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The UK Should Lead -- Not Follow -- In Developing Contextual Regulations to Maximize Their Benefit in the New Space Race

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THE UK SHOULD LEAD—NOT FOLLOW—IN DEVELOPING CONTEXTUAL REGULATIONS TO MAXIMIZE THEIR BENEFIT IN THE NEW SPACE RACE

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ABSTRACT

There is a new space race underfoot. However, this space race is between private companies selling an outer space experience to ordinary, yet wealthy individuals. The regulatory schemes created by countries have the power to promote or stifle this new space travel phenomenon.

Currently, the United States is the only country with a regulatory framework in place for space travel of this type. A recent report by the United Kingdom (UK) proclaims that the UK has the possibility of becoming the European center for space travel. However, for this to be possible, the UK must have regulations promulgated by 2017. Further, the report recommends that, because the European Union (EU) may start to develop spaceplane regulation, the UK should wait for those regulations. This Note will show that the report's suggestion to wait for the EU to develop regulations is a mistake.

This Note will argue that the most prudent decision for the UK is to promulgate national legislation modeled after the Federal Aviation Administration (FAA) Commercial Space Transportation (AST) rule. Further, this Note will discuss why the UK should not wait for the EU, how their temporary solution is not ideal, and why the UK's reasoning for not promulgating their own rules is unconvincing. Last, the Note will address the benefits of adopting regulations similar to the FAA/AST's rule and how these outweigh any supposed problems.

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INTRODUCTION

There is a new space race for the twenty-first century. Yet, unlike the space race of the 1960s, this race is not between nations for glory.[1] The contenders of this race are private companies and this race is strictly for profit. There are at least nineteen companies competing in this new race.[2] What are these companies offering? A chance for ordinary, albeit extremely wealthy, individuals[3] to get the chance to experience the thrill of leaving the planet, a right previously only reserved for the approximately five hundred government-sponsored astronauts.[4] Virgin Galactic (Virgin), the most promising and popular company engaged in this space race, already has over seven hundred "future astronauts."[5] With each ticket costing $250,000 (U.S.D.), and Virgin's spaceplane capable of holding up to six passengers, one can begin to see how profitable this industry could be.[6] Aside from space

[1] *See, e.g.*, Timothy M. Ravich, *Space Law in the Sunshine State,* 84 FLA. B. J. Sept.-Oct. 2010, at 24, 26 ("Unmistakably, space exploration began as an exclusively military and foreign policy competition between two sovereign superpowers, pitting Western capitalism against Soviet Marxism."); Catherine E. Parsons, Comment*, Space Tourism: Regulating Passage to the Happiest Place Off Earth*, 9 CHAP. L. REV. 493, 498 ("Born from Cold War competition, the space race was a battle between governments, not private parties, and the governing laws were designed accordingly.").

[2] *Member Organizations*, COM. SPACEFLIGHT FED'N, http://www.commercialspaceflight.org/membership/member-organizations (last visited Jan. 15, 2016).

[3] *See* Jose Pagliery, *Virgin Galactic Spaceship Explodes*, CNN MONEY (Oct. 31, 2014, 4:32 PM), http://money.cnn.com/2014/10/31/technology/virgin-galactic-spaceship-crash (claiming celebrities such as Stephen Hawking, Leonardo DiCaprio, Justin Bieber, and Ashton Kutcher have already bought tickets for Virgin Galactic).

[4] *See generally List of Astronauts by Name*, WIKIPEDIA, http://en.wikipedia.org/wiki/List_of_astronauts_by_name (last modified Nov. 12, 2015). As of November 6, 2013, a total of 536 people from thirty-eight countries have gone into space according to a Fédération Aéronautique Internationale (FAI) guideline, which defines spaceflight as any flight above one hundred kilometers (sixty-two miles). *List of Space Travelers by Name*, WIKIPEDIA, https://en.wikipedia.org/wiki/List_of_space_travelers_by_name (last modified Dec. 2, 2015). 543 people have qualified when including the U.S. Department of Defense classification. *See id.* Of the 536, three completed only a sub-orbital flight, 533 reached Earth orbit, 24 traveled beyond low Earth orbit, and 12 walked on the Moon. *Id.*

[5] *Virgin Galactic at a Glance Fact Sheet*, VIRGIN GALACTIC, http://www.infosondas.com/2014/11/2-pdfs-virgin-galactic-at-a-glance-space-vehicles-fact-sheets (last updated Oct. 31, 2014).

[6] *Id.*; Stephan Hobe et al., *Space Tourism Activities—Emerging Challenges to Air and Space Law?*, 33 J. SPACE L. 359, 359 ("Early market forecasts of the space tourism industry place its worth at more than USD $1 billion by 2021.").

tourism, spaceplanes, the vehicles that will be used for spaceflights, have other profitable uses.[7] This includes sending satellites and cargo into space and, when the technology evolves, shortening commercial flights. For example, spaceplanes could cut flights from Australia to the UK from twenty hours to only two.[8]

Although countries are not participating in this race, they play an important role, and depending on how they play that role, they have the potential to profit.[9] The most important role a country can play is having favorable regulations for these private space companies. Favorable regulations will give these companies the ability to research, experiment, and get their spaceplanes off the ground without too much red tape.

However, uncertainty is the biggest problem for these space companies, governments, and passengers.[10] The regulatory landscape is the most pressing challenge. It is unclear whether spaceplanes and launches should and will be regulated by aviation law,[11] which has well-established regulatory regimes, or by space law, which does not.[12] Even governments are uncertain about how to regulate

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[7] *See* CIVIL AVIATION AUTH., UNITED KINGDOM GOVERNMENT REVIEW OF COMMERCIAL SPACEPLANE CERTIFICATION AND OPERATIONS: SUMMARY AND CONCLUSIONS 15 (2014), https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/329756/spaceplanes-summary.pdf [hereinafter UK REPORT]. The UK Report defines spaceplanes as a "winged vehicles that act as an aircraft while in the atmosphere and as a spacecraft while in space. They are widely seen as the most feasible method, at least with current technology, of enabling commercial space operations such as spaceflight experience." *Id.*

[8] *Id.*

[9] *Cf.* Hobe et al., *supra* note 6, at 367; UK REPORT, *supra* note 7, at 27 ("Market research undertaken by Surrey Satellite Technology Limited (SSTL) indicates that UK demand for [spaceflights] would start at around 120 paying participants per year, increasing to 150 per year by year three. A rough calculation based on the proportion of capacity of the two businesses that are most likely to be able to offer spaceflight experience in the next few years (Virgin Galactic and XCOR Aerospace) and their corresponding prices would indicate annual revenue from spaceflight experience of approximately USD $19 million in year one and USD $24 million by year three. In the medium term, it is expected that the number of spaceflights will increase in line with demand, up to perhaps 400+ participants in year ten, offering annual revenues of USD $65 million.").

[10] *See* Charity Trelease Ryabinkin, Note, *Let There Be Flight: It's Time To Reform The Regulation Of Commercial Space Travel*, 69 J. AIR L. & COM. 101, 106 (2004) ("Like air travel in the early 1900s, space travel represents uncharted territory for the average modern passenger."); *see also* Parsons, *supra* note 1, at 495 ("As with any emerging industry, there are many questions surrounding its very existence.").

[11] Scholars disagree about whether aviation law should apply fully, partially, or even at all to spaceplanes. *See* Hobe et al., *supra* note 6, at 361-65 (discussing applicability of air law to space law and traditional problems with the two); *see also* Tanja Masson-Zwaan, *Regulation of Sub-orbital Space Tourism in Europe: A Role for EU/EASA?*, 35 AIR & SPACE L. 263, 265 (2010) ("The legal regime governing aviation is very detailed and well defined in terms of liability, registration, jurisdiction, traffic and transit rights, certification of aircraft and crew and other members, hence if sub-orbital space tourism were regarded as aviation, there would be no lack of rules."). This issue is discussed further in a later section.

