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David G. Monk

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THE LESSONS OF AIRLINE REGULATION AND DEREGULATION: WILL WE MAKE THE SAME MISTAKES IN SPACE?

DAVID G. MONK

I. INTRODUCTION: EXPANDING SPACE USE

WITH EACH passing year, man pushes further and further into space - the "final frontier." What was merely science fiction just decades ago has become reality in many respects, and ideas that used to exist only in the minds of the world's true dreamers are now becoming workable plans on computers and blueprints.

The numerous uses man will be able to make of outer space will require new and innovative transportation methods and governance systems. For example, future energy sources may be space-based, requiring frequent traffic between the moon, space, and Earth for building and maintaining the system.¹ Potential mining opportunities exist on the moon and other planets which may eventually become cost-effective,² and production of pharmaceutical and other products in space will give rise to new industries and transportation needs.³ The space

¹ 300 Billion Watts, 24 Hours a Day, AIR & SPACE/SMITHSONIAN, June-July 1990, at 68, 70-75.
² The vast array of minerals on the moon and other planets offer a possibility of great value to those who would be able to mine the ore and transport it back to Earth. Obviously, at this point in time, the costs of conducting such an operation greatly outweigh the benefits. As space transportation and technology expand, however, the costs inherent in mining and transporting the material will fall, perhaps to the point where the benefits outweigh the costs.
³ A number of experiments on the development of pharmaceuticals have been made on Space Shuttle missions. Indications are that the gravity-free, ultra-clean environment of space will allow the manufacture of many higher-quality products.
shuttle program in the United States and the successful space station efforts of the Soviet Union indicate that regular space travel and permanent habitation in outer space will be possible in the near future. Colonization of Mars is closer than one might think, and while space use for telecommunication purposes now affects everyday life as satellite technology increases, maintenance trips will become more common and economical relative to placing another satellite into orbit.

In August 1989, Congress' Office of Technology Assessment (OTA) released a report calling for a realistic appraisal of what it will take to reach the United States

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4 ANDREW S. YOUNG, LAW AND POLICY IN THE SPACE STATIONS' ERA 3-4 (1989). A space station as envisioned by former NASA Administrator James M. Beggs could function as:

- a laboratory in space, for the conduct of science and development of new technologies;
- a permanent observatory, to look down upon the Earth and out at the universe;
- a transportation node where payloads and vehicles are stationed, processed and propelled to their destinations;
- a servicing facility, where these payloads and vehicles are maintained and if necessary repaired;
- an assembly facility where, due to ample time on orbit and the presence of appropriate equipment, large structures are put together and checked out;
- a manufacturing facility where human intelligence and the servicing capability of the station combine to enhance commercial opportunities in space; and
- a storage depot where payloads and parts are kept on orbit for subsequent deployment.

Id. (citing Civil Space Station: Hearings Before the Subcomm. on Science, Technology and Space of the Senate Committee on Commerce, Science, and Transportation, 98th Cong., 1st Sess. 43 (1983)). Additionally, the space station has been considered to serve as "a staging base for possible future missions, such as a permanent lunar base, manned mission to Mars, a manned survey of the asteroids, a manned scientific and communications facility in geosynchronous orbit, or unmanned planetary probes." Id. at 4.


6 The recent difficulty with the Hubble Space Telescope is a good example of a situation where the costs of sending a maintenance mission to remedy the technical difficulties would be considerably less than manufacturing and deploying an entirely new satellite. With highly technical and innovative hardware, malfunctions are sure to arise in future satellite deployments as well. Regular space traffic will eventually be required for service and maintenance missions.
government's goals for space usage. In discussing the expansion of human presence in space, the report mentioned the need for shuttle improvements, advanced manned rockets, an unmanned "Shuttle C" and an advanced launch system. Additionally, the report discussed the development of a National Aerospace Plane and space station escape and rescue vehicles. Beyond the call for this exotic hardware, the report also recognized the potential for increased international cooperation in the development and use of space.

President Bush has received considerable praise from industry leaders for giving new (or at least renewed) direction to the aerospace industry through the recently-formed National Space Council (NSC). Bush is also urging another Moon mission by the year 2010 and a Mars mission by 2019. Some government leaders have expressed hope for international participation to bring fru-
ition to these and other missions. This desire for global cooperation is evidenced by a number of international efforts in space, including plans for future space use. Scientists from several nations are now working together toward breakthroughs which will lower the cost of space travel, thus hastening the utilization and commercialization of space.

As the heavens begin to crowd with commercial and governmental space traffic, however, international cooperation will become increasingly important and more difficult to achieve. Eventually, space transport will require more comprehensive regulation at both the domestic and international levels. Surely, experience with regulation and deregulation of the airline industry in the United States and its international consequences offers a base which can make international cooperation in the coming "spaceline" industry a more realistic goal. Broad, high-minded ideals have their place in plans for the future, but the nuts and bolts of space regulation should come from the lessons of previous experience in regulating air transport.

Because the area of space law is so new, especially re-

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12 Senator Albert Gore of Tennessee recently expressed U.S. interest in securing international participation in these missions. Id. Most likely, Senator Gore's views are at least partially motivated by a desire to offset some of the costs of such missions.

13 See Aerospace Spotlight, AEROSPACE AM., Aug. 1990, at 1. The NSC recently approved plans for launching a U.S. satellite by a Soviet rocket from a spaceport in Australia. Id.

14 Gleb E. Lotzin-Lozinsky & Vladimir P. Plokhik, Reusable Space Systems and International Cooperation, AEROSPACE AM., June 1990, at 36 (describing the USSR's efforts to lower costs through research and development of future reusable space vehicles and calling for international cooperation in the effort).

15 See infra notes 144-153 and accompanying text for a discussion of cooperation in space exploration and use.

16 Some commentators have been inclined to question whether there really is a distinct creature called "Aviation Law." See George N. Tompkins & Rod D. Margo, Space Law - Fact or Myth, J. AIR L. & COM. Perhaps aviation law is just a specialized application of already existing "earthbound" legal principles. Id. "Space Law" is similar to "Aviation Law" in that it involves the application of concepts of existing law in highly specialized circumstances. This similarity offers a paradigm to consider in developing space law.
Regarding space transport, the industry is starting with a more perfect world than that found in the pure aviation environment. As a result, opportunities exist to make the right choices from the start. The purpose of this comment is to discuss some of the mistakes that have been made in the course of regulating and deregulating the airline industry in an effort to glean lessons that will be helpful as the course for regulating the space transport industry begins.

II. THE HISTORY AND LESSONS OF AIRLINE REGULATION AND DeregULATION IN THE UNITED STATES

This section will discuss some of the leading problems the United States is facing after a decade of experience with a deregulated air transport industry. In order to understand the lessons of airline deregulation, one must understand the reasons the airline industry was regulated to begin with and the forces that precipitated the move toward a deregulated system.

A. The History of Airline Regulation and Deregulation

Initially, the transportation industry was unregulated, but because of market failure resulting in destructive competition and outright monopoly or oligopoly, the government developed comprehensive regulation. Congress originally established airline regulation during the Depression to remedy the dismal economic condition of the industry at that time and to avoid the problems of unrestricted competition seen earlier in the rail and motor carrier industries. Congress created the Civil Aeronautics Board to regulate the industry.

Congress recognized the great role the airline industry

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18 Id. at 311; see also Paul S. Dempsey, The Rise and Fall of the Civil Aeronautics Board — Opening Wide the Floodgates of Entry, 11 TRANSP. L.J. 91, 95 (1979).
could play in the growth and development of the nation. During the Great Depression, however, the economic condition of the industry was very weak. Congress viewed the airline industry as similar to a public utility (much like railroads and motor carriers) and proceeded to develop regulations mirroring those it had recently imposed upon the other transportation industries. The focus was to avoid encountering the painful impact of cut-throat, wasteful, and unrestrained competition and the economic chaos which had previously plagued the rail and motor carrier industries. In 1938 Congress passed the Civil Aeronautics Act, creating the Civil Aeronautics Board (CAB) — originally called the Civil Aeronautics Authority — a regulatory agency modeled after the Interstate Commerce Commission.

