China is excluded from the list of eligible countries under the distribution license procedure.<sup>54</sup> This restriction is consistent with the Office of Export Administration's policy of examining proposed exports of controlled commodities to China on a case-by-case basis.

The United States participates in a program of multinational export control with Belgium, Canada, Denmark, France, West Germany, Greece, Italy, Japan, Luxembourg, the Netherlands, Norway, Portugal, Turkey, and

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<sup>49</sup> *Id.* § 371.5(1).

<sup>50</sup> *Id.* § 399.1 (Supp. 1 1985).

<sup>51</sup> *Id.* § 378.2, 370.1 (Supp. 3 1985). and 399.1 (Supp. 1 1985).

<sup>52</sup> *Id.* § 373.

<sup>53</sup> *See id.* § 373.3.

<sup>54</sup> *Id.* § 373.3(a)(ii).

the United Kingdom.<sup>55</sup> This system of multinational controls is administered by an informal Coordinating Committee ("COCOM") which reviews proposed exports of multilaterally controlled commodities (commodities identified by the code letter "A" on the Commodity Control List) to consignees in the communist countries of eastern Europe, the Soviet Union, and the People's Republic of China. Thus, after the Office of Export Administration decides to grant a validated license for a proposed export of an "A" item to one of these destinations, the license application must be reviewed and approved by COCOM before the validated license will be issued.<sup>56</sup>

### *Technical Data*

The EARs control the export of commodities and technical data.<sup>57</sup> Most technical data, except data having certain direct strategic applications, may be exported to destinations in Country Groups T and V, except Afghanistan, under a general license.<sup>58</sup> Strategic technical data relating to the production and delivery of nuclear weapons, airborne navigation, guidance systems, and civil aircraft require a validated export license.<sup>59</sup> Thus, an exporter proposing to export or license its technology to an end-user in a country in Group T or V generally may make the export without a validated export license. However, it may be necessary to obtain a letter of assurance from the end-user that neither the technical data nor the direct product thereof will be reported to a controlled destination.<sup>60</sup>

In contrast, a validated export license has been required for almost all proposed exports of technical data to destinations in Country Groups Q, S, W, Y and Z, as well

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<sup>55</sup> 50 U.S.C. § 2404(i) (1982).

<sup>56</sup> *Id.*

<sup>57</sup> 15 C.F.R. § 379 (1985).

<sup>58</sup> *Id.* § 379.4(b).

<sup>59</sup> *Id.* § 379.5.

<sup>60</sup> *Id.* § 379.3.

as Afghanistan.<sup>61</sup> A general license may only be utilized for technical data exports to destinations in country Groups Q, W, or Y, or Afghanistan, when it consists of: (a) manuals, instruction sheets or blueprints which are (i) sent as part of a transaction involving, and are directly related to, a commodity licensed for export to the specific destination and consignee, (ii) sent no later than one year after shipment of the commodity, (iii) generally delivered with the commodity as a matter of established business practice, (iv) necessary for the assembly, installation, maintenance, repair or operation of the commodity, and (v) not related to production, manufacture or construction of the commodity; or (b) technical data supporting an actual quotation, bid or offer to sell the commodity, provided that, (i) the commodity is not identified as an "A" item on the Commodity Control List and subject to multi-lateral controls, and (ii) the technical data do not disclose the detailed design production, manufacture or means of reconstruction of the quoted commodity or its product.<sup>62</sup>

### *OMC Requirements*

The Arms Export Control Act authorizes the President to "control the import and export of defense articles and defense services" and to designate a Munitions List.<sup>63</sup> The President delegated the export control functions of the Act to the Secretary of State.<sup>64</sup> The State Department established an Office of Munitions Control (OMC) to administer regulations under the Act. These are the International Traffic in Arms Regulations (ITAR).<sup>65</sup> Rockets,<sup>66</sup> spacecraft,<sup>67</sup> space electronics<sup>68</sup> and guidance equip-

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<sup>61</sup> *Id.* § 379.5.

<sup>62</sup> *Id.* § 379.4(b).

<sup>63</sup> 22 U.S.C. § 2778 (1982).

<sup>64</sup> Exec. Order No. 11,958, 3 C.F.R. 79 (1978), *reprinted in* U.S.C. § 2751 app. at 604-05 (1982).

<sup>65</sup> 22 C.F.R. §§ 121-130 (1985).

<sup>66</sup> 22 C.F.R. § 121.1(b), category IV(a), (h); *see also id.* §§ 121.5, 121.11.

<sup>67</sup> *Id.* § 121.1(b), category VIII; *see also id.* § 121.3.

