



**Letter for the Record to Members of the Subcommittee on Space (Committee on Science, Space, and Technology)**

**Clyde Wayne Crews Jr.  
Vice President for Policy/Director of Technology Studies  
Competitive Enterprise Institute**

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Regulating Space: Innovation, Liberty, and International Obligations**

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The Competitive Enterprise Institute (CEI) is a non-profit public policy research organization dedicated to individual liberty, limited government, and free enterprise. We appreciate the opportunity to discuss vital policy issues surrounding innovation in commercial space activities. My written Letter for the Record follows.

**Introduction: Making Space for Free Enterprise**

*There’s more technology in an iPhone than the U.S. air-traffic control system.<sup>1</sup>  
—Wall Street Journal*

In many if not most federal regulatory regimes, were we starting with a blank sheet of paper, we would not maintain the same authorities in place today.

So when liberalizing a heavily regulated segment of a mixed economy, or protecting an emergent sector like the commercialization of outer space from regulatory and political ambitions, the gauge of impending reform's appropriateness is simple: *The body of private activity subject to future regulation must decline rather than increase.* The de-escalation of central power is the essence of agency *expertise*, rather than the administrative state's century long premise that expertise consists in a priestly, guiding hand from above.<sup>2</sup> Commercial and hazard-reducing expertise are distributed globally. Further, rare are the instances in which agency licensing processes move rapidly enough for modern commerce, as we will review.

One hears deserved praise of "permissionless innovation,"<sup>3</sup> the case for a light regulatory touch and a rejection of over-precaution. But there exists too little vocabulary among 21<sup>st</sup> century policymakers for legitimizing large-scale or complex free enterprise, for articulating the reasons for casting off entrenched administrators. This vacuum and the negative initial conditions being created has diminished the prospects for light touch regulation, threatening to paint us into a hyper-regulatory corner even as the "Final Frontier" awaits.<sup>4</sup> That will cost tomorrow's economy trillions.<sup>5</sup>

The public probably has little idea how much regulators intend to crack down on the commercialization of space. A substantial problem for the space sector today is that *laissez-faire* did not happen automatically for earthbound heavy industries and technologies after our industrial revolution, and *still* hasn't materialized for them. The "smokestack" stage of industrial free enterprise brought the contemporaneous public utility era, which created artificial regulatory monopolies against which competition was outlawed (deemed "natural" monopoly), and the progressive era "rule by experts" of regulatory bureaucracies.

The further failure to extend liberal economic institutions of complex property rights, contract and risk management into infrastructure, airsheds, watersheds, spectrum, roads, or even to take the obvious 21<sup>st</sup> century step of kick-starting the privatization of ordinary commercial flight airspace,<sup>6</sup> stands to derail the open-ended potential of commercial space activity. These realms remain largely controlled by governments; such laws as the Antiquities Act govern still more, as do such international agreements as the Law of the Sea Treaty.<sup>7</sup>

Given this precedent and context, for commercialized space (and alas, for other sectors) we need a regulatory heatshield, a HOT Act ("Hands Off Technology"). We require better and soundly defended private and collaborative institutions to replace 19<sup>th</sup> and 20<sup>th</sup> century central bureaucratic oversight of private endeavors that, in fact, should largely be let alone. Congress should eliminate agencies as it once promised in the Contract With America era, or at least pass Article I-enshrining legislation, such as requirements for votes on costly agency rules. If the 115<sup>th</sup> Congress does neither, it should at minimum prohibit agencies from issuing new rules and guidance regarding *frontier* technologies where (1) Congress has not enacted law to authorize (such as Internet "net neutrality") or (2) has enacted law prematurely given the vocabulary problems noted and inadvertently yielded power to the administrative state (autonomous drones, space).

Sectors like commercial space, networked communications technology, robotics, autonomous vehicles and exo-transportation (cars, airborne drones and low-earth orbit) stand on the threshold of inextricably snug, irreversible regulation at precisely the time these very technologies eliminate the “market failures” that rationalized old-school regulation of safety, the “commons” and other features in the first place. The primary engines for these threats to the tech sector are the thousands of pre-existing regulators and their constituents, whose once-convincing justifications for their supposed impartial oversight no longer apply (allowing that they ever, properly, did).

