

Private Space Expansionism: Potential Scientific and Societal Benefits and Implications for Governance

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Posted to The World Orders Forum: 13 August 2021

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1. Introduction

The recent sub-orbital spaceflights of billionaires Richard Branson (Fig. 1) and Jeff Bezos have reignited a debate about the value, or otherwise, of private space activities. Much negative comment has focussed on wealthy individuals using (admittedly their own) money on what may be seen as frivolous activities when the world faces many pressing problems. I don't here want to get into a debate about whether it is healthy for a society to allow individuals to become so rich that they can afford their own private space programmes. I personally have some misgivings about that, and I certainly think that wealthy individuals, and the multinational companies that produce this wealth, should be taxed appropriately. The recent agreement by 130 countries to impose a minimum corporate tax rate of 15%, although still facing hurdles to implementation [1], is a step in the right direction. One could also imagine implementing Tobin-like taxes on currency exchange to redirect some of this excess wealth to global development, as well as implementing more progressive personal taxation. I personally would favour all these measures.

Still, when all's said and done, once companies and individuals have been duly and fairly taxed, what they choose to do with their remaining profits must presumably, within the limits of applicable law, be up to them. And, if they choose to fund private space programmes, then there may be some advantages, both scientific and societal, in allowing them to do so. On the other hand, as Daniel Deudney [2] has recently pointed out, there are

also potential dangers inherent in private space ‘expansionism’ (to use his term), and these dangers will need to be weighed against any potential advantages. These are the issues I wish to examine in this essay for *The World Orders Forum*.

2. Scientific benefits of private space activities

As Alexander MacDonald has pointed out in his excellent study [3], there is a long history, especially in the United States, of wealthy individuals backing astronomical and space-related projects. Arguably, as related to astronomy, these philanthropic activities date back to colonial times, but they reached a zenith with the founding of the great astronomical observatories (e.g., the Lick, Yerkes, and Mount Wilson Observatories, as well as many others [3]). Later, as MacDonald documents, rich benefactors also supported the pioneering rocket experiments of Robert Goddard. Of course, the motivations of these benefactors weren’t wholly altruistic, but were carried out for a mix of egotistical and value-signalling reasons, coupled in some cases with a genuine interest in astronomy and, later, aerospace engineering. However, regardless of the motivations, science has been a beneficiary of these activities, and it seems reasonable to assert that our knowledge of the Universe would be poorer had these millionaires chosen to spend their money on other things. MacDonald argues, persuasively I think, that to some extent the activities of billionaires such as Bezos, Branson and Musk (the ‘Space Barons’ portrayed by Christian Davenport [4]) can be seen as a continuation of this tradition carried into the twenty-first century.

Already it seems clear that science is benefiting from the reduced cost of access to space facilitated by Elon Musk’s SpaceX company. Musk was heavily criticised for the frivolous and flamboyant (and, from the point of view of space debris mitigation, perhaps irresponsible) decision to launch one of his own Tesla cars into orbit around the Sun in order to demonstrate the capabilities of SpaceX’s Falcon Heavy rocket in 2018. Yet, this immensely capable launch vehicle has now been selected to launch several scientific missions, including NASA’s *Europa Clipper* (due for launch in 2024) which will investigate the habitability of Jupiter’s moon Europa, so it is hard to argue that science isn’t benefitting from commercial space capabilities.

At first sight, it seems harder to see the scientific benefits of Branson’s Virgin Galactic and Bezos’ Blue Origin companies which are (so far) only sub-orbital operators predicated on developing space tourism. Yet, as the planetary scientist Alan Stern has argued [5], even these activities may yield short-term scientific benefits by widening access to microgravity for researchers in the biological and physical sciences. Nor should we dismiss the possible long-term scientific benefits of something as seemingly frivolous and unscientific as space tourism. Bear with me as I illustrate this, perhaps at first sight counter-intuitive, assertion by means of a personal anecdote (adapted from reference [6]).

My astrobiological research has sometimes involved doing fieldwork in Iceland. On these occasions, my colleagues and I have travelled to Iceland on aeroplanes operated by

commercial companies. Needless-to-say, my research budget would not have been able to afford to build the aircraft on which we travelled, or the airports in London or Reykjavik, or the associated air traffic support infrastructure, or the hotels in which we stayed, or the 4WD vehicles in which we travelled to our field sites. These activities were only possible because commercial enterprises, mostly driven by tourism, had already built up the background infrastructure, and we were able to pay commercial rates to make use of it. The same is true for hundreds of academic geologists, zoologists, and astronomers who every year travel to field sites and observatories around the world to carry out their research. Much of this research would be prohibitively expensive, and therefore simply wouldn't happen, without the background infrastructure provided by the global tourism industry. By analogy, we may imagine a future geologist making the trip to a Moon base for the purpose of six month's field work. Her research budget could never have afforded either the spaceship on which she travels, or the facility that is her destination, but both will be central to whatever geological discoveries she may make. To the extent that space tourism may lead to the growth of future space infrastructure that scientists will be able to utilise, it may enable science that would not otherwise get done. Thus, if the space tourism aspirations of Branson and Bezos truly 'take off' (apologies, it was difficult to avoid the pun!), future science may be enabled.

