

Getting to the Edge

By Derek Webber FBIS,
Executive Director, Spaceport Associates, USA



WhiteKnightTwo, christened VMS Eve after Richard Branson's mother Eve shown mated with SpaceShipTwo, christened VSS Enterprise at Spaceport America in New Mexico, USA.
Mark Greenberg/Virgin Galactic

There is quite a bit of disarray amongst space agency policy wonks right now, all over the world. They are struggling with how to put budgets together which achieve meaningful progress during a time of generally constrained resources. They are even struggling with such basic issues as relevance. The political masters do not want to support (let alone lead) any initiatives which require increased budget sums for space developments when the regular 'Joe Sixpack', whose tax contributions are needed to fund the developments, cannot see how it affects his life. This is unfortunate, because there is a real need to make progress from the present status quo in space.

It is 40 years now since the last Apollo mission to the Moon, and since then nobody has been any further than low Earth orbit. We are losing some of the personal knowledge from the Apollo generation, at a time when we need to figure out the next steps and leave low Earth orbit, heading farther out. Various destinations are being suggested, such as the Moon again, Mars/Phobos, and an opportunistic asteroid encounter. They will all cost extra money beyond the funds required to simply continue LEO operations at the ISS.

I believe, however, that there is a solution to this difficulty, but it requires a certain patience to take effect. We all realize that the key to all of these possible future interplanetary journeys is to get out of Earth's gravity well in the first place. Once we have reached the

vast interplanetary geopotential plateau, only relatively small amounts of delta energy (and therefore money) are required to go anywhere else in the solar system. So the key is finding (and funding) the way to reach this energy plateau in the first place.

We need to be able to routinely, reliably, and at relatively low cost, get to the edge of Earth's gravity well. We need to establish a Gateway – 'Spaceport Earth' – which can be used for any future interplanetary vehicles to

Derek Webber FBIS the Executive Director of Spaceport Associates now specializing in educational programmes for commercial space activities and space tourism. Derek Webber



use as the entry and return point in the planet Earth region. Where should this be? Various Lagrange Points might be proposed. Even the surface of the Moon itself would be a candidate – it is at the bottom of a relatively small gravity well – a mere dimple compared with that of the Earth. But I have a proposal which carries with it certain funding benefits. I suggest 'Spaceport Earth' should be established at or near geostationary orbit.

A new room with a view...

Why put it there? Because I believe it would be a great place for a hotel for space tourists (for those who want to go further than sub-orbital or low Earth orbit). If this is correct, and it emerges that space tourists will be prepared to pay the extra for going the extra distance, then they would in effect be blazing the trail (and paying) for everyone else. Yes, there would need to be a new class of refuellable space tug to get the tourists (and anyone else) from LEO to GEO. This new regular route to the 'Spaceport Earth' gateway would start with tried and tested means of getting tourists into LEO (Soyuz, Dragon, etc), and then transferring them into the GEO tug for its cycling journey up to GEO and back.

What would 'Spaceport Earth' look like? It would need to be a combination of a tourist hotel destination and an astronaut working gateway station. Some interplanetary craft would be assembled there; for all of them it would be the start and re-entry node. Such interplanetary craft would not need to be built to withstand

the rigours of Earth take-off and re-entry; they could therefore be relatively flimsy, cheap and require very little in terms of propulsive energy.

This would be the way to stretch thin space budgets to still achieve the longer term ambitions without having to seek unwelcome increases. The regular space tourism journeys up to GEO and back would establish, and even largely fund, the infrastructure (the tugs, refuelling stations, and the Gateway hotel destination), and then the national space agencies would be able to concentrate on the interplanetary stuff.

