

terms”, to outline the intended interpretation of the Act’s various phrases.

6. Consider whether removing the distinction between raw data and remote sensing products, so that both are treated as remote sensing products currently are (permitted distribution unless specifically prohibited by the Minister), is feasible from a security standpoint.

7. Investigate whether there are more appropriate ways of addressing the seeming difficulties associated with the definition of “transform.” Similarly, utilize the authority granted under section 20(1)(a) to denote specific activities as either transforming or not transforming raw data.

8. If possible, streamline the licensing process for bent-pipe ground stations that do not store, process or distribute any data/products within Canada.

9. Define the scope of “operate” in section 5 to determine who must be licensed for their activities related to the operation of a remote sensing space system or, alternatively, establish an exemption process for persons acting as employees or agents of remote sensing satellite operators from procuring a license where reasonable to do so.

10. Amend the Act so that the default term of a license is for the lifetime of the satellite system. Conversely, issue a Client Procedural Circular or similar document that communicates the official position of the regulator on this position.

11. Consider implementing a deadline by which the Minister must provide a decision on an application for license. Additionally, applicants seeking a remote sensing space system license should begin to involve the regulator as early as possible in the design and development stages of their operation.

12. Engage with licensees affected by a section 14 restriction order to determine whether alternative courses of action may reach the same objective without hindering commercial operations or whether there are ways to mitigate the harm caused to the commercial operator (such as compensation for loss of business).

13. Ensure proper compensation for priority access (as made available in the Regulations) and clarify what kinds of representations

may be made by an operator and what effect such representations would have on the priority access order.

14. Monitor remote sensing security strategy to ensure Canada's security interests are maintained despite changing international players and evolving and divergent interests.

15. Embed within the Act different ways of stimulating commercial interest so that the balance between security and technological development is regained.

16. Provide the regulatory office in charge of remote sensing with significantly more resources and more personnel.

17. Establish an independent regulatory body that is tasked with overseeing the RSSSA from the perspective of reviewing applications, granting licenses, conducting inspections, monitoring compliance, etc. The independent body should be provided with sufficient financial resources, technical expertise, a broad mandate to regulate (in consultation with other key departments and agencies) and should aim to facilitate commercial space remote sensing activities.

18. Implement a reasonable fee in the application and licensing process that will establish a certain level of expected service and, if implemented on a cost-recovery basis, will alleviate the resource shortages currently associated with the regulator's office.

19. Implement a formal process whereby the licensee and the regulator have an opportunity to discuss and review a license (before and after it is issued), such that any disagreements regarding conditions or restrictions can be resolved or mitigated as best as possible without needing to undertake the license amendment process.

20. Engage community stakeholders by attending industry and academic conferences, publishing client information circulars and establishing an easily and intuitively-accessible online presence to explain clearly and candidly what kinds of activities fall within the scope of remote sensing as defined in the Act.

21. Include a provision that would allow Canada to be indemnified by a private entity for damages it is required to pay internationally as a result of a private entity's space activity causing damage as well as a provision that requires all operators to procure insurance to cover the liability risks associated with space activities.

22. Enter discussions that harmonize international rules related to the cloud so that anyone operating in the cloud, regardless of physical location, is subjected to the same regulations and/or operating procedures since attempting to unilaterally address issues related to the cloud will cause severe consequences to private industry.

23. Engage foreign allies in high- and low-level discussions in an attempt to harmonize the various rules, procedures, standards, methods and strategies by which remote sensing operations are regulated.

24. Enact a general Outer Space Act that would apply to new and emerging space activities as they become a reality.

# HERE A SPACEPORT, THERE A SPACEPORT, EVERYWHERE A SPACEPORT?

*Michelle L.D. Hanlon\**

## ABSTRACT

Arguably, the first location that can be considered a spaceport is located on an island in the Baltic Sea. Peenemünde, Germany was the launch site of the first human-made object to reach space: a German V-2 rocket. Developed as a weapon, the first successful test flight of the V-2 in 1942 nevertheless heralded the birth of space travel. It was not long before the Soviet Union and the United States were testing launch systems from sites like Baikonur, Kazakhstan and the White Sands Missile Range in New Mexico, respectively. In the decades since that first launch, space has come to play an integral, if not vital, role in the daily lives of humans. More and more nations have become spacefaring, and more and more commercial entities are investing or engaged in space activities. Commercial spaceports are literally popping up all over the world. In seeking to appreciate this phenomenon, this article provides an overview of the current status of the commercial spaceport industry in the United States. It commences with a review of the federal regulatory framework which has supported the genesis and growth of spaceports. It evaluates the development progress and success of existing spaceports as well as new legislation designed to sustain this growth. Ultimately, it offers recommendations to nations and entities and encourages communities to welcome the construction of a spaceport as a first sustainable step to the future.

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Space is no longer the jurisdiction of little men in funny suits, Star Trek movies or the Shuttle. The international commercial space industry is our highway into the 21st century and holds the promise of enormous economic benefits to our entire [world].

—United States Congresswoman Andrea H. Seastrand, 3  
February 1995

## I. INTRODUCTION

In July 1994, a “shattered comet” with an explosive force “400 times the power of the world’s entire nuclear arsenal” struck Jupiter “leaving a scar . . . greater than the size of the entire planet earth”<sup>1</sup> Thankfully, the good citizens of Green River City, Wyoming, rolled out their welcome mat and, in the weeks before the collision, dedicated the dirt and gravel runway seven kilometers from the city center as the Greater Green River Intergalactic Spaceport.<sup>2</sup> The publicly stated purpose was to welcome Jovians fleeing the carnage on their planet.<sup>3</sup> Whether the result of a tongue-in-cheek ploy to attract tourists, a nascent – and prescient – effort to attract aerospace business, or simply the brainchild of over-excited science fiction aficionados, the Federal Aviation Administration (FAA) accepted the grandiose appellation. As such, the location the FAA identifies as “48U” remains formally known as an intergalactic

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<sup>1</sup> “A Big Hit: Shoemaker-Levy Comet Bombarbs Jupiter” (NBC Nightly News broadcast July 18, 1994) available at <https://archives.nbclearn.com/portal/site/k-12/browse/?cuecard=42582>.

<sup>2</sup> Kaushik, *The Greater Green River Intergalactic Spaceport*, AMUSING PLANET (Oct. 1, 2015), <http://www.amusingplanet.com/2015/10/the-greater-green-river-intergalactic.html>.

<sup>3</sup> Eric Grundhauser, *The Greater Green River Intergalactic Spaceport*, SLATE (July 30, 2015), [http://www.slate.com/blogs/atlas\\_obscura/2015/07/30/wyoming\\_s\\_greater\\_green\\_river\\_spaceport\\_was\\_built\\_to\\_welcome\\_refugees\\_from.html](http://www.slate.com/blogs/atlas_obscura/2015/07/30/wyoming_s_greater_green_river_spaceport_was_built_to_welcome_refugees_from.html).

spaceport.<sup>4</sup> Sadly, the spaceport has never been developed, and reports suggest even the spaceport's sign is now gone.<sup>5</sup> However, all is not lost for intrepid interstellar travelers. There are eleven fully-licensed and at least seven in-the-process of being licensed commercial spaceports around the United States (US) alone, and the trend is going global. Canada, Sweden, the United Kingdom, the United Arab Emirates, New Zealand, Malaysia, the Netherlands, Italy and Curaçao, among others, either have or are considering the development of commercial spaceports as well.

Are these states and nations throwing good money at fanciful illusions of galactic tourism and trade only to end up, like Greater Green River, just a landing strip without even a sign? Or are they truly on the threshold of the future, assuring that they are better-prepared than their neighbors to welcome the space age? This paper reviews the current status of the commercial spaceport industry in the US commencing with the federal regulatory framework which has supported its genesis and growth. It will evaluate the development process and success of existing spaceports and offer recommendations for newcomers. It will review the Comstock Amendment<sup>6</sup> to the FAA Reauthorization Act of 2018<sup>7</sup> and within that rubric, propose regulatory revision and implementation designed to promote the proliferation of spaceports. Because, ultimately, whether to anchor an aerospace tenant, welcome sub-orbital transport vehicles, or support future space tourism or resource utilization efforts, a carefully planned spaceport development project can only reap long-term rewards.

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<sup>4</sup> As of March 30, 2017, a search of the FAA database of airports in Wyoming returns a page for "GTR Green River Intergalactic Spaceport" at Location ID 48U. See *Airports Contacts Information*, FED. AVIATION ADMIN., [https://www.faa.gov/airports/airport\\_safety/airportdata\\_5010/menu/contacts.cfm?Region=&District=&State=WY&County=&City=GREEN%20RIVER&Use=&Certification](https://www.faa.gov/airports/airport_safety/airportdata_5010/menu/contacts.cfm?Region=&District=&State=WY&County=&City=GREEN%20RIVER&Use=&Certification) (last visited Mar. 18, 2019).

<sup>5</sup> See *Greater Green River Intergalactic Spaceport*, ATLAS OBSCURA, <http://www.atlasobscura.com/places/greater-green-river-intergalactic-spaceport> (last visited Mar. 18, 2019).

<sup>6</sup> FAA Reauthorization Act of 2018, Pub. L. No. 115-254, § 580, 302 H.R. (132 Stat. 3186) 209 (2018) [hereinafter Comstock Amendment].

<sup>7</sup> FAA Reauthorization Act of 2018, Pub. L. No. 115-254, 132 Stat. 3186 (2018).

## II. HOW DID WE GET HERE - A BRIEF HISTORY

A. *Responding to Market Forces*

The US government has “built, operated, and maintained a space launch infrastructure”<sup>8</sup> since the 1950s. Indeed, from “1963 to 1980, the US government . . . launched 100 percent of the western world’s commercial satellites.”<sup>9</sup> During this time, launch vehicles and their components were “nearly all expendable”<sup>10</sup> and coastal locations— namely US government-operated launch sites at Cape Canaveral Air Force Base in Florida and Vandenberg Air Force base in California, became dominant hubs of space launch activity.

In the 1970s, when the European Space Agency developed its Expendable Launch Vehicle (ELV), Ariane, it became “the first competitor to NASA for commercial launches.”<sup>11</sup> Coincidentally, as Europe entered the ELV market, the US seemed intent on abandoning it. In the late 1970s, the US decided to shut down ELV production and implement “a policy to launch all satellites, both government and commercial on the Space Shuttle.”<sup>12</sup> However, it soon became apparent “that the flight schedule of the shuttle could not meet all of the U.S. security, civil, and commercial launch requirements.”<sup>13</sup>

Recognizing this reality, in July 1982 then US President Ronald Reagan issued a directive affirming the government’s commitment to the Shuttle program, but also promoting the expansion of US “private-sector investment and involvement in civil space and space-related activities.”<sup>14</sup> In 1983, President Reagan issued the Na-

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<sup>8</sup> Licensing and Safety Requirements for Operation of a Launch Site, 65 Fed. Reg. 62,812, 62,813 (Oct. 19, 2000) (to be codified at 14 C.F.R. pt. 400).