[12] *See* Parsons, *supra* note 1, at 510-11 ("Before the 1980s, there was no private space transportation industry; thus, there was no domestic regulation on the matter. There was, however, an international body of law governing space, consisting of treaties set during the

spaceplanes because each company has its own spaceplane and some types of spaceplanes do not even exist yet.[13] Further, it is difficult for a government to establish regulations for objects that are still experimental and relatively untested.[14] Even the profit the industry may generate is uncertain as the bubble could pop and customers could lose interest,[15] or one fatal accident could set the industry back for years.[16] One thing that is certain: government authorities agree that heavily regulating this burgeoning industry could stifle innovation and destroy it before it even gets off the ground (and into space).[17]

The United States is the only country in the world that currently has a regulatory framework for spaceplanes and suborbital flights.[18] In 2004, Congress passed the Commercial Space Launch Amendments Act (Space Launch Act) to include suborbital spaceflights.[19] The statute granted the Secretary of Transportation

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Cold War era. All of the existing treaties have outdated ideas of how space would eventually be utilized, particularly requiring that all space developments be for the 'common heritage of mankind.' It is uncertain whether the space treaties, which make no reference to space 'tourists,' even apply to the private space tourism industry; thus, the treaties should be revisited, or even entirely replaced.").

[13] *See* Melanie Walker, *Suborbital Space Tourism Flights: An Overview of Some Regulatory Issues at the Interface of Air and Space Law*, 33 J. SPACE L. 375, 380, 402 (2008) ("[R]egulators lack the knowledge and experience of regulating experimental vehicles that are yet to be in existence. In other words, the regulators do not know, and can not know, what it is that they are to regulate.").

[14] One example of a relatively new medium that governments are struggling to regulate is the internet. *See generally* Thomas B. Nachbar, *Paradox and Structure: Relying on Government Regulation to Preserve the Internet's Unregulated Character*, 85 MINN. L. REV. 215 (2000).

[15] *See, e.g.*, UK REPORT, *supra* note 7, at 27 ("[There is a] possibility that the market for spaceflight experience could be a short-term bubble, with demand declining relatively quickly.").

[16] *See, e.g.*, *Around 24 Wealthy Passengers Demand Refunds After Virgin Galactic Fatal Crash*, ARABIAN BUS. (Nov. 9, 2014, 11:45 AM), http://www.arabianbusiness.com/around-24-wealthy-passengers-demand-refunds-after-virgin-galactic-fatal-crash-571005.html. After a Virgin Galactic pilot died in a test flight in October 2014, around two-dozen of the seven hundred wealthy patrons who had paid to be among the inaugural passengers on Virgin's spaceflights demanded refunds, amounting to around $3 million in lost sales. *Id.* It would not take many accidents like this to destroy this industry prematurely, which is why the entire market is uncertain. *See* Walker, *supra* note 13, at 401 ("[A]ny accident or catastrophes would be self-destructive to the industry reducing tourists confidence.").

[17] *See* 51 U.S.C. § 50901(a)(15) (2012) ("[T]he regulatory standards governing human space flight must evolve as the industry matures so that regulations neither stifle technology development nor expose crew or space flight participants to avoidable risks . . . ."); *see also* UK REPORT, *supra* note 7, at 35-36.

[18] *See* 14 C.F.R. §§ 401, 415, 431, 435, 440, 460 (2015).

[19] Parsons, *supra* note 1, at 512-13 ("The Space Launch Act replaces the original legislation from 1984 . . . . [And] sections were modified in order to remove governmental barriers to the space tourism business and to protect the budding industry.").

authority to promulgate rules to regulate this industry.[20] These duties were then delegated to the Federal Aviation Administration's (FAA) Office of Commercial Space Transportation (AST), which is the agency that has promulgated the country's current space regime.[21] The Space Launch Act set a permissive tone for the FAA/AST by mandating that they allow self-regulation in spaceplane designs, for the first eight years.[22] The AST can only regulate the launches, operations, and reentry of the spaceplanes, unless death or injury results from a design.[23]

The most recent country trying to get some of this profit is the UK. In 2012, the UK's Department of Transportation, under section 16(1) of the Civil Aviation Act of 1982, ordered the Civil Aviation Authority (CAA) to undertake a detailed review to understand what would be required, from an operational and regulatory perspective to enable spaceplanes to operate from the UK.[24] The UK Report, published in July 2014, claims the UK can become the center of European space travel and to do this it must have a fully operational spaceport by 2018.[25] The UK Report claims that to have a spaceport operational by 2018 a permissive regulatory framework must be "established and functioning at least one year in advance of planned operations."[26] This requires regulations to be promulgated by 2017, a tight deadline.

The UK Report recommends that, because the EU may start to develop spaceplane regulation, the UK should wait for those regulations, since they would be based on international aviation law and would preempt UK law. [27] This is a mistake. If the UK wants to have regulations promulgated by 2017, the most prudent decision is to promulgate national legislation modeled after the FAA/AST's rule.

Part I of this Note examines the FAA/AST's promulgated rules and the UK's proposal. Part II of this Note discusses why the UK should not wait for the EU, how its temporary solution is not ideal, and why the UK's reasoning for not promulgating its own rules is unconvincing. Last, the Note will address the benefits of adopting

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[20] 51 U.S.C. § 50903(a) (2012) ("The Secretary of Transportation shall carry out this chapter."); *id.* § 50905(c)(3) ("the Secretary may propose regulations under this subsection").

[21] Ryabinkin, *supra* note 10, at 121 ("The Secretary's licensing authority was delegated to the Administrator of the FAA and further assigned to the Associate Administrator for Commercial Space Transportation (FAA/AST).").

[22] 51 U.S.C. § 50905(c)(3) (2012) ("Beginning on April 1, 2016, the Secretary may propose regulations under this subsection without regard to paragraph (2)(C) and (D). Any such regulations shall take into consideration the evolving standards of safety in the commercial space flight industry.").

[23] It will be interesting to see if the FAA/AST will promulgate anything based on Virgin Galactic's spaceplane test run that killed one pilot. *See supra* text accompanying note 16; *see also* Parsons, *supra* note 1, at 514 ("Favorable to the industry 49 U.S.C.A. § 70105(c)(2) [currently 51 U.S.C. § 50903] allows only minimal regulations on space tourism vehicles. This section allows only regulations that prohibit design features that have resulted in a serious or fatal injury, or that may contribute to events that pose a high risk of causing a serious or fatal injury.").

[24] UK REPORT, *supra* note 7, at 4.

[25] *Id.* at 11.

[26] *Id.* at 7.

[27] *See id.* at 39.

regulations similar to the FAA/AST's rules and how these outweigh any supposed problems.

I. U.S. REGULATORY LANDSCAPE AND THE UK'S PROPOSAL

The most important factor for countries trying to enter this new space race is the development of favorable regulations for emerging space companies. Most authorities agree that heavy regulation of this burgeoning industry could stifle innovation and destroy it before it even gets off the ground (and into space).[28] This problem, the appropriate degree of regulation, is further amplified by the uncertainty regarding the future of space travel. An even greater problem is that government "being the sole regulating entity . . . do[es] not know how to regulate spacecraft because they do not know what type of spacecraft will exist yet."[29] Therefore, ideal regulations will be both flexible and permissive, giving deference to the space companies to set their own standards, at least for the time being.[30]

The U.S. is the only country with regulations for suborbital flights. The first part of this section explores some of the main features of the FAA/AST's promulgated rule for suborbital spaceflight, spaceplanes, and spaceports.[31] These features will then be compared to the UK's proposed regulations in the following subsection.