The winds of deregulation began howling in the 1960s and 1970s with criticism of economic regulation and its apparent evils. Pricing and entry restrictions gave consumers excessive service, insufficient price competition, and inflated airline costs while denying the industry sufficient profits. Senate subcommittee reports posited that deregulation "would allow pricing flexibility which would stimulate new and innovative offerings, allow passengers the range of price and service options dictated by consumer demand, enhance carrier productivity and efficiency, increase industry health, and result in a superior allocation of society's resources." Leaders of the deregulation movement such as Alfred Kahn accused regula-

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21 Id. at 18.
22 Id.
23 Id. at 18, 25.
24 Id. at 18.
25 Dempsey, supra note 17, at 312.
26 Id. at 312-13 (citing Oversight of Civil Aeronautics Board Practices and Procedures, Hearings Before the Subcomm. on Administrative Practice and Procedure of the Senate Comm. on the Judiciary, 94th Cong., 1st Sess. 3 (1975)).
27 Alfred Kahn, former Chairman of the Civil Aeronautics Board (CAB), strongly advocated deregulation of the airline industry.
tion of causing higher air fares than would have existed otherwise, misallocating resources, encouraging carrier inefficiency, denying customers the desired range of price/service options, and creating tendencies toward excess capacity.\textsuperscript{28}

As a result of these sentiments pervading the marketplace of ideas and strong advocates in both the Carter and Reagan Administrations, Congress passed legislation in the late 1970s intending to substantially deregulate much of the transportation industry.\textsuperscript{29} The resulting airline deregulation proved more comprehensive than that of the other transportation sectors, and began with passage of the Airline Deregulation Act of 1978 (1978 Act).\textsuperscript{30}

Beginning with the passage of the 1978 Act, deregulation proponents argued that once governmental restraints were lifted from the competitors in the airline industry, natural market economies would take over and create a more ideal environment. Regarding these market forces, many supporters argued that no economies of scale\textsuperscript{31} exist in the airline industry. Thus, enough competitors and few mergers would ensure competitive pricing if the market were allowed to function freely.\textsuperscript{32} Those who were less confident in studies supporting the absence of economies of scale\textsuperscript{33} advocated that even if a monopoly or oligopoly resulted from deregulation, the threat of new

\textsuperscript{28} Dempsey, \textit{supra} note 17, at 312-13.

\textsuperscript{29} Id. at 312-14.


\textsuperscript{31} Economies of scale exist when a company's increases in total production draw unit costs down. As the operation's scale grows, the company becomes more efficient. In regard to the airline industry, economies of scale would exist if by increasing the number of airplanes, terminals, and/or routes, an airline company could lower its costs per passenger. If economies of scale exist in the airline industry, airlines, in an attempt to lower costs, would grow larger and larger to take advantage of these savings, thus squeezing out smaller, higher-cost competitors. If no economies of scale exist, smaller competitors would be able to effectively compete with their larger counterparts.

\textsuperscript{32} This is known as the "traditionalist" view, and was held by many of those in charge of airline regulation in the 1970s. Dempsey, \textit{supra} note 17, at 314-15.

\textsuperscript{33} Several academic studies indicated there were no economies of scale in the airline industry. See id. at 315.
entrants would force a natural monopolist to price at cost. This "contestability" argument had 3 basic assumptions: (1) there are no absolute cost advantages for an incumbent (that is, all competitors have equal access to technology); (2) there are no entry or exit costs (i.e. sunk costs) with respect to a particular market; and (3) consumers respond to price reductions by new entrants quicker than incumbents can match the lower price.

Thus, the supporters also based their endorsement of deregulation on the premises that destructive competition was unlikely to develop in the industry and that the ease of entry of new market participants would "discipline" pricing. With the advantage of hindsight, commentators today are quick to claim that all of these assumptions have proven to be false.

Even leading deregulation proponents have conceded that they were wrong regarding the absence of economies of scale in the airline industry. The resultant reconcentration through mergers and failures and absence of new entrants means there is little downward pressure on pricing. A decade of deregulation "has brought about cutthroat pricing, a miserable level of industry profitability, insufficient capital to re-equip its aging fleet, and a deterioration of service."

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This viewpoint is called the "contestability argument" because it presents the theory that competitors would enter markets in which prices were too high and "contest" the existing market participants, even natural monopolists, thus driving prices down to an optimal level. Id. at 317.

Id. at 307.

Id. at 308.

Id. at 306; c.f., Alfred E. Kahn Airline Deregulation—A Mixed Bag, But a Clear Success
Promises of lower ticket prices have not been met in the long run. After adjustment for inflation and fuel price changes, ticket prices are at least 2.6% higher than before deregulation. Increased route circuity has resulted in more inconvenience and lower productivity. Despite early indications that deregulation would increase competition and drive down prices, the emergence of “fortress hubs,” dominated by monopolistic and oligopolistic powers, built and solidified formidable barriers to new market entrants.

What does all of this mean to us as we consider a course for space regulation? That depends first upon whether we have really learned anything from our experience with airline regulation and deregulation. If we have learned any lessons, the question becomes whether application of those lessons will be at all valuable in our own hypothetical construction of a spaceline governance system. Most of the answer to the latter issue involves additional application of current international and space law as well as some hypotheses on our ability as a world community to cooperate in achieving common goals. While the regulation and deregulation of the American skies is not a perfect paradigm for developing space regulation, failure to learn from the “mistakes” of that experience would certainly be a waste. The following is a discussion of some possible lessons.

B. Lessons in Economic and Practical Efficiency: Fallout from Mergers, Monopolies, and Hubbing

The problem with the great expectations of deregulation is that, in general, the transportation industry is not the ideal model of perfect competition, as significant


39 Dempsey, supra note 17, at 308-09.
40 Id.
41 Id. at 333-34.
42 See infra notes 139-175 and accompanying text.
economies of scale and scope exist.43 After a brief, substantial increase in the number of carriers,44 more than 200 carriers have gone bankrupt or have been acquired through mergers.45 After many bankruptcies and mergers, the number of competitors has dropped off dramatically and oligopolies now exist. Thus, several carriers are now able to exert great market power and, even monopolistic power in some areas. The natural result of this market power has been borne out empirically: prices have risen for many consumers, and the level of service has deteriorated. From a policy standpoint, these facts are quite disturbing. On a macroeconomic level, excessive wealth has been transferred from consumers to producers. As such, society’s resources are being misallocated while consumers purchase alternative products or services which are more costly for society to produce.46

The transportation industry has a built-in vulnerability to both price wars and excess capacity. Transportation firms sell what is basically an instantly perishable commodity. As soon as an aircraft taxis down the runway (or a spacecraft takes off), the value of any unused capacity is lost forever. Distress-sale pricing is thus used to fill seats during periods when demand is weak or when excess capacity exists due to unlimited entry.47 As a result of this destructive competition, airlines seek out or create monopoly market opportunities so they can increase prices offsetting fixed costs (and hopefully show a profit).48 The results of this phenomenon are now also beginning to