<sup>9</sup> John W. Raymond, *Airports and Spaceports: A Historical Comparison* (Mar. 1997) (unpublished research paper, Air Command and Staff College) at 1.

<sup>10</sup> G. Wayne Finger, David L. Keller & Brian S. Gulliver, *Public-Private Spaceport Development* (paper delivered at American Institute of Aeronautics and Astronautics SpaceOps 2008 Conference May 2008) at 1, *available at* <https://arc.aiaa.org/doi/pdf/10.2514/6.2008-3584> (last visited May 6, 2019).

<sup>11</sup> *Id.*

<sup>12</sup> Raymond, *supra* note 9, at 2; *see also* *Origins of the Commercial Space Industry*, FED. AVIATION ADMIN., [https://www.faa.gov/about/history/milestones/media/Commercial\\_Space\\_Industry.pdf](https://www.faa.gov/about/history/milestones/media/Commercial_Space_Industry.pdf) (last visited Mar. 18, 2019) [hereinafter FAA History].

<sup>13</sup> FAA History, *supra* note 12.

<sup>14</sup> NAT’L SEC. COUNCIL, National Security Decision Directive 42, National Space Policy (1982).

tional Security Decision Directive on the Commercialization of Expendable Launch Vehicles, formally reiterating the resolve of the US government to “encourage[] domestic commercial exploitation of space capabilities, technology and services for U.S. national benefit.”<sup>15</sup> The Directive did not address the establishment of commercial launch sites but rather “encourage[d] the use of [U.S.] national ranges for U.S. commercial ELV operations.”<sup>16</sup>

The President used his third State of the Union address, in January 1984, to highlight his administration’s strong commitment to a commercial space industry. Predicting that the market for space transportation would surpass the government’s capacity to develop it, he pledged that his administration would implement a number of executive initiatives to “promote private sector investment in space.”<sup>17</sup> One month later, he issued an executive order which, among other things, formally designated the Department of Transportation (DoT) as the steward of the fledgling commercial space industry and assigned to the DoT the responsibility for “expediting . . . the establishment and operation of commercial launch ranges.”<sup>18</sup>

The US Congress followed up in October with the Commercial Space Launch Act. One of the stated purposes of the Act is “to encourage the United States private sector to provide launch vehicles, re-entry vehicles, and associated services.”<sup>19</sup> The Act defines “launch” to mean “to place, or attempt to place, a launch vehicle and any payload or human being from Earth in a suborbital trajectory; in Earth orbit in outer space; or otherwise in outer space.”<sup>20</sup> Similarly, a “launch site” “means the location on Earth from which a launch takes place . . . .”<sup>21</sup> Pursuant to the Act, a “license is required for . . . a person to . . . operate a launch site . . . in the United States

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<sup>15</sup> NAT’L SEC. COUNCIL, National Security Decision Directive 94, Commercialization of Expendable Launch Vehicles, at 1 (1983).

<sup>16</sup> *Id.*

<sup>17</sup> Ronald Reagan, President of the United States of America, Address Before a Joint Session of the Congress on the State of the Union (Jan 25, 1984) [hereinafter Reagan SOTU].

<sup>18</sup> Commercial Expendable Launch Vehicle Activities, Exec. Order No. 12465, 3 C.F.R. § 2 (Feb. 21, 1984).

<sup>19</sup> 51 U.S.C. § 50901(b)(2) (2012).

<sup>20</sup> § 50902(7)(A).

<sup>21</sup> § 50902(10).

[and] for a citizen of the United States . . . shall operate a launch site . . . outside the United States.”<sup>22</sup>

The Congress urged a light touch, calling for “stable, minimal, and appropriate regulatory guidelines that are fairly and expeditiously applied”<sup>23</sup> and regulations “only to the extent necessary . . . in order to ensure compliance with international obligations of the United States and to protect the public health and safety, safety of property, and national security interests and foreign policy interests of the United States.”<sup>24</sup> In response, the DoT created the Office of Commercial Space Transportation (AST) to oversee the licensing process.<sup>25</sup>

### *B. Tragedy Becomes a Catalyst*

Despite this federal encouragement, the “commercial space launch industry remained small”<sup>26</sup> due to the difficulties associated with competing against the “government subsidized space shuttle.”<sup>27</sup> This changed after the Space Shuttle Challenger broke apart 73 seconds into its flight on 28 January 1986.<sup>28</sup> In August 1986, when President Reagan announced that a fourth Space Shuttle would be built, he also announced that he expected the private sector to play “an increasingly important role in the American space effort.”<sup>29</sup> He predicted that “[f]ree enterprise corporations will be-

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<sup>22</sup> § 50904(a)(1) & (2). In addition to assuring that the Government is able to assure the safety of launch sites, this provision addresses the US’s obligation pursuant to Article VI of the Outer Space Treaty to bear “responsibility for national activities in outer space” whether carried out by governmental or nongovernmental agencies. Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies art. VI, Jan. 29, 1967, 610 U.N.T.S. 205.

<sup>23</sup> § 50901(a)(6).

<sup>24</sup> § 50901(a)(7).

<sup>25</sup> *Office of Commercial Space Transportation - About the Office*, FED. AVIATION ADMIN, [https://www.faa.gov/about/office\\_org/headquarters\\_offices/ast/about/](https://www.faa.gov/about/office_org/headquarters_offices/ast/about/) (last visited Mar. 18, 2019).

<sup>26</sup> Michael M. Hale, *The Effect of the Commercial Space Launch Act on Department of Defense Contract Administration* (1990) (unpublished thesis School of Systems and Logistics of the Air Force Institute of Technology), *available at* <http://www.dtic.mil/dtic/tr/fulltext/u2/a229497.pdf>.

<sup>27</sup> FAA History, *supra* note 12, at 3.

<sup>28</sup> *Id.*

<sup>29</sup> Ronald Reagan, President of the United States of America, *Statement on the Building of a Fourth Shuttle Orbiter and the Future of the Space Program* (Aug. 15,

come a highly competitive method of launching commercial satellites”<sup>30</sup> and determined that “private firms [were] essential in clearing away the backlog”<sup>31</sup> that had built up while the shuttles were being modified.

In the December following the Challenger disaster, President Reagan decreed, pursuant to another National Security Decision Directive, that the Space Shuttles “shall no longer provide launch services for commercial and foreign payloads unless those spacecraft have unique, specific reasons to be launched aboard the Shuttle.”<sup>32</sup> Although the Directive authorized the governmental redevelopment of ELVs, the administration recognized that there would be a significant gap in launch services. Thus, in early 1988, President Reagan issued a revised National Space Policy which, among other things, directed government agencies to “encourage and not preclude the commercial use and exploitation of space technologies and systems for national economic benefit.”<sup>33</sup> Perhaps realizing that a thriving commercial space industry could also be a boon to the domestic economy, the President tasked his government to “work cooperatively to develop and implement specific measures to foster the growth of private sector commercial use of space.”<sup>34</sup>

### C. *The Regulatory Foundation*

The first formal commercial launch regulations<sup>35</sup> were issued on 4 April 1988 with an acknowledgement that “the United States private sector would have to assume a new and significant role

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1986), available at <https://www.reaganlibrary.archives.gov/archives/speeches/1986/081586f.htm>.

<sup>30</sup> *Id.*

<sup>31</sup> *Id.*

<sup>32</sup> NAT'L SEC. COUNCIL, National Security Decision Directive 254 (1986).

<sup>33</sup> *Presidential Directive on National Space Policy, 11 February 1988 -Unclassified Summary*, NASA, <https://www.hq.nasa.gov/office/pao/History/policy88.html>.

<sup>34</sup> *Id.*

<sup>35</sup> Interim regulations were published by the Office of Commercial Space Transportation on February 26, 1986. Open for public review, the interim regulations on licensing received only 13 comments. Of those 13 comments, only one offered by the House Committee on Science and Technology covered the licensing of launch sites; that one comment regarding the licensing of launch sites focused on how the Office would complete an *ad hoc* review within the statutory time limit of 180 days. Commercial Space Transportation; Licensing Regulations, 53 Fed. Reg. 11004-06 (Apr. 4, 1988) (to be codified at 14 C.F.R. pt. 400).

alongside the government in assuring the nation's access to space."<sup>36</sup> In this first set of regulations, launch site operation was included in the definition of "[l]aunch activity."<sup>37</sup> While not providing a separate definition, it was anticipated that the AST would issue specific licenses authorizing the operation of a launch site. Requests for such licenses would be "reviewed on the basis of the applicant's capability to operate a facility where safety operations are conducted on a continuing basis as support for the launching of a specified class of launch vehicles."<sup>38</sup> As the AST explained in its supplemental guidance, it proposed to review launch site license applications "on an *ad hoc* basis relying, as an interim measure, on existing governmental launch expertise, experience, and safety practices as reference."<sup>39</sup>

Under this regulatory rubric, the development of a privately run launch site still failed to gain traction. Initially, private companies focused on developing ELVs which were being launched from government launch sites. However, in 1993, the US Department of Defense (DoD) was appropriated \$10 million "for grants to be made for the development of dual use space launch facilities to support Department of Defense and commercial space launch requirements."<sup>40</sup>

In 1995, the AST issued guidelines describing the information that the office would require from an applicant seeking a launch site operator license. As directed by the Commercial Space Act, the key concerns for the AST were threefold: public health and safety, the safety of property, and the national security or foreign policy interests of the US."<sup>41</sup> With these goals in mind, the office would

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<sup>36</sup> *Id.* at 11,004.

<sup>37</sup> *Id.* at 11,013.

<sup>38</sup> *Id.* at 11,015.

<sup>39</sup> *Id.* at 11,006.