A. U.S. Regulatory Landscape: The FAA Commercial Space Transportation Rule

Pursuant to the Space Launch Act, the Secretary of Transportation has sole authority to issue licenses for suborbital flights.[32] The AST, within the FAA, acts on behalf of the Secretary of Transportation in carrying out the statutory responsibilities under the Space Launch Act.[33] This was a conscious effort to create a "one-stop-

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[28] *See* 51 U.S.C. § 50901(a)(15) (2012) ("The regulatory standards governing human space flight must evolve as the industry matures so that regulations neither stifle technology development nor expose crew or space flight participants to avoidable risks as the public comes to expect greater safety for crew and space flight participants from the industry."); UK REPORT, *supra* note 7, at 36 ("The challenge will be to arrive at a suitable regulatory framework . . . without being so burdensome that it stifles the development of this new industry."). *See generally* Timothy Robert Hughes & Esta Rosenberg, *Space Law Travel (and Politics): The Evolution of the Commercial Space Launch Amendments Act of 2004*, 31 J. SPACE L. 1, 45-56 (2005) ("The philosophy behind limiting DOT regulatory authority in this way derives from a philosophical view of the commercial human spaceflight industry as highly vulnerable to premature or ill-conceived regulations."); Parsons, *supra* note 1, at 513 ("[Space Launch Act modified sections] to remove governmental barriers to the space tourism business and to protect the budding industry.").

[29] Walker, *supra* note 13, at 402.

[30] *See id.* at 401 (arguing that pressure on industry leaders to achieve the highest safety standards through self-regulation, or else self-destruct the industry, will create a greater threshold of safety); *see also* 51 U.S.C. § 50905(3) (2012) (denying the Secretary the power to regulate design or operation of a launch vehicle until 2016 unless the features or practice result or contribute to serious injury to participants or crew).

[31] The FAA/AST promulgated spaceplane rules are extensive in detail, spanning six sections of the Code of Federal Regulations, but only the main precepts, not the minute details, are discussed here to familiarize the reader.

[32] 51 U.S.C. § 50903(a) (2012).

[33] Ryabinkin, *supra* note 10, at 121.

shop" for space companies, so they would not have to deal with multiple agencies to get off the ground.[34]

FAA/AST's rules created a two-part licensing system: one license for launch vehicles and another license for launch sites.[35] The first license is for an operator to launch a specific spaceplane.[36] Within that license there is a launch-specific license and launch operator license.[37] The former is a more limited license allowing the operator to launch one vehicle from one launch site.[38] The latter allows the operator to launch from one launch site launch vehicles "from the same family of vehicles transporting specified classes of payloads."[39] The latter license is extremely convenient for space companies, because they only have to get one license for multiple launches with their spaceplanes, rather than acquire one license per launch. Each license requires a policy, safety, payload, and environmental review and approval.[40] The FAA also reserves the right to modify a launch license at any time by adding terms or conditions to ensure compliance with the Space Launch Act.[41] As of December 2015, there are seventeen active launch licenses and the FAA has licensed over 239 launches since 1989.[42]

The second type of licenses the FAA issues is for a launch site or spaceport license for where the spaceplanes are launched.[43] With this license, a launch site

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[34] A concern the UK's CAA had as well. *See* UK REPORT, *supra* note 7, at 41 ("[T]he ideal solution ultimately will be to establish a regulatory framework to address all the regulatory requirements under a single competent authority.").

[35] The FAA terms spaceplanes as "launch vehicles" and spaceports as "launch sites," see 14 C.F.R. § 401.5 (2015), however, the UK Report uses spaceplanes and spaceports interchangeably. Therefore, these terms will be used interchangeably in this Note.

[36] 14 C.F.R. § 415.3 (2015).

[37] *See id.*

[38] *Id.* § 415.3(a).

[39] *Id.* § 415.3(b).

[40] *Id.* §§ 415.23, .31, .57, .201.

[41] *Id.* § 415.11.

[42] *Commercial Space Data*, FED. AVIATION ADMIN., http://www.faa.gov/data_research/commercial_space_data (last visited Dec. 7, 2015). Over two hundred over those launches have been without any loss of life, significant injuries, or property damage. *Before the House Committee On Science, Subcommittee On Space And Aeronautics, on the Office Of Commercial Space Transportation's Fiscal Year 2013 Budget Request*, *March 20, 2012*, 112th Cong. (2012) (statement of Dr. George C. Nield, Associate Administrator for Commercial Space Transportation of the FAA), http://testimony.ost.dot.gov/test/pasttest/12test/nield1.htm (last visited Dec. 7, 2015). However, this fact sheet did not include Virgin Galactic's unsuccessful test flight, or Orbital Sciences Corporations failed launch to send supplies to the International Space Station for NASA. *See supra* note 16; *see also* Mike Wall, *Private Orbital Sciences Rocket Explodes During Launch, NASA Cargo Lost,* SPACE.COM (Oct. 28, 2014, 6:43 PM), http://www.space.com/27576-private-orbital-sciences-rocket-explosion.html. Orbital Science attempted to launch a cargo-ship, their Cygnus spacecraft, carrying 5000 lbs. of food and science experiments to the International Space Station, but soon after ignition the spacecraft crashed back down onto the launch pad. *Id.*

[43] *See* 14 C.F.R. § 420.41 (2015).

operator can offer its services to any licensed launch vehicle operator.[44] The launch site must go through an extensive site location review to make sure the facility is safe and capable of supporting multiple launch vehicle types.[45] The license lasts for five years from the day of issuance and is renewable for an additional five years.[46] Subpart D of the license rule lists several responsibilities of the licensee, such as controlling public access, scheduling, accident investigations, records, explosive siting, and separation distance requirements for certain chemicals such as liquid hydrogen.[47] This licensing regime is extremely convenient for space companies because it only requires them to get a launch vehicle license. There are already ten licensed spaceports in the U.S., several of which are purpose built (built specifically to be spaceports and not just multi-purpose airports).[48]

An interesting feature of the FAA/AST rule is that it distinguishes between launching and reentry with a crew and with spaceflight participants.[49] There are generally more requirements for launching with a crew, such as qualifications and training for the variety of situations and emergencies that could arise during a flight.[50] The FAA has also required the operator to inform the crew that the U.S. government has not certified the vehicle as safe for launch and reentry, and must provide this information before he or she enters into an employment contract.[51]

In contrast, the only requirement for spaceflight participants to travel on a spaceplane is for them to give their informed consent.[52] These companies must

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[44] *Id.*

[45] *Id.* §§ 420.19, .21, .23, .25, .27, .29, 31.

[46] *Id.* § 420.43.

[47] *Id.* §§ 420.51-.71 (requiring controlling public access, scheduling of launch site operations, notifications, launch cite accident investigation plan, records, explosive siting, separation distance requirements for certain chemicals such as liquid hydrogen and any incompatible energetic liquids stored within an intraline distance, separation distance requirements for handing incompatible energetic liquids that are co-located, separation distance requirements for co-location of explosives with liquid propellants, separation distance measurement requirements and lightning protection).

[48] *See Commercial Space Data: Active Licenses*, FED. AVIATION ADMIN., http://www.faa.gov/data_research/commercial_space_data/licenses/ (last visited Jan. 17, 2016) (listing nine Active Launch Site Operator Licenses for sites in Texas, Florida, California, New Mexico, Alaska, Virginia, and Oklahoma). Spaceport America, located in New Mexico, is the first purpose-built spaceport and is "wholly owned by the state of New Mexico and its citizens." *FAQ*, SPACEPORT AM., http://spaceportamerica.com/about-us/faq (last visited Dec. 7, 2015); Mike Wall, *SpaceX Breaks Ground on Private Spaceport in Texas*, SPACE.COM (Sept. 23, 2014), http://www.space.com/27234-spacex-texas-spaceport-groundbreaking.html ("SpaceX has begun construction on a new launch site in Texas, a seaside spaceport that will be used to blast commercial satellites into orbit a few years from now.").

