

# Hearing on Space Tourism: Testimony by Buzz Aldrin

Before the Subcommittee on Space and Aeronautics

House Committee on Science

Hearing on Space Tourism

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## Dr. Buzz Aldrin

Mr. Chairman, members of the Space Subcommittee and others, it is a great privilege to speak with you about the future of our space program. After forty years of space exploration, *space tourism* has emerged as the key to generating the high-volume traffic that will bring down launch costs. NASA's own research has suggested that tens of millions of U.S. citizens want to travel to space, with far more if the global market is addressed. This immense volume of ticket-buying passengers can be the solution to the problem of high space costs that plague government and private space efforts alike.

My passion about this springs from the way that large-scale space tourism leads to space infrastructure that enables broader national goals -- such as a return to the Moon and the exploration of Mars. This is spelled out in my written testimony, which I would like to submit now.

We can have an architecture that meets a broad range of anticipated needs by using space tourism as a catalyst and by focusing now on its likely future evolution. It would first reduce the costs to orbit of existing payloads by greater than 50%. It then evolves logically into a two-stage-to-orbit system to meet NASA follow-on Shuttle needs. It could also satisfy military space plane needs, and it can enable high volume space tourism, complete with large orbital hotels, within the next fifteen years.

The committee, however, has asked me to respond to three significant policy-oriented questions. But let me first say that in my view, policy and architecture are inextricably linked. Well intentioned policy combined with a poor architecture, which the Space Shuttle turned out to be, has resulted in the situation we find ourselves in today. If we are to avoid the mistakes of the past, it is imperative that we involve the private sector. The needs of the commercial space tourism business must be central as we define the next generation of reusable space transportation. The next vehicles must be designed with the flexibility to not only satisfy NASA unique needs, but evolve to meet high volume commercial tourism requirements... and the private sector must be responsible for operating the system. Now to the questions at hand:

### **The first question: What types of activities will be enabled or enhanced by space tourism?**

Space tourism will enable space transportation to evolve into a normal industry. It will become like the rail, pipeline, ship, highway, and air traffic systems -- they all have vast markets, low costs, high reliability, full reusability and routine operations. Today, space transportation is characterized by small markets totaling less than 100 tons per year, high costs, high accident rates, wasteful expendability, an inability to operate on a routine schedule and continuing loss of market share to foreign suppliers.

Properly planned and implemented, the reusable first stage of a two-stage to orbit tourism

system will cut the cost of space access by 50% to 70%. This lower cost system will deliver several benefits:

The United States will recapture the lions share of the global satellite market.

NASA's planetary probes will become far more affordable.

Space hotels will become feasible, providing greater volume at far lower cost than the International Space Station.

The launchers for space hotels also will be ideal heavy-lift vehicles for expeditions to the Moon and Mars -- reliable, reusable, and lower cost than currently feasible.

They will also launch massive military payloads like space-based lasers and future civil solar power satellites.

The architecture will also enable large military Titan-class payloads to be lofted at a fraction of the cost of today's Titan IVs. These capabilities will allow future national security payloads the robust shielding and enhanced survivability that our current space assets sorely lack.

This can be contrasted with the current situation where the exorbitant cost of the Shuttle and ISS operations have become a millstone around the neck of our space exploration programs and the American taxpayer.

## **Your second question: What are the major hurdles which must be overcome before the space tourism business will be self-sustaining?**

Actually, it may be self-sustaining already. Some Russian officials have said that Dennis Tito's check covered the entire out-of-pocket cost of launching the Soyuz rocket that took him to the space station.

If space tourism already makes financial sense when you fly Russian expendable rockets -- what happens when their technology becomes reusable? When Russian launch costs suddenly drop and their safety goes way up? I'll touch upon this more in a minute.

We Americans have spare seats for rich tourists, too. The Space Shuttle often flies with only five or six people, when it can hold seven to eight. The United States could be learning about space tourism, using the assets it already has. Flying passengers on the Shuttle can be part of the research that leads to new vehicles, based on first-hand experience with the Shuttle tourists.

So, I have to say that NASA's refusal to actively encourage passengers on the Shuttle is a major hurdle.

This leads directly to the other major hurdle for space tourism, which is access to capital. Private launch companies have not been able to convince investors and lenders to support their efforts. This hurdle can be addressed several ways.

First, investors need market research on space tourism. As I noted, we immediately can start getting some of this data by a series of flights by paying Shuttle tourists. This is the most reliable data -- real people spending their own money to fly, not just answering survey questions. I know of two individuals right now, a well-known Hollywood producer and a well-known television correspondent, who are ready to go right now.

Second, investors and lenders worry about regulatory uncertainties. In other words, "If

you build it, will the government let you fly it?" Initial passenger flights on the Shuttle can start the process of sorting out the regulatory issues of passenger space travel.

Third, investors and lenders hate technical risk. The private operators of the next space transportation systems should be assisted by NASA in perfecting available technologies, and not forced to use "bleeding edge" technologies that will increase technical risk.

Fourth, only a large potential market will attract sufficient capital. That's why our focus must be on developing the future space tourism market *and* creating the vehicles to satisfy space tourism market demand.