43 Dempsey, supra note 20, at 76. Dempsey further argues that economies of scale exist in the space transport industry.
44 Dempsey, supra note 17, at 323.
45 Id.
46 Dempsey, supra note 20, at 76.
47 Dempsey, supra note 17, at 324.
48 Id. A U.S. Department of Transportation study released in 1990 found that when a single airline commanded 75% or more of the traffic at an airport, passenger fares were 18.7% higher than otherwise. Monica Luebker, Comment, The 1992 European Unification: Effects in the Air Transport Industry, 56 J. AIR L. & COM. 589, 621 (1990) (citing Will Europe’s Crowded Airports Strangle Competition at Birth?, ECONOMIST, Apr. 14, 1990, at 69).
show on the international level. With the globalization of air transport, the potential looms for the creation of international megacarriers exercising incredible monopolistic power.\textsuperscript{49} By the year 2000, some analysts predict there could be as few as nine or ten global megacarriers.\textsuperscript{50}

The nature of the transportation industry is such that a local monopoly can cause greater harm than in other industries because transportation is a basic part of the society's social and economic infrastructure. The quality of that system affects the efficiency of all other business activities in the community and the quality of life of its residents. A community's ability to retain existing industries, and attract new ones, is especially dependent upon the adequacy, convenience, and reasonable pricing of its airline service.\textsuperscript{51} Presumably, a city's proximity to and quality of space transportation will have these same effects. Thus, if monopolies are not necessary in the future space transport industry, and private competition at some level is seen as desirable, some method of avoiding excess capacity and deleterious price wars must be implemented.

Competition incited by deregulation has lowered prices for some passengers, but many people are unable to take advantage of the discounts, and substantial price discrimination has emerged.\textsuperscript{52} With the increased concentration through bankruptcy and mergers, even the beneficiaries of discriminatorily lower prices may soon be paying higher fares. Alfred Kahn admits that consideration of price ceilings in single-carrier markets may be in order.\textsuperscript{53}

\textsuperscript{49} Dempsey, supra note 17, at 328.

\textsuperscript{50} See William Stockton, When Eight Carriers Call the Shots, N.Y. TIMES, Nov. 20, 1988 § 3, at 1.

\textsuperscript{51} Dempsey, supra note 17, at 388; see also, Melvin A. Brenner, Airline Deregulation - A Case Study in Public Policy Failure, 16 TRANSP. L.J. 179, 189 (1988).

\textsuperscript{52} Passengers with flexible schedules who travel between major airline points of service have enjoyed discount fares while those who travel to and from low-traffic points or must make last-minute flight arrangements pay considerably higher rates. Price discrimination, therefore, exists in single-carrier markets and hurts passengers who travel on business or must make immediate, unexpected flights for funerals or other emergencies. Dempsey, supra note 17, at 345-46.

\textsuperscript{53} Id. at 347.
Basically, passengers traveling between dense traffic points pay relatively lower fares than those utilizing less-traveled routes. Small town passengers are, therefore, subsidizing the competitive losses of big-town routes.\textsuperscript{54}

If the low or non-profitable routes are to be maintained, someone must pay for them. Such costs may be borne by (1) the small route passengers paying higher fares; (2) the government subsidizing the costs of the route in order to keep it available; or (3) the airline themselves, absorbing the cost as mandated by regulation and charging higher fares on other, more profitable routes to make up the difference.

Pricing will be different for space travel because the costs incurred in reaching space orbit will require that departure and destination points on Earth be located exclusively in large hubs.\textsuperscript{55} Even when the aerospace plane\textsuperscript{56} becomes a common means of transportation, with resultant decreases in noise and large area requirements (for safety and nuisance reasons), only the long-distance routes, whether between two points on earth or from earth-to-space, will utilize spacecraft. Travel to and from hubs offering space transport service will be much cheaper by other transportation means. Costs will be substantial, at least for the foreseeable technological future, to escape the atmosphere, but once in orbit, the space stations will function as hubs themselves. Outside Earth’s atmosphere the airline industry should analogize closely with intraspace transport.\textsuperscript{57}

In the airline industry, “hub and spoking” developed in response to the forces set in motion by deregulation.

\textsuperscript{54} Id. at 347-48.

\textsuperscript{55} Approximately twelve launch sites in the world today are capable of deploying an orbital craft.

\textsuperscript{56} See supra note 8 for a discussion of the aerospace plane.

\textsuperscript{57} According to a NASA spokesman, space travel will one day be largely space-based. Many spacecraft will be built in outer space and never enter the earth’s atmosphere. These craft will function entirely in an outer space environment providing transport between extraterrestrial points. Michael L. Roberts, Address at 25th Annual SMU Air Law Symposium (Feb. 21, 1991).
This practice has significantly increased circuitry in air travel, thus lengthening flying time for many travelers.\textsuperscript{58} The hub concentration resulting from entry and exit opportunities granted by deregulation has translated into escalating fares.\textsuperscript{59} Passengers beginning flights at a hub airport pay as much as 50\% more than if deregulation had not occurred.\textsuperscript{60}

If one of the lessons learned from deregulation is that unregulated oligopolist or monopolist carriers will sacrifice direct, efficient routing of passengers between travel points in order to increase overall profit, will similar problems occur in space? If, as expressed above, hub and spoking is likely to be an inherent characteristic of spacelines, then perhaps the practice should not be completely disposed of, but only regulated enough to avoid the problems that stem from it. Areas of concern for spaceline regulation include allocation of limited terminal space and scheduling of routes to avoid the other problems of limited entry and monopoly power.\textsuperscript{61}

Regulation often includes a public policy objective as well as an economic objective. Like economic goals, polit-

\textsuperscript{58} Dempsey, \textit{supra} note 17, at 352. Hubbing is a process whereby an airline operates connecting banks of arriving and departing flights at certain airports. By channeling passengers from many points through an intermediate connecting point, or hub, a carrier can combine passengers with different origins and destinations and thereby increase the number of city-pairs it serves (and the average number of passengers and revenue per flight). Daniel Kasper, \textit{Deregulation and Globalization} 30 (1988). This arrangement seems very efficient initially, but the fallout effects are less positive. Now all major airlines have created hub-and-spoke systems and all but four hub airports are dominated by a single airline. This domination of the traffic and infrastructure continues to have devastating effects on competition. Dempsey, \textit{supra} note 17, at 330.

\textsuperscript{59} Dempsey, \textit{supra} note 17, at 333.

\textsuperscript{60} Id.; see also Stockton, \textit{supra} note 50, at 1; infra notes 159-60 and accompanying text (discussion of the ramifications of deregulation on air fares).

\textsuperscript{61} A grandfather system currently exists in the United States whereby terminal space is allocated on a seniority basis. Will this work in space? Will it even be necessary, considering the relatively low volume of arrivals and departures? These are additional questions which will need to be addressed as the spaceline system comes of age in conjunction with orbital space ports.

It should be noted that the grandfather system is not held in high favor by all airline industry regulators. The thrust in Europe is toward phasing out this often discriminatory practice of terminal allocation.
ical and social goals sometimes cannot be met through a purely free-market system because they conflict with businesses' goal of maximizing profits. In regulating an industry, the government should seek to achieve an equitable balance between market efficiency and public policy objectives. For example, prohibitions on rate discrimination are usually necessary where the imperfect nature of the competitive environment (i.e., limited terminal facilities) makes it difficult for new competitors to enter the market to stabilize prices. Safety policy concerns often cannot be met through the market. Regulation protects smaller competitors from predatory tactics of larger, stronger companies. Thus, if economic efficiency and political and social goals are to be maintained in the spaceline industry, some form of regulation will probably be desirable with these ends in mind. This will be the case regardless of whether the market consists of many small competitors or, as is perhaps more likely, of a few spaceline power players.

C. Lessons in Price, Quality, and Service

The limited and selective price decreases brought about by deregulation have been accompanied by dramatic decreases in quality and service. Most price reductions have taken the form of discount fares with time restrictions, advance purchase requirements, and non-refundability provisions. Full fares rose 156% from 1978 to 1988, twice the rate of growth of the Consumer Price Index over the same period. Additionally, service quality declines in the form of increased delays and schedule uncertainty attributable to deregulation have added opportunity costs to air travel as well as increased aggravation and anxiety.

