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Space Act 2015: Towards Recognizing the Need for Space Traffic Management Regulation?

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‘Space Act 2015’: Towards recognizing a need for space traffic management?

Space Traffic Management can be described as technical and regulatory provisions required for guaranteeing safe and interference free operations during launch, suborbital and orbital space activities and atmospheric re-entry. During the last decade, the Federal Aviation Administration has recognized that the exponential increase in the rate of development of space technology will create future challenges associated with the resultant increase in volume of space traffic. While the introduction of new technology is always a challenge for regulatory frameworks, the ‘Space Act 2015’ was passed by the house with a clear majority in May 2015. This legislation proposes to support industry growth by extending the existing semi-comprehensive regulatory regime, creating a pro-growth environment and encourage private sector investment. The ‘Space Act’ clearly shows that US Congress acknowledges this potential future requirement for a more comprehensive framework to address space traffic management of both United States Government assets and United States private sector assets. As liability is arguably the primary risk facing both the public and private space industry, it seems on first reading that this act purports to create stable and more predictable regulatory conditions and improved safety to boost industry growth and development. This paper discusses whether the proposed changes address identified liability issues and regulatory uncertainties in addition to delivering the foundational requirements which support the United States greater international obligation towards space traffic management.

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I. Introduction

There are a wide variety of long term solutions which have been proposed to establish a comprehensive and integrated Space Traffic Management (STM) framework internationally and within the USA. Under International Law, nation states are required to authorize and continuously supervise space activities, (including private activities), however only a small number of State parties to the treaty have enacted legislation to do so.¹ It can be argued that an integrated national STM framework, is the highest level of control and authorization of space activities that a state can implement and proposed changes to existing legislative and regulatory frameworks establish the groundwork for evolution of such a system. In considering domestic space industry governance frameworks through the ‘holistic lens’ of STM, there exists an opportunity to assess domestic and international industry regulatory burdens arising from environmental and climate change treaties and multilateral agreements, human rights related considerations and trade related commitments. This will create an opportunity to co-ordinate and align policy mechanisms across a variety of Federal Agencies reducing the financial policy burden.

Current commercial space legislation introduced into both the House and Senate to amend the *Commercial Space Launch Act* propose to ‘facilitate a pro-growth environment for the developing space industry by encouraging private sector investment and creating more stable and predictable regulatory conditions’.² The amendments proposed, establish the framework for long term evolution of an effective STM, beginning with the development of technical and safety standards, promotion of industry innovation and risk management.

Section II, outlines the regulatory framework and industry environment which currently exist in the USA, including comment about the reception of current space related legislation. Section III will then consider operational technical and safety standards issues raised by the use of industry voluntary consensus standards (IVCS) as the foundational point for developing regulations to govern space activities. An examination of the evolutionary theory of economic change, notes that a dominant technological design is not necessarily a guarantee of long term success and processes such as IVCS that involve vigorous democratic competition

¹ See von der Dunk, Frans, Private Enterprise and Public Interest in the European Space – Towards Harmonized National Space Legislation for Private Space Activities in Europe, Leiden 1998 and Gerhard, Michael/Schrogl, Kai-Uwe, Report of the ‘Project 2001’ Working Group on National Space Legislation, in: Böckstiegel, Karl-Heinz (ed.): ‘Project 2001’ – Legal Framework for the Commercial Use of Outer Space, Cologne 2002, 529-564. See also Article 6 *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies*, 27 January 1967, 610 U.N.T.S. 205, 18 U.S.T. 2410, T.I.A.S. No. 6347, 6 I.L.M. 386 [hereinafter *Outer Space Treaty*] (entered into force on 10 October 1967), at I and IX at article VI.

² *Spurring Private Aerospace Competitiveness and Entrepreneurship (SPACE) Act* (H.R. 2262) & *Commercial Space Launch Competitiveness Act* (S. 1297).

between ideas are not necessarily equitable or in the best interests of the industry.³ Section IV will discuss risk management issues raised by the House and Senate commercial space legislation. For the purposes of this paper, risk management refers to broad liability issues, addressing international obligations including what may be perceived by the international community as a greater obligation towards STM. Finally, this paper argues that continuing the US political debate regarding space industry governance (largely in ‘proxy’ status) in the same direction will ultimately result in ‘more of the same’. That is a continued fundamentally unbalanced approach to the real issues facing the commercial space industry rather than a concerted effort to create innovative new ways to create a governance framework which is adaptable and flexible enough to accommodate rapid technology innovation.

