

**Testimony of Michael S. Kelly,**  
**Chairman, Reusable Launch Vehicles Working Group,**  
**Commercial Space Transportation Advisory Committee**  
**Before the House Aviation Subcommittee**  
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Mr. Chairman, Members of the Aviation Subcommittee, ladies and gentlemen, I appear before you today to testify on the state of the emerging private commercial space transportation industry (hereafter, “the industry”). My testimony will focus on two areas, the direction of the industry, and its plans for dealing with regulation as a result of the enactment of the Commercial Space Launch Amendments Act of 2004.

For the first time, the term “emerging” can now be used in a positive sense. It *is* emerging thanks to the achievements of a small group of individuals. However, make no mistake: there is as yet no industry in the sense of ongoing, revenue-producing operations. We have a long way to go before such a thing exists and even the smallest of stumbles could add years of delay.

The landmark achievement of last year was establishing a personal space flight, the conveyance of paying passengers into space, as the primary market for the industry.

Any commercial enterprise requires a market, if only a perceived one, to attract the startup investment required. Because space transportation is a very capital-intensive activity, potential payoffs needed to be great. The great irony is that every visionary in this field has had, as an ultimate *end* goal, the establishment of a personal space flight industry. Only a tiny subset of these visionaries recognized that what was considered the “furthest out” of the markets prospects was the only sensible one with which to begin.

Demand was never really in question, but it was not until Dennis Tito became the first person to pay for a trip into space that the demand was demonstrated.

After that, what was required was a demonstration that private industry could develop a safe transportation system that could repeatedly take people into space, and return them safely to the earth. Last year, Burt Rutan and Scaled Composites made that demonstration, and did it so completely and decisively that even many of the visionaries in this field are stunned and amazed.

Concurrent with Rutan's demonstration, the next step in establishing an industry occurred. An operator who has the financial capacity and reputation to go the last mile stepped forth. Sir Richard Branson announced his intent to purchase several spaceships from Scaled Composites, and offer suborbital space rides to private citizens at a price of \$200,000 a ticket. At last count, Virgin Galactic had 14,000 reservations.

Government has kept pace with these rapid developments. The Commercial Launch Amendments Space Act of 2004, now signed into law, is the first legislation dealing with the reality of private, personal spaceflight. While the Act continued to provide for the safety of the uninvolved public, it resisted limiting the freedom of the participants in personal spaceflight. It did not attempt to legislatively preempt the right of space flyers to assess and take their own risks. It is to the everlasting credit of this Congress that these rights of the individual were explicitly acknowledge and preserved by this Act.

However, safety of space flyers is a serious issue. If it is not addressed in legislation, many asked, how would it be ensured?

Make no mistake, safety is *the* foremost concern of this industry. Primarily, the concern is out of basic human decency and a deep commitment to the value of human

life. Close behind that motivation (though almost inseparable from it) is a more immediate concern: the economic aspect of the safety of space flyers.

It is in everyone's best interest to have a safe and reliable vehicle and a safe operator in this industry.

Aviation safety has long been regulated by the federal government. But aviation safety regulations were based on the operational experience of many years. There is no such experience base for personal space transportation. A major fear of the industry, and its financial backers, has been that the government would attempt to formulate regulations in a vacuum, placing impossible obstacles in the way of people whose job is difficult enough as it is.

But the question remained of how, in lieu of government regulation, the industry would ensure the safety of space flyers. To start to find an answer, the most prominent members of the industry met in El Segundo California on 18 January of this year. Their task was to provide an industry solution to the problem of safety.

Out of this first meeting came a plan of action. The members decided to establish a federally recognized Industry Consensus Standards Organization whose purpose would be primarily to establish Consensus Standards for ensuring the safety of space flyers. If such Consensus Standards exist, they take the place of federal regulation, and provide the equivalent or greater effect.