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63 Id.
64 See infra note 160 and accompanying text.
65 Dempsey, supra note 17, at 356.
66 Id. at 357.
67 Id. at 357, 360.
Along with service quality declines, unregulated airlines often resort to bait-and-switch advertising, deliberate overbooking, unrealistic scheduling, and demand-based flight cancellations.68 According to one explanation, declines in profitability resulting from destructive competition have used up the resources airlines could have otherwise used to enhance staffing, buy and maintain aircraft, provide better food, and avoid overbooking.69 If these ramifications are considered undesirable in the airline industry, they also deserve disdain from those planning to avoid foreseeable problems in the spaceline industry.

Service to some destinations is insured by federal assistance. The government subsidizes airlines to cover their operational losses and provide a reasonable profit in order to ensure service to otherwise unprofitable destinations, usually small, low-traffic areas.70 Not surprisingly, deregulation has resulted in higher prices for poorer service to small businesses and small towns. Many communities are losing their airline services, and many more have seen a decrease in the frequency of direct flights in their areas. Since deregulation, about 140 small towns have lost all air service and 190 others have seen their large airline service replaced by smaller, less comfortable, less convenient and less safe commuter lines.71

Perhaps these governmental subsidies will also be necessary someday in intraspace transport if regular traffic between points wholly outside the Earth’s atmosphere ever reaches a volume beyond which individual chartering is sufficient. It is doubtful, however, that subsidized routes to or from points on Earth will be necessary. This is because, as stated above, other transportation methods will be used to reach the hub launch sites on Earth.
Therefore, this service problem of airlines which deregulation has made even more important should not carry over as an issue of space transport.

The costs of space travel and transport are currently very high; thus, competitive pricing is not yet a real issue. The cost of placing just one kilogram of payload into orbit currently ranges from $5000 to $10,000. This high cost deters space exploration and use, but scientists all over the world are working to make space transport less expensive. Private companies as well as governments are already involved in the development and use of commercial launch vehicles to take payloads into space at competitive prices. Additionally, the development of air-space systems wherein a shuttle or similar craft can take off like an airplane and continue into low earth orbit will likely be the next major technological breakthrough. Some scientists believe that these systems could transport commercial travelers and cargo very quickly over great distances at costs which many would find acceptable. These scientists have set a goal of developing hypersonic passenger and cargo transportation very early in the twenty-first century. Whether the costs ever fall to a level such that price competition can truly exist remains to be seen, but as technology advances, price competition may become an issue.

72 Lonzino-Lozinsky & Plokhikh, supra note 14, at 36.
73 Id.
75 See supra note 8.
76 Lonzino-Lozinsky & Plokhikh, supra note 14, at 40. Lonzino-Lozinsky and Plokhikh, two prominent Soviet space scientists, offer some figures for cost comparison: currently, the airfare for a subsonic flight from Moscow to Washington is about $1,000. A supersonic Concorde flight from London to New York is $2,400. The estimated cost per flight for a passenger on the Space Shuttle (assuming a capacity of 70 passengers) is now about $2 million. The price of an air-space ticket halfway around the world, such as from London to Hong Kong, would be around $50,000. They believe that new technological developments could lower these costs even more by the first decade of the 21st century. Id.
77 Id.
It is safe to say that spacelines will not be economical for everyday travel and transport in the same manner as airlines for quite some time. Therefore, the applicability of the lessons of airline deregulation (or just about any experience in earthbound endeavors) will be limited. If we assume, however, that price, quality, and service become considerations at some optimal level, the questions become: How are we to reach that level? Will the marketplace do it? What will be the important service and quality considerations? How can they be affected by regulation?

We have learned from deregulation that unregulated monopolies or oligopolies in the transportation industry can reduce quality and service while holding up prices or pricing discriminately because of limited access through hubs. It has also been conceded that hubs will be necessary as a practical matter for space travel. With these premises as a foundation, those planning the future governance of domestic and international space transport must make basic policy decisions to either bolster the quantity of routes and quality of service through subsidies or regulation, or leave it to the same types of market forces that exist in the deregulated airline industry.

D. Lessons in Safety

Immediately after the Airline Deregulation Act of 1978 when the deregulation of the airline industry went into effect, competition in the industry dramatically increased, resulting in net industry losses of $500 million in the six-month period ending in March of 1980. That amounted to the worst profitability in the industry’s history. This economic anemia has resulted in less safe air travel. The lessons in safety stemming from airline regulation and de-

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78 Dempsey, supra note 20, at 31.
79 Id.
regulation should be considered, as safety in space travel is also of utmost importance.

Whenever profitability is suffering, it is natural for management to take measures to cut costs. In the airline industry, the costs that can be reduced most quickly and significantly are maintenance costs closely connected with safety: mechanics' wages, spare or replacement parts, and idle vehicle time during inspection and maintenance. An increase in FAA maintenance fines appears to reflect this tendency to reduce safety-related expenditures.

Since deregulation, the average age of the aircraft fleet in the United States has increased markedly. Expenditures relating to maintenance have declined, and the number of near misses and accidents has increased. Additionally, hiring standards for cockpit crews have become more lenient, and pilots are required to fly more hours with less rest. In fact, 97% of airline pilots agree that deregulation has resulted in decreased airline safety.

In dealing with safety concerns, regulation is often superior to judicially ordained tort damage awards. No matter how well money can erase the pain of injury, economic compensation for injury frequently cannot restore health, and can never restore life. In contrast, regulation attempts to prevent injuries before they occur, thereby protecting the innocent from harm. Many who may be harmed (including children and bystanders) are not "market participants" and thus do not have the opportunity to "purchase" their personally optimal amount of safety.

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81 Union protection is a limiting factor on an airline's ability to cut mechanics' wages.

82 DEMPSEY, supra note 20, at 31.

83 Id.

84 Id. at 116.

85 Id.

86 Id. at 78.

87 Id.

88 Notwithstanding this discussion, it should be noted that deregulation per se did not involve lifting safety requirements. The United States government still maintains control over the technical side of the airline industry, though the pric-
Thus, what would normally work as deterrence through the tort system may be less effective while regulation mandates safety standards applicable to all.

There is no doubt that NASA has learned in the last decade at least two lessons: one, safety measures are of the utmost importance when dealing with fragile, technical spacecraft; and two, even strict safety regulation can break down and result in tragedy. Considering how quasi-governmental regulation did not succeed in avoiding the Challenger tragedy, would we be better off relying on a deregulated market to supply the requisite safety? Surely not. We have learned that deregulation resulting in market competition at some level requires cost- and corner-cutting. Essentially, NASA was cost- and corner-cutting when it chose to give the Challenger mission the green light while simultaneously recognizing that serious safety considerations directed otherwise. The easiest cost-cutting measures are those that quickly affect the bottom line while causing the least immediate disruption. Safety should come first; in reality it goes first. This is unacceptable in space transport. The technical nature and inherent danger in space transport need not be exacerbated by any incentive to forego necessary, indeed greater-than-necessary, safety measures.

In the United States, airline safety regulation has been maintained, even while pricing has been deregulated. The National Transportation Safety Board (NTSB) and the Federal Aviation Administration (FAA) function as the

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89 The National Aeronautic and Space Administration (NASA) is an agency of the United States government; however, it is largely self-regulated. The political, administrative, and technological forces impacting decision and rule-making in the agency must bear some resemblance to the types of pressures any organization or company would face in competition — whether against time (as in the Apollo race to the moon) or against itself (as in the Challenger case) or against other, profitable companies (as would be the case in a deregulated spaceline market).