The other threat is cronyism, from government funding of science and technology that widely displaces private funding,<sup>8</sup> to billionaires with hands outstretched for federal subsidies and favors<sup>9</sup> to assuring NASA first dibs.<sup>10</sup> It is not prudent to expect such individuals or entities to be advocates of laissez-faire. A corollary for permissionless innovation is the presupposition that one innovates, not that extract others’ resources or political favor. Other citizens have aspirations of their own that may not involve paying for battery research technology, the HyperLoop or a trip to Mars. Recipients pay for subsidies by accepting regulation in exchange. That makes the subsidy in one sense a mere wealth transfer, rather than the innovation-enhancing boost it seems. This that doesn’t just hurt recipients and their industry, even if they don’t see it; it impacts all of society. Cronyism’s impacts can be particularly severe in frontier sectors like commercial space development where entire industry structures are being upended and the role of the regulator and perhaps even some incumbent firms require total reassessment. Technology pulls America’s economic wagon, but the wrong interventions can mean stagnation that propagates for decades, doing even century-long damage as when competition outlawed in the communications and electricity sectors and government-granted monopolies affirmed instead.

In technology, market liberal institutions are too easily pre-empted by the bureaucratic impulse to expand and create “public good” or “public utility” centrally managed models for everything big and new and game-changing. Drone and self-driving car policies are at grave risk of morphing into 21st century versions of 19th-century public-utility style regulation. The reason? Since roads already are primarily government-owned, and airspace government-controlled, we can be certain that policymakers are not pondering liberalizing alternatives that reduce their power, such as a wealth-creating extension of private property rights into airspaces. We’ll cover the implications of this for commercial space development shortly.

Many regulatory steps will be backward; others will veer into a cul-de-sac inducing an incalculable reduction in frontier production possibilities, wealth expansion, well-being and advancements in safety. This Letter for the Record is a call for making explicit the benefits of the principle, while conforming to international treaty obligations, of *separation of technology and state* in the commercial space sector. It seeks to provide some of the initial vocabulary needed to legitimize keeping distortion-inducing regulation off the entrepreneurial frontier. Regulation in advanced technology beyond the absolute minimum necessary is worse than government merely picking winners and losers (governments pick only losers); regulation effectively *chooses among business models as such*, imposing rigid frameworks on all. (examples include the allegedly “open” Internet; antitrust regulatory reconfigurations; government controlled airspaces). Today’s technologies make the stakes immensely higher than in previous eras.

## **Context: “Authorization and Supervision” of Private Commercial Space Activity**

The future of the commercial space regulatory regime now appears to have been made to hinge largely on certain directive to the Office of Science and Technology Policy (OSTP) contained in the 2015 U.S. Commercial Space Launch Competitiveness Act’s (CSLCA) Section 108 (“Space Authority”).<sup>11</sup> Based upon the Barack Obama administration’s identification of “appropriate authorization and supervision authorities” for “current, and proposed near-term, commercial non-governmental activities conducted in space,” it was then directed by the Congress to develop and recommend “an authorization and supervision approach that would prioritize safety, utilize existing authorities, minimize burdens to the industry, promote the U.S. commercial space sector, and meet the United States’ obligations under international treaties.”

This private-sector authorization and supervision language descends from the Outer Space Treaty of 1967,<sup>12</sup> (50 years old this year) Article VI of which specifies:

*The activities of non- governmental entities in outer space, including the moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty.*

This formulation represented 1967’s cold war era anticipation of private commercial activity in space, and directed governments to oversee private “activities,” keep weapons out of space, keep the peace, and (elsewhere in the treaty) restrain certain ambition such as sovereignty claims. The modern disagreement is over how much or how little regulation is needed to constitute “authorization” and “supervision.” The implications are enormous. For one example, PL 114-90’s Section 51302 provisions on mining and ownership and sale of resources provisions (“exploration for and commercial recovery of space resources”) authorized in the CSLCA, which would be the most obvious and elemental operations on celestial bodies beyond basic roaming, are already regarded by some as a violation of the Outer Space Treaty, in the form of an illegal assertion of sovereignty.<sup>13</sup> Section 51303, on “Asteroid resource and space resource rights,” holds that:

*A United States citizen engaged in commercial recovery of an asteroid resource or a space resource under this chapter shall be entitled to any asteroid resource or space resource obtained, including to possess, own, transport, use, and sell the asteroid resource or space resource obtained in accordance with applicable law, including the international obligations of the United States.*

There are either eight or nine planets in the Solar System depending upon who’s counting and their sympathies toward Pluto, along with at least 146 moons,<sup>14</sup> nearly 2 million asteroids larger than a kilometer,<sup>15</sup> and millions of smaller ones. So a bit more liberal interpretation of “sovereignty” will be in the interests of all space-faring nations, one can assert confidently.