<sup>40</sup> Raymond, *supra* note 9, at 15 (citing Briefing, Assistant Secretary of the Air Force (Space) Subject: FY 93 & 94 Dual Use Space Launch Infrastructure Grant Program, 30 May 1996). Emerging spaceport projects in California, Florida, Alaska and New Mexico received a total of \$13.94 million in federal grants in 1993 and 1994. *Id.*

<sup>41</sup> Licensing and Safety Requirements for Operation of a Launch Site, 64 Fed. Reg. 34,316, 34,317 (June 25, 1999) (to be codified at 14 C.F.R. pt. 400). The Office of Commercial Space Transportation of the Federal Aviation Administration now implements licensing responsibilities. At the time the guidelines were initially developed, the Office of Commercial Space Transportation was considered part of the Department of Transportation, but not within the structure of the FAA.

perform three distinct reviews covering: launch site location; environmental matters; and national security/foreign policy.

i. Launch Site Location Review

The AST, naturally, sought information regarding a launch site's geographic characteristics including "location, size, and shape, . . . topographic and geological characteristics."<sup>42</sup> From a public safety standpoint, it was also important to describe the sites "proximity to populated areas, and any local commercial and recreational activities that may be affected by launches such as air traffic, shipping, hunting, and offshore fishing."<sup>43</sup> As part of the ground safety review, applicants were required "to perform a hazard analysis and develop a comprehensive ground safety plan and a safety organization"<sup>44</sup> which included a discussion of explosive safety. Significantly, the AST noted, "little or no launch site location review would be needed if the applicant proposed to locate a launch site at a federal launch range."<sup>45</sup>

The potential licensee also had to describe "possible flight paths and general impact areas designated for launch."<sup>46</sup> Among other things, if it was intended that flight paths overfly land, the applicant had to "provide flight safety analyses for generic sets of launch vehicles and describe, where applicable, any arrangements made to clear the land of people prior to launch vehicle flight."<sup>47</sup>

Finally, the applicant was required to describe the so-called meteorological environment and provide "data regarding temperature, surface and upper wind direction and velocity, temperature inversions, and extreme conditions that may affect the safety of launch site operations."<sup>48</sup> The license-seeker also had to indicate "the frequency (average number of days for each month) of extremes in wind or temperature inversion that could have an impact on launch."<sup>49</sup>

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<sup>42</sup> *Id.* at 34,318.

<sup>43</sup> *Id.*

<sup>44</sup> *Id.*

<sup>45</sup> *Id.*

<sup>46</sup> *Id.*

<sup>47</sup> *Id.*

<sup>48</sup> *Id.*

<sup>49</sup> *Id.*

## ii. Environmental Review

In addition, potential launch site operators had to supply information to allow the AST to meet its environmental impact requirements under the National Environmental Policy Act (NEPA). NEPA's goal is to assure that "the federal government to use all practicable means to create and maintain conditions under which man and nature can exist in productive harmony."<sup>50</sup> Since issuing a license for the operation of a launch site is considered a federal action, the DoT was required to prepare an environmental impact statement "assessing the environmental impact of and alternatives to"<sup>51</sup> the issuance of such license. Assessing "environmental impact" includes reviewing, among other things:

Air quality, Land use, Biological resources . . . , Natural resources and energy supply, Noise and compatible land use, Climate, Coastal resources, Socioeconomics, environmental justice, and children's environmental health and safety risks, . . . Farmlands, Visual effects . . . Hazardous materials, solid waste, and pollution preventions, Water resources . . . [and] Historical, architectural, archeological, and cultural resources.<sup>52</sup>

The entire environmental review process typically takes at least twelve to twenty-four months.<sup>53</sup>

## iii. Policy Review

Finally, the license application was also reviewed "to determine whether operation of the proposed launch site would jeopard-

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<sup>50</sup> National Environmental Policy Act, 42 U.S.C §§ 4321-70 (2012).

<sup>51</sup> *What is the National Environmental Policy Act?* ENVTL. PROT. AGENCY, <https://www.epa.gov/nepa/what-national-environmental-policy-act#NEPA> (last visited Mar. 18, 2019).

<sup>52</sup> Presentation, Pam Underwood & Stacey Zee, Fed. Aviation Admin., EIS for Spaceport Camden, Camden County Georgia (Dec. 7, 2015) at 10, [https://www.faa.gov/about/office\\_org/headquarters\\_offices/ast/environmental/nepa\\_docs/review/documents\\_progress/camden\\_spaceport/media/Spaceport\\_Camden\\_EIS\\_ScopingPresentation\\_v1\\_508.pdf](https://www.faa.gov/about/office_org/headquarters_offices/ast/environmental/nepa_docs/review/documents_progress/camden_spaceport/media/Spaceport_Camden_EIS_ScopingPresentation_v1_508.pdf).

<sup>53</sup> *See id.* Spaceport Camden commenced the EIS review with a public meeting on December 7, 2015. The public comment period closed on January 16, 2016 and remains listed as work in progress on the FAA website.

ize national security, foreign policy interests, or international obligations of the United States.”<sup>54</sup> In conducting this review, the AST would coordinate with the DoD, the Department of State and “other federal agencies that have responsibility for national and international interests.”<sup>55</sup>

*D. The First Generation Spaceports – Taking Advantage of Federal Infrastructure*

The establishment of a spaceport generally requires significant infrastructure investment as well as competitive subsidy support to woo launch service providers. Developing and running a spaceport requires much more than simply the existence of a launch site. Significant infrastructure requirements include payload processing facilities, range assets, ground control centers, and convenient intermodal connections.<sup>56</sup> Moreover, in the early 1990s, the vast majority of launch vehicles were government-developed vertically integrated ELVs. Thus, pre-existing government infrastructure and proximity to the water were beneficial. Not surprisingly, then, each of the first three private spaceports licensed by the FAA—California Spaceport, Spaceport Florida Authority and Virginia Spaceflight Center—were co-located at a pre-existing federal launch range. Indeed, the regulations “envisioned that most commercial launches would take place from federal launch ranges.”<sup>57</sup> In so doing, the launch operator “must comply with the rules and procedures of [that] federal launch range,”<sup>58</sup> rules and procedures that had already been assessed and approved by the government.

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<sup>54</sup> Licensing and Safety Requirements for Operation of a Launch Site, 64 Fed. Reg. 34,316, 34,320 (June 25, 1999) (to be codified at 14 C.F.R. pt. 400).

<sup>55</sup> *Id.*

<sup>56</sup> See generally Florida Spaceport System Plan 2013 (April 2013) at 4, available at [https://spacecoasttpo.com/wp-content/uploads/2014/06/florida-spaceport-systems-plan-2013\\_final1.pdf](https://spacecoasttpo.com/wp-content/uploads/2014/06/florida-spaceport-systems-plan-2013_final1.pdf) (providing general background regarding the necessary components of a spaceport system).

<sup>57</sup> 64 Fed. Reg. at 34,317.

<sup>58</sup> *Id.*

As such, a large part of the licensing conditions were almost automatically met.<sup>59</sup> This, however, did not demonstrably hasten the licensing process on these first spaceports.

i. The Pioneer: California Spaceport

It had been expected, prior to the Space Shuttle Challenger explosion, that Vandenberg Air Force Base would host its own shuttle launch. Unfortunately, after the disaster, the Air Force cancelled the Vandenberg Shuttle Program,<sup>60</sup> costing the state four thousand jobs, and calling into question the \$5 billion that had been invested in Vandenberg to develop a manned-space facility. In 1993, the state of California stepped in. It created a California Spaceport Authority to “to foster the development of activities in California related to space flight including, but not limited to, space vehicle launches, space education and job training infrastructure and research launches, manufacturing, academic research, applied research, economic diversification, business development, tourism, and education.”<sup>61</sup> The Authority’s mission was “to develop the commercial space industry in California and to assist with defense conversion efforts.”<sup>62</sup> The first project was the development of a commercial spaceport at Vandenberg Air Force Base.<sup>63</sup>

In addition to state support, the proposal required both a federal grant and private funding. The project received “a \$30 million investment by ITT”<sup>64</sup> and was granted \$3 million from the Department of Defense.<sup>65</sup> In 1994, the United States Air Force announced its intention to lease space at Vandenberg to the California Space

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<sup>59</sup> In fact, in 1997, the FAA entered into a Memorandum of Understanding with the Department of Defense and the National Aeronautics and Space Administration “regarding safety oversight of licensed launch site operators located on federal launch ranges.” *Id.* at 34,318.

<sup>60</sup> *Id.*

<sup>61</sup> A.B. 1475, 1997 State Assemb. Reg. Sess. (Cal. 1997).

<sup>62</sup> *Id.*

<sup>63</sup> See Raymond, *supra* note 9, at 16.

<sup>64</sup> Andrea H. Seastrand, “Commercial Space Activities on California’s Central Coast,” *Congressional Record* Volume 141, Issue 22, H11195 at 1196 (Feb. 3, 1995).

<sup>65</sup> Andrea H. Seastrand, “Western Commercial Space Leasing Center Lease Signing,” *Congressional Record* Volume 141, Issue 53, H3529 at 3530 (Mar. 22, 1995).

Authority.<sup>66</sup> The project underwent three review processes, pursuant to the DoT's "case-by-case approach to evaluation"<sup>67</sup> of launch site operator license applications. Since the US Air Force was expected to play a "significant role in California Spaceport's safety process," AST was "able to review . . . the application expeditiously because the applicant certified its intention to observe the safety requirements currently applied."<sup>68</sup>

Finally, in September 1996, the AST granted "the first license to operate a launch site to Spaceport Systems International to operate California Spaceport."<sup>69</sup> Today, the California Spaceport is run by Harris Spaceport Systems and maintains a license for both government launches "and licensed launches of small payload weight class . . . of orbital expendable vehicles."<sup>70</sup> It purports to "offer one-of-a-kind facilities and services with the ability to support a wide variety of satellite customers' processing configurations and specialty requirements."<sup>71</sup> According to its marketing content, it remains the "only continental U.S. complex from which customers can launch their rockets directly at a pole without flying over any land masses while inside Earth's atmosphere."<sup>72</sup> It is also, according to the FAA, "the only exclusively commercially operated launch site in the United States, receiving no federal or state taxpayer funds to operate."<sup>73</sup>

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<sup>66</sup> *Id.*

<sup>67</sup> Licensing and Safety Requirements for Operation of a Launch Site, 64 Fed. Reg. 34,316, 34,317 (June 25, 1999) (to be codified at 14 C.F.R. pt. 400).

<sup>68</sup> *Id.* at 34,318.

<sup>69</sup> Licensing and Safety Requirements for Operation of a Launch Site, 65 Fed. Reg. 62,812, 62,814 (Oct. 19, 2000) (to be codified at 14 C.F.R. pt. 400). Note that the AST was transferred to the FAA in 1995.

<sup>70</sup> Harris Corp., FAA Order No. 01-005 (Rev 2) (Sept. 16, 2016).

<sup>71</sup> HARRIS CORP., <https://www.harris.com/what-we-do/spaceport-operations> (last visited Mar. 18, 2019).

<sup>72</sup> Dan Gillen, *A Spaceport for Smallsats*, HARRIS CORP. (Apr. 3, 2017), <https://www.harris.com/perspectives/harris-for-tomorrow/a-spaceport-for-smallsats>.