I should also mention that there is quite a lot of commercial space activity proposed for the coming decades that is less high-profile than that led by the Space Barons. For example, there are private companies aiming to mine raw materials on the Moon and asteroids [e.g., 7, 8], and this commercial activity, while sometimes criticised on environmental and other grounds, may also prove to have long-term scientific benefits [9]. Of course, there is also the danger that private space activities, including but not limited to space tourism, may result in damage to sites of scientific interest in the Solar System, so they will need to be carefully regulated. I'll return to this point in Section 4.

3. Societal benefits: Enhancing the cosmic perspective

Collins and Autino [10] have provided a wide-ranging discussion of what they see as wider societal benefits arising from private space activity and space tourism. Some of these potential benefits, such as increased employment and economic growth in the space sector (and associated tax revenues) seem uncontroversial, whereas others, such as the development of satellite solar power systems, are more problematical and might trigger significant geopolitical risks (as articulated by Deudney [2]). However, here I want to concentrate on another potential benefit – as I have argued previously in these pages [11], those of us interested in uniting the world politically should consider seriously the potentially unifying *perspective* of viewing the Earth from space (Fig.1).



Fig. 1. NASA astronaut Tracy Caldwell Dyson views the Earth from the cupola of the International Space Station in 2010. Space tourism has the potential to enable many more people, including very influential people, to gain this perspective (NASA/Tracy Caldwell Dyson).

It seems obvious, and has in fact been noted even by such ‘realist’ international relations scholars as Hans Morgenthau [12, p. 406] and John Herz [13, p. 317], that building a stronger sense of common global identity is likely to be a prerequisite for building stronger institutions of global governance. Deudney [14, p. 376] has himself summarised the views of Morgenthau as follows:

Humanity thus faces a tragic impasse: it needs a world state for security, but lacks a sufficiently thick sense of common identity both to make it possible and to prevent it from being threatening.

Significantly in this context, in another article Deudney [15, p. 273] has argued that the view of Earth from space has led to widening recognition of a “practical geography of Planetary Earth” where “the Earth as a whole is now a place” and that this “type of Earth-place sensibility amounts to a kind of Earth nationalism.” More recently, Deudney [2, pp. 241, 253-4] has identified ‘Whole Earth Identity’ formation as an important benefit of (albeit limited and well-regulated) space activities under the general rubric of ‘planetary security space expansionism.’

It seems reasonable to suggest that if a sense of “Earth nationalism,” or what Barbara Ward [16, p. 148] perhaps more felicitously termed “a patriotism for the world itself,” were to become sufficiently widespread it would imply a stronger sense of global identity. This, in turn, could help provide the psychological foundations on which stronger institutions of global governance might be built. Here, I am reminded of a passage in Arthur C. Clarke’s 1949 short story *The Lion of Comarre* [17, p. 125], where the Council Chamber of a future world government is located in a high orbit about the Earth:

When the members of the Council were in session it seemed as if there was nothing between them and the great globe spinning far below. The symbolism was profound. No narrow parochial viewpoint could long survive in such a setting.

Since Clarke wrote these words, over 500 people have now experienced this perspective for real (Fig. 1) and, as documented by Frank White [18], the psychological effects on many of them have been profound. However, if we want to leverage what White calls the ‘Overview Effect’ for the purposes of enhancing a sense of global solidarity it will presumably be helpful if many more people are able to experience this perspective for themselves. Of course, even given the most optimistic forecasts for the growth of a space tourism industry, for the foreseeable future the fraction of humanity who will ever have a chance to do so in person will be miniscule. On the other hand, those individuals who *are* able to afford the view (e.g., leaders of industry, politicians, well-connected societal ‘influencers’ of various kinds) are likely to have a disproportionate influence on world affairs.

This may all seem hopelessly naive. However, we will never know if exposure to the cosmic perspective of seeing the Earth from space will yield significant geopolitical benefits unless or until a sufficiently large number of sufficiently influential individuals are able to experience it. Utilising the infrastructure built-up for space tourism may be the only way of achieving this.¹ And, of course, even if the geopolitical benefits turn out to be a mirage, the long-term scientific benefits of such an infrastructure (discussed in Section 2) would remain, as would the employment and tax revenues generated by this new industry (and perhaps some of the other benefits identified by Collins and Autino [10]). Thus, it seems to me that at least some of the criticism directed at the activities of the space billionaires is rather poorly thought out. That having been said, there *are* potentially serious causes for concern regarding private space activities, to which we now turn.