OSTP’s letter in fulfillment of April 4, 2016 to House Science, Space, and Technology Committee Chairman Lamar Smith (R-Texas) and Senate Committee on Commerce, Science, and Transportation Chairman John Thune (R-South Dakota) contained a “Mission Authorization Proposal” in the appendix which, ominously, took “months of consultations among Federal

departments and agencies and with the commercial space industry.”<sup>16</sup> Further, new paperwork burdens in the form of a “Registry” would be created for “the holder of a Mission Authorization to provide updated information both on a periodic basis, and whenever the holder of the authorization experiences a material change to operations that would affect the affirmations and information that were originally submitted in support of the authorization.” Whatever counts as a “material” change would trigger the attention of numerous agencies to reauthorize again.

Existing space-related operations, already regulated by numerous agencies and not implicated in the proposed Mission Authorization, include, as, the Section 108 report to Thune and Smith put it, launcher services, satellite communications and remote sensing,

The OSTP’s Section 108 report emphasized instead “newly contemplated commercial space activities,” which the Administration gauged as “Private Missions Beyond Earth’s Orbit,” “New On-Orbit Activities,” and “Space Resource Utilization.” The Mission Authorization would have the Federal Aviation Administration “coordinate an interagency process in which designated agencies would review a proposed mission in relation to specified government interests.” These would include the Secretary of Transportation (via the Federal Aviation Administration), the Secretary of Defense, the Secretary of State, the Secretary of Commerce (National Oceanic and Atmospheric Administration), the NASA Administrator, the Director of National Intelligence, “and such other appropriate United States Government departments and agencies.” Recent moves to legislate this overly complex coordination would enable the Federal Aviation Administration’s (FAA) Office of Commercial Space Transportation (AST) to govern these functions.<sup>17</sup> AST regulates launch and re-entry now, but not activities in outer space.<sup>18</sup> There exist alternatives to such agency licensing constraints and an opportunity to reorient.

### **Solution In Brief: A Presumption of Authorization for Commercial Space Activities Without New Legislation**

The “Mission Authorization Proposal” was not issued in a policy/intellectual vacuum. It was, rather, contemporaneous with a mindset wherein former president Obama and his administration demonstrated preferences for federal oversight of a great amount of private scientific and technological activity, including “manufacturing hubs”<sup>19</sup>; purported “net neutrality” for the Internet<sup>20</sup>; a “National Broadband Plan”<sup>21</sup>; an “Internet of Things” privacy policy<sup>22</sup>; and governance schemes for artificial intelligence and high-technology generally.<sup>23</sup> Better, however, to leave such ill-advised, wealth-reducing and risky “national” policies to other nations.<sup>24</sup>

There exists a well-intended legislative proposal to flesh out the permitting process of the CSLCA and the FAA Mission Authorization Proposal and become space-faring asteroid miners sooner rather than later.<sup>25</sup> Here, however, we echo the recommendations of commentators and experts who instead recognize the legitimacy with respect to the Outer Space Treaty and CSLCA of blanket rather than one-by-one approvals for every mission. Reasons will become even clearer when we look shortly at FAA’s track record with respect to governing related edge technologies. Rep. Brian Babin (R-Texas), chairman of the Subcommittee on Space of the House Committee on Science, Space and Technology, has, in numerous comments before stakeholders including industry and government, cited a presumption that commercial space activities are effectively authorized.<sup>26</sup> Babin said to the Commercial Spaceflight Federation: <sup>27</sup>

*[T]he government's role isn't to give you permission to do something. The government's role should be limited to only those areas that require its intrusion, which is a high bar. The burden of proof shouldn't be on the individual to demonstrate the "right" to act; the burden of proof should be on the state when it seeks to restrict liberty. This isn't simply a philosophical question; it is also a question of economics" [with respect to the competitive global environment and space-faring activities of other nations].*

The OSTP letter itself notes that, with respect to authorization and supervision, "Many space-faring States discharge this treaty obligation through a more general licensing framework for non-governmental space activities," while in contrast the U.S. utilizes "separate frameworks" for various aspects of launch, and spaceflight reentry, and communications.<sup>28</sup> There is leeway for this man-made set of circumstances to break toward more liberalization.