Such Standards are prevalent in the U.S. An example of how they provide safety in the face of hazards arguably greater than those posed by suborbital space flight may be found in the workings of Underwriters Laboratories. Virtually every electrical device sold in this country carries a UL stamp of approval. That stamp specifically means that

the safety of the device has been assessed with the benefit of over a century of experience, and found to the best of all knowledge to be safe. While it is possible to sell a non-UL approved device, market acceptance is low, and liability exposure to the seller high. Though not in many cases compulsory, obtaining UL approval is the only sensible way to proceed.

The same will be true of spaceships and operating procedures promulgated by this future Industry Standards Organization. When faced with the choice of flying on an approved versus non-approved spaceship, a space flyer is much more likely to accept the former.

In terms of *actual* safety, Industry Standards are likely to be superior to government regulations. Since they come directly out of industry experience, they can be accepted and implemented quickly without the review of people who are less experienced in the field, or who have experience only in the non-applicable field of expendable launch vehicles.

Though it is too long a story to relate here, it is a matter of historical fact that aviation safety regulations have sometimes *reduced* safety of aircraft compared to what industry would have provided. Worse, the imprimatur of government approval carries a weight that can give a false sense of security. This violates the principle of informed consent.

Perfect safety is a worthy goal, and having it always in the forefront will keep the industry healthy and growing. However, any activity in which humans engage will someday result in an accident. There will be injuries, and there will be fatalities. No one wants this, but it will happen. How we respond is what is important. The industry has

committed itself to safety, and to incorporate lessons learned from such accidents as quickly and completely as possible. No one can reasonably expect more, because no more can be done.

I do not share the view of many in industry that the first fatal accident will spell the end of personal spaceflight. Such a thing has never happened in all of history, and never will happen in all of future history. It is contrary to human nature. But the outlook provided by this view is one that ensures a commitment to safety at the maximum level possible.

There is only one way to ensure *perfect* safety in this or any human activity, and that is to not engage in it. Legislatively, the only way to see that no one engages in an activity is to outlaw it. It is my position, and that of many in the industry and government, that federal regulation of space flyer safety would almost be the equivalent of outlawing personal spaceflight. This industry needs all of the innovation human beings can muster, and these innovations – especially those related to safety – need to be developed and implemented as quickly as humanly possible. If these things do not happen, the financial backing will be the first thing to disappear. The industry will stop “emerging,” and instead *submerge*.

The Congress has shown its commitment to guaranteeing the freedom of this industry to grow as a commercial enterprise. That is defined as people trading value for value, according to their own judgment unclouded by coercion. Industry has now stepped up to take the responsibilities that come with freedom. Maintaining this course will guarantee that the door to the future opened last year will remain open.

Before I conclude, I wish to reiterate the significance of last year's events. Without those space flights, and without the Commercial Space Launch Amendments Act of 2004, the commercial space flight industry would remain stagnant. Now it is moving forward, in a direction of which for many years we could only dream.

There are people who deserve recognition. Prior to last year, Dennis Tito proved the market for personal spaceflight by becoming the first person to purchase a ride into space. Peter Diamandis conceived and executed a brilliant plan for incentivizing the development of a private spaceship, the ANSARI X PRIZE. Paul Allen had the vision and commitment to finance such a development effort. Patricia Grace Smith, FAA Associate Administrator for Commercial Space Transportation, had the vision and commitment to help this happen while maintaining the safety of the uninformed public. But it was Burt Rutan who, in the end, had the genius and ability to create the first private spaceship, and he who showed the world once and for all that it could be done.

These are people not just of vision, but of action. They persevered in the face of obstacles that defeated others, and opened the door to the next great human adventure. I believe that humanity owes them a debt of gratitude that should and will be paid by having their names live on throughout history.

For now, we owe them – and ourselves – the commitment to work together to ensure that their accomplishments do not lay fallow. The government and industry have now defined their proper areas of responsibility. Let us preserve that, so that this great adventure may flourish.