<sup>73</sup> Fed. Aviation Admin, *The Annual Compendium of Commercial Space Transportation 2018*, at 26 [hereinafter FAA Compendium 2018]. See also Andrew Tarantola, *8 Spaceports That Are America's Gateway to the Stars*, GIZMODO (Sept. 26, 2013), <http://gizmodo.com/8-spaceports-that-are-americas-gateway-to-the-stars-1257821819>.

## ii. Two More: Virginia and Florida

The next two spaceports to be licensed by the FAA followed a similar path as California Spaceport. They took advantage of pre-existing federal launch ranges, were developed using a combination of federal, state and private sector funds, and commenced with the creation by the state legislature of a space authority.

The Spaceport Florida Authority was created as a state government space agency in 1989.<sup>74</sup> The mission of the Authority – which has since become Space Florida – was “to retain, expand and diversify Florida’s space-related industries.”<sup>75</sup> The Authority commenced with the idea of operating a spaceport at Launch Complex 46 at Cape Canaveral Air Station. The Authority initially received \$4.89 million in federal funds and an additional \$7.2 million in state and private funds. It was licensed by the FAA in 1997 to support both orbital and suborbital launches.<sup>76</sup> Spaceport Florida became the first commercial spaceport to host a launch when NASA’s Lunar Prospector launched “aboard Lockheed Martin’s new Athena-2 in January 1998.”<sup>77</sup> After hosting one more launch in 1999, the spaceport was “largely abandoned.”<sup>78</sup> However, with an additional investment of \$6.6 million from Federal, state and local coffers,<sup>79</sup> the spaceport has been refurbished and has entered into an agreement with Orbital ATK, Inc. to launch Orbital’s Minotaur IV from its site.<sup>80</sup> The first such launch occurred on August 26, 2017.<sup>81</sup> Additionally, it has been reported that British aerospace firm Orbital

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<sup>74</sup> See FLA. STAT. § 331.301 (2018).

<sup>75</sup> FLA. DEPT OF STATE, SPACE AUTHORITY - RECORD GROUP 000795, available at [http://archivescatalog.info.florida.gov/default.asp?IDCFile=/fsa/DETAILSG.IDC,SPECIFIC=487073,DATABASE=GROUP\(date of report unknown\)](http://archivescatalog.info.florida.gov/default.asp?IDCFile=/fsa/DETAILSG.IDC,SPECIFIC=487073,DATABASE=GROUP(date of report unknown)).

<sup>76</sup> Raymond, *supra* note 9, at 18-19 (internal citations omitted).

<sup>77</sup> Assoc. Admin. for Commercial Space Transp., “1997 Year in Review,” (Jan. 1998), at 1.

<sup>78</sup> James Dean, *Cape Canaveral Pad Revived for Minotaur Rocket Launch*, FLORIDA TODAY (Feb. 12, 2017), <http://www.floridatoday.com/story/tech/science/space/2017/02/12/cape-pad-revived-summer-launch-minotaur-rocket/97692258/>.

<sup>79</sup> Marco Santana, *Orbital ATK Launch Injects New Life in Long-Dormant Florida Launch Pad*, ORLANDO SENTINEL (Aug. 26, 2017), <https://www.orlandosentinel.com/news/space/os-bz-orbital-atk-launch-20170825-story.html>.

<sup>80</sup> Dean, *supra* note 78; see also Orbital Sciences Corporation, FAA Order No. LLO 17099 (Feb. 10, 2017).

<sup>81</sup> Santana, *supra* note 79.

Access Limited is planning on establishing “a principal operating base” at the spaceport.<sup>82</sup>

The Virginia Commercial Space Flight Authority (VCSFA) was created by the commonwealth in 1995 to, among other things, “disseminate knowledge pertaining to scientific and technological research and development among public and private entities, including but not limited to knowledge in the area of commercial space flight.”<sup>83</sup> In 1997 the VCSFA entered into an agreement with NASA to use NASA’s Wallops Island, and the Virginia Spaceflight Center was granted a license by the FAA in 1998. While originally licensed for “government launches and licensed launches of small, and medium payload weight class (less than or equal to 11,100 pounds) and of orbital expendable launch vehicles . . . on launch azimuths from 90 degrees east to 160 degrees southeast,”<sup>84</sup> the license has been broadened to include any “U.S. Government or FAA-licensed or permitted launches.”<sup>85</sup>

In July 2003, Virginia entered into a joint governance, and financing, agreement with Maryland and VCSFA became the Mid-Atlantic Regional Spaceport (MARS).<sup>86</sup> MARS received \$90 million from the Commonwealth of Virginia, \$60 million from NASA, and \$10 million from Orbital ATK.<sup>87</sup> Maryland now also contributes to the operating budget. A total of eleven missions have launched from MARS since its establishment.

### iii. The First New Location: Alaska

The Kodiak Launch Complex, now known as the Pacific Spaceport Complex, also found its genesis in a state-owned entity. The

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<sup>82</sup> Kendall Russell, *Orbital Access Limited to Establish Operations Hub at Cape Canaveral Spaceport*, SATELLITE TODAY (Feb. 22, 2017), <http://www.satellitetoday.com/launch/2017/02/22/orbital-access-limited-establish-operations-hub-cape-canaveral-spaceport/>.

<sup>83</sup> Virginia Commercial Spaceflight Center Authority Act, 2199, Gen. Assemb. Reg. Sess. (Va. 1994).

<sup>84</sup> Va. Commercial Spaceflight Auth., FAA Order No. 02-007A (Rev 3) (Dec. 18, 2002).

<sup>85</sup> Va. Commercial Spaceflight Auth., FAA Order No. 02-007A (Rev 4) (Aug. 19, 2014).

<sup>86</sup> *Mid-Atlantic Regional Spaceport (MARS) Implementation Plan*, (Joint Md. & Va. Working Grp. on Reg'l Spaceport Implementation, 2004), <http://dls.virginia.gov/commission/Materials/MARSReport2004.pdf>.

<sup>87</sup> FAA Compendium 2018, *supra* note 73, at 27.

Alaska Aerospace Corporation (AAC), created in 1991, is an independent political and corporate entity located within the Alaska Department of Military and Veterans' Affairs intended to develop a high technology aerospace industry in the state.<sup>88</sup> Located on Kodiak Island in Alaska, it operates the nation's first commercial spaceport not co-located on a federal range. According to the AAC, this provides the added benefit of "allowing customers the flexibility to schedule the support they need without a lot of government red-tape."<sup>89</sup> Nevertheless, the AAC received \$1.85 million from the federal government to fund necessary environmental studies, and an additional \$25 million from the state,<sup>90</sup> though the state ceased all funding in 2014.<sup>91</sup>

The AAC is currently licensed to "operate a launch site . . . for government launches and licensed launches of small payload weight class (less than or equal to 300 lbs) of orbital expendable launch vehicles . . . on launch azimuths between and including 100 degrees and 220 degrees."<sup>92</sup> Launch Pad 1 (LP-1) is designed to launch intermediate-class payloads to low Earth or polar orbits and Launch Pad 2 (LP-2) is designed for suborbital missile testing. A third launch pad is being developed intended to allow the facility to support launches of satellites in under twenty-four hours.<sup>93</sup>

The AAC has launched twenty rockets since receiving its license in 1998,<sup>94</sup> all but one of which have been for the US government. In 2018, Astra Space, a company seeking to develop small satellite launch capabilities, attempted to carry out an extremely secretive suborbital launch from the site. The Pacific Spaceport

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<sup>88</sup> ALASKA STAT. § 26.27.050 (2018).

<sup>89</sup> *Alaska Aerospace FAQ*, AK AEROSPACE, <http://akaerospace.com/frequently-asked-questions> (last visited Mar. 18, 2019).

<sup>90</sup> Raymond, *supra* note 9, at 20.

<sup>91</sup> Joanne Snoderly, *AAC Looking for New Launch Site Nearer Equator*, KODIAK DAILY MIRROR (Jan. 31, 2017), <http://akaerospace.com/news/aac-looking-new-launch-site-nearer-equator>.

<sup>92</sup> Alaska Aerospace Corp., FAA Order No. LSO 03-008 (Apr. 13, 2015).

<sup>93</sup> FAA Compendium 2018, *supra* 73, at 29.

<sup>94</sup> *First Commercial Launch Scheduled for Alaska Aerospace Complex*, THE ASSOC. PRESS (Mar. 20, 2018), <https://www.juneauempire.com/news/first-commercial-launch-scheduled-for-alaska-aerospace-complex/>.

Complex has confirmed that the launch did occur on its third attempt in July 2018.<sup>95</sup> The AAC has also entered into contracts with Vector Space Systems and Rocket Lab.

Interestingly, the AAC is also now considering expanding its operations and has indicated an interest in developing a second launch site “capable of equatorial launches.”<sup>96</sup> The corporation, which is looking at sites in Hawaii and Saipan believes that it will be a “tremendous competitive advantage over anybody else, because there’s no other launch site that can do both equatorial and polar in the United States of America.”<sup>97</sup>

### III. THE NEXT GENERATION: FORMAL RULES

#### A. *The Formal Rules*

With the experience of four licenses under its belt, and the realization not only that more site launch operator applicants were coming, but also that these newer applicants would not, for the most part, be co-locating on federal sites and thus able to easily share and adopt their safety protocols, the FAA, in 1999, abandoned its *ad hoc* approach and drafted formal, and vastly more specific, rules. The regulations now include a specific definition of “launch site,”<sup>98</sup> and as a general matter, do not deviate markedly from the original guidelines except to provide detailed requirements for the gathering and analysis of information.<sup>99</sup> The focus of the rules remains safety and public health.

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<sup>95</sup> Jeff Foust, *Alaska Launch Shrouded in Secrecy*, SPACENEWS (July 27, 2018), <https://spacenews.com/alaska-launch-shrouded-in-secrecy/>.

<sup>96</sup> Snoderly, *supra* note 91.

<sup>97</sup> *Id.* (quoting Alaska Aerospace CEO Craig Campbell).