Babin's permissionless-innovation approach is echoed by the Mercatus Center at George Mason University, which observed in a November 2016 comment to Rep. Lamar Smith (R-Texas), Chairman of the Committee on Science, Space, and Technology, that the "nature of the authorization and supervision required by the treaty are not specified. Each State Party to the treaty may decide what constitutes appropriate authorization and continuing supervision of its national nongovernmental entities."<sup>29</sup> And, further, in a section on "Blanket Authorization and Alternatives to Regulatory Supervision," that "Congress has sole authority and complete discretion to decide what, if any, authorization and supervision it would like to require," and that "Congress is within its rights to authorize all nongovernmental activities in space on a blanket basis" while still ensuring objectives such as non-interference with peaceful activities by other States. In other words, a regulatory framework, especially a complex, multi-party one like that contained in the FAA Mission Authorization Proposal is not necessary.

As former FAA attorney Laura Montgomery's work indicates, it is folly to create an environment where every move in space requires authorization and supervision.<sup>30</sup> The OST notes *activities* (plural), not that any and every particular activity requires specific authorization, which quickly descends into impossibility in both the real world and outer space. The CSLCA simply instructed the administration to "recommend an authorization approach." That can be liberally interpreted. As we'll see shortly, different technology industries and sectors cross-fertilize one another, to the benefit of commercial space activity. Sometimes new stones don't get turned over until complementary and prerequisite discoveries are made, which halt-inducing regulation can derail. Propeller research had to happen before the Wright Flyer could lift off under power.

When it comes to treaty and statutory obligations, we nonetheless can (and competitor nations surely will) aggressively interpret "authorization," and light-handedly interpret "supervision." Part of long-term planning and federal agency "expertise," echoing our introduction to this Letter, will consist of being prepared, while showing these clauses do not require regulation. Even if restrictions and regulatory hindrances did exist, as they do with the legacy launch, communications and sensing services not part of Mission Authorization, Congress should move forward with a stance of reducing them.

## **Space Commercialization Within the Broader Regulatory Liberalization Agenda**

It is hardly a surprise that administrative agencies wish to retain authority over emerging sectors; we don't even grow sugar and produce milk without big government programs.<sup>31</sup> So frontier sectors stand little chance of enjoying relative laissez-faire without conscious, aggressive initiative and guardianship on the part of policymakers; and too few are doing that. The large regulatory and fiscal state, which issues thousands of regulations annually,<sup>32</sup> as well of thousands of guidance documents and other manifestations of “regulatory dark matter”<sup>33</sup> implicates not just commercial space and other frontier sciences but many legacy industries too.

A broader regulatory reform agenda is taking place in the new Donald Trump administration, which issued a series of executive actions such as temporary regulatory holds, and procedures for eliminating two rules when a new rule is adopted.<sup>34</sup> Meanwhile the 115<sup>th</sup> Congress passed several regulatory liberalization measures in its first weeks. Though he has shown a worrisome inclination toward spending stimulus in the form of infrastructure,<sup>35</sup> Trump should avoid seducing the tech sector with federal “help” through federal subsidies, favors and piloting in the vein of President Obama’s above-noted manufacturing hubs. The model of the modern administration state model should yield to congressional accountability, such that loosely or non-accountable bureaucracies extend no rules to new technologies without explicit acts of Congress (and these too should be avoided if possible).

The yet-to-be-regulated technology frontier should be left that way, with the president and Congress maintaining a presumption against economic regulation and agency mission creep in areas like commercial space and technology generally. Sound principles noted with respect to Internet policy apply broadly too, and include (1) do no harm; (2) be patient; and (3) embrace change:<sup>36</sup>

*Rather than impose administrative rules, policymakers should respect private property rights; unhindered freedom of contract; voluntary negotiations and standard-setting; private dispute resolution; other common law standards such as the law of trespass and torts; and the proper interpretation of the Commerce Clause of the Constitution as a guarantor of the free flow of interstate commerce.*

Modern over-regulation stems not solely from agency overreach, but from over-delegation by Congress, an issue tackled in a series of 2016 congressional task force reports providing numerous suggestions to reinstate the principles of separation of powers and checks and balances.<sup>37</sup> The president and Congress should maintain a general predisposition toward avoiding legislation and regulation in technology sectors, eliminating and/or rolling back agencies and programs, and rejecting new sectoral regulation by any agency until Congress votes to explicitly authorize it.<sup>38</sup>

In conjunction with regulatory liberalization, there is an increasing interest in expediting roads, bridges, plants, and critical infrastructure, of which space-related assets will increasingly be a part. The nation has cycled through government canals and national roads that failed or were overtaken by the new,<sup>39</sup> and now contends with the likes of a national capitol Metrorail system with budget shortfalls, rising costs and low ridership,<sup>40</sup> and modern crumbling infrastructures including sewer systems that can't handle flushable diaper wipes<sup>41</sup> (the government knee-jerk

response to the latter? Ban the wipes.<sup>42</sup>). The Obama administration had claimed drinking water and wastewater infrastructure require \$600 billion in improvements over 20 years.<sup>43</sup> The market should steer, not just row.

