The Space Race, the Last Frontier, and the New Legal Practice Area

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September 2021

On the left, we see a picture of a brilliant Russian engineer named Igor Sikorsky, often referred to as the 'father of the modern helicopter'. I've consulted for Sikorsky Helicopter Corporation in Stratford, CT for more than ten years now and the helicopter has changed a bit since the 1941 photo. We see Igor, wearing his iconic top hat and maneuvering the 'mosquito' maybe 50 feet above ground. And on the right, 80 years later, we have Sir Richard Branson, weightless at an altitude of 279,000 feet wearing his so recognizable sunglasses. What's different? Everything. What's in common? Two men changing the world, and exposing new areas of engineering liability.

What's going on here?

The early days of helicopter development involved tethering the craft to the ground in multiple places due to an endless stream of horrific crashes, often with the helicopter spinning wildly out of control. Sikorsky said he would do his own flight testing, stating that if anyone gets killed, it's going to be him. Branson's Virgin Galactic ship has had its failures as well, but Branson takes the ride just the same. Right next to Jeff Bezos' Blue Origin craft and Elon Musk's Starship, while NASA looks on. So now it's time for you to take one of Sikorsky's helicopters to Branson's headquarters in New Mexico where you can take a ride for $450,000 USD. Now, I have no idea what kind of 'paperwork' is signed before and after you're blasted into outer space, but I do know something about serious engineering projects, materials and structures, and they can break, and people can be killed and a whole new area of engineering litigation is opening.

Where do we stand legally?

The first fatality in space travel for the United States was the Apollo 1 launch pad fire in 1967. This was followed by the Challenger explosion in 1986 which I remember well. Engineer and Shuttle test pilot Ellison Onizuka was a University of Colorado at Boulder graduate, and I was finishing up my Bachelors in Engineering in Boulder in 1986. Our last disaster was the Columbia in 2003, which was our only spacecraft lost at re-entry, and not to forget the near-disaster Apollo 13 incident in 1970. Perhaps I am mistaken, but I do not recall an endless stream of negligent lawsuits in the aftermath, but rather a proud but saddened country.

Monetary compensation for personal injury to passengers, or even the crew, along with manufacturers liability were topics I just don't remember being in the forefront during the first space race with the Soviets. This was NASAs effort and NASAs people, and the public were merely spectators. And a decade ago, the thought of a reusable rocket period, let alone a spacecraft landing vertically on a barge in the ocean was an impossibility, but Elon Musk doesn't take no for an answer. Now in the thirty years or 360 months the Shuttle program was alive, a total of 135 missions were flown, but five spacecraft were used, making the usage rate about one flight every two months for each Shuttle. Branson's Virgin Galactic has already taken four flights in the last four months with the frequency slated to increase dramatically, creating a significantly harsher and unproven flight profile, to which the public is exposed, voluntarily or otherwise.

Even our laws present a conflict, with liability insurance coverage being required on international flights. But Branson's spacecraft launches and lands in the same place in New Mexico, so despite being in outer space, it is technically considered domestic travel. Virgin has said passengers will eventually be required to sign a contract agreeing to be fully liable for their own safety, but current American law makes it nearly impossible to transfer all liability in the case of personal injury or loss of life.

It is technical

Although I am not a pilot, I have spoken with many, including student pilots, experienced commercial transport pilots and 'aggressive' military fighter jet jocks. They speak in a calm tone about hazard factors, mission critical procedures and failure modes, effect and criticality analyses (FMECA), of which I have done many, particularly when I was at GE Aerospace. The pilots are scientific about assigning a numerical risk value to their own safety, which is largely, not entirely, but largely in the hands of the engineers who are designing their flight vehicle and therefore assuming responsibility for their safety. But what about the participating public simply going for a thrill ride? What do they really know about what the risk of space travel? My guess, almost nothing, and I base this on what the public really knows before they board a commercial jetliner. If the airline says it's safe to fly, then most of us get on board and essentially hope for the best. And we usually get it, despite the endless amount of litigation we earn our livings on. The facts remain: air travel is statistically quite safe, but I don't think we can yet say this about recreational space travel. Although I was only able to cite a few isolated incidents of fatality in the beginning of the article, there were still countless injuries, failures and deaths outside of the NASA bubble during the R & D phase, and the point is one of complete unknown with regard to engineering responsibility and liability.

A once unknown question occurring in the early days of the Soviet space race was will the human heart function in a zero gravity environment? Will the blood spill from one chamber to the next absent of gravity? NASA spent a fortune answering this question, in a then highly classified experiment. And when the test was complete, the answer was 'we don't know'. The monkeys seem OK, we think you're going to be OK, but we really weren't able to simulate the zero gravity environment on earth long enough to definitively answer the question. Of course now we do know the simple answer to the simple question, but the point is one of assumed risk, but on which party?

The new space race is a new project, requiring materials and manufacturing methods still in development substantiated by new tests and demonstrating yet unseen failure modes as we expose ourselves and each other to massive, inherent danger. Of course we will draw from lessons learned on the Shuttle, our only other reusable spacecraft, but engineering data is limited with regard to Bransons and friends' plans, and the business of recreational space travel is truly uncharted, with much, much to learn.

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