<sup>98</sup> The definition of launch site parallels the definition offered in the original Commercial Space Act, namely that “Launch site means the location on Earth from which a launch takes place . . . and necessary facilities at that location.” 14 C.F.R. § 401.5 (2016). The regulations also define “Operation of a launch site” as “the conduct of approved safety operations at a permanent site to support the launching of vehicles and payloads.” *Id.*

<sup>99</sup> This Article provides only a brief glance at the specifics required by the rules. For a more detailed and systematic walk through the regulations, the author recommends Michael C. Mineiro, *Law and Regulation Governing U.S. Commercial Spaceports: Licensing, Liability, and Legal Challenges*, 73 J. OF AIR L. & COM. 759 (2008).

i. Launch Site Location Review

Rather than generally describing the launch site's geographic, flight and meteorological characteristics, the regulations now require that an applicant "use specified methods to demonstrate the suitability of the launch site location for launching at least one type of launch vehicle, including orbital, guided sub-orbital, or unguided sub-orbital expendable launch vehicles, and reusable launch vehicles."<sup>100</sup> Moreover, "each proposed launch point on the launch site must be evaluated for each type of launch vehicle that the applicant wishes to have launched from the launch point."<sup>101</sup> The regulations exactly stipulate minimum launch site boundary distances based on the debris dispersion radius of a worst-case scenario<sup>102</sup> and detail how an applicant shall define its flight corridor.<sup>103</sup> Among information required to submitted are:

"[a] map or maps showing the location of each launch point proposed, and the flight azimuth, IIP, flight corridor, and each impact range and impact dispersion area for each launch point; . . . Trajectory data; . . . Wind data, including each month and any percent wind data used in the analysis; . . . Each populated area located within a flight corridor or impact dispersion area; . . . The estimated casualty expectancy calculated for each populated area within a flight corridor or impact dispersion area; . . . and . . . If populated areas are located within an overflight exclusion zone, a demonstration that there are times when the public is not present or that the applicant has an agreement in place to evacuate the public from the overflight exclusion zone during a launch."<sup>104</sup>

If a flight corridor does not "encompass populated areas, no additional analysis would be required."<sup>105</sup> Otherwise, a risk analysis must be prepared and approved by the FAA.<sup>106</sup> The regulations also have added requirements for "the submission of an explosive

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<sup>100</sup> 14 C.F.R. § 420.19.

<sup>101</sup> *Id.*

<sup>102</sup> *Id.* § 420.21.

<sup>103</sup> *Id.* § 420.23.

<sup>104</sup> *Id.* § 420.27.

<sup>105</sup> Licensing and Safety Requirements for Operation of a Launch Site, 64 Fed. Reg. 34,316, 34,318 (June 25, 1999) (to be codified at 14 C.F.R. pt. 400).

<sup>106</sup> *Id.*

site plan”<sup>107</sup> and completed agreements with the US Coast Guard and the FAA Air Traffic Control office with “jurisdiction over the airspace through which launches will take place.”<sup>108</sup>

The regulations continue to stress safety and delineate a number of affirmative, ongoing and specific ground safety responsibilities for launch site operators including:

Preventing unauthorized public access to the site; properly preparing the public and customers to visit the site; informing customers of limitations on use of the site; scheduling and coordinating hazardous activities conducted by customers; and arranging for the clearing of air and sea routes and notifying adjacent property owners and local jurisdictions of the pending flight of a launch vehicle.<sup>109</sup>

#### ii. Environmental Review

The regulations continue to require that the aspiring launch site operator provide all necessary information to prepare an environmental impact statement as required by NEPA. The FAA acknowledges that the environmental review may precede or be concurrent with the licensing process.<sup>110</sup>

#### iii. Policy Review

The regulations require that an applicant supply information relevant to the FAA’s policy approval, “including, for example, identification of foreign ownership of the applicant” and indicates that it will derive other information from the application to make its policy determination.<sup>111</sup> As added protection, the regulations also require licensees to control access to the launch site “through the use of security personnel, surveillance systems, physical barriers, or other means approved as part of the licensing process.”<sup>112</sup>

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<sup>107</sup> *Id.*

<sup>108</sup> 14 C.F.R. § 420.31.

<sup>109</sup> 64 Fed. Reg. at 34,319.

<sup>110</sup> *Id.* at 34,319-20.

<sup>111</sup> *Id.* at 34,320.

<sup>112</sup> 14 C.F.R. § 420.53.

#### iv. The Process

Despite the formal regulations, and recognizing the continued uniqueness of the spaceport business, the launch site operator licensing process retains an organic flavor. The FAA requires that all applicants submit to a “pre-application consultation” pursuant to which the administrators will work with the applicant on preparing a proposal. Not only will the FAA review draft application submissions, but it will help the applicant identify – and presumably work through – distinct issues.<sup>113</sup>

#### v. Exclusive Use Exemption

Notably, the regulations do not require a launch site operator to obtain a launch site operator license if it does not plan on offering its launch platform to others for launch.<sup>114</sup> Launches from such “exclusive use”<sup>115</sup> sites are covered by the launch license. “Exclusive use” launch sites include the Blue Origin launch site in Van Horn, Texas; the SpaceX site in McGregor, Texas; and the Odyssey Launch Platform, the Sea Launch site in the Pacific Ocean.<sup>116</sup>

### B. *The Next Generation Spaceports*

Six more launch site operators have been licensed by the FAA since the formal regulations were promulgated. These next-generation spaceports are an illustration of the diversifying use of space. The most significant trends are the move to develop reusable launch vehicles, thereby reducing the cost of entry into space, and the genesis of realistic space tourism and suborbital adventurism. These two industry expansions have changed the face of spaceports. First, the advancement of reusable and recoverable launch vehicles

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<sup>113</sup> *Id.* § 413.5. See also: *Launch Site Licenses -Pre-Application Consultation*, FED. AVIATION ADMIN., [https://www.faa.gov/about/office\\_org/headquarters\\_offices/ast/licenses\\_permits/launch\\_site/preapp\\_consult/](https://www.faa.gov/about/office_org/headquarters_offices/ast/licenses_permits/launch_site/preapp_consult/) (last visited Mar. 18, 2019).

<sup>114</sup> See 65 Fed. Reg. 207 at 63,923.

<sup>115</sup> Brian Gulliver, *Commercial Spaceports: Where We Are and Where We Are Going* (paper delivered at International Conference on Transportation and Development, 2016).

<sup>116</sup> FAA Compendium 2018, *supra* note 73, at 21. There is also a launch site located about 30 miles northeast of Fairbanks, Alaska. The Poker Flat Rocket Range is the only U.S. launch facility owned and operated by a not-for-profit organization, the University of Alaska, Fairbanks.

means that a spaceport does not need to be located close to water. Secondly, suborbital vehicles are more likely to require horizontal, rather than vertical takeoff, requiring different design and area considerations. Finally, the space tourism industry will need the ability to launch quite frequently in order to achieve financial success. With these trends in mind, the last sixteen years have seen the construction and licensing of what one design firm has coined “Mixed and Customized Spaceports.”<sup>117</sup>

i. Mojave Air & Space Port – Imagination Flies Here

The earliest of the next generation spaceports, the Mojave Air & Space Port in California, boasts many firsts. It is the first US facility to be licensed “to support reusable launch vehicle missions,”<sup>118</sup> the first inland spaceport and the “only private airport in the US with a commercial spaceflight license.”<sup>119</sup> Originally a “small rural airfield serving the local gold and silver mining industry,”<sup>120</sup> the airport is owned by Kern County and has been run by the county-formed East Kern Airport District since 1972. It was granted a license to operate as an aerospace test center and launch and reentry site in 2004. Famously the test site for Virgin Galactic, which celebrated a successful test flight of its VSS Unity from the air and space port in February 2017,<sup>121</sup> sixty companies currently operate out of Mojave, including Scaled Composites, XCOR Aerospace, Masten, Orbital ATK, and Interorbital Systems.<sup>122</sup> Truly diversified, the air and space port includes an industrial park, the National Test Pilot School and an upgraded rail infrastructure with “34 daily rail car shipments” to support the onsite manufacturers, fabricators, and researchers.<sup>123</sup>

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<sup>117</sup> Finger et al., *supra* note 10, at 2.

<sup>118</sup> No. LSO 04-009 Mojave Air & Space Port, FAA Order No. LSO 04-009 (June 13, 2014).

<sup>119</sup> *America’s First Inland Spaceport*, MOJAVE AIR & SPACE PORT, <http://www.mojaveairport.com/history.html> (Mar. 18, 2019).

<sup>120</sup> *Id.*

<sup>121</sup> Tariq Malik, *Virgin Galactic’s SpaceShipTwo Aces 3rd Glide Test Flight*, SPACE.COM (Feb. 25, 2017), <http://www.space.com/35834-virgin-galactic-spaceshiptwo-unity-3rd-glide-test.html>.

<sup>122</sup> FAA Compendium 2018, *supra* note 73, at 28.

<sup>123</sup> *Id.*

## ii. Oklahoma Spaceport – Gateway to Space

The Oklahoma Space Industry Development Authority (OSIDA) was created by the state of Oklahoma in 1999 with “the vision to create a commercial spaceport that will expand and economically develop the space frontier with advanced spacecraft operating facility and concentrations of specialized industry in Oklahoma.”<sup>124</sup> One of its delineated missions was to “create a licensed commercial spaceport in southwest Oklahoma to include facilities necessary for space launch operation and associated industries in specialized space-related fields.”<sup>125</sup> OSIDA was granted a launch site operator license in June 2006 “to support suborbital reusable launch vehicle missions [and] . . . to operate at Clinton-Sherman Industrial Airport,”<sup>126</sup> which conducts approximately 35,000 flight operations annually.<sup>127</sup> It is the only spaceport with an FAA-approved spaceflight corridor that is strictly assigned to the OSIDA and not in restricted airspace or Military Operation Areas, and it has one of the longest and widest runways in the US.<sup>128</sup> Rocket-plane Global “had planned to operate a commercial spacecraft that would take travelers to space,” from Oklahoma, but “failed to deliver” and went bankrupt in 2009.<sup>129</sup> Although the spaceport has yet to launch any orbital or suborbital flights, “Oklahoma lawmakers voted to give OSIDA \$372,887 for 2015 operations costs.”<sup>130</sup> It is estimated that the state has spent \$30 million on the spaceport initiative.<sup>131</sup> In a further effort to attract aerospace business, the state has joined California, Colorado, Florida, New Mexico, Texas, and Virginia by passing space flight liability and immunity legislation

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<sup>124</sup> Okla. Space Indus. Dev. Auth., Business Development Plan FY 2015-2016 (July 9, 2015) at 4, available at [http://airspaceportok.com/wp-content/uploads/2015/01/OSIDA-Business-Plan-FY15\\_16\\_UNCLASSIFIED.pdf](http://airspaceportok.com/wp-content/uploads/2015/01/OSIDA-Business-Plan-FY15_16_UNCLASSIFIED.pdf).

<sup>125</sup> *Id.*

<sup>126</sup> Okla. Space Indus. Dev. Auth., FAA Order No. LSO 06-10 (June 12, 2006).

<sup>127</sup> FAA Compendium 2018, *supra* note 73, at 28.

<sup>128</sup> *More Investment Needed for Multi-Million Dollar Oklahoma Space Agency to Lift-off*, NEWS ON 6 (Nov. 12, 2012), <http://www.newson6.com/story/20074343/state-invests-nearly-30-million-in-space-venture-more-money-needed-for-liftoff>.