II. Background

While there is no single established international definition for Space Traffic Management (STM) the definition used here is;

*“.....the technical and regulatory provisions required for guaranteeing safe and interference free operations during launch, suborbital and orbital space activities and atmospheric re-entry”.*⁴

There is an underlying presumption that the security of space services is critical for economic growth and prosperity and as nations operate in a globalized environment, the action of one state affects others. The United Nations codifies these ‘expectations’ of international behavior across a variety of disciplines including environment, human rights and risk management. For example, environmental protection is an important foundation of various Human Rights including; the right to life, the right to an adequate standard of living and the right to health and a clean environment.⁵ Importantly, sustainable development principles seek to achieve a balance between competing national interests and while were considered ‘soft law’ have achieved sufficient recognition within treaties, declarations, recognitions and international practice for recognition as established legal concept and part of ‘hard’ law.⁶ Regardless of whether a Nation state is a party to these treaties or not, there exists an obligation to incorporate these principles into all domestic governance frameworks. International space law defines the parameters for interactions between states and national space legislation establishes

³ Marpet, Mark I., 'An Ethical Issue in Voluntary-Consensus-Standards Development: A Decision-Science View' (1998) 17(15) Journal of Business Ethics 170, 1701.

⁴ Cosmic Study on Space Traffic Management, International Academy of Astronautics, edited by: Corinne Contant-Jorgenson, Petr Lála, Kai-Uwe Schrogl, International Academy of Astronautics (IAA) 2006, Paris.

⁵ H.E. Judge Christopher G Weeramanty former Vice-President of the International Court of Justice. Sustainable Development: An Ancient Concept Recently revived addressing the UNEP Conference Speech.

⁶ Ibid. see also *Rio Declaration on Environment and Development (1992)*, the United Nations Conference on Environment and Development, principles 4,5,7,8,10,20,21,28.

technical and safety standards for space objects to achieve safe access to outer space, establish liability rules, prevent pollution and provide a framework for industry growth in the domestic market.

III. Current Regulatory Framework and Background

a. Government vs Commercial Space Industry

Opposing values exist with regard to the privatization of domestic U.S. Space exploration largely due to changes that the industry has undergone in recent years. These opposing values originate from the findings of the Augustine Committee (U.S. Spaceflight Committee) which in 2009 analyzed plans for human spaceflight and recommended a variety of options. Of these options, a variety of models for transport to low earth orbit was presented replacing current NASA programs including a higher level of commercial space industry engagement.⁷ Fast forward to 2012 and Gerald Dillingham (Government Accountability Office) noted that as NASA procures an increasing number of commercial cargo and transportation services and private industry development of suborbital spacecraft continues, there will be an increase in the number of commercial launches, an increased regulatory load for the FAA along with a corresponding amplified risk of potential federal liability risk exposure.⁸

The US federal government has historically introduced robust forms of legislation and regulation for commercial space activities, choosing to include space law as a separate and unique area of law within Title 51 of the United States Code and establishing the *Commercial Space Launch Act* in 1984.⁹ U.S. Commercial Space Legislation passed the House and the Senate earlier this year extending the FAA's Office of Commercial Space Transportation's preclusion from issuing additional regulations related to commercial human spaceflight.¹⁰ The two bills, *Commercial Space Launch Competitiveness Act* (S. 1297) and *Spurring Private Aerospace Competitiveness and Entrepreneurship (SPACE) Act* (H.R. 2262), highlight the fundamental disparity in governance frameworks, arising principally from a lack of alignment and coordination between various Federal Agencies. The US Space Industry is comprised of both military, commercial and civil stakeholders who currently operate under a patchwork of federal agencies including the FAA's oversight of commercial space launches, NASA's scientific space activities, the DoD's national security

⁷ Bouchey, Michael and Jason Delborne, 'Redefining safety in commercial space: Understanding debates over the safety of private human spaceflight initiatives in the United States' (2014) 30(2) (5//) Space Policy 53.