Commercial space activity authorizations of the 21<sup>st</sup> century will, alas, inevitably involve government partnerships given today's mode of operation, but should avoid governmental mismanagement that is now the rule. Also, the acknowledged headaches and delays of routine terrestrial permitting need changing,<sup>44</sup> and the president has issued directives intended to speed up projects and remove impediments imposed by regulatory agencies.<sup>45</sup>

The case for separation of technology and state needs a hearing, and the current environment of rethinking regulation sets the tone for a cornucopian rather than precautionary view of commercial space activities. Naturally, policy uncertainty affects firms and sometimes leads to unwise-in-hindsight calls for guidance. But in important respects, today it is the *certainty* of regulation that drives costs skyward and hurts innovation.<sup>46</sup> The FAA's Mission Authorization Proposal will send uncertainty into orbit, as we will see.

### **Hazard and Risk Reduction: Traffic Management, Space Situational Awareness and More**

*From the Fall from Grace to the fall of Enron, it has always been with us. It has been the primary reason that man is so often trapped into fatalistic acceptance of poverty and ignorance. And once mankind accepted the Promethean challenge to improve his condition, the issue of how best to deal with it has been a central element of controversy. Should the elites control it centrally, or should individuals deal with it directly? And when the unpleasant aspects of it occur, should we retreat or evolve institutions to make future mishaps less likely? In any event, it involves degrees of uncertainty and, invariably, an element of danger; therefore, it must be addressed in a balanced and careful fashion. Progress—civilization itself—may be seen as the gradual evolution of institutions that manage it.*

*It is risk—the possibility that a desired event will not occur or that a feared outcome will.<sup>47</sup>*

—Fred L. Smith Jr., Founder, Competitive Enterprise Institute

Before looking at the regulatory thicket that will be created by the Mission Authorization Proposal, it is helpful to address the question of hazards, for these risks are what prompt most calls for tight regulatory oversight. In its normal evolution, technology can reduce the scope of “market failure” and the subject matter for top-down regulation, including that of risk management, even in space.<sup>48</sup> Along with compliance with assessing the OST's authorization and supervision requirements, the CSLCA directed the Administration to report on matters such as orbital traffic management, space situational awareness and related matters.

But not everything under the sun—or between here and the asteroid belt—is best turned into a public policy question, or a regulatory agency. Policymakers should keep uppermost in mind that matters they presume to *regulate*—public health, financial stability, privacy, and in the present instance, safety in outer space—are not just dependent variables subject to Washington's easy

manipulation. These features are forms of *wealth*, and aggressive competitive disciplines, not just bureaucratic ones, are necessary to advance them.

The market discovery process, that is, increasingly enables not just wealth creation, but fairness and democratized access, choice, consumer protection, and safety and fitness for use. The regulatory state, utility-style regulation and the Administrative Procedure Act are increasingly inadequate means of managing risk and imposing discipline in a market economy. Technology, luckily, exposes prior and ongoing regulatory malpractice. Contractual mechanisms, insurance markets, waivers, and liability innovations that mitigate risk become easier, not harder, alongside technology itself in the normal course of events, if not derailed by regulators or special interests legacies.

Humans traveling in privatized space will lose their lives. And the first to make the trip to Mars may never return, voluntarily so.<sup>49</sup> (I say that as one who favors robotic rather than human space travel beyond the moon but would not interfere with those choosing permanent settlement and cosmic ray baths). But the drive to politically regulate such concerns is not unusual; on a parallel track, some politicians intend to exploit the concerns caused by the rise of artificial intelligence to expand government power.<sup>50</sup>

The more relevant issue with respect to space risk entails hazards to third parties. Government too often indemnifies companies from the harms they cause, and in that sense cannot even pretend to be in the risk-reduction business. Regulators sometimes attempt to “help” favored industries with waivers of liability. Homeland security legislation sought to limit liability for manufacturers of products related to the fight against terrorism, by indemnifying them for losses above insurance levels should their security technologies like weapon alarms and bomb detectors fail in the event of an attack. Relatedly, thanks to the immunity granted by the Price Andersen Act, we have no way of knowing whether nuclear power is viable in a free market. Most pertinent for pondering commercial space activity, one certainly cannot now envision the nuclear power industry’s emergence from hyper-regulation. This state of affairs was self-inflicted.