<sup>129</sup> Jennifer Palmer, *No Spaceships at Oklahoma’s Spaceport, but they Are Welcome*, NEWSOK (Jan 17, 2010), <http://newsok.com/article/3432669>.

<sup>130</sup> FAA Compendium 2018, *supra* note 73, at 28.

<sup>131</sup> NEWS ON 6, *supra* note 128.

which confirms the binding legality of informed consent to space-flight risks.<sup>132</sup> Today the spaceport largely supports itself with, among other things, a contract from the US Air Force,<sup>133</sup> but has yet to launch a vehicle.

### iii. Spaceport America – The World’s Invitation to Space

Spaceport America “is the world’s first purpose-built, commercial spaceport.”<sup>134</sup> The New Mexico Office of Space Commercialization introduced the project to the FAA in 1997 when the State optimistically predicted that the project “would enhance space-related economic development with the state.”<sup>135</sup> Entirely financed by the taxpayers of New Mexico at a cost of \$209 million,<sup>136</sup> the spaceport includes:

a central control facility for administrative functions; an airfield capable of handling aircraft and launch vehicles that land horizontally; a maintenance and integration facility for payload-processing and space vehicles; a launch/landing complex with three launch/landing pads; a flight operations control center; and a cryogenic fuel plant to manufacture and store liquid hydrogen and liquid oxygen.<sup>137</sup>

Operated by the New Mexico Spaceport Authority, it received a launch site operator license authorizing it to “support suborbital launches”<sup>138</sup> in 2008. And in 2009, it entered into a Memorandum of Understanding with Spaceport Sweden to align as “Sister Spaceports.”<sup>139</sup> Virgin Galactic, the anchor tenant, signed a twenty-year lease agreement<sup>140</sup> immediately after issuance of the license. Initial

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<sup>132</sup> See OKLA. STAT. tit 3, §§ 351-53 (2019).

<sup>133</sup> Jesse Pound, *The Space Wait Continues for Oklahoma Town*, NEWSOK (Aug. 1, 2016), <http://newsok.com/article/5511901>.

<sup>134</sup> FAA Compendium 2018, *supra* note 73, at 29-30.

<sup>135</sup> Southwest Regional Spaceport, NM, 62 Fed. Reg. 40,133, 40134 (July 25, 1997).

<sup>136</sup> *Id.*

<sup>137</sup> *Id.*

<sup>138</sup> N.M. Space Auth., FAA Order No. LSO 08-011A (Rev. 2) (Dec. 9, 2013).

<sup>139</sup> *Spaceport Sweden and Spaceport America Announce Sister Agreement*, SPACEPORT SWEDEN (Jan. 29, 2009), <http://www.lspace.com/?id=9504&cid=14260&Year=2009>.

<sup>140</sup> Facilities Lease between Virgin Galactic, LLC and New Mexico Spaceport Authority, *available at* <http://nmpolitics.net/index/wp-content/uploads/2017/08/Executed-VG-Lease.pdf> (last visited May 7, 2018).

rent was \$1 million per annum for the first five years and recently increased to about \$3 million per annum, still just a fraction of the state's "nearly \$220 million" investment.<sup>141</sup> The spaceport's first FAA licensed launch took place in October 2012. However, the delays in the development of suborbital launch providers like Virgin Galactic have left the Spaceport largely empty and inspired the New Mexico Spaceport Authority to explore alternative means of generating revenue.<sup>142</sup> Efforts included hiring a marketing firm to woo potential tenants and sponsors. At present, Spaceport America remains mostly vacant.<sup>143</sup> In early 2015, a disgruntled state senator introduced a bill to "advertise and promote the sale of Spaceport America to potential national and international buyers."<sup>144</sup> While the bill did not pass, state citizens remain unhappy with the spaceport, urging the state legislature to "unload the white elephant."<sup>145</sup>

This pessimism notwithstanding, Virgin Galactic's Richard Branson recently announced that the company would be moving all operations to Spaceport America by the end of the summer 2019.<sup>146</sup> SpaceX also hopes to use Spaceport America to launch, recover, and reuse Falcon 9 v1.1 boosters and has spent over two million dollars on "infrastructure improvements."<sup>147</sup>

#### iv. Cecil Field Spaceport

In 2010, after four years of feasibility and development studies, the FAA issued a license to Florida's Cecil Field Spaceport, a former naval air station, for "supporting suborbital reusable launch vehicle missions."<sup>148</sup> Owned and operated by the Jacksonville Aviation Authority, an independent state government agency, it is the

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<sup>141</sup> Andrew Oxford, *Spaceport Officials to Seek More Funding*, Santa Fe New Mexican (Sept. 1, 2017), <https://www.lcsun-news.com/story/news/local/spaceport/2017/09/01/spaceport-officials-seek-more-funding/627237001/>.

<sup>142</sup> FAA Compendium 2018 *supra* note 73, at 29.

<sup>143</sup> *Id.*

<sup>144</sup> S. 267, 52nd Leg., 1st Sess. (N.M. 2015) (introduced by George K. Munoz).

<sup>145</sup> Dowd Muska-Rio Grande Found., *'Spaceport America': 0 for 2016*, KRWG PUB. MEDIA (Jan. 6, 2017), <http://krwg.org/post/spaceport-america-0-2016>.

<sup>146</sup> Christian Davenport, *Virgin Galactic is Finally Moving to New Mexico's Spaceport America for Tourist Flights to Space*, WASH. POST (May 10, 2019), [https://www.washingtonpost.com/technology/2019/05/10/virgin-galactic-is-finally-moving-new-mexicos-spaceport-america-tourist-flights-space/?utm\\_term=.f530c4e8f392](https://www.washingtonpost.com/technology/2019/05/10/virgin-galactic-is-finally-moving-new-mexicos-spaceport-america-tourist-flights-space/?utm_term=.f530c4e8f392).

<sup>147</sup> FAA Compendium 2018 *supra* note 73, at 29.

<sup>148</sup> Jacksonville Aviation Auth., FAA Order No. LSO 09-012 (Jan. 11, 2010).

only horizontal launch commercial spaceport on the East Coast. It is specially designed with a 12,500-foot-long runway, to launch and recover space vehicles that take off and land horizontally. The Authority explicitly seeks to become a hub for space tourism, noting that at least initially, “operations will be for your upper-end leisure traveler, the person who wants an exciting ride . . . [at] about \$200,000 each.”<sup>149</sup> The Authority even went so far to predict that a first launch could occur by 2011 – a prediction that did not come to fruition. At the time of this writing, Cecil Spaceport revealed that it is working with Generation Orbit and planning a commercial launch in late 2018 or early 2019.<sup>150</sup> Officially designated a “Space Territory” by the state, the Florida Department of Transportation now has legal authority to fund spaceport-related transportation facilities within Cecil to better accommodate horizontal launch space travel.<sup>151</sup>

#### v. Midland International Airport – The Sky is No Longer the Limit

A project promoted by the Midland Development Corporation, city-owned Midland International Air and Space Port, located in Texas, is the first primary commercial service airport to be licensed as a commercial launch site by the FAA. Its broad license permits all “U.S. government or FAA-licensed or permitted launches.”<sup>152</sup> The air and space port, which is located on the same site as the original airport developed in 1927<sup>153</sup> currently has two tenants. XCOR Aerospace, which is moving its headquarters from Mojave Air and Space Port to Midland, and Orbital Outfitters, a company that specializes in space suits and space vehicle mockups.<sup>154</sup> Orbital Outfitters is constructing the Midland Altitude Chamber Complex,

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<sup>149</sup> James Dean, *Florida Airport is Newest U.S. Spaceport*, SPACE.COM (Jan. 18, 2010), <http://www.space.com/7789-florida-airport-newest-spaceport.html>.

<sup>150</sup> Melissa Ross, *First Launch at Jacksonville’s Cecil Spaceport Could Come Before Year’s End*, WJCT PUB. MEDIA (Feb. 14, 2018), <http://news.wjct.org/post/first-launch-jacksonville-s-cecil-spaceport-could-come-year-s-end>.

<sup>151</sup> *Former Jacksonville, FL Master Jet Base Wins State Approval as ‘Space Territory’*, AERO NEWS NETWORK (June 15, 2011), <http://www.aero-news.net/index.cfm?do=main.textpost&id=aea6182b-598d-46e8-b69d-e8b1a7316875>.

<sup>152</sup> Midland Int’l Airport, FAA Order No. LSO 14-015 (Sept. 15, 2014).

<sup>153</sup> FAA Compendium 2018, *supra* note 73, at 27-28.

<sup>154</sup> *Id.*

a facility that will include three hypobaric chambers for scientific and human high-altitude testing and training.<sup>155</sup>

#### vi. Ellington Airport

The FAA issued a launch site operator license to the Houston Airport System in 2015 for “U.S. Government or FAA-licensed or permitted launches” from Ellington Airport.<sup>156</sup> Billing itself as “the world’s first truly urban spaceport,”<sup>157</sup> the Houston Spaceport remains a work in progress. It is owned by the City of Houston and operated by the Houston Airport System (HAS). “Already, committed partners to the program include the Houston Airport System, NASA, the Greater Houston Partnership, The Sierra Nevada Corp., the City of Houston, Rice Space Institute, Texas A&M Aerospace Technology, University of Houston College of Architecture, Bay Area Houston Economic Partnership, U.K.-based Catapult Satellite Applications, and Intuitive Machines.”<sup>158</sup> Sierra Nevada Corporation, in particular, won “a piece of a multibillion-dollar NASA contract, making it one of three companies charged with resupplying the International Space Station starting in 2019.”<sup>159</sup> Sierra Nevada hopes to use Houston Spaceport to land its Dream Chaser space plane. A feasibility study estimated costs to properly outfit Ellington as a spaceport will require approximately \$170 million.<sup>160</sup> In October 2015, the Houston City Council approved the \$6.9 million purchase of a building, adjacent to the Ellington Airport, to be used as an incubator for early-stage space industry companies.<sup>161</sup> And in December 2016, Houston Spaceport signed a Memorandum of Understanding with Glasgow Prestwick Airport Spaceport “that will allow both parties to share best practice for commercial space

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<sup>155</sup> *Id.*

<sup>156</sup> Houston Airport Sys., FAA Order No. LSO 15-016 (June 26, 2015).

<sup>157</sup> HOUSTON SPACEPORT, <http://fly2houston.spaceport.com/> (last visited Mar. 18, 2019).

<sup>158</sup> *Houston Spaceport Named ‘Deal of the Year’ by Houston Business Journal*, HOUSTON SPACEPORT (Jan. 22, 2016), <http://fly2houston.spaceport.com/news/houston-spaceport-named-deal-of-the-year-by-houston-business-journal>.