⁸ Comments made by Gerald Dillingham, Director of Civil Aviation Issues, Government Accountability Office during the 2012 SENATE COMMITTEE ON COMMERCE, SCIENCE AND TRANSPORTATION, SUBCOMMITTEE ON SCIENCE AND SPACE, HEARING ON COMMERCIAL SPACE FLIGHTSEN. BILL NELSON HOLDS A HEARING ON COMMERCIAL SPACE FLIGHT. (2012, Jun 20). *Political Transcript Wire* Retrieved from <http://search.proquest.com/docview/1021809794?accountid=36155> .

⁹ 26 FDMELREV 516, Fordham Environmental Law Review, PRESERVING APOLLO: H.R. 2617 AND THE CREATION OF THE APOLLO LUNAR LANDING SITES NATIONAL HISTORICAL PARK Spring, 2015 (Approx. 33 pages), Kyle Ellis see also *Commercial Space Launch Act* 1984 (CSLA) (P.L. 98–575).

¹⁰ Senate bill, the Commercial Space Launch Competitiveness Act (S. 1297) passed in August. The House bill, Spurring Private Aerospace Competitiveness and Entrepreneurship (SPACE) Act (H.R. 2262), passed in May.

space launches, the State Department's involvement in international trade issues, and the Department of Commerce's advocacy and promotion of the industry.¹¹ GAO noted in 2011 that alignment of civil and national security space agencies may address many current issues which have arisen from uncoordinated and overlapping strategies.¹²

The commercial space industry in the United States is undoubtedly ecstatic about changes proposed in the Bills before the 114th Congress providing commercial companies with broad immunity for torts damage arising from a licensed launch or re-entry in addition to providing a fundamentally unbalanced approach to issues facing the broader commercial space industry. While GAO noted in 2011 that liability indemnity extension was required for the industry, however the proposed new legislation moves far beyond addressing issues of US commercial space industry global competitiveness and tip-toes towards the territory of breaching international human rights obligations with regards to legal standing. ‘*The Space Act 2015*’, received scathing criticism from ranking member Eddie Bernice Johnson at the Committee on Science, Space and Technology, who labelled the Bill as a vehicle giving preference to commercial space launch industry priorities over the safety of the general public.¹³ Johnson declined to support the Bill on the basis that Congress and the Committee have failed to give proper consideration or deliver sufficient due diligence in considering the changes for the *Commercial Space Launch Act*.¹⁴

b. Rapid Technology development and Innovation

The diversity of space systems currently under development represents a vast array of technologies and necessitates a comprehensive strategic plan to deliver effective and practical management of rapidly growing frameworks required to authorize and control space activities. SpaceX was founded in 2002 to “*radically improve the reliability, safety and affordability of space transportation*” and has consistently demonstrated that the global commercial market for space transportation is more stable than in the early 2000’s.¹⁵ Many other stakeholders have entered the market since due to the changing regulatory landscape on which the commercial space industry in the US is formerly based. The changes within current proposed legislation

¹¹ Dillingham, G. L. (2011). DEVELOPMENT OF THE COMMERCIAL SPACE LAUNCH INDUSTRY PRESENTS SAFETY OVERSIGHT CHALLENGES FOR FAA AND RAISES ISSUES AFFECTING FEDERAL ROLES. *Journal of Magnetohydrodynamics and Plasma Research*, 16(1), 1-14. Retrieved from <http://search.proquest.com/docview/1702940774?accountid=36155> .

¹² Ibid.

¹³ Statement on H.R. 2262 Ranking member Eddie Bernice Johnson (D-TX) , Committee on Science, Space and Technology, Full Committee Markup Session, May 13th, 2015. <http://democrats.science.house.gov/sites/democrats.science.house.gov/files/documents/EBJ%20Open%20SPACE%20Act.pdf> .

¹⁴ *Commercial Space Launch Act* 1984 (CSLA) (P.L. 98–575).

