



The potential of space tourism for space popularisation: An opportunity for the EU Space Policy?



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ABSTRACT

This article examines space tourism in the perspective of popularisation of space, to determine its potential role, with a special focus on the possible implications for the development of the EU Space Policy.

After a preliminary analysis of space tourism and an overview of the technology required to make it possible, distinguishing between orbital and suborbital flights, the article outlines some legal and political issues related to this emerging sector and discusses the possible consequences of space commercialisation.

The positive trend and the progress made in this domain suggest that space tourism could actually become a factor of space popularisation. At the same time, the existing legal framework does not seem to efficiently respond to the challenge. Rather than adapting the current air space and outer space rules, it would be preferable to establish a comprehensive special regulation for space tourism.

In the European context, in particular, space tourism could contribute to the evolution of the EU Space Policy, which is still at an early stage, and thus it could have a positive impact on the European integration process.

1. Introduction

Space travellers have constituted, up to now, a limited group of persons that, crossing the traditional barriers, have pushed the experience of tourism beyond the known horizons. Thus, space has become a new attractive and elitist destination; this phenomenon, although still marginal, may nonetheless contribute to a radical change of the perception of space in the public opinion.

Can space tourism drive space popularisation? In other words, is it possible to popularize space by ‘populating’ space with tourists?

Especially in the European Union (EU), where the Lisbon Treaty has recently enshrined Space Policy as a shared competence of the Union, this domain represents an area of increasing interest. In particular, as Hörber [1] pointed out, it is a policy at an early stage of development, compared to others, and it could give fresh impetus to the further progress of European integration. If space tourism becomes a reality soon, it will likely affect the forthcoming evolution of space law and policy in the EU, indirectly contributing to the European integration process.

An extended version of the initial research question could be the following: could space tourism become a strategic factor for bringing the larger public closer to space activities? Could that assure public support to space policies and the huge investments that they imply?

Space tourism (also called personal spaceflight [2] or private

spaceflight [3]), can be qualified under a subjective point of view (the person concerned) and an objective point of view (the activity carried out or the kind of service provided).

With regard to the first approach, a space tourist is a person that undertakes a travel to space for leisure purposes. Firstly, it is opportune to clarify the meaning of “space tourists” and “space flight participants”. The second expression is used by NASA to identify non-professionals that participate in space programs. Federal regulations, in particular, define space flight participant as “an individual, who is not crew, carried aboard a launch vehicle or reentry vehicle” [4]. It refers to persons that take part in an existing space program to make an extraordinary experience in outer space. The NASA Space Flight Participant Program [5] creates a win-win situation. On the one hand the space agency benefits from the dissemination to the large public of this experience. On the other hand, private citizens without specific professional skills are included in space programs as spaceflight participants and have the privilege to go to outer space, an experience previously reserved to astronauts. Space tourists can be considered as a kind of space flight participants, with a special emphasis on the reasons of the travel. The space tourist indeed is a person that travels to outer space for recreational purposes thanks to a service that is conceived specifically for that. Secondly, space tourists are different from payload specialists that are persons “who have specialized onboard duties” [6].

From the objective point of view, it is necessary to take into

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<http://dx.doi.org/10.1016/j.spacepol.2017.04.005>

Received 30 September 2016; Received in revised form 13 April 2017; Accepted 14 April 2017

Available online 08 May 2017

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consideration not only the travel to space, but also the possible accommodation, for example in an orbital or space hotel [7,8], and the leisure activities that can be offered, such as partial or full experience of weightlessness, space and earth observations, or space walks [2,7,8]. Von der Dunk [3] provides a larger definition that is founded on the fact that the technologies developed for space tourism could be used also for assuring quick transportation from one side of the world to the other. As a consequence, the larger public could in the future use this means of transportation not only for holidays, but also for professional or other personal purposes. Thus the issues that will be discussed in the next sessions with reference to space tourists can be extended to space travellers in the broad sense, without making distinction on the basis of the travel purposes.

2. Peculiar aspects of space tourism and consequent challenges

To some extent, today a new “space race” is taking place: it differs from the well known space race that took place during the cold war, because it does not primarily involve governments, but rather private companies.

In the “privatized space age” (or “new space race”) new tourism agencies appear and the companies that operate in this sectors are making quick progress in reusable rocket engines and other technologies, e.g. XCOR Aerospace's “Lynx rocket plane”, Virgin Galactic's “SpaceShipTwo”, Space X's “Dragon spacecraft”, Reaction Engines' “Skylon spaceplane”, EADS Astrium's “Phoenix”. In particular, entities such as Virgin Galactic or SpaceX work at a fast pace and are in fierce competition to first achieve the technology allowing the launch of commercial space flights.

