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Foreword

Frank Borman

INTRODUCTION

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ON CHRISTMAS EVE OF 1968, I was orbiting the Moon as commander of America's Apollo 8, skimming sixty miles above the pockmarked lunar surface, observing in detail what I stared at with wonder as a boy in Tucson, Arizona. Peering through another port of our spacecraft, I could see the planet Earth, suspended in cosmic blackness, a brilliant circle of pale blue, swathed in swirling white clouds.

It was a poignant Christmas Eve, observing our planet 240,000 miles distant. The other crew members and I were thinking of our families, knowing that they might well be looking up at the Moon toward us. Bill Anders, Jim Lovell and I were heirs to six centuries of the intellectual efforts of Copernicus, Galileo, Kepler, Brahe, da Vinci and Newton, the modern scientists, Tsiolkovsky, Oberth, Goddard, von Braun, and so many others I hesitate to begin a list that would stretch endlessly even before reaching the scientists at Cape Kennedy. We were acting out the literary fantasies of the ages, ranging from Lucian, the Greek, who wrote of a voyage to the moon in the Second Century A.D., to Jules Verne, H.G. Wells, Ed-

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ward Everett Hale, and Arthur C. Clark. As we raced toward the dark side of the moon, which previously man had only envisioned, even the Buck Rogers comics of my boyhood were fast changing from fantasy to remarkably accurate advance glimpses of reality.

Certainly we were aware of our role as space pioneers, yet our Apollo 8 had 5.4 million parts, hundreds of miles of wires, and nearly 1.5 million systems or subsystems. Each tiny part was the solution to problems which once took genius merely to *envision*. We had been lifted into space by a rocket—Saturn V—as tall as a 30-story building, its cluster of five huge engines developing more than seven million pounds of thrust. If we were space pioneers, we also rode an incredible cutting edge of technology.

Our mission was conceived amid earthly tensions, but circling the Moon we looked toward a globe erased of its political boundaries. Man, for the first time, had escaped his gravitational environment and achieved a new perspective. It was impossible not to think in terms of soaring freedom and peace, and that was our message to Earth on that Christmas Eve.

For all the sophistication that took us to the Moon, we were in an age of comparative innocence, certainly in the field of law. We no more contemplated the idea of pioneering legal horizons than did the crews of the first Clipper ships, or pioneers on the Conestoga wagons of the American West.

The extent of that innocence was brought home to me by reading the collection of articles that follow in this issue of the *Journal of Air Law and Commerce*. Neither in my first flight, Gemini 7, nor at any time during the Apollo I mission did I—or any other of the astronauts to my knowledge—give thought to the legalities and treaties of the time.

As astronauts, we were in space under a 1967 Treaty entitled "Principles Governing the Activities of States in the Exploration and Use of Outer Space Including the

Moon and Other Celestial Bodies." That treaty expanded on a 1963 United Nations manifesto, "Declaration of Legal Principles Governing the Activities of the States in the Exploration and Use of Outer Space." By treaty (I learned from these articles), we were "envoys of mankind," flying in the equivalent of international waters, entitled to assistance and safe return should we have landed, say, in some Bulgarian's backyard. Our endeavors were expected to benefit all mankind.

The language of those early conventions, and others in 1968, 1972, 1974 and 1979, tends toward a loftiness of ideals which, as these articles reveal, have potential to butt heads with emerging commercial space law. For instance, a premise that space information is to be shared may negate a private corporation's plans to spend millions to acquire data. Another question raised in these pages asks: Given the fact that geostationary orbit slots are limited, are they a common heritage to be apportioned and reserved for future Third World use, or should they be on a first-come, first-served basis?

Such legalities were not part of our indoctrination, nor would they have meant much to us. If my concerns touched even obliquely on law, they involved my obligation as a husband and father to provide adequate insurance. I had done that privately throughout my military career, so the dangers of space flight were merely another on-going condition of employment. The government's liabilities, obligations and responsibilities were not discussed even in the wake of the Apollo fire. We had faith that the scientists and engineers were doing their best. Beyond that, we lived with the fatalism of military test pilots.

Confusing, contradictory and embryonic as the *Journal* shows space law to be 22 years later—partly because of the dichotomy of military and commercial considerations—the legal leap between 1968 and 1986 is analogous to the difference between the the laws affecting Charles Lindbergh's flight across the Atlantic in 1927 and the

body of law that accompanies one of our own Eastern pilots flying a Transatlantic route today.

I think it appropriate and useful that the *Journal* would analyze and critique the existing body of space law. Eugene Jericho, chairman of the American Bar Association Space Law Committee, and co-author David G. McCracken point out that the term "space law" has yet to find its way into legal dictionaries, an omission I suspect will be corrected soon enough. Their lead article asks the question, *Space Law: Is It The Last Legal Frontier?* If not the last, it is certainly the newest, a fact that piques both my interest and concern.

