35. National Aeronautics and Space Administration

Congress should

- shut down the National Aeronautics and Space Administration (NASA). To that end, it should
  - scrap plans to build a space station or, failing that,
  - upon completion, sell off the station to private purchasers and
  - allow the private sector to provide and pay for all future travel to and from the station as well as station operations, maintenance, and expansion;
- sell off the space shuttle or, failing that, strictly enforce the ban on the shuttle carrying cargoes that can be launched by the private sector and turn over as much of shuttle operations as possible to the private sector; and
- build down government civilian space activities.

From Exploration to Freight Hauling

Sending Ohio's Sen. John Glenn, who in 1962 became the first American in orbit, back into space on the shuttle is NASA's version of bread and circuses. That sentimental journey distracts attention from the agency's truly astronomical costs. Why, 35 years after Glenn's first trip, are there no regularly scheduled commercial flights into orbit? The Wright Brothers' first flight was in 1903; in 1927 Charles Lindbergh flew across the Atlantic; and by the late 1930s the first commercially viable aircraft, the DC-3, was up and flying.

In the past two years NASA has publicized as ''faster, better, cheaper'' the Clementine lunar mapping mission, which costs only about $65 million; the *Pathfinder* that landed on Mars at a price of under $150 million; and

the Mars surveyor orbiter that set the taxpayer back $154 million. Those missions have yielded important scientific returns.

But they might have been contracted out to private providers. And in any case, such crumbs thrown to scientists distract attention from the fact that in recent decades NASA has hindered the advance of space science as surely as economic planning in communist countries undermined prosperity. The federal role in civilian space ventures should be cut, not expanded.

The space program and NASA were born of the Cold War wish to wipe out the embarrassment of early Soviet space successes. In the late 1950s many Americans believed that only governments could undertake such endeavors. The lunar landings will long be celebrated as great human and technological achievements. Yet today NASA is wasteful and inefficient, squandering the public's goodwill and about $13 billion annually. While the government has a legitimate defense role in space, commercial ventures, and most scientific research and exploratory ventures, ideally should be carried out by the private sector.

In the early 1970s, with Moon landings curtailed and Moon bases ruled out, NASA sought to preserve its big budgets and staffs with another big project: the space shuttle, which was sold to policymakers as a reusable and thus cheaper way to put payloads into orbit than expendable launch vehicles. In effect, NASA's mission went from science and exploration to freight hauling.

Astronomical Costs

If at that time NASA had begun to turn over space activities to the private sector, space stations and Moon bases might be a reality today. Market competition usually brings down the real price of goods and services. For example, since 1978 the price for airline travel in constant dollars has been cut by at least 30 percent. Shipping costs for oil have dropped by 75 percent. And in the communications satellite industry, the one space activity principally in the private sector, costs have dropped dramatically in real terms.

By contrast, as nearly as can be determined from impenetrable NASA accounting, the cost of putting payloads into orbit has skyrocketed. David Gump in his book *Space Enterprise* estimates that the cost, in constant dollars, went from $3,800 per pound with *Apollo* to $6,000 with the shuttle. Alex Roland of Duke University estimates that the cost of a shuttle flight, including development and capital costs, is not the $350 million

claimed by NASA but closer to $2 billion, which works out to as much as $35,000 per pound.

As NASA developed and flew early shuttle missions, it had to fend off private competitors. In the late 1970s and early 1980s federal agencies were forbidden to contract with the infant private launch industry to put government payloads in orbit.

As it became apparent in the early 1980s that the shuttle was a costly white elephant, NASA needed a mission to justify the shuttle's continued existence. Regardless of any commercial or scientific benefits, an orbiting space station seemed to serve that purpose. But the cost of the station, initially named Freedom, went from a promised $8 billion to nearly $40 billion before the current stripped-down $30 billion model, renamed Alpha, was redesigned in 1993. A recent General Accounting Office report found that, through June 2002, the actual cost of designing, building, and launching the station will be $48.2 billion. The cost of operating the station after its assembly through 2012 will add another $45.7 billion to the price tag for a total bill of $93.9 billion.

To protect its big budgets, NASA continued to ignore the private sector. For example, Space Industries of Houston in the 1980s offered to launch for $750 million a mini-station that could take government and other payloads a decade before the planned NASA station. The government would not contract with that private supplier.