¹⁵ Rogosa, Alexander. (2015) 101 Shifting Spaces: The Success of the SpaceX lawsuit and the danger of single-source contracts in America’s Space Program. *Federal Circuit Bar Journal*. 2015 101.

leaves every stakeholder protected with the exception of the general public and customers.¹⁶ In particular those customers for Suborbital Spaceflights. Suborbital Reusable Vehicles (SRV's) are designed to cross the threshold of space without achieving orbit and provide a short experience of weightlessness for customers. Six or more companies are in active planning, development or operation of 11 different types of SRV's.¹⁷ A ten year forecast of demand for SRV's published by the FAA shows continued growth under current legislative arrangements. The study found that associated new markets using current consumer demand and research budgets the demand could result in daily SRV flights and attract between \$300 Million and 1.6 Billion in revenue.¹⁸ This data raises questions about whether legislative reform is really required to extend liability protections further as proposed in H.R.2262 and S.1297.¹⁹ There are a number of risks associated with developing new markets and technologies and an increase in the volume, frequency and variety of 'Space Traffic', potential for accidents through experimental technology failures or (learning experiences) is amongst one of the results of a rapidly developing commercial space industry.

The CSLCA provides authority for the Federal Aviation Administration's Office of Commercial Space Transportation (FAA-AST) to license and indemnify launch providers from third party liability in the event of an accident. The result of this is that the volume of suborbital 'traffic' will affect the FAA-AST, licensing and regulatory workload in particular as the FAA's NextGen air traffic control system is integrated into current operations.²⁰ In viewing domestic space industry governance frameworks through the 'holistic lens' of STM associated policies, procedures and standards for a mixture of diverse aircraft and spacecraft transitioning through the national airspace system can provide new opportunities to inform industry voluntary consensus standards as proposed by the legislation. As numerous federal agencies have responsibility for space activities, the 'holistic lens' which may leverage various space agency resources to align various agencies in order to address issues created by gaps in federal authority.

Throughout the history of man, the many benefits of new technology have always been weighed carefully against the potential for catastrophic failures such as the one experienced on October 31, 2014 by the

¹⁶ *Spurring Private Aerospace Competitiveness and Entrepreneurship (SPACE) Act (H.R. 2262) s7, & Commercial Space Launch Competitiveness Act (S. 1297) s4.*

¹⁷ Suborbital Reusable Vehicles; a 10 year Forecast of Market Demand, The Tauri Group prepared for the FAA May 2014.

https://www.faa.gov/about/office_org/headquarters_offices/ast/media/Suborbital_Reusable_Vehicles_Report_Full.pdf .

¹⁸ Ibid.

¹⁹ Senate bill, the Commercial Space Launch Competitiveness Act (S. 1297) passed in August. The House bill, Spurring Private Aerospace Competitiveness and Entrepreneurship (SPACE) Act (H.R. 2262), passed in May.

²⁰ United States Government Accountability Office, Testimony before the Subcommittee on Aviation, Committee on Transportation and Infrastructure, House of Representatives, released 10am December 2nd 2009, *Commercial Space Transportation Development of the Commercial Space Launch Industry Presents Safety Oversight Challenges for FAA and Raises Issues Affecting Federal Roles*, Statement of Gerald L. Dillingham, Ph.D., Director Physical Infrastructure Issues. GAO-10-286T.

SpaceShipTwo (SS2), a reusable suborbital rocket. The vehicle, N339SS, developed by Scaled Composites, broke into multiple pieces during rocket powered flight, scattering debris over a 5 mile area near Koehn Dry Lake, California, fatally injuring the co-pilot and rendering serious injuries for the pilot.²¹ SS2 was completely destroyed however no other injuries were reported as a result of the falling debris. SS2 was operated under an experimental permit issued by the (FAA) Office of Commercial Space Transportation (AST) pursuant to 14 *Code of Federal Regulations* (CFR) Part 437. The accident report issued 28 July 2015 by the National Transportation Safety Board (NTSB) stated the probable cause of the accident as ‘*Scaled Composites failure to consider and protect against the possibility of a single human error could result in a catastrophic hazard to the SpaceShipTwo vehicle*’. The NTSB then followed up by making a number of recommendations to the FAA AST office and directed a review of the evaluation of experimental permit applications, develop human factors guidance in collaboration with the Commercial Spaceflight Federation and develop and implement procedures and guidance for confirming that operators are implementing a range of identified safety mitigations. While SRV technology and the potential new markets identified for this industry are in their infancy both from a technical and legal standpoint, there are questions raised by the findings of the accident investigation. The accident investigation findings can only inform safety data and contribute towards the formulation of voluntary industry standards for future operations and provide data for future decisions on regulation.

