

# Space tourism - the enabler

by Derek Webber, FBIS

Public space travel, aka space tourism, will be fun for those who can afford it. It will even make money for those companies that are going to provide the vehicles and facilities for the new travellers. But is it merely a sideshow and distraction to the serious pursuit of mankind's journey into space? I believe that, to the contrary, this new industry deserves centre stage, because it will prove, in the long haul, to be the enabler of everything else that people want to do in space.

Public space travel is not new. Helen Sharman became the UK's first space citizen when she took off in her Soyuz vehicle headed for space station Mir back in 1991 and Akiyama, the Japanese journalist, had flown his mission a year earlier. More recently, Tito and Shuttleworth have also paid the reputed \$20 m for their Soyuz flights. They became the first true tourists, as opposed to public space travellers, by paying for their missions out of their own pockets. All four made orbital flights. Soon, we shall see the start of the much-cheaper sub-orbital tourist flights (expected to be priced at around \$100 k per trip).

A major market study into the demand for public space travel, both orbital and sub-orbital, was conducted in 2002, and is known as the Futron/Zogby demand study. The results were very credible, because a number of safeguards were taken. First of all, only millionaires were interviewed (because space tourism is initially so expensive). A statistically valid sample was questioned, so we know that the findings are representative.

Those interviewed were asked about their attitude to risk, and about their views of the relative riskiness of space flight. Their answers were cross-checked against their own prior involvement in risky activities, such as mountain climbing, and against the amounts of money they had spent in the past for leisure activities.

Descriptions of the missions were checked, for realism, by a former astronaut, and they included negative factors such as potential back-ache, etc, and of course the realistic prices. After all this care, what were the findings? Allowing for a build-up curve, the study predicted that by 2020 there would be around 50 orbital tourists per year, even at today's exorbitant prices, and around 13,000 sub-orbital tourists per year. It should be pointed out that today's price levels are predicated on dedicated launches for each

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traveller. Clearly, once the industry is established and passenger modules are developed that can carry 10 or 20 or more tourists at a time, then the price per person will tumble, and the demand will multiply accordingly.

What is the significance, then, of these kinds of numbers? This becomes clear when one considers a tourist as a 'payload' compared with other payloads that are routinely sent into orbit. These other orbital payloads may be commercial telecommunications satellites, earth-resource satellites, TV/Radio spacecraft or other governmental or military mission hardware. When all these traditional launches are added up, for all the space-faring nations of the world, the grand total is less than 70 launches per year. Thus, even at today's prices, the number of 'human payloads' per year is roughly equivalent to all of the other payloads out there, added together! And when payload modules are introduced that dramatically reduce prices, then the number of "human payloads" will become so great as to make all the current payloads relatively insignificant by comparison. Clearly, therefore, it is the 'human payloads' that will become the driving force in the search for better launch economics.

The Soyuz capsules that have been used for space tourism to date were only each capable of a single mission. When the new multiple passenger modules are eventually introduced, they will need to be reusable. The same can be said of the launch vehicles themselves. They, too, must be reusable to make possible the lower

prices necessary for the full development of space tourism. So, we can see how the onset of public space travel will bring about a transformation in the kinds of spacecraft and launch vehicles that are available for all space transportation. Furthermore, as these new classes of re-useable vehicles and spacecraft are developed, they will inevitably bring benefits in three distinct ways. First of all, there will be improvements in reliability; secondly the price per pound into orbit will be dramatically reduced, and finally, the launch business will begin to move towards a more airline-like operation, after more than 40 years of the implicitly wasteful expendable launches. Human cargoes are the only payloads that will be numerous enough to enable RLV's to fly frequently and therefore economically.

We can now see that in a very real sense public space travel is an enabler. It leads to a step-function change in the economics of launching payloads that has not thus far proved possible from over four decades of launches all over the world for the traditional customers. Any CEO or Marketing VP of a business would deride the notion that 70/year of anything could represent a workable market. Yet today's launch vehicle manufacturers fight amongst themselves for even a 10 percent share of that number of launches per year. By contrast, the highly profitable cruise and tourism industries deal in very different numbers. We can be sure that, once the new low-cost, reliable, airline-like operations are introduced, then the space business will begin to deal in market numbers much more akin to other businesses. For instance, the Futron/Zogby study indicated that when prices to orbit are reduced to \$1 m, then there would be 250/year public space travellers in orbit, and of course the figure would soon get into the thousands once prices drop much below \$1 m. The implications are significant for every other space operation, whether it is the traditional commercial satcom sector, military Earth sensing, or even space agency lunar missions or interplanetary probes. They will all ultimately benefit from the paradigm shift represented by the introduction of public space travel, with its associated high reliability, low cost to orbit, and airline-like operations.

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