Another hurdle is the current structure of the space transportation industry. The two major private companies, Boeing and Lockheed Martin, formed a monopoly to operate the space shuttle. Even monopolies have good ideas from time to time, and one idea was to turn the Columbia Orbiter into a commercial vehicle, one that might take passengers. NASA's reaction was to have the president of the monopoly fired.

On the military space side, the two major companies both were given contracts for the EELV, the Evolved Expendable Launch Vehicle. With the 20/20 clarity of hindsight, we can now see that this was a mistake. Now neither of them has any incentive to develop reusable vehicles, despite what may be said for public consumption, at least until they've recovered their considerable sunk costs in the new systems.

So, we have a civilian space agency that's been hostile to tourism, and the two major private companies left with no incentives to move on to reusable systems that could greatly serve our national interest and the waiting tourism market. In the mean time, the Russians just announced at the Paris Air Show that they are moving ahead with their reusable first stage system, the Baikal. Making matters worse, they have found a market for their vehicle in Europe where they are now attempting to team with ESA to use it as a reusable booster on the Ariane 5, replacing the more costly and accident prone expendable solid rocket motors.

Therefore, until NASA becomes an *advocate* for space tourism, or Congress intercedes and mandates the DoD or NASA to develop reusable space transportation, *and it can be done during this administration*, the current establishment structure will not produce what we need.

## **Your third question: What role should the federal government play in promoting space tourism?**

Well, first it should keep its promises. Speaking very personally, I want you to know what NASA has done directly to my ShareSpace Foundation. At the end of March, after great effort, we responded to a NASA request for cooperative research proposals on the Human Exploration and Development of Space. We offered to compile detailed and sophisticated market research on the potential demand for passenger space travel. Two months later, NASA told us our proposal was exactly what they wanted, and that we'd won. But in the same letter, it said the money to fund the entire program had been hijacked by other budget needs. This, unfortunately, has become more of the norm for doing business with NASA, not the exception.

More than 150 universities, foundations and small companies had responded to the NASA request. This request plainly said that while funds for "out years" might be uncertain, at least money was set aside *and available* for this year's work. I understand the need to

reshape budgets for future years, but it is shameful to yank away current year funding from people who have worked hard and in good faith. I doubt that NASA has congressional approval for this maneuver. I hope you tell them to put the money back where they found it.

Next, NASA should immediately set up the mechanism for flying paying passengers on the space shuttle. My ShareSpace Foundation has been proposing this to NASA for two years now. We offered to create a scientific research program on what's required to safely train passengers for space travel, and what medical standards should be developed for screening passengers. The passengers' own ticket money would pay for all the research, and my Foundation would make the results freely available. This would be a tremendous help to all the companies planning space tourism ventures, and to the government agencies that would regulate them. Left over ticket money would go back into NASA to support other space tourism initiatives.

Since the Shuttle was declared operational, more than 100 seats have gone unused. If the value of a seat is \$20 million, that amounts to \$2 billion in lost revenue for the space program.

The ShareSpace Foundation proposal for Shuttle seats would see the chance to fly to orbit made available in many different ways. Some seats would be sold to the highest bidders, to determine just how much early pioneers are willing to pay for space travel. This is important market research data. Some seats would be offered via sweepstakes or lotteries, so that every American could have a small chance of flying to space. Others might be sold to television networks, so that professional communicators could educate the public about the nature of the experience. It also would be good to have an independent journalist or two check in person on the space station's progress. As things stand now, the taxpayers will pour up to \$95 billion into a government construction project, and the only people who will report on how its going are employees of the federal agency in charge of construction. This strikes me as very unusual for such a massive expenditure of taxpayer funds.

If NASA continues to be hostile to using the Space Shuttle, all space tourists will be forced to use Russian companies, as Mr. Tito did. This makes no sense to me. We have spare seats in the Shuttle, and using them doesn't cost NASA a cent -- instead, it brings in extra money. As I hope you recognize by now, space tourism is not just a cute idea. The country that leads in space tourism will reap a tremendous drop in launch costs and far greater vehicle reliability. Its exploration initiatives, and its military space activities, will dominate the 21st century. As you can see, the United States is way off course on this subject, and it desperately needs Congress to firmly set a new pro-tourism policy. And the Russians have again assumed a lead position in this important area.

Another arena for government action is tax policy. The IRS code should be amended to remove some unintended disincentives. For example, airports and seaports are allowed to issue tax-exempt bonds. Spaceports are not. Such an amendment would be nearly tax neutral because this industry is just getting started.

The IRS code should be further amended to encourage the development of new privately owned and operated space passenger vehicles that significantly reduce cost and increase safety. One such mechanism would be an investment tax credit designed to draw in several dollars of private capital for each dollar of tax credit. Provisions to prevent abuse must be a part of the package, and these would include a sunset clause.

The IRS code should also be amended to incentivise the development of new space

based businesses such as space hotels. One such mechanism would be a tax holiday. Again, such an amendment would be tax neutral because these new industries do not yet exist.

Thank you very much for the opportunity to speak with you on these matters of great national importance.