c. Spaceflight expertise and governance: politics, knowledge and technocracy

In order to deliver a solid foundation for continued innovation and development of new technology and capability, governance frameworks must deliver a balance between industry growth and investment and the introduction of new rules which can adapt and support commercial business during this rapid change. Another aspect of delivering industry growth is providing mechanisms to ensure that companies are provided with equitable opportunities. Establishing fair competition within competitive government civil and national security contracts will promote industry growth. Arguments over safety of operations reveals a more politically polarized view of between proponents of pro-commercial or pro-government actors which centers on a values dispute. For example the Evolved Expendable Launch Vehicle (EELV) United States Air Force program, will lower launch costs for the American taxpayer and drive contractor funded innovation, however at its inception, questions regarding the fairness of the process was raised.²²

²¹ National Transportation Safety Board, Aviation Accident Report In - Flight Breakup During Test Flight Scaled Composites SpaceShip Two, N339SS Near Koehn Dry Lake, California October 31, 2014 NTSB/AAR - 15/02 PB2015-105454.

²² Rogosa, Alexander. (2015) 101 Shifting Spaces: The Success of the SpaceX lawsuit and the danger of single-source contracts in America’s Space Program. Federal Circuit Bar Journal. 2015 101.

It has been argued that the appropriate role of State in development of science and technology development is beyond Keynesian manipulation of spending and regulation.²³ Central to the debates over commercialization of human spaceflight are issues of governance and expertise and the acknowledgement that the market selects the dominant technological design.²⁴ Should the US seek flexible and innovative expertise offered by private commercial firms or is does NASA's organizational experience provide critical expertise?²⁵

Conflicting pro-government and pro-commercial views over what constitutes the minimum technical requirements for safe space operations, are reflected in political debates to promote what are considered to be 'safe policy options'.²⁶ Literature suggests there are four working definitions of spaceflight safety including; high cost, technical requirements, organizational experience and track record.²⁷ The commercial space industry safety regulatory issues which '*The Space Act 2015*' and the *Commercial Space Launch Competitiveness Act*, attempt to address are complex and require careful consideration.

Currently, there are many new and innovative technologies under development for civil, commercial and military space applications with technological innovation causing changes in the application of those technologies. The effect of this rapid development, is that regulatory requirements for space operations will increase or decrease largely due to evolving science and technology policy, i.e. technological systems co-evolve with institutional systems.²⁸ Mechanisms proposed by current Bills to control activities of private non-governmental actors is limited to an ongoing evolution of the current system, and instead of regulations, voluntary consensus standards, liability protections and a statement of recognition that 'there may be a need for a framework addressing STM'.²⁹ There is currently no consideration of mechanisms required to ensure an equitable system of regulatory evolution to minimize techno-institutional lock-in such as that which can be seen in high carbon energy systems industry legislation.³⁰

²³ Fuchs, Erica R. H., 'Rethinking the role of the state in technology development: DARPA and the case for embedded network governance' (2010) 39(9) (11//) Research Policy 1133.

²⁴ Bouchey, Michael and Jason Delborne, 'Redefining safety in commercial space: Understanding debates over the safety of private human spaceflight initiatives in the United States' (2014) 30(2) (5//) Space Policy 53.

²⁵ Ibid.

²⁶ Ibid.

²⁷ Ibid.

²⁸ Konnola, T, Unruh, G, et al. Prospective Voluntary agreements for escaping techno-institutional lock-in. Ecological Economics, Volume 57, Issue 2, 1 May 2006, 237-252.

²⁹ Kai-Uwe Schrogl, Space traffic management: The new comprehensive approach for regulating the use of outer space—Results from the 2006 IAA cosmic study, Acta Astronautica, Volume 62, Issues 2-3 p272-276.