One justification for the space station now offered by many supporters is that it fosters international friendship and cooperation with Russia. American astronauts have logged time on Russia's dilapidated Mir space station. And Russia is supposed to contribute money and material for America's ''international'' station. The problem is that Russia simply does not have the funds. America will end up paying Moscow's part.

Indicative of NASA's inability to hold down costs is a planned Mars mission. In 1991 President Bush announced the goal of placing humans on the Red Planet by 2019. Such a mission would bring unparalleled scientific returns. But NASA's ''90 Day Report'' put the mission's price at a staggering $450 billion, effectively killing the idea.

Sensing that a less costly mission was possible, then-Martin Marietta engineer Robert Zubrin and other scientists devised what they called a Mars Direct approach that would use existing technology and dispense with the space stations, Moon bases, and NASA's other expensive infrastructure. Zubrin saw that rather than carrying return fuel to Mars, an unmanned ship could land first with a simple chemical laboratory to manufacture

methane and oxygen (i.e., rocket fuel) out of Mars's carbon dioxide atmosphere.

NASA put the cost of Zubrin's approach at between $20 billion and $30 billion, some 95 percent less than the government approach. Yet NASA continues to squander its $13 billion annual budget on a space shuttle and a station that contribute little new, useful knowledge.

The consequences of NASA's mismanaged civilian space efforts are seen in the fact that for over a decade American manufacturers have found it economical to launch their satellites on Chinese rockets. And an indication of the unsound habits that still infest NASA is its preliminary consideration of a plan to use the shuttle to rescue a Chinese communications satellite, purchased from Hughes Satellite, that was launched into a useless orbit by a Chinese Long March rocket on August 18, 1996. The insured value of the launch and spacecraft is $102 million. The shuttle rescue would cost $400 million.

It is time for the federal government to adopt a build-down strategy to extract itself from most civilian space ventures and let the private sector take over.

Scrap the Space Station

Estimates of the actual costs of completing the station range from around $50 billion to as high as $100 billion. Once built, the station will be operated by NASA at an annual loss of at least $2 billion in taxpayers' funds. There are three principal problems with the station:

- There is no prospect of any profitable commercial venture coming from NASA's operation of the station. No customers are committed to paying the actual costs of renting space on the station. NASA will have to give away space at a loss. Because the station is run as a command economy, there are no opportunities for private companies to take over parts of the operation at lower costs.
- A special presidential advisory commission, chaired by Martin Marietta Corporation CEO Norman Augustine, in 1991 stated, ''We do not believe that the space station . . . can be justified solely on the basis of the (non-biological) science it can perform, much of which can be conducted on Earth or by unmanned robots.'' Building a station with a price tag of nearly $100 billion to handle scientific experiments valued in only hundreds of millions of dollars is like

insisting on a chauffeur-driven limousine to go to the corner store for milk.

- Russia's participation in the station is driving costs up even further. The Clinton administration plans to spend a total of $1.2 billion to bail out the Russian space program, with much of that sum going to cover the costs of Russia's contribution to the station. Further, NASA already has had to reschedule launches of Russian station components, and the prospect is that most components will not be ready to meet NASA deadlines. Thus NASA is being forced to build interim or backup systems to make up for Russian failures, adding yet more costs to the already overpriced station.

If the political will to scrap the station cannot be mustered, a second-best option would be to sell the station to private purchasers upon completion and allow the private sector to provide and pay for all future travel to and from the station as well as station operations, maintenance, and expansion.

The station will have to be sold at a loss, but at least taxpayers will not continue to lose money on its operation. Under nonsubsidized private management, a real market will develop for use of the station based on the actual costs for private launchers to transport payloads and technicians to the station. The prices for use of the station will change with real costs. Thus, for example, the price for space on the station may start low, but as launch costs come down, greater demand for space will cause its value and price to rise. Most important, station policy will not be determined by politics or bureaucratic power.