[49] *See generally* 14 C.F.R. §§ 460.1 -.53 (2015).

[50] *See id.* § 460.5.

[51] *Id.* § 460.9.

[52] *See id.* § 460.45(a) ("An operator must inform each space flight participant in writing about the risks of the launch and reentry, including the safety record of the launch or reentry

inform the participant of the risk of launch and reentry, and the safety record of the launch or reentry vehicle.[53] The informed consent doctrine, as stated in the statute, requires that the presentation of information be in writing and in such a way that the average person can readily understand it.[54] The document must be signed and dated by the spaceflight participant.[55] Both crew and spaceflight participants must also sign a waiver of claims against the U.S. government.[56] Overall, the FAA/AST rule creates fairly light regulations that give deference to the spaceflight companies.

Another important aspect of the U.S. regulatory approach is the issuance of "experimental permits." The FAA has authority to issue "experimental permits" to allow for research and development, crew training, and to demonstrate compliance with requirements for obtaining a license.[57] Vehicles with experimental permits are subject to minimal regulations for safety, but are not subject to regulations for design.[58] These permits give the industry the necessary autonomy to develop and test new technologies, while also gaining experience for their launches with spaceflight participants without having to meet burdensome aviation regulations to be in the air.[59]

The last major facet of the U.S. space regime is the liability insurance and financial responsibility requirements found in the Space Launch Act, which were eventually mirrored in the FAA's rule.[60] The rule imposes strict liability on commercial space launch providers and requires them to obtain $500 million in third-party liability insurance.[61] The U.S. government is responsible to indemnify a launch provider up to $1.5 billion for remaining damages.[62] The rule also requires

vehicle type. An operator must present this information in a manner that can be readily understood by a space flight participant with no specialized education or training.").

[53] *Id.*

[54] *Id.*

[55] *Id.* at § 460.45(f)(3).

[56] *Id.* §§ 460.19, .49.

[57] *See id.* § 437.5.

[58] *See id.* § 437.1-.95 (requiring program description, flight test plan, operation safety documentation as required, enough information to analyze the environmental impact, a maximum probable loss analysis, and an inspection before issuing the permit).

[59] *E.g.*, Alan Boyle, *Virgin Galactic's SpaceShipTwo Crashes: 1 Dead, 1 Injured*, NBC NEWS (Oct. 31, 2014), http://www.nbcnews.com/storyline/virgin-voyage/virgin-galactics-spaceshiptwo-crashes-1-dead-1-injured-n238376 (discussing Virgin Galactic's new fuel that was being tested during this launch).

[60] *Compare* 51 U.S.C. § 50914 (2012), *with* 14 C.F.R. § 440 (2015). There is strict liability for any "bodily injury or property damage resulting from a licensed or permitted activity in connection with any particular launch or reentry." 14 C.F.R. § 440.9(c) (2015).

[61] 14 C.F.R. § 440.9(c)(1) (2015).

[62] Ryabinkin, *supra* note 10, at 120 ("The government will cover excess damages up to $1.5 billion, but the launch company is liable for any amount beyond the $2 billion total."). This limit is not favorable to U.S. space companies and could make it difficult for them to compete with foreign space companies as foreign governments may provide more protection. *See id.* at 135-136 (discussing this issue and noting the French government has no cap on the government's indemnification of third party claims).

the licensee to have insurance up to $100 million to cover claims by the United States, its agencies, and its contractors and subcontractors for property damage or loss resulting from a licensed activity.[63] This rule applies to both licenses and experimental permits.[64]

B. UK Analysis and Proposal for Spaceplane Regulations

The UK Report recommends that for the UK to realize the most benefits of this space industry, it must have regulations promulgated and established by 2017 to allow the first spaceflight to launch by 2018.[65] The UK Report has two main recommendations for getting spaceplanes off the ground in the UK: (1) develop national regulations, which would likely mirror the FAA/AST regulatory framework, or (2) wait for the EU to promulgate regulations with a temporary situation in place until then.[66] The UK Report also claims that, ideally, a single competent authority would be appointed for all safety regulation of all spaceflight operations.[67] Like the FAA/AST, it suggests the main focus of the regulations should be protecting the uninvolved general public rather than participants and crew because the passengers will have knowingly engaged in this endeavor.[68]

The UK Report initially notes a common space law problem: spaceplanes could qualify as an "aircraft" under the International Civil Aviation Organization (ICAO) definition.[69] The ICAO is a UN specialized agency, created in 1944 by the Convention on International Civil Aviation.[70] The ICAO works with the 191 member states and global aviation organizations to develop international Standards and Recommended Practices (SARPs), which are binding on member states.[71] The ICAO has stated that a spaceplane could qualify as an aircraft, which means that existing aviation safety regulations would apply to spaceplanes.[72]

The European Aviation Safety Agency (EASA), an EU agency, is the independent body under European law that issues airworthiness certificates that allow aircrafts off the ground and drafts EU aviation safety regulations and legislation.[73] The EASA works closely with the ICAO to make sure its rules are in

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[63] *See* 14 C.F.R. § 440.9(e) (2015).

[64] *See id.*

[65] UK REPORT, *supra* note 7, at 36.

[66] *See id.* at 39.

[67] *Id.* at 41.

[68] *Id.* at 35.

[69] *Id.* at 33.

[70] *About ICAO*, INT'L CIV. AVIATION ORG., http://www.icao.int/about-icao/Pages/default.aspx (last visited Dec. 7, 2015).

[71] *See id.*

[72] *See* UK REPORT, *supra* note 7, at 33; *see also* COMM. ON THE PEACEFUL USES OF OUTER SPACE, CONCEPT OF SUBORBITAL FLIGHTS: INFORMATION FROM THE INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO) 1, 5 (Mar. 19, 2010), http://www.oosa.unvienna.org/pdf/limited/c2/AC105_C2_2010_CRP09E.pdf.

[73] *See generally Regulations*, EUR. AVIATION SAFETY AGENCY, http://www.easa.europa.eu/the-agency/faqs/regulations (last visited Dec. 8, 2015).

accord.[74] If spaceplanes qualify as an aircraft they would need to meet existing EASA certification, airworthiness, and regulations, which they currently could not.[75] Under Annex II of the EASA Basic Regulation, certain categories of aircraft can be excluded from international regulation and, instead, be subject to national regulations.[76] One of these categories is "experimental aircraft," which are "aircraft [of any mass] specifically designed or modified for research, experimental or scientific purposes, and likely to be produced in very limited numbers."[77] The UK Report recommends qualifying spaceplanes under this category to allow the UK to regulate spaceplanes at the national level and have flights up and running more quickly.[78] However, "experimental aircraft" are not allowed to have paying participants on board.[79] The UK Report recommends the CAA issue an exception, pursuant to section 60 of the UK Civil Aviation Act, to circumvent this.[80]

The UK Report's main recommendation is that the UK should wait for the EU to promulgate regulations.[81] The UK Report based this recommendation on its belief that the EU will issue regulations based on international aviation law and those regulations would be included in the EASA Basic Regulation and thereby be binding law.[82] In the interim, the UK Report proposes a temporary solution to allow U.S. space companies to begin operating in the UK.[83] The first part of this temporary solution involves preliminary discussions with the U.S. government and space companies to obtain export licenses.[84] These licenses would allow space companies to operate in the UK.[85] This arrangement would be akin to a "wet lease," which

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[74] *See Regulations*, CIV. AVIATION AUTH., http://www.caa.co.uk/default.aspx?catid=1404 (last visited Dec. 8, 2015).