³⁰ Konnola, T, Unruh, G, et al. Prospective Voluntary agreements for escaping techno-institutional lock-in. Ecological Economics, Volume 57, Issue 2, 1 May 2006, 237-252.

d. Are Voluntary Industry Consensus Standards a way of creating Embedded Autonomy within the US Commercial Space Industry?

The rationale behind the extension of the commercial space industry ‘learning period’ authorized by CSLA³¹ s2c amendments of 2004, and 2012 and now S1297 proposed changes to 2020, is that reducing the regulatory burden for new and rapidly evolving industry stakeholders will promote innovation.³²

Section 101 of ‘*The Space Act*’ and Section 10 of the *Commercial Space Launch Competitiveness Act* (CSLCA) relate to proposed government reporting on Industry Voluntary Consensus Standards (IVCS).³³ IVCS are defined by a number of studies as standards created by interested volunteers under due-process procedures which fairly take the concerns of all parties into account.³⁴ The benefits of IVCS include lowering costs and commercial barriers to doing business, promote commerce and generate vigorous democratic competition between ideas which leads to a high-quality standard.³⁵ There is an inherent danger in the commercial space environment that some participants in the standards-development process will work against the common interests of all parties and attempt to skew the standards in favor of a specific product, service or practice.

For governance system success, whether it is centralized command and control and Top-down policies (*developmental bureaucratic state*) or decentralized and distributed with mutual adjustment, facilitation on building trust, and co-ordination and co-operation between the relevant parties (*experimental federalism*); it’s argued that public officials must have embedded autonomy. In other words, institutionalized channels for continued negotiation and renegotiation of goals and policies.³⁶ While the ‘*Space Act*’ invites the commercial space industry to be an integral part of the creation of regulations through IVCS, this methodology is essentially flawed. Established commercial space companies have a significant advantage over new market entrants and have the capacity to skew and unfairly influence the process towards their technology application and business.

³¹ *Commercial Space Launch Act* 1984.

³² section 2(c) of the *Commercial Space Launch Act* Amendments of 2004 (118 Stat. 3977), and in 2012 was extended through September 30, 2015 (51 U.S.C. 50905(c)).

³³ S.1297, *U.S. Commercial Space Launch Competitiveness Act* (CSLCA) amends section 50905(c), of title 51, Industry Voluntary Consensus Standards.

³⁴ Marpet, Mark I., 'An Ethical Issue in Voluntary-Consensus-Standards Development: A Decision-Science View' (1998) 17(15) *Journal of Business Ethics* 170, 1701.

³⁵ *Ibid.*

³⁶ Fuchs, Erica R. H., 'Rethinking the role of the state in technology development: DARPA and the case for embedded network governance' (2010) 39(9) (11//) *Research Policy* 1133.

This unfair advantage was demonstrated when the US Air Force awarded the contract for thirty-six core Evolved Expendable Launch Vehicle (EELV) to the United Launch Alliance on December 18, 2013.³⁷ The EELV contract secured rocket hardware to launch payloads developed by the National Reconnaissance office, US Air Force and Navy, NASA and some commercial customers.³⁸ SpaceX alleged in their lawsuit that the Air Force solicited bids before completing the certification which would allow SpaceX to compete for the contract, effectively excluding them.³⁹ As with many government solicited contract bids, in particular within the space industry, the primary obstacle to competition is the extensive certification process requirements for potential bidders. It is important to note that SpaceX had filed suit in 2006, attempting to block the most recent EELV award, arguing that the Air Force's single source selection process would disadvantage SpaceX in submitting a future proposal when it had completed the certification process.⁴⁰ In that instance, Lockheed Martin and Boeing filed a joint motion to dismiss the case for lack of standing, which was granted by the Court.⁴¹ The 2014 bid by SpaceX was successful in establishing standing to sue and resulted in a private settlement on January 23, 2015. As a result of this case, the Air Force will conduct solicitations which seek to identify multiple certified providers.⁴² Established space industry companies will likely have more power with regulatory agencies such as the FAA, DoD and DoT in addition to a greater financial resources available to influence IVCS processes. What are the mechanisms which can be identified to build equity into the IVCS process and what recourse do companies have if they do not agree with the predominant standard selected by the group and adopted as regulations by the FAA? Consensus standards have been criticized for being 'too slow and too messy'.⁴³

IV. Risk Management

a. Liability Issues

Congress recognized in 2009 that decisions needed to be made regarding the continuation of existing liability indemnification for the commercial space industry as the number of commercial launches increases to reduce

³⁷ 25 FEDCBJ 101 Federal Circuit Bar Journal SHIFTING SPACES: THE SUCCESS OF THE SPACEX LAWSUIT AND THE DANGER OF SINGLE-SOURCE 2015.