<sup>68</sup> *Id.* § 121.1(b), category XI.

ment<sup>69</sup> are specifically included in the Munitions List under the ITAR. Exporters must obtain licenses for the export of any item on the Munitions List.<sup>70</sup>

"Defense services" include the furnishing of assistance to foreigners "in the design, engineering, development, production, processing, manufacturing, use, operation, overhaul, repair, maintenance, modification or reconstruction of defense articles."<sup>71</sup> Defense services also include the furnishing to foreigners of any technical data, whether in the United States or abroad.<sup>72</sup> Technical data include not only classified information relating to defense articles and defense services, but also "information which is directly related to the design, engineering, development, production, processing, manufacturing, use, operation, overhaul, repair, maintenance, modification or reconstruction of defense articles. This includes, for example information in the form of blueprints, drawings, photographs, plans, constructions, computer software and documentation."<sup>73</sup>

An export under the ITARs does not necessarily have to cross a border (i.e., the border of space). For example, an export occurs when a space commercialization corporation discloses technical data concerning its spacecraft or its rocket to a potential foreign customer, even if both the giver and the receiver of the data are located in the United States.<sup>74</sup> If a space business expects to export rockets or spacecraft, either by selling them to foreigners, or, by launching into space, the company must register with the Office of Munitions Control.<sup>75</sup> Registration can be for a period of one to five years. There is a sliding scale of fees.<sup>76</sup>

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<sup>69</sup> *Id.* § 121.1(b), category XII.

<sup>70</sup> 22 U.S.C. § 2278(b) (1982).

<sup>71</sup> 22 C.F.R. § 120.8; *See also* 22 U.S.C. § 2794(4), (5), (7) (1982).

<sup>72</sup> 22 C.F.R. 120.8; *See also* 22 U.S.C. § 2794(4), (5), (7) (1982).

<sup>73</sup> 22 C.F.R. § 120.12(a) (b).

<sup>74</sup> *Id.* § 120.10(d).

<sup>75</sup> *Id.* § 122.10(d).

<sup>76</sup> *Id.* § 122.2(a).

Under the ITARs, most of the equipment used by a commercial space organization, such as rockets and spacecraft, would be considered significant military equipment.<sup>77</sup> When a company makes a proposal or presentation for the sale of significant military equipment in an amount of more than \$14 million to countries other than Australia, Japan, New Zealand, or a member of NATO, the presentation must be approved in advance by the Office of Munitions Control.<sup>78</sup> Failure to seek prior approval can lead to the rejection of a subsequently filed export license application.<sup>79</sup> Consequently, the export licensing of rockets and spacecraft under the ITARs must, for all practical purposes, be accomplished by a United States citizen, whether they are a national or permanent resident.<sup>80</sup> The purchaser must then identify himself and the foreign consignee must then execute a "non-transfer end use certificate" if purchasing significant military equipment. Significant military equipment would include a rocket or spacecraft worth more than \$14 million.<sup>81</sup> The Office of Munitions Control can request such a statement for the export of any other article or service covered under the ITARs.<sup>82</sup> The sale of spacecraft or rockets for an amount greater than \$14 million is subject to congressional review.<sup>83</sup> The Office of Munitions Control presently treats this review as a thirty (30) day waiting period. If Congress does not forbid the export within 30 days, the State Department can issue the license.<sup>84</sup>

A number of arguments can be made that the ITAR's control of the export of unclassified military technical data violates the First Amendment right of free speech.<sup>85</sup> The

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<sup>77</sup> See *id.* § 120.19(a).

<sup>78</sup> *Id.* § 126.8(a), (g).

<sup>79</sup> *Id.* § 126.8(e).

<sup>80</sup> *Id.* § 123.1(b).

<sup>81</sup> *Id.* §§ 120.19, 123.10(a), (c).

<sup>82</sup> *Id.*

<sup>83</sup> *Id.* § 123.10(e).

<sup>84</sup> *Id.*

<sup>85</sup> See, e.g., Hirschorn, *The Revised Arms Export Control Regulations*, 19 INT'L LAW. 675 (1985); Cheh, *Government Control of Private Ideas — Striking A Balance Between*

State Department has imposed four limitations on the control of technical data by ITAR. First, the technical data must be significantly and directly related to specific articles on the Munitions List.<sup>86</sup> Second, information on new developments is regulated only if that information advances the state of the art of articles on the United States Munitions List.<sup>87</sup> Third, the ITARs specifically regulate information concerning general scientific, mathematical, or engineering principles.<sup>88</sup> Finally, disclosure by an academic institution in the United States is not regulated by the ITARs if made to a bonafide and full-time employee whose permanent abode is in the United States and who is not a national of a communist country.<sup>89</sup> This limitation is only available if the foreign national has been advised in writing that he may not transfer the data to other foreigners without the approval of the Office of Munitions Control.<sup>90</sup>

If taken literally, these regulations require that any information about a rocket or a spacecraft given by an American aerospace company to a foreigner requires determination of whether or not a license is required prior to disclosure. Even if such a license is not required (and this would only be true in a small minority of cases), the prohibitions against disclosure make it difficult for an American aerospace company to sell its products or services to foreign customers.