I start with the premise that America's involvement in space is not a national indulgence but a necessity in which security needs and economic opportunities must subsidize one another. President Reagan is committed to transfer much of our space program to the private sector. (One example is the Commercial Space Launch Act of 1984.) That policy may be preempted by his Strategic Defense Initiative, if it survives political and scientific hurdles. "High Frontier" ("Star Wars" to its critics) may require a goal-oriented mobilization that only government can coordinate.

Leadership in space technology is one of our few potential military advantages, and if the President is correct, it is our only long-range hope of replacing Mutual Assured Destruction as a foundation for peace. Commercially, more than five hundred companies are engaged in space-related activities today. Whether the military or civilian segment takes the reins, I expect civilian space industry growth to be constant, though perhaps more measured than some anticipate.

Surely we ignore history if we believe we have experienced or even anticipated all the wonders of space. A space platform is already workable; we have the capability of walking and working in space without lifelines, using hand-controlled, nitrogen-propelled backpacks; and it is only a matter of time before scientists find a way to re-

cover and reuse the rockets themselves. Once such a second generation of Space Shuttles becomes reality, commercial airlines will undoubtedly become interested in space. The limits of scientific ingenuity are far from exhausted, and they will inevitably expand on themselves.

But the age of innocence, in which success was its own justification of effort and money spent, is behind us. Henceforth, what occurs in space will be scrutinized more and more by accountants. For example, satellite signal transmission has been the predominate space industry, representing a reported annual market of more than $3 billion. But will fiberoptics make landline transmission more economical? I expect that the frenzy to commercialize space will be tempered by such economic considerations.

Nevertheless, I look for continued demand for satellites and vehicles of exploration for missions that are unique to space. In addition to communications, the main areas of opportunity include remote sensing, space manufacturing, energy and transportation. Our potential to tap energy from space has enormous ramifications.

Eventually, private industry may routinely provide its own means of entry into space, but in the foreseeable future, I expect the private sector to remain a client of government for both vehicles and the rockets to launch them. While space may not become economically self-sustaining in our lifetime, space-oriented commerce can generate hundreds of billions of dollars domestically and from abroad. The United States national interest in space leadership is not unlike that of England in the centuries when her men o'war ruled the seas in support of commerce, and her merchant ships in turn supported the economy and thus her navy.

The explosion of the Challenger, which occurred after most of these articles were drafted, was a setback for the space program. However, a similar setback also occurred in 1967 when the Apollo vehicle burned on its launch pad, at what was then Cape Canaveral, killing three astro-

nauts. I was part of the investigating team following the accident, and I remember keenly the public and official outcry for the United States to cancel its space programs. Cooler heads prevailed then, and today, I suggest, the nation is too committed to space to be deterred by setbacks. Whatever its flaws on that particular flight, the shuttle itself is a brilliantly conceived and engineered vehicle, whose reuseability greatly enhances the cost effectiveness of space exploration.

What the Challenger tragedy reminds us is that danger rides on the cutting edge of technology and space is not yet a playground. The liability for failure and death is a significant problem. If space is indeed the last frontier, it is also the first to be explored in such a litigating society, preoccupied with indemnification for the consequences of unforeseen events. This is certainly an area of concern for the future of our space program. Mr. Joseph A. Bosco has written a scholarly analysis of the United States government's liability in space. The article addresses the conditions and limitations in which the government can be sued.

Given the fact that there are virtually no "purely" governmental efforts in space, even the question of who is or is not an employee of the United States government, and thus entitled to bring suits at law, turns out to be amazingly complex. The question of jurisdiction in such matters and, for that matter, the question of identifying blame for failure are similarly complex.

Mr. Bosco raises the question of space industry insurance — an issue which could become the Achilles heel of American space development. The space insurance industry is "definitely not healthy," Mr. Bosco says, and the reasons are obvious. Trying to pinpoint responsibility for a disaster, when not only the government but numerous private firms are involved and when some of the evidence may be lost forever, is a nightmare insurers may not want to risk. The complexity of litigation all but guarantees that damages sought will be astronomical.

One might argue that the government is self-insured, has deep pockets, and furthermore has certain sovereign immunity in areas of policy discretion and security. However, not surprisingly, a major thrust of space law outlined in these pages clearly points toward penetrating those shields. Experience counsels that courts are not disposed to tolerate failure. Private firms—those that build space vehicles as well as those that might contract for their use—are particularly vulnerable. Should they be responsible for their actions? Common sense says yes. Should that responsibility jeopardize our program? Common sense says no.

I was particularly struck by a legal theory cited by Mr. Bosco which states that when the government undertakes a task which is relied upon by the public (a lighthouse for example), it is held to the same standard of care as private entities in carrying out the task. Obviously, that responsibility is particularly complex when civilians are involved in space. What constitutes due care? Where does the government's shield against lawsuits end and its liability begin? Mr. Bosco says "courts and legal scholars have struggled to draw lines in this gray middle area." Questions such as these have leaped from abstractions to hard reality in the aftermath of the Challenger explosion.