³⁸ National Security Space Launch Program: Hearing Before the Subcomm. On Def. of the S. Comm. On Appropriations, 113th Cong. 1 (2014), (statement of Sen. Richard Durbin, Chairman, S.Subcomm. on Def.).

³⁹ *Space Exploration Techs. Corp. v. United States*, 116 Fed.Cl.68 (2014).

⁴⁰ *Space Exploration Techs. Corp. v. United States*, 68 Fed.Cl.1,1 (2005).

⁴¹ *Ibid.* at 1,4.

⁴² Rogosa, Alexander. (2015) 101 Shifting Spaces: The Success of the SpaceX lawsuit and the danger of single-source contracts in America's Space Program. Federal Circuit Bar Journal. 2015 101.

⁴³ Marpet, Mark I., 'An Ethical Issue in Voluntary-Consensus-Standards Development: A Decision-Science View' (1998) 17(15) Journal of Business Ethics 170, 1701.

commercial uncertainty in order to create a pro-growth environment.⁴⁴ Both the House and Senate legislation seek to address these uncertainties, by reducing risk for both the federal government and launch companies.⁴⁵ The ‘*Space Act*’ in particular moves far beyond addressing legitimate industry needs and towards treacherous territory as it fails to protect future customers of the space industry and the general public.⁴⁶ The proposed changes are so far reaching that community justice organizations have opposed these liability provisions on the basis that they are unnecessary and harmful. Provisions which provide immunity for torts arising from licensed commercial space launch and re-entry could invite recklessness and intentional misconduct. In addition to these broad liability waivers which require passengers to waive their rights to damages for personal injury, property damage or death. All U.S. industry is subject the Civil Justice system and the commercial space industry should be no exception.

b. Space Traffic Management is a direct application of State Jurisdictional control.

The assertion that an integrated national STM framework, is the highest level of control and authorization of space activities that a state can implement is based on the concept that acknowledgement the international obligation to authorize and control activities under Article VI (2) of the OST⁴⁷ Since the direct ascent anti-satellite weapon test by the Peoples Republic of China in January 2007, the international community has increased interest in the Article Six responsibility principle.⁴⁸ Congresswoman Donna Edwards noted in her introductory speech for the ‘*Space Act*’ that the moratorium on the FAA’s authority to regulate the safety of crew and spaceflight participants has been extended by an additional decade.⁴⁹ This will extend a period which began in 2004 when amendments were made to the *Commercial Space Launch Amendments Act 2004* for industry to continue to acquire experience and collect data to inform the development of safety standards.

⁴⁴ United States Government Accountability Office, Testimony before the Subcommittee on Aviation, Committee on Transportation and Infrastructure, House of Representatives, released 10am December 2nd 2009, *Commercial Space Transportation Development of the Commercial Space Launch Industry Presents Safety Oversight Challenges for FAA and Raises Issues Affecting Federal Roles*, Statement of Gerald L. Dillingham, Ph.D., Director Physical Infrastructure Issues. GAO-10-286T, 2.

⁴⁵ SEC 102. (b)*Spurring Private Aerospace Competitiveness And Entrepreneurship Act 2015* (H.R. 2262).

⁴⁶ *Spurring Private Aerospace Competitiveness And Entrepreneurship Act 2015* (H.R. 2262) section 102(a),(b), section 105, section 106, section 107, section 108.

⁴⁷ *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies*, 27 January 1967, 610 U.N.T.S. 205, 18 U.S.T. 2410, T.I.A.S. No. 6347, 6 I.L.M. 386 [hereinafter *Outer Space Treaty*] (entered into force on 10 October 1967).