[75] UK REPORT, *supra* note 7, at 33 ("Within the EU, this means those set by EASA which cover certification, continuing airworthiness and operations. But at this stage of their development, commercial spaceplanes cannot comply with these regulations: technology will need to be developed and mature before it can comply with the norms of commercial aviation.").

[76] *See* EUROPEAN AVIATION SAFETY AGENCY, POLICY STATEMENT: AIRWORTHINESS CERTIFICATION OF UNMANNED AIRCRAFT SYSTEMS (UAS), http://www.easa.europa.eu/system/files/dfu/E.Y013-01_%20UAS_%20Policy.pdf (last visited Dec. 8, 2015).

[77] *Id.*

[78] UK REPORT, *supra* note 7, at 33.

[79] *Id.* at 34.

[80] *Id.*

[81] *See id.* at 39.

[82] *See id.*

[83] *Id.* (advocating a "short-term approach of treating spaceplanes as experimental aircraft under Annex II of the EASA Basic Regulation, allowing initial launches to take place using a wet lease type arrangement under FAA AST licenses").

[84] *Id.* at 31 ("[I]nitial commercial operations outside the US would have to be conducted under a 'wet lease' type arrangement, ie the US operator would be responsible for the entire operation, including the aircraft, its flight crew and its maintenance staff.").

[85] *See id.*

would make the U.S. operators responsible for the entire operation, including aircraft, flight crew, and maintenance staff.[86] The UK Report acknowledges that this step is essential to enable short-term UK commercial spaceplane operations, which is necessary to achieve the maximum benefits of space tourism.[87] By designating spaceplanes as "experimental aircraft," the UK would enable U.S. companies to launch spaceplanes from the UK without violating EU aviation law.[88]

The UK Report claims that for the UK to achieve the maximum benefits and to become the space-hub of Europe, it must have a successfully operating spaceport by 2018.[89] The UK Report lists several factors to balance when deciding a location, such as: (1) operating criteria (large site with a runway at least 9,800 feet long), (2) safety factors (away from any dense populations), (3) favorable meteorological conditions, and (4) environmental and economic concerns (e.g., must be easily accessible for participants and staff).[90] The UK Report also recommends, to have this spaceport operational by 2018, that adapting an existing aerodrome will be the best choice.[91] A purpose-built spaceport, while ideal, is simply not feasible to meet this 2018 deadline; however, the UK Report still recommends pursuing such a port for the long term.[92]

The last major component of this UK Report is the recommendation to adopt the doctrine of informed consent for spaceflight participants.[93] Because suborbital spaceplanes are not designed or built to any internationally recognized safety standards, crew, and participants will have to be informed of the inherent risks of suborbital travel.[94] This includes risks to their health and the spaceplanes known safety record before flight.[95] They will have to acknowledge receipt of this information in writing.[96] These requirements are very similar to the FAA/AST's informed consent requirement.[97] Informed consent does not, however, discharge the

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[86] *Id.*

[87] *Id.*

[88] *See id.* at 33.

[89] *Id.* at 35; *see also id.* at 52 ("As our analysis of the opportunity for the UK makes clear, the pivotal factor in realising many of the economic and scientific benefits associated with spaceplane operations is the availability of a UK launch site: a spaceport.").

[90] *Id.* at 52-53.

[91] *Id.* at 8; *see also id.* at 53 ("However, there is a further critical factor in our work: the desire to enable sub-orbital spaceplane operations to commence before 2018. To meet this demand, it is likely that an interim spaceport solution would need to be found: we would not expect to be able to build a new aerodrome in such a timescale as, even if construction could be accelerated, the planning and approval process necessarily takes a long time. Therefore, we believe that a purpose-built spaceport is not a realistic option in the short term.").

[92] *See id.* at 58.

[93] *Id.* at 40.

[94] *Id.*

[95] *Id.*

[96] *Id.*

[97] *See* 14 C.F.R. § 460.45 (2015).

operator of liability claims by crew or participants in the event of death or serious injury.[98]

It is worth noting that the UK Report does not discuss any liability or insurance issues. The Outer Space Act of 1986 states that a license may contain an insurance requirement for third-party liability, but unlike the Space Launch Act, it does not contain a definitive figure for insurance.[99] This needs to be considered and worked into the UK's new space regulations as the issue of insurance can affect the flourishing of a state's own space companies and affect which foreign space companies will choose operate in it.[100]

II. THE UK SHOULD NOT WAIT FOR THE EU TO DEVELOP SPACE REGULATIONS

There are several problems with the UK Report's recommendation to wait for EU space regulations and to adopt a temporary solution in the interim. This solution contradicts the urgent tone of the UK Report—especially because the CAA wants these regulations by 2017. The EU regulations may cause more problems than they solve because they would not be crafted specifically to facilitate UK's space industry's growth. The UK Report's reasons to not adopt national legislation and to wait for the EU are unconvincing. Further, the benefits of adopting national regulations similar to the FAA/AST's rule outweigh any supposed problems.

A. Waiting Contradicts the Urgency

The first problem with waiting for the EU is that it contradicts the urgency of the UK Report to both act swiftly to reach the 2018 deadline and to achieve the maximum benefits of a space industry by allowing spaceplanes to launch as soon as possible.[101] Time is of the essence because several space companies are looking to begin suborbital flights with space tourists within the next year or two.[102] The UK Report wisely notes that the space tourism market could be a "short-term bubble" and after the initial rush, demand could decline quickly.[103] The longer the UK waits to establish favorable regulations to lure these space companies to operate in the UK and to allow their own space companies to blossom, the more capital they will miss out on.

If, as the UK Report claims, the UK government wants the UK to be a European center for space tourism,[104] it will need to be competitive. It will need to have

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98 UK REPORT, *supra* note 7, at 40.

99 Outer Space Act 1986, c. 38, § 5(2)(f) (UK).

100 *See* Ryabinkin, *supra* note 10, at 135-36.

101 *See* UK REPORT, *supra* note 7, at 35, ("[A]llow[ing] spaceplane operations to take place in the short term . . . is key to maximising their commercial benefits"); *see also id.* at 26, 31, 52.

102 *See, e.g.*, *id.* at 20-24; Jim Dobson, *Virgin Galactic Tells Billionaire Passengers, SpaceShipTwo Launch in 2017*, FORBES (July 28, 2015), http://www.forbes.com/sites/jimdobson/2015/07/28/virgin-galactic-spaceshiptwo-tells-billionaire-passengers-fall-2017-is-new-launch-date.

103 UK REPORT, *supra* note 7, at 27.

104 *Id.* at 10 ("UK Government identified the space industry as one of the eight key sectors governed by the Growth Review, and stated that it 'wants the UK to be the European centre for space tourism.'").

favorable regulations in place and have an operational spaceport. This latter point is even more critical for the UK because Sweden already has an operational spaceport[105] and also wishes to be the European space-hub.[106] This places Sweden in direct competition with the UK. Putting even more pressure on the UK to act swiftly, Sweden, aside from already having an operational spaceport, now also has Space Travel Alliance, a new Swedish space company looking to make Sweden the European space tourist center.[107] This company, while new and still a few years away from being fully operational,[108] emphasizes the urgency for the UK to establish its own national regulations so UK space companies can begin to prosper, while also getting U.S. companies to operate in the UK in the meantime. The longer it waits to get an operational spaceport, the greater the chance companies looking to get into the European market will go for the first available spaceport in Europe, which as of now is in Sweden.[109]

B. EU Regulations May Cause More Problems Than They Solve

To have an operational spaceport, the UK will need regulations in place to allow a converted aerodrome to facilitate space launches. One problem that could arise while the UK is adapting an existing aerodrome to allow for U.S. wet lease launches is that the EU could promulgate regulations that may be more stringent or particular than the current construction. This would frustrate the spaceport investors, which the UK Report has suggested will be necessary to get this project started.[110] If the U.S. promulgated requirements for what is necessary for a spaceport to be operational are any indication,[111] the EU could place requirements on a spaceport that could ruin a

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[105] SPACEPORT SWEDEN, http://www.spaceportsweden.com (last visited Dec. 8, 2015) ("Spaceport Sweden is a pioneering initiative to establish commercial human spaceflight in Kiruna and become Europe's gateway to space.").