90 PRESIDENTIAL COMM’N ON THE SPACE SHUTTLE CHALLENGER ACCIDENT, REPORT TO THE PRESIDENT 104 (June 6, 1986).
overseers of technical safety considerations. Without doubt, some form of safety regulation must exist domestically, and probably also internationally, if space transport is to be a viable transportation option for passengers and shippers. Presumably, the NTSB or the FAA could extend its role to include space transport in the United States. As we have seen in the deregulated airline industry, however, other forces can affect safety beyond what these bodies can do (or have done). Because most of these forces stem from competition for profits, the future commercial space transport industry must be regulated in a manner which considers the detrimental as well as the beneficial aspects of competition. An unsafe spaceline industry is not an option.

E. Reregulation? The Lessons Considered

After learning some of these hard lessons, some commentators are calling for reregulation of the airline industry. The ideas they express may be useful in drawing lessons from the deregulation experience and applying them to space transport governance. Paul Stephen Dempsey, a prominent advocate of airline reregulation, offers several ideas to consider in reregulating the airline industry.91 One proposal is that entry must be regulated to prevent an unhealthy influx of capacity which jeopardizes efficiency.92 Moreover, entry into the commercial space transport industry should be regulated for a number of reasons. Along with efficiency considerations, safety and service quality are affected when too many or below-standard suppliers of transportation service occupy a market. Through regulatory “gate-keeping,” efficiency and economy can be maintained without sacrificing safety or service quality.

A body in charge of enforcement of the regulations should exercise power to suspend or revoke licenses to

91 Dempsey, supra note 20, at 223-24.
92 Id.
operate when a company fails to meet safety standards or engages in discriminatory or predatory actions. Enforcement is a necessary companion to all regulation. On a domestic level, this will not be very difficult to achieve. Effective regulation requires an agency that will police the space transport industry. By granting an agency power to remove authorization to operate, standards of efficiency, service, and safety can all be maintained. The real problem will be establishing such a power on an international scale, if ever deemed desirable. Certainly, the depth and breadth of the enforcement aspect requires consideration if international regulation of the space transport industry becomes a goal.

Another possibility for reregulation is establishment of a "reasonable zone" method to govern rate structures. Efficient, well-managed companies should be able to earn a reasonable return on their investment. Establishment of a zone within which price competition could exist might avoid the problems of economy-induced safety declines when prices fall very low, yet keep consumer prices below some ordained level where forces push prices up. Until technology reaches a point where costs, and thus prices, achieve a higher degree of predictability and stability, it seems that establishment of a "reasonable zone" would be very difficult. Eventually, however, such a rate structuring system may be viable for the space transport industry.

Mergers and acquisitions should be carefully scrutinized, but agreements enhancing efficiency, encouraging information flows, and facilitating ratemaking principles should be granted antitrust immunity. This proposal is revolutionary, indeed. The possibilities of both collusion as well as deleterious competition loom large when one

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93 Id.

94 See infra notes 139-175 and accompanying text for a discussion of possible regulatory and enforcement methods.

95 Dempsey, supra note 20, at 223-24.

96 Id. at 224.
considers the effects of granting antitrust immunity to an industry that already has such few, huge oligopolistic and monopolistic participants. The applicability of this idea to space transport will depend on the structure into which the industry evolves. Obviously, mergers and acquisitions in the airline industry have had great impact since reregulation. If the government chooses to keep a tight rein on the space transport industry and guide and mold its development, mergers and acquisitions of industry participants should be reviewed in some manner. This would facilitate the structuring of a strong industry while maintaining control over what is sure to become a big business. The real problem as mentioned above will be carrying such control into the international arena.

II. INTERNATIONAL AIR GOVERNANCE AND THE EFFECTS OF DEREGULATION

The international consequences of United States deregulation appear to be more positive than the domestic effects, at least for the moment. United States airlines occupy strengthened positions relative to foreign airlines, and European carriers are attempting to offset those advantages through mergers and establishment of comput-

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In another writing, Dempsey advocates reform of the regulatory system to "steer a common sense course between heavy-handed regulation and laissez-faire." Dempsey, supra note 17, at 307. His recommendations include the following four points:

- Establishment of a new body to regulate the transportation industries with a broad perspective of all transportation systems and which is "immune from capture by any single transport industry."
- "[P]rohibition of a single airline maintaining a dominant position at more than a single airport;"
- "[P]rice regulation directed at keeping fares within a range which would prohibit price-gouging in thin markets on the one hand, and predatory pricing to drive out new competitors on the other;"
- Regulations "directed at eliminating price discrimination, so that fare differences reflect cost differences and not differential market power."

Id. at 307-08.

These points offer additional considerations for viewing both possible reregulation of the airline industry and future governance of the space transport industry.
Foreign governments are also beginning to press the United States to open its domestic market.99

One expert argues that by the turn of the century most of the world's air transport services will be provided by large multinational airlines competing on a worldwide scale.100 If this turns out to be the case, perhaps it offers something to an analysis of the possible effects of a relatively unregulated space transport industry. The existence of a few, large multinational airlines is a natural result of several factors. For instance, United States airline deregulation has brought about more competition and major structural changes in the industry and foreign airlines and governments have had to react by accepting more market liberalization than they would have otherwise.101 Since United States deregulation, Canada, New Zealand, Australia, the United Kingdom, Japan, and the People's Republic of China have significantly deregulated their domestic air service markets.102 Additionally, many of those nations with state-owned airlines are considering privatization.103 Whether the international space transport industry will be substantially privatized or government-run is as of yet unknown, but if the market consists of both types of participants (as the current airline industry does), the relationships between these competitors may analogize to those in the airline market.

Today, bilateral agreements are the basis for international air service operations.104 Airlines have no right to engage in traffic to, from, or over a nation's territory without the consent of the sovereign state.105 Thus, these bi-
lateral agreements, governing entry, capacity, traffic, fares and routes are negotiated between national governments whose airlines want to provide service in another country.\textsuperscript{106}

The legal and institutional regime governing international air services developed during the late 1940s. The international system we have today "arose from the failure of nations to agree on a more comprehensive, multilateral system."\textsuperscript{107} Thus, air services have developed under an odd array of multilateral and bilateral agreements entered into by both governments and airlines.\textsuperscript{108} It is likely that space services will develop in much the same manner.

Among governments, multilateral agreements generally address international legal issues affecting the operation of civil aircraft.\textsuperscript{109} These matters include overflight rights, nationality of aircraft, and minimum safety, maintenance, and training standards.\textsuperscript{110} In contrast, bilateral agreements usually deal with the exchange of substantive economic rights.\textsuperscript{111} Some technical safety and security matters are addressed through bilateral agreements, as are ancillary issues like conversion of currency, repatriation of profits, and mutual recognition of licenses.\textsuperscript{112}

Among airlines, multilateral agreements deal with a number of technical and facilitation matters, trade association activities, and pricing agreements.\textsuperscript{113} Bilateral agreements sometimes address issues involving division

\textsuperscript{106} Kasper, \textit{supra} note 58, at 3.
\textsuperscript{107} Id. at 45.
\textsuperscript{108} Id.
\textsuperscript{109} Id.
\textsuperscript{110} Id.
\textsuperscript{111} Id.
\textsuperscript{112} Id.
\textsuperscript{113} Id. For further discussion of bilateral air service agreements, see id. at 50-57 (discussing economic rights which includes entry and designation, capacity, route and traffic rights, pricing; and ancillary rights which consist of local currency conversions, profit repatriation, access to local distribution channels, etc.).
of capacity or traffic, pricing, reciprocal access to reservations systems, maintenance, ground handling, and joint operations. This system of contracting for rights and duties thus makes up a large part of what constitutes aviation law. Because most international relationships are governed by treaties, a system of international space transport regulation must arise, at least initially, in the same manner.