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*Scientific Freedom and National Security*, 23 JURIMETRICS J. 1, 3-10 (1982); Greenstein, *National Security Controls on Scientific Information*, 23 JURIMETRICS J. 50, 76-82 (1982); *United States v. Eidler Indust., Inc.*, 579 F.2d 516 (9th Cir. 1978); *The Government's Classification of Private Ideas: Hearings Before A Subcomm. of the House Comm. on Government Operations*, 96th Cong., 2d Sess. 268-84 (1980); (Dept. of Justice memorandum expressing concerns about constitutionality of ITAR technical data restrictions).

<sup>86</sup> 22 C.F.R. § 120.21(c).

<sup>87</sup> *Id.* § 120.22(c).

<sup>88</sup> *Id.*

<sup>89</sup> *Id.*

<sup>90</sup> *Id.* § 125.4(b)(10).

## CONCLUSION

Why are these policies so crucial? Why not just reassure the Department of Commerce or State that the proposed transfers are for "good" purposes and that the data and/or goods that aerospace companies must transfer to do business will not go to any "bad" users?

The basic premise of United States technology transfer policy and regulation is simple. Virtually any "goods," "data," or "services" moved in any way, for any reason, for any length of time, to a person anywhere outside the physical boundaries of the United States, is an export. Even an oral discussion of technical information with a foreign national within the United State may be considered an export. Therefore, technology, whether physical or verbal, must comply with the export licensing procedures. For example, sending a United States based engineer to repair a satellite communications system is probably not an export, provided he takes no tools or documents with him. On the other hand, sending a copy of corrected engineering drawings by satellite from an office in Houston to an American owned office outside Paris, France probably is an export within the regulations. Movement of data may qualify as "goods." Even inviting a foreign national to work in a corporate laboratory to develop new products or research for new data may fall within the general control of export regulations. This is of particular concern to companies planning commercial space research because American and foreign researchers will likely work together in space to discover the fundamental technical processes to be used in future space manufacturing and materials processing. Under current law, such work could be considered a series of exports of technical data and thus could require licensing under the strict letter of the current regime.

The policy of the United States government toward recoupment of technical data emphasizes protection. This protectionism has developed at the expense of private commercial entities which must sell products and research

to maintain their market positions in an international field. For example, in 1983, Space Services Incorporated of America, the first private American firm to market a private commercial launch vehicle, put together a small brochure describing the potential performance of its Conestoga launch vehicles.<sup>91</sup> This brochure contained information that was widely published and available to any interested member of the public with a knowledge of college physics. After the company used this brochure to promote and sell its launch services, the State Department objected to a table of payload weights included with the document. The brochure was subjected to rigorous State Department review under export licensing regulations before it could be released to foreign nationals or sent overseas. The State Department finally allowed the brochure to be distributed, but only to specifically named countries and only for a limited period of time. This action by the State Department prohibiting the release of publicly available information by a commercial space corporation in the United States had a chilling effect on the company's international marketing efforts. The company simply had no way of knowing what information it could legally release to answer the inevitable questions of its potential foreign customers.

The basic concern of export policy is national security. In a cogent article discussing proposed changes in United States export policy, Roland W. Schmitt of General Electric's Research and Development Center stated:

The proposed new tightening of the export administration regulation to control unclassified technical data exports would require a validated license for millions of routine transactions. This would place a burden of catastrophic proportions on research and technology-based institutions. Technical data involving sales proposals, the use of foreign consultants, technical discussions, remote computer services, and data basis — all such interactions with

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<sup>91</sup> For a discussion of the *Conestoga I* launch, see *supra* note 13 and accompanying text.



people of allied and friendly nations would require government approval. . . . The current impasse centers on a vital issue: whether the gain in security offered by tightened restrictions on trade with allies and neutral parties is worth more to the United States than the economic penalties resulting from lost trade, lost technical contacts with the rest of the world, while weakening scientific and engineering creativity, which is at the heart of both our economic and our military strength.<sup>92</sup>

The solution to this dilemma is straightforward. First, all activities occurring within the jurisdiction of the United States in space on facilities launched by United States registry space vehicles should be considered to be within the United States for legal purposes. This would render moot the problem of export regulation, because there would be no export in most cases even for multinational work done on United States space stations. A simple federal statute can accomplish this. Second, the United States must realize that technology is not static. Technological evolution continues. Further, technology cannot be used and hidden at the same time. In my opinion, our best chance for true security lies in allowing rapid exchange of ideas and products between the free nations of the West. The West must stay ahead in the race to develop the resources and potential uses of space for the benefit of all humanity. This race cannot be won if the West copies the paranoid secrecy of its despotic opponents. As Kipling put it so well:

*They copied all they could follow, But they couldn't copy my mind,  
And I left them sweating and stealing a year and a half behind.*<sup>93</sup>

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<sup>92</sup> Schmitt, *Export Controls: Balancing Technological Innovation and National Security*, FALL ISSUES IN SCI. & TECH. 119 (1984).

<sup>93</sup> R. Kipling, *The Many Gloster*, in RUDYARD KIPLING'S VERSE (Inclusive Ed. 1922).

## **Comments**