4. Potential dangers: The need for space governance

Although recognizing the potential advantages for ‘Whole Earth Identity’ formation, Deudney [2] has drawn attention to what he sees as the geopolitical dangers of space expansionism. Among the dangers he identifies are the possibility of conflicts between nation-states on Earth arising out of competition for space resources; conflict occurring between human settlements in space, and between such settlements and Earth; and, especially, the deliberate alteration of asteroid orbits, raising the spectre of asteroids being used as weapons of mass destruction. Regarding the role of private space activity in all this, he writes (p. 380):

¹ I should stress that I am not claiming that the view from space is the only means of engendering such unifying perspectives; [elsewhere in these pages](#) I have argued that the common evolutionary perspectives engendered by the emerging discipline of ‘big history’ may also be helpful in this respect.

Allowing a handful of messianic internet billionaires to steer the space enterprise is an extremely dubious way to make decisions with species-existential consequences. Space choices are too important to be left to the space cadets.

I agree with this, but I think it is mainly an argument for the proper *governance* of space activities rather than for their abandonment.

With regard to space tourism, which is the main focus here, it is true that we don't want future space tourists trampling around scientifically important locations on the Moon and Mars, and this will require appropriate regulation. It is also true that we will need to protect Earth's environment from the impact of large numbers of rocket launches. For the foreseeable future this is likely to be a minor contribution to environmental pollution relative to other human activities, but the impact still needs to be minimised. Fortunately, mitigation measures can already be identified [19], but, again, they will need to be implemented globally. In the more distant future, Deudney is certainly correct that we need to prevent private space actors from doing really dangerous things in space, such as altering asteroid orbits; as he puts it [2, p. 374]:

allowing private companies answerable to only a handful of corporate owners to develop this technology would be like allowing private firms to develop the hydrogen bomb in the 1950s.

For these reasons, there is no doubt that private activities in space will need to be governed and, as space is a transnational domain, these governance structures will themselves need to be transnational in nature. I therefore agree with Deudney [2, pp. 241, 372, 376] that in the short-term we need to strengthen the existing international institutions dealing with space activities (e.g., the United Nations and its associated outer space treaty regimes) to ensure that private space activities are properly regulated internationally. In the longer term, we might go further and consider the creation of a world space agency under UN auspices [e.g., 20, pp. 296-302; 21], and/or the creation of a high-level UN organ at the level of the Security Council (perhaps by re-purposing the now redundant Trusteeship Council) to coordinate global space activities [e.g., 22, pp. 251-2; 23].

I have argued elsewhere [e.g., 11, 23] that this logic ultimately points towards placing the governance of space activities within the remit of a future federal world government. Of course, a world government is unlikely to be created especially for the purpose of regulating global space activities – rather, as many have argued previously (not least in these pages) we will need to create stronger institutions of global governance in order properly to manage the wide range of global existential problems with which humanity is already faced in the 21st century. But if a world government is necessary to deal with all these other issues, placing global space activity within its remit would seem to be appropriate. Achieving that goal will doubtless involve a long and uncertain evolution [e.g., 24, 25] but, as I've argued in Section 3, the cosmic perspective provided by space activities may help strengthen the sense of global identity on which the institutions of global governance might be built.

5. Summary

I have argued that much of the criticism directed at the space billionaires is misplaced. By enabling easier and cheaper access to space, these wealthy individuals, and their associated companies, are developing space transportation infrastructures that may yield significant long-term scientific and societal benefits. In particular, the potential benefits of space tourism, and its associated infrastructure, are often overlooked. These may include increased scientific access to a range of Solar System locations, as well as the progressive exposure of ever larger numbers of influential people to seeing Earth as a planet in its cosmic setting. Arguably, this perspective may help in building the deeper sense of global identity likely to be required before stronger institutions of global governance can realistically evolve.

That said, I agree with Daniel Deudney and other critics that private space activities cannot simply be allowed a free hand. For all the reasons articulated by Deudney [2], the last thing we need is anarchy in space! As space is a transnational domain, ensuring appropriate governance will necessitate developing appropriate international and transnational space governance structures. In the short term, this may involve strengthening the UN treaty regime for outer space to ensure that the activities of private space actors are appropriately included. In the longer term, much stronger international governance structures may be required. I have suggested that, ultimately, the governance of human activities in the Solar System would most logically fit within the remit of a future federal world (perhaps later interplanetary [26]) government. We can therefore perhaps envisage the emergence of a ‘virtuous circle’, whereby space tourism helps contribute unifying cosmic perspectives to the psychological foundations of the global governance structures that will (among other things) be required for the regulation of space activities.

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