IV. CURRENT SPACE LAW

The Space Age has developed incredibly quickly in just over three decades. What is almost as amazing is that space law has preceded this rapid technological development in many aspects. Rather than following technical developments and creating rules and regulations long after international customs and practices have been established, space law has provided an early framework for the planning and carrying out of activities regarding the exploration and use of outer space.

Several nations have cooperated to form and adopt agreements on the general principles of outer space related activities. These agreements are manifested mostly in multilateral treaties and enunciate broad principles which form the groundwork for further development of specific regulations and rules as they become relevant.

The policies underlying the direction of space use and, therefore, space law are currently found in the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (Outer Space Treaty). This doc-

114 Id.
115 The opening of the Space Age is generally credited to the launch of the first man-made satellite, Sputnik 1, into low earth orbit by the U.S.S.R. in October, 1957.
116 Peter Jankowitsch, Foreward to MORRIS FORKOSCH, OUTER SPACE AND LEGAL LIABILITY at xiv (1982).
117 Bosco, supra note 75, at 612.
ument represents an international effort at cooperation regarding the exploration and use of outer space. It sets forth ideals and principles relating to peaceful coexistence and progress in the development of space and is the basic treaty out of which all other space treaties developed.\textsuperscript{119} The treaty states in article II: “Outer space, including the moon and other celestial bodies, is not subject to national appropriation by claim, by sovereignty, by means of use or occupation, or by any other means.”\textsuperscript{120} This principle highlights an inherent difference between regulating outer space activities and regulating airlines. According to well-established civil aviation law dating back to the Chicago Convention of 1944, each nation has sovereign power and control over the airspace directly above it.\textsuperscript{121} Although defining the separation of air space and outer space is itself a difficult issue,\textsuperscript{122} the Outer Space Treaty announces that outer space above a nation is open to development and use by all nations. Regulation of this area, therefore, is not the responsibility or province of any nation, but of all nations cooperatively.\textsuperscript{123} Thus, while domestic regulation of the space transport industry is in order, it is also obvious that the international interaction in outer space will demand cooperative regulations as

\textsuperscript{120} Outer Space Treaty, supra note 119, art. II, 18 U.S.T. at 2412, 610 U.N.T.S. at 708.
\textsuperscript{121} Convention On International Civil Aviation, Dec. 7, 1944, 61 Stat. 1180, 15 U.N.T.S. 295 [hereinafter Chicago Convention]. Article 1 states: “The contracting States recognize that every State has complete and exclusive sovereignty over the airspace above its territory.” Id. art. 1, 61 Stat. at 1180, 15 U.N.T.S. at 296. Article 2 further declares: “For the purposes of this convention the territory of a State shall be deemed to be the land areas and territorial waters adjacent thereto under the sovereignty, suzerainty, protection, or mandate of such State.” Id. art. 2, 61 Stat. at 1181, 15 U.N.T.S. at 298.
\textsuperscript{122} This is known as the “delimitation” issue. See Benko, supra note 120, at 121-30.
\textsuperscript{123} See infra notes 144-151 and accompanying text. Note also that this “province of all mankind” approach to space is similar to international maritime law on the High Seas and aviation law over the oceans. The reason this characteristic of international law exists and is accepted by all nations is undoubtedly to protect and enhance economic interests. Apparently the same approach is being taken to space law for the same reasons. See White, supra note 106, at 36.
well. The eventual form of this regulation (whether solely by bilateral and multilateral treaties or by a central governing body) remains undecided, but this treaty at least recognizes the necessity of international cooperation.

Article III addresses this idea directly and asserts that nations shall use outer space "in accordance with international law, including the Charter of the United Nations, in the interest of maintaining international peace and security and promoting international co-operation and understanding." As commercial and governmental space traffic increases, however, the international cooperation so obviously essential to maintaining peaceful government of space will become both more important and more difficult to achieve. We should incorporate the lessons from our experiences with the international consequences of deregulation as well as our experiences with international air and maritime law into the formula we finally set to govern space transport. At this time, air transport law is the closest useful analogy available to aid us in making international cooperation in the coming "spaceline" industry a realistic goal.

Article VI states that nations agreeing to the Outer Space Treaty carry a responsibility to all nations for their activities in outer space, regardless of whether the expedition is governmental or commercial in nature.\(^1\)

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\(^{125}\) See infra note 129.

\(^{126}\) Eighty-eight nations have agreed to be bound by this document. (Eighty-nine before the unification of Germany and at December 31, 1988.)

\(^{127}\) Outer Space Treaty, art. VI, supra note 119, 18 U.S.T. at 2415, 610 U.N.T.S. at 209. The actual language, revealing a significant principle of current (and most likely future) outer space governance is as follows:

States Parties to the Treaty shall bear international responsibility for national activities in outer space . . . whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty. The activities of non-governmental entities in outer space . . . shall require authorization and continuing supervision by the appropriate State Party to the Treaty.

\(^{Id.}\)
Each nation is therefore responsible for the actions of any and all civilian space users and is required to authorize and supervise any such activity.\textsuperscript{128}

In accordance with the principles of responsibility in article VI, article VII places liability for damage caused to another State Party on the State Party which either launches, procures the launching, or from whose territory or facility such object is launched.\textsuperscript{129} Thus, as it stands, the nation "responsible" for the damage caused by either government or private spacecraft shall be held liable since it is that nation's responsibility to police the space-related actions of all its constituents.\textsuperscript{130}

In support of this governing power, article VIII states that jurisdiction over and ownership of objects launched into outer space remain with the State Party who carries the particular spacecraft or other object on its registry.\textsuperscript{131} This principle offers further enforcement authority to sovereign nations in international space and affords some degree of extended protection over its constituents' activities.

The interaction of nations in space and the possible conflicts of multiple nations in space are dealt with in article IX.\textsuperscript{132} This article requires any nation either con-

\textsuperscript{128} This practice is similar to maritime and aviation law. Ships and planes are assigned nationality so that in the absence of any general international enforcement agency, assigning responsibility to the flag state for liability and safety matters affords some enforcement basis. \textit{White, supra} note 106, at 36-37.


\textsuperscript{130} The possibilities for liability in space transport are legion. Damages could arise from falling spacecraft, collisions with other spacecraft or space stations, pollution, and just about any other errant activity that could be envisioned in air transport activities.


\textsuperscript{132} \textit{Id.} art. IX, 18 U.S.T. at 2416-17, 610 U.N.T.S. at 209-10. The text of the article states:

If a State Party to the Treaty has reason to believe that an activity or experiment [perhaps read "commercial or governmental space flight"] planned by it or its nationals in outer space . . . would cause potentially harmful interference with activities of other States Parties in the peaceful exploration and use of outer space . . . it shall under-
ducting space-related activities or knowing of such activity planned by another to actively seek out communication to resolve any potential conflict arising from the conduct. This provision is actually a primitive form of "space traffic control." This article sets the stage for both bilateral and multilateral agreements to establish relative rights of use and maintain cooperation, much like in current international air space governance.

Article XI provides that State parties to the Agreement will "inform the Secretary-General of the United Nations as well as the public and the international scientific community, to the greatest extent feasible and practicable, of the nature, conduct, locations and results of such activities." While this may become either unnecessary or impractical as space traffic increases, this language indicates that disclosure of information such as flight plans, destinations, and purposes of space traffic and use should be routed through a central dissemination point whereby the previously discussed multinational space traffic conflicts can be more efficiently handled.

\[\text{Id.}\] The language appears to authorize multinational cooperative regulation of space traffic and space use. It also appears that such regulation almost certainly would be organized, enunciated, and implemented through treaties. Article X further encourages space flight observation between States to be governed by agreement between the concerned States. \textit{Id.} art. X, 18 U.S.T. at 2417, 610 U.N.T.S. at 210.