A variation of that approach is suggested by Rick Tumlinson, president of the Space Frontier Foundation. While still involving government funding, his Alpha Town approach contains elements to help create markets in space. One element would be tax and regulatory exemptions for space enterprise. Another would force NASA to sell off rather than scrap unused assets. For example, each shuttle flies 98 percent of the way to orbit with an external fuel tank the size of a 17-story building. Once the nontoxic liquid oxygen and hydrogen from those tanks burn off, they are dropped into the ocean. If they were placed in orbit, with over 90 shuttle flights to date, there would be 90 platforms—with 27 acres of interior space, nearly the size of the Pentagon—waiting to be sealed and ''homesteaded'' by private owners for scientific experiments, space hotels, or any other activity of which an entrepreneur could conceive. But NASA currently

has no incentive to create competition for its own space station by placing those tanks in orbit for private use.

Those approaches to privatization are similar to the approach used to privatize assets in communist countries. Putting assets in private hands best guarantees their profitable use. Thus, future expansion of the station would occur only in response to market demands rather than bureaucratic dictates and would be paid for by customers, not taxpayers. If done right, such privatization would help create a true market for space services.

Sell Off the Space Shuttle

Without a space station to build, there will be little reason to keep the overpriced shuttle in operation.

The Clinton administration announced a ''privatization'' of the shuttle in 1995, but what was actually meant was that the operation of the shuttle would be contracted out to a single private company at some set rate per flight. United Space Alliance will operate the shuttle for a price of around $400 million per flight on the basis of seven flights per year.

But that is phony privatization, not only because the American taxpayer continues to foot the bill. United Space Alliance, for political reasons, is prevented from cutting staff to more reasonable levels, and NASA continues to carry cargoes that could be launched by private-sector carriers. After the *Challenger* disaster in 1986, the shuttles were supposed to carry only cargoes that could not be put into space on other vehicles. Such a policy means more business for private carriers and thus a stronger private sector. But NASA has been backsliding on that commitment.

In addition, when companies offering private launch services do compete vigorously with NASA for customers or complain about NASA's neglect of the cargo restriction, NASA lets the companies know that their efforts are not appreciated. Those companies must take that into account since NASA still contracts out some of its launches to those companies, and they do not want to lose those and future contracts.

Finally, NASA has never charged private companies wishing to send payloads into orbit via the shuttle the real costs of the service. Such costs would include development costs as well as the operating costs for particular launches. Charges based on real costs would price the shuttle out of the market.

Without a station to build, the shuttle could be allowed to fly already scheduled scientific missions but barred from taking on new missions. If NASA continues with station construction, the ban on the shuttle carrying

cargoes that can be launched by the private sector should be strictly enforced. And NASA should not be allowed to dream up missions that must use the shuttle as a way to avoid the ban.

Such a reform could be a boon to the private launch industry. Lockheed-Martin in the past decade has successfully commercialized its Atlas rocket launch services. It used to sell nearly all of its services to the government; now two-thirds of its customers are private parties. It has held costs down and now has a year and a half backlog of launches. Further, Boeing, which builds and launches the Delta rocket, is also competing for cargo and providing private-sector services. The telecommunications revolution has created strong demand for satellites for commercial broadcasts, Internet access, and the like.

If NASA gets out of the freight-hauling business, Boeing, Lockheed, and smaller private launchers such as Pegasus might reach true economies of scale. They would have an incentive to build additional launch capacity to clear up launch backlogs; that would more than offset their costs. They then would have an incentive to cut launch costs to ensure continuing use of capacity, which in turn could allow entrepreneurs who were previously unable to meet high launch costs to take advantage of cheap access to space.

In addition, as much of the shuttle operations as possible should be turned over to the private sector. Perhaps NASA could allow the private operator of the shuttle to sell launch services to customers. United Space Alliance could seek paying customers and could ''rent'' the shuttle from NASA for such a profit-making venture. Since United Space Alliance would have to put some of its own money at risk, it would have an incentive to reduce the real costs of a shuttle flight.

That approach or some variation of it could help ensure that the life spans of the shuttles were determined more by economic than by political considerations.

Another reform discussed on Capitol Hill would eliminate NASA's exclusive power to decide which experiments will be flown into orbit on each flight in spare cargo space not needed for station construction activities. The current arrangement gives NASA no incentive to increase shuttle efficiency. Some people suggest that funds be given directly to prospective users, scientists and other experimenters, in the form of vouchers for the purchase of launch services. Proponents of that approach believe it could create more marketlike demand for launch services, forcing the operator of the shuttle to compete for business. That approach gives rise to many questions; for example, would the vouchers become a kind of high-tech

entitlement for scientists? But the suggestion does demonstrate the wide recognition that the current NASA shuttle cannot be expected to give way to an efficient private space transportation system.