[106] *See* Alex Hudson, *Scotland Battles Sweden to Get European Spaceport*, BBC NEWS, (Feb. 14, 2012), http://news.bbc.co.uk/2/hi/programmes/click_online/9694766.stm ("'Spaceport Sweden is potentially a great place to fly from,' says Stephen Attenborough, commercial director of Virgin Galactic.").

[107] SPACE TRAVEL ALLIANCE, http://www.spacetravelalliance.com (last visited Dec. 8, 2015) ("Space Travel Alliance (STA) is a new Swedish venture aiming to make the dream of space discovery a reality to mankind with the vision to become the premier European space travel company. Operating from Spaceport Sweden, STA will offer commercial suborbital spaceflights for tourism.").

[108] *See* Susanne W. Lamm, *Space Tourism Planned for Sweden*, EPOCH TIMES (Sept. 16, 2014), http://m.theepochtimes.com/n3/961087-space-tourism-planned-by-swedish-company ("[Space Travel Alliance] hopes to be able to send the first tourists into space within 3 to 5 years").

[109] *See* SPACEPORT SWEDEN, *supra* note 105.

[110] *See* UK REPORT, *supra* note 7, at 29 ("Constructing a spaceport will require significant capital investment . . . .").

[111] *Launch Site Licenses*, FED. AVIATION ADMIN., https://www.faa.gov/about/office_org/headquarters_offices/ast/licenses_permits/launch_site (last visited Dec. 8, 2015) (listing and explaining the policy, safety, and environmental concerns and reviews that must occur for a launch site license to be granted).

UK spaceport if it does not meet even just one of those requirements. The UK Report itself recognizes that there are several problems or factors that need to be taken into consideration when selecting a spaceport site.[112] For example, the UK Report recommends that the best option will be to repurpose an existing aerodrome;[113] however, this could easily lead to repurposing it in such a way that may be cost effective, but does not meet an EU future requirement and making that spaceport inoperable under that law. This would result in an enormous waste of time, effort, money, and could affect the public's perception and attitude towards having an operational spaceport.

Another major problem with the UK's plan is that this proposed temporary solution might not be as temporary as it suspects. There is no guarantee that the EU will begin working on spaceplane and flight regulations. According to the EU Issue Tracker, the website that tracks EU legislation, space regulations do not appear on the current or future dockets[114] and there are several reasons suggesting there is no hurry to add them to the docket. Suborbital spaceplane regulation is an issue that does not affect many member states. Sweden and the UK are currently the only member states actively competing for space companies' suborbital business. Thus, there will not be many members pushing for these regulations over other pressing issues, such as economic or climate concerns.[115]

Another reason suggesting the EU will be slow to promulgate regulations is that the regulations will be important. These regulations will define how Europe deals with suborbital and orbital spaceflights for many years to come. This is analogous to the space treaties that currently govern space law.[116] These treaties were all written and signed during the 1960s and 1970s, a time where space travel was not nearly as prevalent; despite this, they are still the governing law.[117] Several commentators

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[112] *See* UK REPORT, *supra* note 7, at 52-53 (citing as factors: operating criteria, safety factors, meteorological considerations, environmental concerns, and economic issues).

[113] *See id.* at 58.

[114] *See generally* EU ISSUE TRACKER, http://www.euissuetracker.com/en/Pages/default.aspx (last visited Dec. 8, 2015) (used website's searched bar with the terms "space" and "Suborbital" and no results returned for either term).

[115] *See generally Major Issues in EU-Related Work 2014*, GOV'T OFF. OF SWEDEN (Oct. 7, 2014), https://web.archive.org/web/20141007180647/http://www.government.se/sb/d/17646 (listing six topics for the EU to focus on 2014: a transparent, effective and democratic Union, measures for growth and increased competitiveness, the EMU's future and the banking union, an ambitious climate policy, asylum and migration, and the EU as a strong global actor). It is worth noting that currently Europe is facing a serious refugee crisis that will further push back any space discussions. *See generally*, *Europe Gets 8,000 Refugees Daily*, BBC NEWS (Sept. 25, 2015), http://www.bbc.com/news/world-europe-34356758.

[116] *See* Michael J. Listner, Note, *The Ownership and Exploitation of Outer Space: A Look at Foundational Law and Future Legal Challenges to Current Claims*, 1 REGENT J. INT'L L. 75, 76 (2003) ("[T]he bulk of current space law incorporates a large body of rules that emanate from various treaties and agreements."); *see also* UK REPORT, *supra* note 7, at 32 ("International space law is based on five UN treaties").

[117] *See Space Treaties and Principles*, UNITED NATIONS OFF. FOR OUTER SPACE AFF., http://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties.html (last visited Dec. 8, 2015).

argue that they are outdated because they only truly contemplated states as space actors, as only governments could afford space programs, and should be rewritten or renegotiated.[118] Therefore, if the EU promulgates regulations, they are likely to affect space travel in Europe for decades to come. As a consequence, the EU will likely take its time in crafting these regulations. For these reasons, despite what the UK Report claims, it may be faster for the UK to promulgate its own regulations to meet its tight deadline and reap the maximum benefits.

Another issue with the UK Report's temporary solution is that U.S. companies and other space companies are looking for countries with stable, favorable regulations. This means regulations that are permissive, flexible,[119] and predictable to allow for stable investments. Developing and starting a space company requires a tremendous amount of capital, so investors have to be careful with the country they choose to operate in. For the UK to adopt a temporary solution means that the system it will set up, that companies will become familiar with it, and it will change when the EU promulgates its own regulation. These new regulations will force companies to reevaluate the costs and benefits of operating in the UK, and they may even be unsure about being able to meet these new requirements. The CAA recognizes this concern in its Report and claims it wants a permissive framework that is flexible in handling spaceplane designs, but will also be flexible enough to adapt to future EU rules.[120] While the CAA has the right perspective, it is unclear with what level of certainty the UK can predict when the EU will promulgate regulations, what the regulations will be, and how compatible the regulations will be with the UK's laws.[121] This uncertainty in the UK's proposed temporary regulations and their potential incompatibility with future EU regulation could greatly frustrate companies and investors in an already uncertain market with uncertain profits.

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[118] *See, e.g.*, Alexander G. Davis, Comment, *Space Commercialization: The Need to Immediately Renegotiate Treaties Implicating International Environmental Law*, 3 SAN DIEGO J. CLIMATE & ENERGY L. 363, 386 (2012) ("[T]reaties bearing on international space issues [should] be renegotiated due to new technologies in space exploration and travel that have emerged in the last decade. But the [Outer Space Treaty] has an even greater reason for renegotiation: the fact that it was signed at a time when space exploration and travel was in its infancy."); Adam G. Quinn, Note, *The New Age of Space Law: The Outer Space Treaty and the Weaponization of Space*, 17 MINN. J. INT'L L. 475, 487 (2008) ("An analysis of the Outer Space Treaty reveals that it is too weak to adequately govern space and therefore needs to be replaced.").