The CSCLA already violates the principle of private risk management in Sec. 103’s extension of “Indemnification for Space Flight Participants,” to absolve launch providers from catastrophic losses or for injury to third parties (at least through September 2025). The alternative market approach would be private assumption of risk or contracts that limit liability—both of which would impel greater attention to quality control. Ironically removing that indemnification would more easily foster removal of the entire regulatory structure at issue. Every new technology brings risks, but part of the market process is also to develop the risk management institutions that go along with that risk to mitigate it. For example, the sharing economy” (Uber, Airbnb and the like) faces novel liability challenges,<sup>51</sup> but these are not impossible hurdles.

Still, private assumption of governmental traffic and situational risk management are a major topic and great progress is being made. Space Subcommittee Chairman Brian Babin notes the possibility of reaching beyond federally centered directives:<sup>52</sup>

*The FAA is advocating for taking over existing DoD [Department of Defense] SSA [Space Situational Awareness] responsibilities. They are also calling for expanding the*

*number and types of SSA data sources they would process, including commercial sources. The Administration's Section 110 report concludes it is feasible for a civil agency, specifically the Department of Transportation, to take over DoD's function. But neither the Administration's report or the FAA has undertaken an analysis of the broader trade space to determine the pros and cons of non-governmental solutions. Are there viable solutions that are superior and do not involve the FAA or another civil agency taking over DoD responsibilities?*

Data collection plays a large potential role in risk management. Despite the ever-present insistence for an FAA/governmental lead on the myriad kinds of data collection, the prospects for and eventual presumption for private risk management can be elevated. Data sharing by entities like the Space Data Association's satellite operators is already prevalent.<sup>53</sup> Here below orbit, technology and tracking could make it possible to pack the sky like a neutron star with commercial and personal drones, with defined corridors respecting rights,<sup>54</sup> if only policy would permit (as we will see, drones are being absorbed into old commercial airspace models instead). Numerous data-awareness and sharing innovations are happening. Routing by algorithm can save lives in airspace and highways by eliminating the human-error hazard.<sup>55</sup> Companies like Uber are collecting vast amounts of locational and traffic data.<sup>56</sup> Amazon has patented a technology to allow self-driving vehicles to navigate reversible lanes.<sup>57</sup> Space-based tracking of commercial airline flights is emergent, gradually eliminating real-time trans-oceanic gaps.<sup>58</sup> We see privately managed drone docking stations and infrastructure.<sup>59</sup> We see Google's "Street View" cars mapping air pollution with chemical sensors, and traffic algorithms taken for granted by commuters,<sup>60</sup> while, ironically, it is the local city planners who would like to thwart the apps, or even create gridlock to drive desperate people into biking or taking public transport.<sup>61</sup>

Data collection with respect to space operations, and related innovations, are ripe and growing, very competitive fields. These ought not be turned into public utility functions when market pricing algorithms and distribution are essential. Here on the ground, "smart highways" and "smart cities" in which governments compel communications technologies' interface with private sector autonomous vehicles will be anything but "smart." Cross-fertilization between the space sector's needs with autonomous vehicles on the ground and air should be abundant. It is interesting that the orbital space debris that has become a concern has happened without a large private sector presence in space. In any event, situational awareness and like services are really alternative ways of talking about property rights emergence in air and space. Transactions costs are coming down, better informational outcomes are emerging, and rationales to regulate or control centrally are declining.

The matters preoccupying FAA seem not to be the actual problems needing resolution at the dawn of a multi-generational space program, but rather seem custom-made to ignore the actual issues that need to be solved for robust airspace and space development. A recent FAA presentation in some instances seems to conflate the industry's "challenges" with FAA's.<sup>62</sup> "Achieving continuous improvement human space flight safety" is not a "challenge" for industry, it's the normal goal and operational mode; they have lives and assets to protect. The industry seems light-years ahead of such thinking. Amazon's Bezos, for example, ambitiously envisions that "all of our heavy industry will be moved off-planet," that "Earth will be zoned residential and light industrial."<sup>63</sup>

Rep. Babin has noted that “The argument that space traffic needs to be managed by the government fails to sufficiently take these ongoing and successful efforts into account”<sup>64</sup> and that “space situational awareness information and services are not an inherently governmental function.”<sup>65</sup> We can see this reality cuts across sectors that can learn from one another.

Next, we look at why the prospects for FAA to take a light-handed regulatory approach are not good.