Build Down Government Civilian Space Activities

Congress should take the following steps to build down the government's civilian space activities.

Bar NASA from Building and Operating Launch Vehicles and Require All Other Nondefense Launches and All Nonemergency Defense Launches to Be Purchased from the Private Sector

NASA has actively discouraged a market for private-sector launch services in the past. And today, instead of contracting for launch services, NASA still is addicted to purchasing expensive hardware while spending very small amounts on actual science. In addition to being barred from carrying on the shuttle cargoes that can be privately launched, NASA and all other government agencies should be required to contract out for all launches.

The Pentagon ought not be exempt from the push to privatize. The Defense Department clearly should continue to own and control intercontinental ballistic missiles that might need to be launched at a moment's notice. But many defense functions, such as remote sensing with satellites that require launch services, are planned years in advance. There is no reason why launches for such systems could not be secured from the private sector. Yet the Defense Department, continuing to protect its budget, currently is spending $2 billion to develop a new expendable launch vehicle.

Market conditions are ripe for competition to help create more private-sector launch alternatives that will bring down prices and provide better service. The U.S. government should not be in competition with the private sector for those services any more than it should be competing in trucking or air travel. If the government does have legitimate cargoes to place in orbit, it should contract with private providers.

Require NASA to Accept Bids from Private Firms to Acquire Scientific Data

NASA's activities involve not just launches but collection of scientific data. Far more valuable from a scientific perspective than the space station and shuttle have been the planetary probes overseen by the Jet Propulsion

Laboratory in California, which is under NASA but has considerable independence. Although costs for the probes are not as high as for the shuttle or the station, the process is still wasteful and politicized. For example, 60 percent of the support contracts that the laboratory issues to the private sector are reserved for minority contractors.

Rather than build their own probes, even if they are carried into space by private launchers, the Jet Propulsion Laboratory and other NASA or government agencies should allow scientists to purchase data from the private sector. In effect, as part of a build-down of NASA, government science agencies would ask private-sector providers for bids to collect desired data and allow those suppliers to devise the most cost-effective ways of acquiring the data.

That approach was considered for one of the toughest possible projects. In 1987–88 an interagency U.S. government working group considered the feasibility of offering a one-time prize and a promise to rent to any private group that could deliver a permanent manned Moon base. When asked if such a station was realistic, private-sector representatives answered yes, but only if NASA stayed out of the way and did not force the private providers to use the shuttle or the proposed station. Needless to say, that approach never saw the light of day. It has been revived by Zubrin, who suggests that offering a $20 billion prize might be the best way to fund a manned mission to Mars.

Eliminate ''Mission to Planet Earth,'' or Turn It Over to Other Government Agencies and Contract with Private Providers for All Data Services

NASA in recent years has seen environmental projects as potential cash cows. It has fought with other agencies—through its Mission to Planet Earth, a project to study Earth's ecology—for jurisdiction over satellites to monitor the environment. Typical of its tactics, in February 1992 NASA made screaming headlines with its announcement that a huge ozone hole could be in the process of opening over the Northern Hemisphere. In fine print the data were skimpy at best. Still, the agency got the politically correct headlines as well as funding. There were few headlines months later when no ozone hole developed.

The mission itself is of questionable value. It seems to be aimed at selectively acquiring data to push politically correct agendas. Even if the mission is not shut down, it does not belong in NASA's portfolio. Some other department should direct the project. And if the government needs data, it should take bids from the private sector to provide those data.

Conclusion

NASA administrator Daniel Goldin has struggled to bring greater efficiency to his agency and find innovative ways to overcome bureaucratic inertia. But he is like the former Soviet Union's Mikhail Gorbachev, trying to save his failed system by introducing limited market reforms when what is really needed is a real free market.

Those who believe that mankind has a future in space should think deeply and seriously about how to ease the government out of civilian space activities. Only by approaching this challenge with the same honesty and clarity of mind that were needed to put men on the Moon can Mars and other future goals be attained.

Suggested Readings

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—Prepared by Edward L. Hudgins