[119] The UK Report notes significant difference among spaceplane designs and operations so regulations must be permissive and flexible to accommodate the variety of spaceplane designs and operations. UK REPORT, *supra* note 7, at 36 ("A permissive regulatory framework needs to be established . . . . The challenge will be to arrive at a suitable regulatory framework for each type of spaceplane operation . . . . It should be compatible with existing spaceplane operations and flexible enough to allow for future regulatory development in the EU . . . ."); *see also id.* at 16-25.

[120] *See* UK REPORT, *supra* note 7, at 36.

[121] An idea discussed in a preceding section.

C. The Report's Reasons for Waiting for the EU Are Unconvincing

Many of the reasons the UK Report cites for not promulgating UK regulations are unconvincing.[122] The most important reason why the UK Report claims the UK should wait for the EU to promulgate space regulations is that spaceplanes qualify as aircrafts under international aviation law and so any regulations the EU promulgates on spaceplanes will be binding on the UK, preempting any national legislation.[123] The UK Report essentially makes the argument that it is not worth the time and effort to promulgate its own regulations since they could eventually be preempted by EU regulations. However, it is unclear just how valid this claim is. The UK Report states definitively that spaceplanes "meet the International Civil Aviation Organization (ICAO) definition of 'aircraft'";[124] however, this seems unclear despite the UK Report's definitive claim. This definition says an "aircraft" is a "machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface."[125] This argument heavily relies upon a "spatialist approach" and definition of space law where the spaceplane would fall under aviation law until it reaches outer space.[126] This is in contrast to the "functionalist approach," which says that however suborbital activity is regarded, as aviation activity or space activity, should determine the applicable law.[127] This is because any spaceplane would necessarily have to travel and derive support through the atmosphere; however, it does not necessarily follow that aviation law is the appropriate governing law. It makes more sense to allow space law and regulations to govern spaceplanes because they were designed for them, whereas aviation law was designed for airplanes. Even the ICAO itself recognizes that it is unclear whether or not spaceplanes would qualify as airplanes and be subject to aviation

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122 *See id.* at 33 (containing brief summary of its reasons).

123 *See id.*

124 *Id.*

125 *Id.*; *see also* EUROPEAN AVIATION SAFETY AGENCY, ANNEXES TO THE DRAFT COMMISSION REGULATION ON 'AIR OPERATIONS – OPS' 1, https://easa.europa.eu/system/files/dfu/Annexes%20to%20Regulation.pdf.

126 COMM. ON THE PEACEFUL USES OF OUTER SPACE, CONCEPT OF SUBORBITAL FLIGHTS, *supra* note 72, at 5 ("From a spatialist viewpoint, there is no clear indication in international law on the delimitation between airspace and outer space which would permit to conclude on the applicability of either air law or space law to sub-orbital flights. On the other hand, it might be argued from a functionalist viewpoint that air law would prevail since airspace would be the main centre of activities of sub-orbital vehicles in the course of an earth-to-earth transportation, any crossing of outer space being brief and only incidental to the flight."); *accord* Masson-Zwaan, *supra* note 11, at 264.

127 *See supra* text accompanying note 126.

regulation since they possess qualities consistent with both aircraft and rockets.[128] The ICAO has recently stated they may begin to discuss this issue in early 2015.[129]

The next document that would determine whether the UK could promulgate national regulations for spaceplanes is the Treaty on the Functioning of the European Union (TFEU). The TFEU is the governing treaty between member states of the EU that has codified EU areas of competency. These areas of competency designate the areas in which the EU can exercise preempting legislation over member states. It is unclear if EU space laws would preempt national space laws. The TFEU lists three different kinds of competencies the EU possesses: (1) exclusive, (2) shared, and (3) support. When the EU possesses exclusive competency in an area only the EU can promulgate legislation in that area.[130] When the EU has shared competency with a member state, both are able to promulgate legislation.[131] Member states are allowed to exercise their competency to the extent that the EU has chosen not to exercise competency; hence they must verify the EU has made such a decision.[132]

The space industry has the possibility of being classified as either transport, which is a shared competency, tourism, which is a support competency, or in its own category that would grant the UK parallel competency. Article 4, section 2 lists the areas where EU and its member states have shared competency, and transport is listed there.[133] Aviation would thus fall under this shared competency of transport.

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[128] COMM. ON THE PEACEFUL USES OF OUTER SPACE, CONCEPT OF SUBORBITAL FLIGHTS, *supra*, note 72, at 2-3, 5 (claiming that during the upward portion of a suborbital spaceplane's trajectory it would qualify more as a rocket, but on the downward part it would qualify more as an aircraft).

[129] Allison Lampert, *UN Aviation Body to Mull Space Safety as Space Taxis Ready for Flight*, REUTERS (Sept. 19, 2014), http://uk.reuters.com/article/2014/09/19/aerospace-space-icao-idUKL1N0RK2LS20140919 ("'We're starting to look at (suborbital space travel) more closely,' said a representative on the International Civil Aviation Organization's (ICAO) governing council who spoke to Reuters on condition of anonymity. Montreal-based ICAO will hold its first conference on issues related to commercial space travel in early 2015 and will discuss whether it should expand its governance to include oversight of suborbital space travel.").

[130] *See* Consolidated Version of the Treaty on the Functioning of the European Union art. 2, § 1, Mar. 30, 2010, 2010 O.J. (C 83) 47 [hereinafter TFEU] ("When the Treaties confer on the Union exclusive competence in a specific area, only the Union may legislate and adopt legally binding acts, the Member States being able to do so themselves only if so empowered by the Union or for the implementation of Union acts.").

[131] *See id.* art. 2, § 2 ("When the Treaties confer on the Union a competence shared with the Member States in a specific area, the Union and the Member States may legislate and adopt legally binding acts in that area. The Member States shall exercise their competence to the extent that the Union has not exercised its competence. The Member States shall again exercise their competence to the extent that the Union has decided to cease exercising its competence.").

[132] *Id.*

[133] *Id.* (listing as areas of shared competency: "(a) internal market, (b) social policy, for the aspects defined in this Treaty; (c) economic, social and territorial cohesion; (d) agriculture and fisheries, excluding the conservation of marine biological resources; (e) environment; (f) consumer protection; (g) transport; (h) trans-European networks; (i) energy; (j) area of freedom, security and justice; (k) common safety concerns in public health matters").

Further, it seems the CAA believes suborbital flights would also be classified under transport.[134] Interestingly, space is not mentioned in this section, but is instead mentioned in Article 4, section 3, which states that "[i]n the areas of research, technological development and space, the Union shall have competence to carry out activities, in particular to define and implement programmes; however, the exercise of that competence shall not result in Member States being prevented from exercising theirs."[135] Because space is not in the list of shared competencies, but in its own separate section, at least one scholar has referred to space as a "parallel competence."[136] It is also possible that suborbital spaceflights could qualify under tourism, which is classified as a support competency.[137] This would mean the EU would not have power to enact binding legislation.[138] It should be clear that the UK Report's conclusion is based on the presumption that EU legislation would be binding when in truth, it is possible that the UK has parallel competency, or perhaps even support competency, and thereby does not have to wait for the EU. This would make EU legislation not binding on member states and would allow the UK to promulgate its own regulations without fear of preemption.[139]

Another reason the UK Report claims to support waiting for the EU is that national legislation could take years to develop.[140] This claim also rests on questionable presumptions. First, if the UK chooses to adopt its own legislation and it is based loosely off the FAA/AST's rule then drafting the legislation may not be as challenging or take as long as the UK Report suggests.[141] The UK Report suggests that taking years for such regulation would be a problem,[142] but should legislation proposals start immediately, and with the FAA/AST rule and Space Launch Act as framework it is not unreasonable for legislation to be complete by 2017. This proposition also fails to acknowledge that the EU may take years to develop legislation, as well.