135 Outer Space Treaty, supra note 119, art. XI, 18 U.S.T. at 2418, 610 U.N.T.S. at 210. Presumably, this provision applies to all activities in space exploration and use, including both scientific and commercial activities.

136 See supra notes 133-135 and accompanying text.
Article XIII also provides for governance of "[a]ny practical questions arising in connection with activities" in outer space and under certain circumstances by either "the appropriate international organization or with one or more State members of that international organization, which are Parties to this Treaty." This provision perhaps clears the way for the establishment of an international regulatory body to perform administrative functions regarding the space transport industry. This would certainly be an alternative to governance by treaties. Many problems would accompany the establishment of a general, central governing system to regulate space activities. Some aspects of space exploration and use, however, might lend themselves to limited centralized regulation. Areas such as safety and traffic control would probably be the initial possibilities.

V. APPLICATION OF THE PAST IN AIR LAW TO THE FUTURE IN SPACE TRANSPORT

The Space Age has already brought about new legal and regulatory measures to deal with the issues of space exploration and use. Access to outer space and the establishment of an orderly and safe environment to conduct space activities requires considerable regulation. The regulatory system will require both domestic and international measures. The international regulation will include bilateral and multilateral agreements on both regional and global scales. As the high costs and risks of

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139 Bosco, supra note 75, at 611.
140 Id. at 611-12.
141 Young, supra note 4, at 5. According to Young, man's entry into space on a regular basis:
space activities become more apparent, cooperation in the
field of space exploration may tend toward a global per-
spective. Some ideas for development of global space
governance have included United Nations control, a
Space Court, and a World Space Organization. Regard-
less of the form, as commercialization of space becomes
more of a reality and cooperation becomes a necessity
(due to the nature of space as the "province of all man-
kind"), the application of lessons of aviation law as well as
our experience with deregulation will help make the space
law regulation system more effective.

The effectiveness of the system will have great impact
on our ability to use space to its full potential, but regard-
less of the manner of development, space transport is sure
to experience exponential growth in the future. Will the
system grow by each nation regulating its own transport
systems independently, or by international regulation?
The answer will depend on whether technologically ad-
vanced nations believe it is in their best interests to work
out internationally agreed upon standards and systems.\textsuperscript{142}

A. Cooperation?

The tendency of both current space law and current ac-
tivity in space is toward international cooperation.\textsuperscript{143} If
this cooperation is a reflection of the desires of nations
which have been archenemies for decades to work side by
side to advance the use of space, it is quite commendable.

\begin{flushright}
will inevitably and irrevocably precipitate a host of legal and regulat-
tory measures. These will be promulgated at all legislative levels,
both municipal and international, the latter including bilateral, re-
gional and global. They will be both responsive to and anticipatory
of technological developments, according to the context and the op-
erative legislative philosophy. . . . [T]his process has already begun
and will be illustrated by a multi-tiered progression from the na-
tional, through the bilateral and multilateral, to the global.
\end{flushright}

\textit{Id.} (in the context of space stations).

\textsuperscript{142} Hamilton DeSaussure, \textit{Maritime and Space Law, Comparisons and Contrasts (An
Oceanic View of Space Transport)}, 9 \textit{J. Space L.} 93, 93 (1981) excerpted in \textsc{Glenn H.

\textsuperscript{143} \textit{See supra} notes 9-14 and accompanying text.
Certainly these actions are being taken by nations because they are in each respective nation's best interest rather than simply due to some newfound global goodwill. Just as there are economies of scale in the transportation industry, so too economies of scale are found in many ways when international cooperation exists in space exploration and use. The synergy of international interaction brings rewards to all of mankind. As indicated earlier, however, one of the greatest weights burdening the development of space law is the seeming incongruity between the nationalistic motivation that has inspired the successful exploitation of our world on Earth and this competing desire to approach the use of space from a "universal good" perspective. Some suggest that real breakthroughs in space exploration and utilization will only be achieved when the motivation flows from selfish, competitive acquisitiveness, generally from a nationalistic perspective.

Would international regulation of the space transport industry necessarily stifle the aggressive ingenuity that fuels great advances in space exploration and development? Could a system of regulation ever foster this capitalistic attitude? Answers to these questions may signal the ultimate success or failure of our cooperative attempts to establish an international structure for space development.

Currently, six powers have the capability to launch a mission to outer space: the United States, the Union of Soviet Socialist Republics, the European Space Agency (ESA) nations, Japan, the People's Republic of China,

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144 Young, supra note 4, at 6. According to Young:

[A central problem of developing space law is the] tension between the desire to perpetuate the rationales which have motivated mankind in his successful exploitation of the Earth, and the equally strong belief in the radical "Province of all Mankind" concept. . . . It may well be that the space frontier cannot be opened up without the spirit which has brought us to this threshold, with all its nationalistic acquisitiveness, being given a free rein.

145 Id.

146 The European Space Agency (ESA) is the space development counterpart to
A number of other nations are prominently involved with space activities in cooperation with at least one of the six launch powers.\textsuperscript{148}

Although the superpowers have always used space travel and exploration as propaganda devices, prompting continued competition and political "one-upmanship," the trend is moving toward more cooperation in space use.\textsuperscript{149} The ultimate, utopian goal would be to create a climate in which the use of space assets is divorced from and unaffected by terrestrial political concerns.\textsuperscript{150} While the airline industry is not entirely divorced from politics, it is more so than the space industry. Perhaps the fact that the airline industry is so commercialized makes this partial separation possible. Obviously, national carrier airlines are not free from political forces, but as the trend continues toward privatization,\textsuperscript{151} the separation will widen. Would privatization of the space industry increase or decrease cooperation? As long as governments are involved, so are politics. It is unlikely that total privatization will ever be desirable in the space transport industry, thus, this issue may be moot.

Today, many roadblocks stand in the way of cooperation free from earthly political conflicts, but there has been considerable progress in recent years (though not

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the European Economic Community (EEC). While the membership in the two organizations is not exactly the same, there is considerable overlap. The Member States in the ESA are: France, Germany, Denmark, Belgium, Ireland, The Netherlands, Norway and Austria. Finland is an Associate member and Canada has a "special" relationship agreement with ESA. \textit{Id.} at 40.

\textsuperscript{147} \textit{Id.} at 292.

\textsuperscript{148} \textit{Id.} Canada is involved with both the U.S. and the ESA in substantial space activity. The U.S. Space Shuttle has flown payload specialists from the ESA, France, Saudi Arabia, and Mexico. The Challenger accident suspended this program before completion of plans which included representatives from the U.K., Japan, Australia, and the People's Republic of China. The Soviet Union has carried into space representatives from Czechoslovakia, Poland, the (then) German Democratic Republic, Bulgaria, Hungary, Vietnam, Cuba, Mongolia, and Romania. \textit{Id.} at 292-93.

\textsuperscript{149} \textit{Id.} at 293.

\textsuperscript{150} See \textit{id.}

\textsuperscript{151} See Luebker, \textit{supra} note 48, at 590.
wholly free from propaganda). Considering all of the national and international forces affecting the direction of space development, it seems that the positive effects of both rivalry and cooperation should ideally be incorporated into the system that is eventually developed. The governance structure should aim to achieve the best of both worlds. The only way history has shown this can be accomplished is through some form of international regulation with freedoms within certain spheres of conduct. The chances of achieving this ideal regulatory balance will be enhanced if we apply the lessons of airline regulation and deregulation.