<sup>159</sup> *Id.*

<sup>160</sup> FAA Compendium 2018, *supra* note 73, at 26.

<sup>161</sup> *Id.*

launch activities, operation, safety and environmental standards.”<sup>162</sup>

#### vii. Colorado Air and Space Port

Adams County, Colorado received a license, in August 2018, to “operate certain portions of Front Range Airport as a launch site.”<sup>163</sup> The newly monikered Colorado Air and Space Port hopes to operate a horizontal launch facility and a “hub” for suborbital transport<sup>164</sup> at the airport which is just eighteen minutes from Denver International Airport.<sup>165</sup> At least one company, British Reaction Engines, is already building a facility at the site to test its hypersonic engine technology.<sup>166</sup> However, there are no launches planned at this time.

#### viii. In the Wings

There are many more spaceports under consideration in the US. The projects below are in various stages of the licensing process with the FAA:

- World View Enterprises, Inc. is working with the County of Pima in Arizona to obtain a license to operate a launch site at what will be Spaceport Tucson.<sup>167</sup> If authorized, it “would be the closest to a commercial airport than any of the 10 current FAA-approved space launch sites.” The project, which is being funded with \$15 million in county bonds is being sued by the Goldwater Institute for “violating the Arizona constitution’s

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<sup>162</sup> *Agreement Signed in Prestwick Spaceport Bid*, BBC NEWS (Dec. 6, 2016), <http://www.bbc.com/news/uk-scotland-glasgow-west-38229169>.

<sup>163</sup> Adams County, Colo., FAA Order No. LSO 18-107 (Aug. 17, 2018).

<sup>164</sup> Leonard David, *Proposed Colorado Spaceport Could be Suborbital Spaceflight Hub*, SPACE.COM (Oct. 20, 2012), <http://www.livescience.com/24150-colorado-spaceport-suborbital-private-spaceflight.html>.

<sup>165</sup> Spaceport Colo., *Technical Issues*, FRONT RANGE AIRPORT, available at [http://www.ftg-airport.com/pdffiles/spaceport\\_oct\\_2015.pdf](http://www.ftg-airport.com/pdffiles/spaceport_oct_2015.pdf) (last visited Mar. 18, 2019).

<sup>166</sup> Jeff Foust, *Colorado Airport Receives FAA Spaceport License*, SPACENEWS (Aug. 21, 2018), <https://spacenews.com/colorado-airport-receives-faa-spaceport-license/>.

<sup>167</sup> David Wichner, *Airport Board Mulls Plans for Spaceport Tucson*, TUCSON.COM (July 9, 2016), [http://tucson.com/business/tucson/airport-board-mulls-plans-for-spaceport-tucson/article\\_88b32f6b-c62e-5c44-b3ea-0123dadfd6a2.html](http://tucson.com/business/tucson/airport-board-mulls-plans-for-spaceport-tucson/article_88b32f6b-c62e-5c44-b3ea-0123dadfd6a2.html).

gift clause [which] bars state government entities from giving their ‘credit in the aid of any company or corporation.’”<sup>168</sup>

□ The FAA is currently preparing an environmental assessment for the state-proposed Hawaii Air and Space Port, which intends to use the existing runway at Kona International Airport for only horizontal launches.<sup>169</sup>

□ Florida’s Space Coast Regional Spaceport filed paperwork with the FAA in July 2012 to obtain a launch site operator license. The primary impetus for this effort was to lure Rocket Crafters Inc. and its \$72 million investment in a 400,000-square-foot-facility to Titusville. Rocket Crafters, which has indeed moved to Titusville, hopes to transport passengers from Melbourne, Florida (close to Titusville) to Melbourne, Australia in two hours.<sup>170</sup>

□ Brownsville, Texas will be the site of SpaceX’s second exclusive use launch platform. The company broke ground on the site in October 2014 and has talked about launching both cargo and humans from the spaceport.<sup>171</sup>

□ In Georgia, the Camden County Board of Commissioners is working to “create the premier spaceport” on the US East

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<sup>168</sup> Murphy Woodhouse, *Space Balloon Firm to Pay County Rent of About \$1.2M Yearly for Facility*, TUCSON.COM (June 18, 2016), [http://tucson.com/news/local/govt-and-politics/space-balloon-firm-to-pay-county-rent-of-about-m/article\\_808edc24-9b99-5ce9-b620-ee07472bc02d.html](http://tucson.com/news/local/govt-and-politics/space-balloon-firm-to-pay-county-rent-of-about-m/article_808edc24-9b99-5ce9-b620-ee07472bc02d.html).

<sup>169</sup> HAW. AIR & SPACEPORT, <http://hawaiiairandspaceport.com/project-information.html> (last visited Mar. 18, 2019).

<sup>170</sup> *Rocket Crafters Planning New Spaceport in Titusville*, WFTV (July 10, 2012), <http://www.wftv.com/news/local/rocket-crafters-planning-new-spaceport-titusville/287805912>.

<sup>171</sup> Rick Jervis, *Texas Border Town to Become Next Cape Canaveral*, USA TODAY (Oct. 5, 2014), <https://www.usatoday.com/story/money/business/2014/10/05/spacex-brownsville-spaceport/16584729/>.

coast.<sup>172</sup> The FAA's environmental impact analysis was completed in January 2016,<sup>173</sup> and Vector Space Systems has indicated an interest in making Spaceport Camden its hub.<sup>174</sup>

Globally, commercial spaceports are in various stages of planning and development in Sweden,<sup>175</sup> Abu Dhabi,<sup>176</sup> Malaysia,<sup>177</sup> Italy,<sup>178</sup> Curacao,<sup>179</sup> Canada,<sup>180</sup> the Netherlands,<sup>181</sup> and the United Kingdom.<sup>182</sup> And Rocket Lab's Launch Complex 1, located on New Zealand's Mahia Peninsula was completed in September 2016.<sup>183</sup> Because Rocket Labs is a US entity, it must obtain a license from the FAA to operate this site. Currently, the Rocket Labs website

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<sup>172</sup> SPACEPORT CAMDEN, <http://spaceportcamden.us/about.php> (last visited Mar. 18, 2019).

<sup>173</sup> Dave Williams, *Spaceport Camden Bill Gains Passage in General Assembly*, ATLANTA BUS. CHRONICLE (Mar. 23, 2017), <http://www.bizjournals.com/atlanta/news/2017/03/23/spaceport-camden-bill-gains-final-passage-in.html>.

<sup>174</sup> Urvaksh Karkaria, *Georgia's Space Industry Gets Ready to Blast Off*, WABE (Apr. 14, 2017), <http://news.wabe.org/post/georgias-space-industry-gets-ready-blast>.

<sup>175</sup> *Spaceport Sweden Seeks to Become Europe's Gateway to Space*, SPACEPORT SWEDEN, <http://www.spaceportsweden.com/> (last visited Mar. 18, 2019).

<sup>176</sup> Richard Branson had "vowed" to build a spaceport in Abu Dhabi by 2016. Frank Kane, *Branson Vows to Build Abu Dhabi Spaceport in Two Years*, THE NATIONAL (Feb. 10, 2014), <http://www.thenational.ae/business/industry-insights/aviation/branson-vows-to-build-abu-dhabi-spaceport-in-two-years>.

<sup>177</sup> SPACEPORT MALAYSIA, <http://spaceportmalaysia.com/V3/> (last visited Mar. 18, 2019).

<sup>178</sup> Doug Messier, *Virgin Galactic, ALTEC Sign MOU to Study Italian Spaceport*, PARABOLIC ARC (Dec. 16, 2016), <http://www.parabolicarc.com/2016/12/16/virgin-galactic-altec-sign-mou-study-italian-spaceport/>.

<sup>179</sup> SPACEPORT CURAÇAO, <http://www.spccuracao.com/the-space-advantage-series-an-introduction-to-spaceport-curacao/> (last visited Mar. 18, 2019).

<sup>180</sup> Marc Montgomery, *Update: Canada Chosen for a New Spaceport*, RADIO CAN. INT'L (Mar. 14, 2017), <http://www.rcinet.ca/en/2017/03/14/updatecanada-chosen-for-new-spaceport/>.

<sup>181</sup> *Schipol Gears Up for Space Travel*, THE STAT TRADE TIMES (Mar. 31, 2017), <https://www.stattimes.com/index.php/schiphol-gears-up-for-space-travel-aviation>

<sup>182</sup> James Vincent, *UK Selects Scottish Site for First Spaceport*, THE VERGE (July 16, 2018), <https://www.theverge.com/2018/7/16/17575268/uk-spaceport-site-selected-scotland-sutherland-satellites>.

<sup>183</sup> Calla Cofield, *Rocket Lab Opens Private Orbital Launch Site in New Zealand*, SPACE.COM (Sept. 26, 2016), <http://www.space.com/34195-rocket-lab-opens-private-launch-site-new-zealand.html>.

indicates that the site is “FAA compliant”<sup>184</sup> but no license authorization is indicated by the FAA.<sup>185</sup>

#### IV. IS THERE A RECIPE FOR SUCCESS?

Writing in 2010, Jeff Foust wondered if an “oversupply of spaceports” is a bad thing.<sup>186</sup> Foust answered his own question with a guarded “no,” pointing out the benefits of competition and diversity.<sup>187</sup> He does, however, warn of “overselling” and overpromising the benefits a spaceport can provide to a community. Using the struggling Oklahoma Spaceport and Spaceport America as examples, Foust warns that return on what is sure to be significant investment may not be swift or complete. This is fair warning in any industry or new business. Nevertheless, it fails to take into account the transformative nature of commercial space transportation.

The fact is, we are in the midst of a space revolution. Certainly, the media focuses attention on the billionaires who promise to send wealthy passengers to orbit for what are exorbitant sums to most. What must be recognized is that space tourism is not a fad but a facilitator. The technologies that will catapult the financial elite beyond the atmosphere for minutes at a time are also the foundation for a revolution that will result in deep reductions in the cost to access space. The heavens will be open for use. And there are myriad ways in which to harness the resources of space. In addition to space tourism, the satellite launch market will continue to grow with payloads of both conventional and small satellites covering everything from remote sensing to navigation to telecommunications. Several companies are planning asteroid or Moon mining missions while others are contemplating the development of private

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<sup>184</sup> *Our Launch Sites*, ROCKET LAB, <https://www.rocketlabusa.com/launch/launch-sites/> (last visited Mar. 18, 2019).

<sup>185</sup> In fact, search of the FAA website turns up no information about the licensing of Rocket Labs’ New Zealand launch site which leaves open the question of how the agency would conduct an extra-territorial environmental assessment.