D. The Benefits of Adopting National Rules Aligned with the FAA/AST Rules

Should the UK adopt its own national legislation for space regulations, based on the FAA/AST's rule, there are many immediate benefits. The most obvious benefit is that the UK will be able to put its goal of reaching this 2017 deadline in its own

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134 UK REPORT, *supra* note 7, at 33.

135 TFEU, *supra* note 130, at art. 4, § 3.

136 Masson-Zwaan, s*upra* note 11, at 268.

137 *Id.* ("If considered as tourism and, hence, as a 'support' competence for the Union, the EU would *not* have the power to enact EU legislation in the field and legislation would be left to the Member States.").

138 *See id.*

139 *See id.*

140 UK REPORT, *supra* note 7, at 33 ("legislation would take some years to develop, meaning that it is unlikely that new legislation could be in place within the desired timescales to allow commercial space operations from the UK in the short term.").

141 *Cf. id.* at 39 (adopting the U.S. definition of a sub-orbital spaceplane into UK law would take considerable time).

142 *See id.* at 33.

hands and not be dependent on the EU. It would have control over the regulations that are promulgated and be able to draft them in the best interest of the UK and its space companies. This would also create some certainty in such an uncertain area for not only the UK space companies and investors, but also for foreign space companies trying to enter the European market. This would also guarantee that the UK's rules could harmonize with the FAA/AST to allow U.S. companies to operate in the UK. The last obvious benefit is that it would allow the UK to remain competitive with Sweden, which currently has the upper hand with an operational spaceport.

Another benefit of adopting legislation similar to the FAA/AST is that the CAA, which published the UK Report, is the likely authority to promulgate space regulations for the UK, and is already familiar with most of the FAA/AST's rule. The UK Report discusses the FAA/AST's rule and agrees with most of its major points, which would make adopting a similar rule relatively painless.[143] For example, the UK Report believes that because spaceplanes are so new, regulations should be minimal for the time being with the goal of having regulations for things like design in the future just as the Space Launch Act required of the FAA/AST.[144] The UK Report also wants to adopt the informed consent doctrine for the spaceflight participants just as the FAA/AST rule did.[145] The UK Report emphasizes that because spaceplanes are so new and will have minimal government approval, as compared to the level of safety people are accustomed to with airplanes, the focus, like the FAA/AST rule, will have to be on protecting the uninvolved public.[146] The UK Report even acknowledges that the UK should give due respect to the FAA/AST safety regulations for licensing requirements when designing its own.[147]

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[143] *See, e.g.*, UK REPORT, *supra* note 7, at 37-39.

[144] *Compare id.* at 36 ("In order for sub-orbital spaceplane operations to take place from the UK by 2018 or earlier, a permissive regulatory framework needs to be established . . . . In the longer term, the aim of regulation of commercial spaceplane operations will be to provide the best possible level of safety assurance that can be achieved by establishing rules and guidance material which promote a culture of safety management, safe spaceplane design and manufacture, together with safe operation . . . ."), *with* 51 U.S.C. § 50905(c)(3) (2012) ("Beginning on April 1, 2016, the Secretary may propose regulations under this subsection without regard to paragraph (2)(C) and (D). Any such regulations shall take into consideration the evolving standards of safety in the commercial space flight industry.").

[145] *Compare* UK REPORT, *supra* note 7, at 40 ("[S]paceplane flight crew and participants will have to be informed of the inherent risks, including to their health, and [the spaceplane's] known safety record before flight. Crew and participants will have to acknowledge receipt of this information in writing; this is known as informed consent."), *with* 14 C.F.R. § 460.45(a) (2015) ("An operator must inform each space flight participant in writing about the risks of the launch and reentry, including the safety record of the launch or reentry vehicle type. An operator must present this information in a manner that can be readily understood by a space flight participant with no specialized education or training . . . .").

[146] *See* UK REPORT, *supra* note 7, at 35 ("[P]rotecting the uninvolved general public, rather than participants and crew, becomes our underlying priority.").

[147] *See id.*, at 43 ("Given that the FAA AST licensing system includes assessments of safety standards and operating procedures, the UK should develop a methodology that gives due recognition to FAA AST verification of these assessments.").

Not only does the UK Report agree with most of the major components of the FAA/AST rule, it also recognizes the more practical implication that the majority of the space companies that will be operational within the next few years are based in the U.S.[148] These U.S. space companies are designing its spaceplanes to meet U.S. safety and operational requirements.[149] Thus, having similar or identical regulations would be a good incentive for these U.S. companies to operate in the UK over other countries, like Sweden, that may have more cumbersome regulations.[150]

Another major benefit in adopting the FAA/AST's rule is that it may become an international standard that influences the EU's future regulations. At least one scholar has suggested that the FAA/AST's rules for spaceflight regulation, as the first of their kind to be tested soon,[151] will likely set an international standard and will influence other States or even international regulations including the EU.[152] An analogous example of this can be found in the Truman Declaration, which established the concept of the Continental Shelf in 1945.[153] This declaration endowed coastal states with the authority to exercise jurisdiction over economic exploitation of the mineral resources in the continental shelf of their coasts.[154] This proclamation, which was made into U.S. law, eventually became an international customary norm and was eventually enshrined in treaties and became international law.[155] Therefore, it is possible that since the FAA/AST rule will be the first of its kind to be tested, it will set a standard for other States and could be a catalyst for the creation of new international customary norms, which could eventually be encapsulated in the new space treaties some scholars claim are required.[156]

CONCLUSION

The benefits to the UK for adopting its own permanent national legislation greatly outweigh the UK Report's concerns and the alternative, temporary approach it recommends. Because it already agrees with most parts of the FAA/AST's rule,

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[148] *Id.* at 20-23; *see also id.* at 43 ("In the short term, a number of UK sub-orbital operations are likely to use spaceplanes that have been designed and manufactured in the US . . . .").

[149] *See id.* at 37 ("Given that the designs of the spaceplanes that are most likely to launch from the UK by 2018 or earlier have been developed in line with the US model, any regulation we propose should be compatible with this model.").

[150] *See id.* at 39.

[151] *See* Taylor Dinerman, *2016 Could Be the Year Space Tourism Takes Off*, OBSERVER (Sept. 22, 2015), http://observer.com/2015/09/2016-could-be-the-year-space-tourism-takes-off.

[152] *See* Hobe et al., *supra* note 6, at 367 ("Arguably, the U.S. approach is perhaps the one step forward that will lead the way for other States.").

[153] Proclamation No. 2667, 10 Fed. Reg. 12303-01 (Sept. 28, 1945).

[154] *Id.*

[155] North Sea Continental Shelf Cases (Fed. Republic of Ger./Neth.) 1969 I.C.J. 3, 33-34 (Feb. 20) ("The Truman proclamation however, soon came to be regarded as the starting point of the positive law on the subject, and the chief doctrine it enunciated . . . came to prevail over all others, being now reflected in Article 2 of the 1958 Geneva Convention . . . .").

[156] *See supra* text accompanying note 118.

creating national legislation similar to this rule will not be difficult or time-consuming. It is unclear whether the EU will be promulgating space regulations in the near future, and since time is of the essence to realize the maximum benefits, adopting its own legislation is the more prudent choice. It is also unclear whether EU regulations would even preempt their national legislation and at the very least the UK, as a prominent member of the EU, could play a strong hand in developing EU regulations to be compatible with its own. Last, the FAA/AST's rule is the first of its kind and it is likely it will influence future space regulation in other countries. Therefore, the UK should disregard the UK Report's recommendation and forge ahead by legislating its own national space regulations.