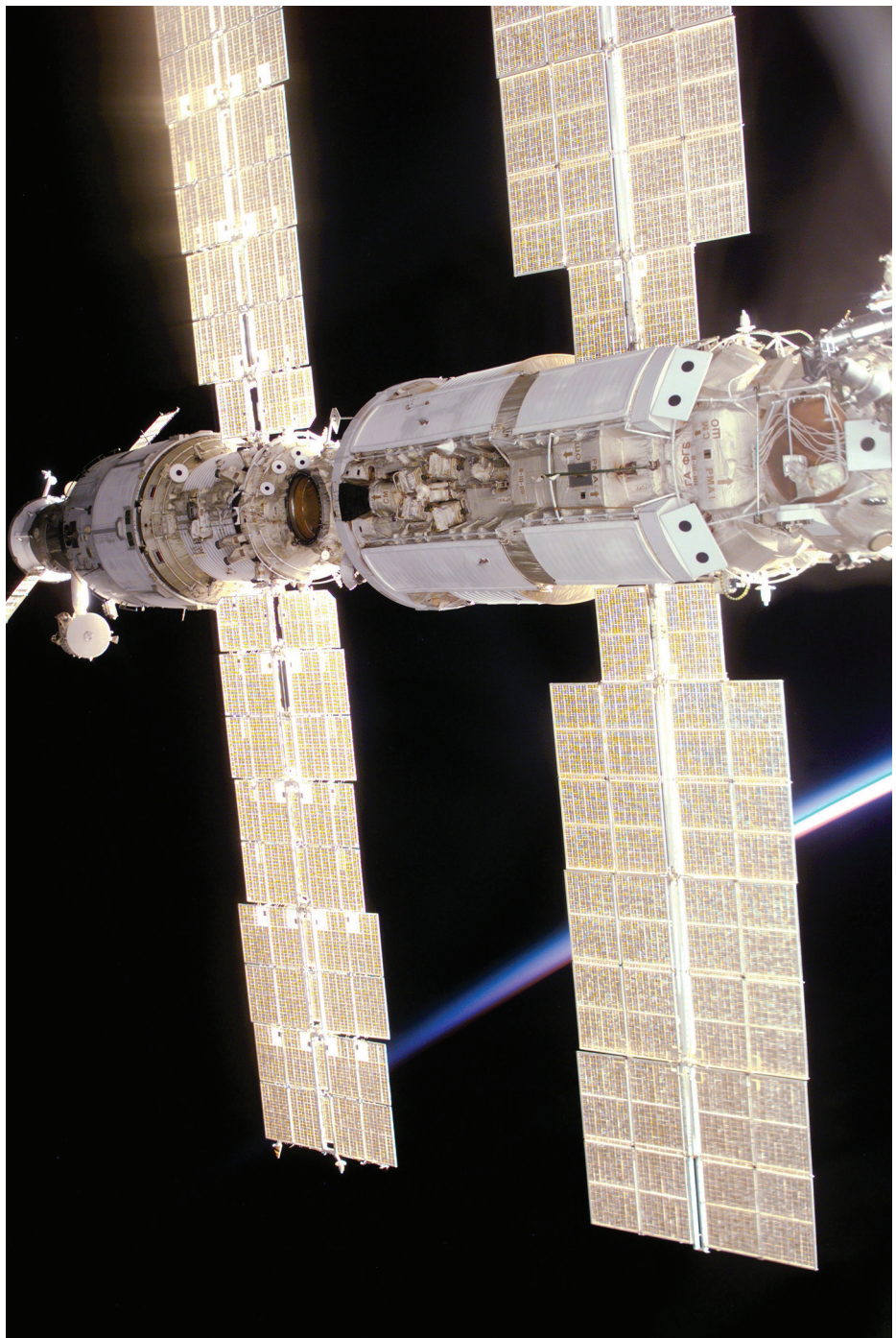
This would all take time – hence my plea for patience. First of all the sub-orbital space tourism industry needs to begin operations and achieve high reliability and reusability. Then more orbital space tourists would be expected to follow the seven who have so far flown, once the new vehicles, such as Dragon, bring down the unit cost for the LEO orbital experience. A commercial hotel for tourists in LEO (maybe an inflatable provided by Bigelow) would furnish

‘We need to be able to routinely, reliably, and at relatively low cost, get to the edge of Earth’s gravity well’

an alternative destination than the ISS for these travellers. Finally, one of these hotels would need to be established at GEO to serve as one part of the joint commercial/governmental Gateway ‘Spaceport Earth’, to be supplied by the tug/refuel station architecture.

There are some problems with the proposal, although they are not insoluble and would provide good material for Masters students to tackle. The geostationary orbit is administered by the ITU as a preserve for geostationary applications satellites. Maybe a slot could be found that is not needed for these purposes. Or the Gateway ‘Spaceport Earth’ could be located *just above* GEO, so that it slowly drifted around the Earth. Benefits would include a changing view for the tourists; the downside would be a more complicated telecommunications requirement at the Gateway. There would need to be a management process at the Gateway to handle the individual (and sometimes conflicting) requirements of the commercial space tourism hotel and the construction agenda at the governmental part of the complex.

The GEO hotel would need to be equipped with telescopes so that the tourists could focus in on any part of the Earth’s hemisphere that they could see beneath them. Probably the biggest unknown right now is whether there would be enough potential space tourists who could and would pay the ticket price to spend a week or two at ‘Spaceport Earth’, and thereby help open up this ‘Highway to the Edge’.



Could commercial spin-offs from existing space station modules provide short-stay hotel rooms in space?

NASA

Spaceport Associates

With former satellite and launch vehicle systems engineer Derek Webber as its Executive Director, Spaceport Associates has been around for more than 12 years and has made several contributions to commercial and space tourist business. The organization provides support to companies around the world engaged in commercial space activities providing consultancy services for new entrants and established companies.

Derek Webber has carried out several studies on launch vehicle markets and on the viability of business plans for proposed space tourist ventures, in addition to developing a market survey for the Futron Corporation. Spaceport Associates is transitioning now toward a more education-based business in which the information and analytical skills of its professional consultants is applied to existing and new-start operations.

Spaceport Associates is not limited to conventional proposals for space tourism but is also studying hypersonic alternatives for sub-orbital flight and the organization recognizes the potential in winged aerospace transport systems at several levels.