Well in advance of the Challenger tragedy, I had been concerned that its dangers were being minimized. At the time of the Apollo 8 flight, Jerry Lederer, NASA's safety chief, pointed out that even if our 5.4 million functioning parts operated with 99.9% reliability, there would still be 5,600 failures. By the time of the shuttle Challenger's liftoff, the number of parts and systems requiring reliability had increased dramatically. Yet the public and many United States officials had come to view the flights as routine jaunts. Such an implication of safety clearly could not and cannot be guaranteed.

In my view, seeking to increase public support for the space program by holding nationwide lotteries for the "extra" seat may be a miscalculation with a downside that

outweighs any advantages. The public can understand service personnel dying in the line of duty, but another spectacular failure, this time with a civilian journalist aboard (perhaps even a nationally-known individual), might well be more burden than the program could handle. The Challenger disaster itself may be litigated for years at enormous expense and jeopardy to future space programs. We cannot assume such a disaster will not happen again.

Litigation, of course, is the tool by which individual rights are protected, but Mr. Bosco's article prompts me to ask, what precisely are a civilian's rights when he or she steps aboard a space shuttle? In the case of a commercial airplane, the passenger has a one-hundred percent right to expect safe arrival, and if that does not occur, enormous liability attaches. Military service personnel, Mr. Bosco points out, normally cannot sue the government for death incurred during active duty.

But what about civilians? Is it legally enforceable for a civilian, lured by the once-in-a-lifetime opportunity to fly in space, to sign away such rights? And if not, what burden can the space program stand? I refer not merely to the current series of NASA shuttle flights, but to future commercial ventures such as Art Dula, past chairman of the ABA Aerospace Law Committee, and James V. Baird envision in their respective articles.

These are delicate matters which the *Journal* illuminates. I am concerned that the complexity of our legal system has the potential to impede our space program. I am not saying that this hindering will happen, but anyone reading the articles in these pages must come away realizing the potential exists. If space commerce becomes too risky to insure, the industry will collapse or revert to government domain — a result I suggest would be disastrous.

Perhaps a graver danger to our space program than the spectre of litigation is the potential to strangle it through taxation and regulations. In his article, *Space Commercialization and the Federal Income Tax*, Mr. Baird creates a hypo-

thetical corporation (based in part on the experience of a Houston corporation, Space Services Inc. of America) to illustrate tax inequities for American space-oriented ventures in general and start-up space ventures in particular. Tax biases are not a subject of sizzling interest to the media and public, but Mr. Baird makes a cogent case that it is in the nation's best interest for Congress to address Tax Code reforms so as not to hinder space development. One glaring problem is the paradox that while "space" is not in a foreign nation, neither is it in the United States, and on that basis, the Tax Code treats space endeavors as "foreign."

Mr. Dula's article, *Export Controls Affecting Commercial Space Operations* can be read as a companion piece that focuses on regulatory problems stemming, in part, from the same paradox. This paradox is that "goods manufactured, property owned, and activities conducted in space are considered to be outside the United States for the purposes of United States laws, including tax, patent, customs, and export regulations."

Mr. Dula argues that because United States export rules are more complex and restrictive than those of our international competitors, including the Soviet Union and France, these export rules may become a major barrier to American success. France, he points out, has virtually no export controls, yet United States space businesses are mired in regulation. Both the Soviet Union and France, he adds, have set up national marketing organizations to sell aerospace hardware and services, and yet the United States has no parallel program.

Mr. Dula further warns that excessive United States preoccupation with security may become self-defeating. Mr. Dula quotes an official of General Electric's Research and Development Center who states that proposed new restrictions "would require a validated license for millions of routine transactions" and would "place a burden of catastrophic proportions on research and technology-based institutions."

This GE official, Roland W. Schmitt, writing for a journal of the National Academy of Sciences, said, "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."

Mr. Dula argues (as does Mr. Baird) that all American commercial activities in space should be considered domestic for the purposes of regulatory control. He further urges that restrictive (and immensely complex) licensing laws, which currently have the potential to impose imprisonment, fines and corporate forfeitures even for innocuous transactions, should be brought into line with the reality of our need for commerce and scientific exchange. Mr. Dula asks, "Why are these policies so crucial? Why not just reassure the Department of Commerce or State that the proposed transfers [of information or material] 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" end users?"

My initial reaction is that security matters are not so simple. On the other hand, the idea of an American program stifled by outmoded, ill-advised, multi-agency laws and rules, guarded by watchdogs vigorously safeguarding from our friends what is already known to our enemies, is a frighteningly plausible caricature. Fanaticism, according to Santayana, is redoubling your efforts when you have forgotten your goal. If, as these distinguished attorneys believe, our efforts for security are ignoring our goal of space preeminence, then perhaps it is time for Congress to revisit the issue.

What concerns me most about the space program as outlined in these articles, as well as articles such as Defense Secretary Casper Weinberger's in the Spring issue of *Foreign Affairs*, is that solutions to major problems are

dragging at a time when we are clearly behind in our competitive efforts. These issues must escape the domain of intellectual journals, and take center stage. Too much is at stake to leave our future in space—perhaps our very survival—to Murphy's Law. Clearly we need debate and decisions on laws and regulations that facilitate, not impede, our national goals.