B. Applying the Lessons

ECONOMIC AND PRACTICAL EFFICIENCY: As noted above, the transportation industry is inherently susceptible to price wars and excess capacity because of the immediately vanishing utility when a craft takes off with an empty seat or cargo compartment. The incentive is to price high early and hold “fire sales” on capacity remaining shortly before takeoff. As long as excess capacity exists, as it may one day in the space context, transportation providers will seek out or create monopoly market opportunities. This brings on many of the problems discussed herein resulting from deregulation. Space transportation will be subject to many of the same pressures. How the

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152 Young, supra note 4, at 293-94. For example, Interkosmos (USSR), NASA, ESA and the Institute of Space and Aeronautical Science (ISAS) of Japan have come together to establish the Inter-Agency Consultative Group (IACG) to conduct international cooperative projects. Among these are the successful missions in 1986 to view Halley's Comet. The British National Space Centre has entered pacts with the Soviet Institute of Space Sciences. The French and the Soviets are cooperating to perform experiments on the MIR space station. The Chinese and Japanese are even cooperating in the launching of small commercial and scientific satellites. The Chinese and British are working together on a joint satellite design and launch program. Negotiations are proceeding in an unprecedented cooperative venture known as the U.S./International Space Station. Id. at 294-95.

153 See supra note 47 and accompanying text.

154 Dempsey, supra note 17, at 323.
airlines deal with these problems should offer lessons for application to the space transport industry.

At first, and perhaps permanently, depending upon technological advances, only a few spaceports will be built. As long as terminal space is scarce, the same problems regarding allocation of terminal space may also provide incentive for mergers aimed at creating monopoly opportunities or acquiring more terminal access. This has been seen in the airlines industry through the domination of terminal space in the “fortress hubs.” The “fortress hub” can be analogized to the space stations in low Earth orbit. It will be expensive to get to the hub, but after that, transportation between destinations in space will compare closely to the airline industry. Thus, the lessons of airline deregulation should apply well to an intraspace transport system. The same issues of hub port capture resulting from lack of terminal space must be dealt with to avoid the problems seen in the airline context.

Price, quality, and service: It is probably safe to say that spacelines will not be economical for everyday travel and transport in the same manner as airlines. Therefore, the applicability of the lessons of airline deregulation (or just about any experience in earthbound endeavors) will be limited. If one can assume, however, that price, quality, and service become considerations at some optimal level, the question becomes how can those goals be met? Will the marketplace do it? What will be the important service and quality considerations? How can they be affected by regulation?

Deregulation has shown that unregulated monopolies or oligopolies in the transportation industry can reduce quality and service while holding up prices or furthering discriminatory pricing because of limited access through

155 Kasper, supra note 58, at 6.
156 Even today, Europeans view airline travel as somewhat of a luxury. Luebker, supra note 48, at 590.
157 See supra notes 58-60 and accompanying text.
158 See Young, supra note 4, at 36.
hubs. It has also been conceded that hubs will be necessary as a practical matter for space travel. Transposing the issue to space transport, the problems of terminal access, monopolies by merger aimed at overcoming the access problem, and price competition to the extent it becomes destructive to the structure of the system as a whole must accordingly be addressed.

**Safety Concerns:** The importance of strict safety measures in the space transport arena has been illustrated all too vividly in the Challenger tragedy. As passenger space flight becomes more common, the safety concerns will only increase. After deregulation of the airline industry, the immediate competition brought about some serious belt-tightening as a matter of survival. By reducing maintenance and other costs having a direct relation to safety, some airlines were able to quickly add to their bottom line while causing little immediate flight disruption. This type of action is undesirable in air transport and unacceptable in space transport. Because the margin for error is so much smaller in the space context, both incentives in the system and direct safety regulation are imperative in order to maintain an optimal safety level.

All of these lessons must be packaged in a workable form of governance. Assuming that some form of international cooperative regulation should eventually be in the best interest of all involved, the focus then concerns the practicality of regulating the spaceline industry.

**C. Practical Regulation**

The negotiations regarding the U.S./International space station were historically conducted using bilateral agreements but have recently been transformed into limited multilateral arrangements. This progression roughly parallels the agreements entered into between

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158 See id. at 295.
159 See supra notes 79-87 and accompanying text.
160 YOUNG, supra note 4, at 295.
nations regarding air rights. Some progress has been achieved in U.N. committees such as the Committee on Peaceful Uses of Outer Space (COPUOS) and the Conference on Disarmament (CD), but after the many compromises necessary to pass such a body, the pronouncements tend to be largely ineffective at solving real problems.

National, bilateral, and multilateral attempts to deal with space-related problems have reached pragmatic solutions to the issues as they have surfaced. These developments in space law are occurring as needed in the absence of effective global legislation. State practices will lead to international law based on custom, or piecemeal multilevel legislative action will ensue. This is in fact already occurring. One commentator suggests that this does not necessarily need to be considered as veiled imperialism or colonialism, but may be viewed as a maturation of space law, paralleling similar developments in maritime and air law. What he believes "must be avoided is the cumulative legislative reinforcement of the terrestrial status quo in the 'province of all mankind', doing by collateral means what could not be done openly at the global level."  

In the spirit of cooperation, many have advanced the idea of a World Space Organization to advance the principles of peace and mutual advantage in the international space use context. Many experts understand this to be more of a "universalist's pipedream" than a realistic goal,

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162 Id.
163 Id.
164 A good example of the progression and development of the use of bilateral and multilateral arrangements in the context of air law can be found in the European Community experience. As the countries of Europe move toward international cooperation in their airline industry, and as barriers between the sovereign nations are lifted, unique problems arise regarding the relationship of various agreements governing air rights. The manner in which the conflicts are solved should provide guidance in approaching the same types of issues regarding space transport law. See Luebker, supra note 48, at 602-05.
165 YOUNG, supra note 4, at 295.
166 Id.
167 Id.
168 Id. at 296.
however.169 Most experts would probably agree, none-theless, that developing countries as well as current space powers should be brought into space participation, and regulation should take this into account. The reason for such inclusion is obvious if one subscribes to the view of space as the province of all mankind.170

Space law should be allowed to develop by national and private international means, with much discretion given to nations to operate in space except where their actions may have detrimental effects on other nations’ use of space.171

This situation is considered in article IX of the Outer Space Treaty:

Global institutions should function to ameliorate the individual excesses of nations operating in space through timely and appropriate legislation. As a quid pro quo for acceptance of such legislation, commercialization should be allowed to proceed responsibly, with a public commitment by the space powers to increasing pragmatic participation by developing nations as it unfolds.172

An international Outer Space Court has also been considered by some to be a more realistic way to develop space law and relations among space powers.173 Because the effectiveness of global legislation through such bodies as the United Nations is inherently diluted through numerous compromises, some finality and enforceability of the provisions may be lost. The Outer Space Court has been proposed to initially take on legislative as well as judicial responsibilities and then to give up the legislative aspect after a reasonable time.174 As with any judicial system, problems could arise if the distinction between the power to interpret law and the power to create law becomes blurred.

169 Id. at 296-97.
170 Id. at 297-98.
171 Id. at 298-99.
172 Id.
173 See MORRIS FORKOSCH, OUTER SPACE AND LEGAL LIABILITY 4-5, 121-189 (1982).
174 Id. at 15.
If such a legislative-judicial body is deemed to be the proper agency to direct the exploration and development of space, what would be the effect on space transport regulation? Almost certainly, it seems that an Outer Space Court would not have the capacity to deal with the grand scheme as well as function as a truly legislative body. Regulation of outer space activities would still be required and there is almost no possibility that nations would be willing to give up a more representative form of governance in order to achieve the "finality" a judicial body may provide. Therefore, it seems that cumbersome, vague regulation of outer space activities can only be dealt with by continuing the scheme of bilateral and multilateral arrangements. A judicial body may prove valuable on broad issues of safety and liability, but the growth of the space transport industry appears to hinge on the nations' ability to cooperate in treaty and legislative form. Deregulation of the airline industry and the lessons learned, therefore, must not be ignored.