The phenomenon of space tourism is characterized by the fact that, up to now, only a few persons have had this opportunity, because the costs are massive and the risks are also high (accidents do occur in this early phase: in 2014 the crash of the SpaceShipTwo of Virgin Galactic occurred, and a pilot died [9]). Therefore, it becomes the new extreme adventure for those who have the financial means and the courage. Indeed, “The 'World' is larger than planet Earth. Space is a part of the world” [7, 279]: from the myth of the far west adventurers we move to the current “far away from earth” adventurers.

Apel pointed out that “real spaceflight does not fascinate humans in a comparable way as 'travel to the stars', as shown in the very popular science fiction adventures in movies and television, does” [7, 279]. However, this may change: “Space tourism has been a dream up to now. However difficult, every achievement is a dream at first” [8, 136]. Recent surveys have demonstrated that space tourism is gaining more and more popularity: “There can be no doubt that the prospect of commercial space tourism flights has captured widespread imagination” [10, 2]. This new reality is going to have considerable implications.

Space tourism is not a recent idea, already in the 1960s the perspective of future hotels in space, for example, was mentioned [11], but only recently it has become an actual business project. A technical/commercial barrier currently exists: to become economically interesting, space tourism needs to reach a large public of potential users. To this purpose, a further technological progress is necessary and several companies are currently working on that. In particular, reusable launch vehicles are the key in order to make accessible to the public what, up to now, is still an activity very expensive that only a limited number of persons can afford [8]. As underlined by Loizou, “The success of space tourism depends upon a mass demand from potential travellers and the participation of industrial and financial partners throughout the world” [2, 289]. In considering the feasibility of space tourism, assessing the potential market allows providing information on the potential scale of the demand in different price segments. Market studies have showed that a relevant market does exist [7]. Consequently, the economic potential of this service is enormous, it is just a matter of costs and capabilities. “Popularisation” of space should also

mean “democratisation” of space, in the sense of making space accessible to a large number of people. Thus, in the long term, space tourism should not be conceived as a new luxury product for a few privileged individuals [11], although at the initial stage it is necessarily like that. Furthermore, technological development is essential not only to make space tourism more accessible, but also to increase its safety standards [2,7].

With regard to the legal background, Von der Dunk [3] has identified three main stages in the development of outer space activities: during the first one, governments were the only protagonists and private companies had a subordinate role. In this context the legal framework was established through international agreements. In the second phase, private companies gained ground, but the system of state responsibility and liability was adequate to deal with the limited activities concerned, mainly private launches and operation of space objects. That is not the case anymore for the current third stage, where private activities are complex and demand new legal solutions, more adapted to the interests at stake.

On the one hand, scholars have highlighted the lack of specific regulations on space tourism and the need of a clear legal framework for the further development of this sector [2,8]. Apel affirms that “National and international laws regulating spaceflight must be adapted to allow a commercial business” [7, 283]. On the other hand, serious ethical and environmental concerns have been raised about space tourism. Scholars have launched debates on fundamental questions, e.g. do space and the celestial bodies such as planets and stars belong to humankind? Can we use outer space for leisure purposes? [7,11]. Ethical questions come also from the classification of outer space as *res communis* and the fact that, therefore, it cannot be object of appropriation. Article II of the Outer Space Treaty affirms that “Outer space, including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means” [12]. If this is not necessarily an obstacle to tourist activities in space, it is however important to determine which activities should be considered appropriate [10]. An adequate legal framework should also take into consideration these aspects. From the environmental point of view, Brown highlighted a sort of paradox: if it is true that space tourism could represent, to some extent, an answer to the problems that an increasing number of tourists are creating on our planet, it is also possible that it will produce similar negative effects on the environment in air space or outer space [13].

3. Orbital and suborbital flights: legal issues

Suborbital flights have been defined as flights “in which a transport vehicle enters outer space but does not reach an orbit” [14, 263], while on the contrary orbital flights do.

When comparing orbital and suborbital flight, scholars have pointed out their complementarities: the former requires the development of vehicles for semi-regular flights, with lower development costs, whereas the latter requires vehicles for regular flights, with higher development costs. Suborbital flights would be less performing, compared to orbital flights, but their progress is believed to be necessary for providing the technology and market infrastructures for orbital flights [15].

Specifically, suborbital flights create more problems, from the legal point of view, because the vehicles used in this case have a hybrid nature, due to the exploitation of both aviation and space know-how, therefore the determination of the applicable law is difficult [2,10]. Currently air space rules and outer space rules apply, but their coordination is not easy. As clearly explained by Gerhard [14, 265]: “those vehicles may take off and/or land horizontally and are designed to perform some parts of the flight with support in the atmosphere from the reactions of air against the earth's surface (that is using lift in the air), while other parts of the flight are supported by rocket-power (that is using thrust)”. His analysis is based on the distinction between the

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