<sup>186</sup> Jeff Foust, *The Spaceport Glut*, THE SPACE REVIEW (Jan 18, 2010), <http://www.thespacereview.com/article/1545/1>.

<sup>187</sup> *Id.* “Having a wide range of spaceports to choose from can be beneficial to vehicle operators, who can use that competition to win concessions from spaceports and local governments to get their business. As the industry matures, having a large number of spaceports to choose from can also support vehicle operators, allowing them to get closer to potential customers and offer a wider range of services and experiences to them.” *Id.*

space stations, manufacturing depots, and power generators. Indeed, United Launch Alliance “wants to operate a fleet of ‘space trucks’ that would ferry cargo and people between Earth and the moon to create a \$3 trillion economy in space.”<sup>188</sup> At the sub-orbital level, a most promising application is time efficient point-to-point travel, like the proposed Melbourne to Melbourne flight from Florida’s Space Coast Regional Spaceport,<sup>189</sup> for cargo and human passengers. All of these activities must start at a spaceport. Thus, though there is risk involved, the growth potential is, literally, infinite.

#### A. *Local Nurturing and Global Reach*

While there is no conclusive recipe for success, the experience of the US’s spaceport pioneers offer valuable guidance.

##### i. Government Support

All of the spaceports currently licensed or in the process of being licensed are the result of local development initiatives. This local support is key both in terms of obtaining financial incentives or tax breaks and with respect to creating the intermodal infrastructure needed to make the spaceport relevant. Local support can also be of a regional nature, just as Virginia and Maryland collaborate on MARS, one can imagine a multistate authority bringing a spaceport to New England.

##### ii. Purpose

Existing spaceport missions run the gamut from spaceport as destination, like Spaceport America, to specific purpose, like the proposed Florida Space Coast Regional Spaceport. At the development phase, the mission must be set out as specifically as possible. While use will largely be determined by geography, the proposed spaceport must determine, among other things, whether it will host ELVs as well horizontal launches, whether it will cater to human

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<sup>188</sup> *United Launch Alliance Chief Says He Wants to Develop a Fleet of “Space Trucks” to Ferry People Between Earth and Moon*, THE DENVER POST (April 7, 2017), <http://www.denverpost.com/2017/04/07/united-launch-alliance-space-trucks/>.

<sup>189</sup> *See supra* note 170.

passengers or cargo shipments and whether it will be a tourist destination or transport hub. Offering full services and varied launch opportunities will require considerable space, both for runway and launch platforms as well as necessary facilities for vehicle maintenance and payload processing. While destination spaceports can afford to be remote, they must still be accessible, so transportation infrastructure – like a railway or adequate roads – is a must. These spaceports will also require training facilities for space tourists, medical facilities and tourist attractions for Earth-bound curiosity seekers.

A transportation hub, like the proposed Colorado Spaceport and Houston Spaceport, will benefit most from being close to a conventional airport so cross-continent travelers can connect to their final destination with ease.

The proposed Hawaii Spaceport offers an interesting investment risk analysis as the islands seem to be counting on two factors for success: first, the ability to offer space tourism to buttress their existing tourism industry; and second, the ability to accommodate point-to-point suborbital travel, facilitating the voyages of people seeking to vacation in the Aloha State.

### iii. Anchor Tenant

Given the experience of the Oklahoma Spaceport, it would be wise to work closely, from the beginning of the development of a project, with multiple anchor tenants. States can help promote such joint business ventures by, among other things, offering tax incentives and passing space liability immunity legislation to help promote the nascent industry.

### iv. Global Ties

Finally, in anticipation of point-to-point travel, and also in order to facilitate technology sharing, proposed spaceports should develop relationships with non-US spaceports. US spaceports can offer much in terms of experience and also create synergies for sharing of services. Thus, for example, an ELV launch capable spaceport can partner with a horizontal launch spaceport and thus offer dual services to clients. Moreover, gaining an early partner can help as-

sure point-to-point service. Currently such relationships exist between Spaceport America and Spaceport Sweden and between Houston Spaceport and Glasgow Prestwick Airport Spaceport. Similarly, though not working through a joint venture, the Pacific Spaceport Complex is looking for a non-US site to complement its current orbital launch capabilities.

### *B. How Can the Government Help?*

Thus far, the FAA has done an admirable job reviewing spaceport proposals. The regulations promulgated by the agency are clear and specific, and the pre-application consultation process an invaluable resource for project developers. However, it must be recognized that as point-to-point suborbital flight develops, more and more existing airports are going to seek spaceport status in order to take advantage of what will become an entirely common form of transportation. This is not to suggest that spaceports be treated like airports. Indeed, quite the opposite.

The temptation to equate spaceports with airports is nearly irresistible. The United States Congress has opined that “space transportation may evolve into airplane-style operations.”<sup>190</sup> And Diane Howard draws upon the history and evolution of the airport system in proposing to adopt an international regime for spaceport regulation.<sup>191</sup> Perhaps not surprisingly, then, some scholars, notably Ram Jakhu and Yaw Nyampong recommend that spaceports be treated like airports and international regulation thereof be subsumed in the very successful International Civil Aviation Organization.<sup>192</sup> This is quite tempting, and, the need for harmonized international regulation of space transport is a necessary goal. However, we must recognize that space transport is fundamentally different from air transport. While much may be borrowed, the space industry requires and deserves to be viewed and regulated as its own creature, and not as a wild stepchild of air law.

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<sup>190</sup> Commercial Space Transportation Competitiveness Act of 2000, Pub. L. No. 106-405, § 2(3), 114 Stat. 1751 (2000).

<sup>191</sup> See Diane Howard, *Points of Connection: Relating ICAO Annex 14 to Spaceports*, 38 ANNALS AIR & SPACE L. 281 (2013).

<sup>192</sup> See Ram S. Jakhu & Yaw Otu M. Nyampong, *International Regulation of Emerging Modes of Space Transportation*, in ANGIE BUKLEY & WALTER PEETERS, “PRIVATE HUMAN ACCESS TO SPACE VOLUME 1: SUBORBITAL FLIGHTS (Amsterdam: Elsevier Ltd. 2010).

Putting aside the question of international regulation, which is beyond the scope of this paper, a domestic regulatory regime must build on its current success and continue to balance risk and innovation. In the US, this means that the government must recognize that the utilization of space is a unique endeavor that offers unique problems and issues – and tremendous earning potential. For this reason, the AST should be removed from the auspices of the FAA and be treated – and funded – as an independent agency. As Joshua Hampson notes, the

FAA generally deals with the mature airline industry, and focuses on safety. Space transportation is not yet a mature industry, and so the government agency that manages has to strike a more delicate balance between public safety and industry growth and development. Unlike the rest of the FAA, the FAA AST has a legislative mandate to promote commercial space.<sup>193</sup>

#### i. The Comstock Amendment

And it seems the US Congress is at least part way there. In August 2018, the legislative branch of the US government passed the FAA Reauthorization Act of 2018. The Act, which was ultimately enacted in October 2018, includes an amendment (“Comstock Amendment”), sponsored by Representative Barbara Comstock, which among other things directs the FAA to establish an Office of Spaceports within the AST.<sup>194</sup>

#### ii. The Preamble

The preamble to the Comstock Amendment articulates a welcome recognition of the importance of commercial spaceports and the many benefits they provide. It is noted that “State government-owned and -operated spaceports have contributed hundreds of millions of dollars in infrastructure improvements to the national space launch infrastructure, providing the United States Government and commercial customers with world-class space launch and

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<sup>193</sup> Joshua Hampson, *The Future of Space Commercialization*, NISKANEN CTR. RESEARCH (Jan. 25, 2017), at 25.

<sup>194</sup> 51 U.S.C. § 51501(a) (2012).

processing infrastructure.”<sup>195</sup> Indeed, it is further recognized that “State spaceports play a critical role in providing resiliency and redundancy in the national launch infrastructure to support national security and civil government capabilities, and should be recognized as a critical infrastructure in Federal strategy and planning.”<sup>196</sup>

The amendment goes on to point out that there is “currently no Federal infrastructure investment program funding or encouraging State and local government investment in spaceport infrastructure.”<sup>197</sup> This despite that fact that “all other modes of transportation, including aviation, highways, ports, and rail”<sup>198</sup> benefit from such federal programs. This is an incredible breakthrough for spaceports and for the development of a space economy in general. In the minds of Congress (or at least the staff tasked with transportation issues in the individual offices of the US Representatives), space transportation should be afforded the same support as other, more traditional, types of transportation. In short, the federal government has been directed by Congress to embrace space as a vital element in the US transportation network and encourage, support and, it seems, enhance investment strategies that will build the “multi-modal networks needed for robust space transportation that support national security, civil, and commercial launch customers.”<sup>199</sup>

### iii. Office of Spaceports

In working to sanctify this objective, the Comstock Amendment requires the establishment of an Office of Spaceports that will:

- (1) support licensing activities for operation of launch and reentry sites;
- (2) develop policies that promote infrastructure improvements at spaceports;

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<sup>195</sup> Comstock Amendment, *supra* note 6, at (a)(1).

<sup>196</sup> *Id.* at (a)(2).

<sup>197</sup> *Id.* at (a)(4).

<sup>198</sup> *Id.*

<sup>199</sup> *Id.* at (a)(5).

- (3) provide technical assistance and guidance to spaceports;
- (4) promote United States spaceports within the Department;  
and
- (5) strengthen the Nation’s competitiveness in commercial space transportation infrastructure and increase resilience for the Federal Government and commercial customers.<sup>200</sup>

Moreover, it requires that the Secretary of Transportation to “recognize the unique needs and distinctions of spaceports that host (1) launches to or re-entries from orbit; and (2) are involved in sub-orbital launch activities.”<sup>201</sup> also directs the Department of Transportation to submit a report to Congress that “proposes policies and programs designed to ensure a robust and resilient orbital and sub-orbital spaceport infrastructure to serve and capitalize on”<sup>202</sup> national security and civil space launch demands. The report is due one year from the enactment of the FAA Reauthorization Act.

### *C. Recommendations*

The Comstock Amendment is an opportunity. An opportunity to create policies and guidelines that will promote the development of successful spaceport operations, while dissuading opportunistic gimmickry. It is also an opportunity for states and local governments to think seriously about whether their communities are appropriate venues for a spaceport. In determining how to create and maintain a properly balanced regulatory regime, the following considerations must be considered.

#### *i. Private Enterprise*

While most current air and spaceports are operated by state or local governments, the regulations must offer guidelines, opportunities, and incentives for private operations. Space infrastructure projects will best be enabled not just through federal/state partnerships, but also private/public partnerships.

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<sup>200</sup> 51 U.S.C § 51501(b) (2012).

<sup>201</sup> *Id.* § 51501(c).

<sup>202</sup> *Id.*