### **The Takeaway: Why the Federal Aviation Administration et al. Cannot Provide Light-Touch Mission Authorization**

*It is hard to imagine a more stupid or more dangerous way of making decisions than by putting those decisions in the hands of people who pay no price for being wrong.*

—Thomas Sowell

Sometimes, the devil isn’t just in the details, but in the premise. What does the Federal Aviation Administration’s record indicate about a propensity toward a light touch with regard to commercial space activities? For those actors anticipating that the mission authorization plan will increase regulatory certainty, FAA may have other ideas. Good intentions notwithstanding, the FAA’s track record unambiguously shows that it will not be able to coordinate Mission Authorization in a way that doesn’t increase regulatory uncertainty.

A recent example is the FAA’s track record of the with respect to adopting a live-and-let-live posture with respect to drones, where the agency has shown they’re not fully engaged in the business of streamlining regulations at all, but rather expanding them on operation and certification. Early on, there was a 2007 FAA rule interpretation on drones via a Notice of Policy<sup>66</sup> that actually temporarily *outlawed* commercial activity (in violation of the Administrative Procedure Act), before a reversal by the National Transportation Safety Board.<sup>67</sup>

The 2012 FAA Modernization and Reform Act<sup>68</sup> (unwisely in this view) certified FAA authority to regulate drones with its section on “Integration of Civil Unmanned Aircraft Systems Into National Airspace System” (and, like CSLCA, included a Section 332(a) call for a “Comprehensive Plan”<sup>69</sup> complete with mandatory reports and a “roadmap”). In other words, even when presented with the opportunity to take a more hands-off stance with respect to a more “earthbound” (albeit, airborne) set of technologies, the FAA opted for a regulatory approach.

Later in fulfillment came the FAA’s June 2016 624-page final rule,<sup>70</sup> “Operation and Certification of Small Unmanned Aircraft Systems,” which contained “excessively precautionary approaches,”<sup>71</sup> such as stipulating line-of-sight operational requirements, and a ban on night-time operations among numerous other restrictions—ignoring the ability of technological and contractual solutions to address risk. The agency also refused to stand down to local law enforcement solutions.<sup>72</sup> The final rule also contains declarations from the agency regarding case-by-case waivers and blessings, as well as a large quantity of forthcoming *guidance* (not new laws or new APA-based regulations, but unpredictable guidance), much of which would seem to be economically significant, on issues including:

- Industry best practices;
- Risk assessment;
- Potential guidance on external load operations;
- Guidance associated with not dropping objects in ways that damage persons or property;
- Advisories on training and direction to air traffic control facilities;
- Preflight checks for safe operation;
- Vehicle conditions for safe operations; and
- Guidance “on topics such as aeromedical factors and visual scanning techniques.”

Consider, just for one example from this assortment, FAA’s conclusion with respect to the seemingly ordinary freedom to operate multiple drones without asking permission:

*The FAA also acknowledges the benefits of research and development associated with the simultaneous operation of multiple unmanned aircraft and agrees that additional flexibility is called for in this rule so that the agency can administratively allow these types of operations based on operation-specific mitigations. Accordingly, the FAA has made the prohibition on the simultaneous operation of multiple small unmanned aircraft waivable on a case-by-case basis. To obtain a waiver, a person will have to demonstrate that his or her simultaneous operation of more than one small unmanned aircraft can safely be conducted under the terms of a certificate of waiver.*

So one must get a *waiver*. This approach could, air traffic control-style, put us on a path to getting a handful of licensed, dominant operators controlling the likes of the national drone package-delivery market, just as 100 years ago, competitive electricity and communications services were purposely eliminated in favor of monopoly franchises and a perpetual regulatory superstructure to manage it all.

The Mother May I, case-by-case approach continues now in the CSLCA aftermath. If FAA causes drones to fly into a restrictive regulatory black hole, it may be taken as given that the multi-party regulatory process of the Mission Authorization approach to commercial space activities will as well. The industry will be largely governed by guidance, the most uncertain of the uncertain when it comes to regulation. And the agency will be largely unaccountable, shielded by the presence of a regulatory coalition that agrees with it. At this point it would come as no surprise to know that the FAA tried to halt a flight-sharing “Uber” in the air venture.<sup>73</sup>

Other developments in land-based autonomous vehicle operations offer further cautions. In September 2016, the National Highway Traffic Safety Administration’s (NHTSA; notably an arm of the Department of Transportation just as the FAA is) issued its Federal Automated Vehicles Policy guidelines “to speed the delivery of an initial regulatory framework and best practices to guide manufacturers and other entities in the safe design, development, testing, and deployment of highly automated vehicles.”<sup>74</sup> This guidance offered some worthy proposals in the main, minding, however, the caveat that “NHTSA must work to limit its precautionary impulses, which have the potential to delay and increase the cost of automated vehicle deployment—meaning more preventable crashes, more injuries, and more deaths.”<sup>75</sup>

More troublesome is NHTSA’s recent foray into certain vehicle-to-vehicle (V2V)

communications standardization mandates,<sup>76</sup> and even vehicle to infrastructure (V2I) guidance newly emergent from the Federal Highway Administration.<sup>77</sup> These are some of the areas we noted important cross-fertilization could occur with space data awareness—and *they are already being blanketed with DoT regulation.*

There are so many variables, so many technologies. It is clear that the halting, hiccupping, unpredictable and cautionary regulatory model in place poses threats. In the works today are marvels like supersonic jets,<sup>78</sup> NASA's own megarocket<sup>79</sup> and proposed private alternatives,<sup>80</sup> and even the long-awaited space elevator, never mind that “key players have distanced themselves from the concept.”<sup>81</sup> Regulatory approaches have already undermined and delayed steps needed to address issues of property rights in airspace/airsheds by simply ignoring them and imposing rules instead; ultimately such questions matter even more for the orbital and outer-space economy.

“The bottom line,” as Rep. Babin put it with respect to the Section 108 report, “is that the Administration is asking for an expansion of regulatory authority for the Secretary of Transportation, in coordination with a number of other Federal agencies, to grant authorizations for missions in outer space”<sup>82</sup> FAA wants to take the lead—but it has not shown proper judgement or restraint in paving the way for liberalization of oversight in other sectors. The problem is compounded by the involvement of so many additional agencies apart from FAA; not merely Mother May I, but Mothers May I. A “failure to launch” of this particular regime would be the best thing to happen for the commercial space sector.

### **Conclusion: Disruptive Technologies Versus Disruptive Washington**

*[H]is doom was that no man may ripen a field before harvest season.*

—Poul Anderson, “The Man Who Came Early.”

While we might once have engaged in 30,000 foot views of how to conduct regulatory policy, we now must take the 239,000 mile view. Decisions to be made in the future will require looking beyond the administrative state's inherent limitations, notably its foreclosing of the creation of new risk management “institutions of liberty” in frontier sectors.

With software, innovators may simply issue their product; but with biotech advances, every single incremental step needs major review procedures from the Food and Drug Administration. That binds technology to the speed of bureaucracy. The commercial space sector stands on the brink of similarly zealous regulation.

Without being utopian about it, government failure has always been a graver threat than transitory market failures. Government doesn't merely pick winners and losers; it influences business models and entire industry configurations, and entire economies. But technology and expertise outgrow the capabilities of central regulatory agencies, even granting that the regulatory or administrative state approach was ever fully appropriate.

The rationales for policy intervention in technology decrease rather than increase over time, as market failure reveals itself to have been failure to have markets at all. Still, elements of the technology sector broadly stand on the verge of being regulated like bygone-era utilities across

many fronts, with the commercial space sector now a worrisome special case. The industry is both fighting it, and asking for it, at the same time with its appeals for an illusory regulatory “certainty.” Nimbleness matters, and companies need to be able to grow and test new ideas quickly, as well as shut operations down quickly without regulators looming. Private property rights themselves are likely to evolve in novel ways at the level of inter-orbital exploration. We recognize such rights at the individual level, and at the corporate; and may see more of what we might call the “inter-corporate” variety as “critical infrastructure” goes airborne. Such wealth-building relationships will be especially valuable in tomorrow’s polycentric competition with “monopoly” governmental space programs like NASA. In fact, in the ideal, private space programs should be free from government competition,<sup>83</sup> let alone regulated by it.

Policymakers pondering the governance of commercial space activities should support disruptive technologies that are the real foundation of not just wealth but superior risk management and long-term infrastructure maintenance—rather than a disruptive Washington. We know that governments cannot be counted on to sustain their interests in long-term space programs in a fiscal/appropriations environment. The last moon landing was 46 years ago. That’s no way to run a railroad; or space program.

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<sup>9</sup> Jerry Hirsch, “Elon Musk’s Growing Empire is Fueled By \$4.9 Billion in Government Subsidies” *Los Angeles Times*, <http://www.latimes.com/business/la-fi-hy-musk-subsidies-20150531-story.html#page=1>.

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