⁴⁸ Spencer, Ronald L. J. R., 'STATE SUPERVISION OF SPACE ACTIVITY' (2009) 63 (2009 2012-02-08) *The Air Force Law Review* 75 for the purposes of this paper non-government entities implies commercial space companies.

⁴⁹ Congresswoman Donna Edwards Floor Statement (Opening) on Space Act 2015, May 21, 2015.

FAA licenses for Nation States, meet the dual requirements of authorization and continued state supervision of commercial space businesses as specified by Article VI the OST, is becoming increasingly complex as technology developments yield a variety of new space vehicles, applications and markets which in turn widens the scope of safety data required to assure safe operation.⁵⁰ States as defined by Article I of the *Montevideo Convention 1933*⁵¹, are under an obligation to exercise jurisdiction and control over objects and personnel during launch, operations in space and on re-entry.⁵² The principle of State Responsibility for national Space activities established during the cold war, applies more than ever in today's increasingly globalized society. Recognition of the State 'due diligence' standard for Addressing ongoing liability issues at a State level is required to promote industry growth and development. An important aspect of meeting international obligations with regard to Article Six responsibility is demonstration or evidence of responsibility for authorization since the main consequence of responsibility is that the State bears the main liability for damages caused by authorized space activities.⁵³ The learning period or moratorium on regulatory authority may represent a weakness in article six authorization, presenting to some degree a lower level of due diligence on the part of a nation which is regarded as a world leader in space technology development and operations. The difficulty is that there does not exist sufficient safety and operational data to definitively provide regulations for the industry with any kind of confidence. Identifying the operational gap which informs regulatory authorization is the key to moving forwards towards a system which represents a reasonable balance between safety considerations and the need for a concrete framework. While authorization systems are relatively easy to assess or impute, Article VI supervision provisions are more difficult in their application.⁵⁴ Ascertaining compliance with supervision or continuing supervision encompasses all operations from⁵⁵ Recognition of the perceived need for a Space Traffic Management System in the '*Space Act*' could provide evidence of States continued supervision.⁵⁶

V. Conclusion

The two bills, *Commercial Space Launch Competitiveness Act* (S. 1297) and *Spurring Private Aerospace Competitiveness and Entrepreneurship* (SPACE) Act (H.R. 2262), have received criticism for proposing to

⁵⁰ *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies*, 27 January 1967, 610 U.N.T.S. 205, 18 U.S.T. 2410, T.I.A.S. No. 6347, 6 I.L.M. 386 [hereinafter *Outer Space Treaty*] (entered into force on 10 October 1967), at VI.

⁵¹ *Convention on the Rights and Duties of States* (Montevideo Convention), Dec. 26, 1933, 165 L.N.T.S. 19, 28 AM. J. INT'L L. (Supp.) 75 (1934) (reprinting text of Montevideo Convention).

⁵² *Outer Space Treaty Article VIII*.

⁵³ *Ibid Article VII*.

⁵⁴ Spencer, Ronald L. J. R., 'STATE SUPERVISION OF SPACE ACTIVITY' (2009) 63 (2009 2012-02-08) *The Air Force Law Review* 75.

⁵⁵ *Ibid*.

⁵⁶ *Convention on International Liability of Damage by Space Objects*, March 29, 1972, art 1(c), 24 U.S.T. 2389.

remove public liability protections and failing to deliver real policy solutions. The fundamental disparity in governance frameworks, arising principally from a lack of alignment and co-ordination between various Federal Agencies should be addressed by introducing additional governance mechanisms which leverage public financial resources. Mechanisms proposed by current Bills to control activities of private non-governmental actors is limited to an ongoing evolution of the current system, and instead of regulations, voluntary consensus standards, and liability protections. Proposals pointing towards the development of a national overarching launch strategy suggested as one possible mechanism to fill gaps in federal policy and provide impetus for leveraging resources.⁵⁷

A statement of recognition that ‘there may be a need for a framework addressing STM’ may be a step towards delivering due diligence and providing evidence of continuing supervision with the highest level of control and authorization of space activities that a state can implement.⁵⁸ Utilizing the ‘holistic lens’ of STM, to assess domestic and international industry regulatory burdens arising from environmental and climate change treaties and multilateral agreements, human rights related considerations and trade related commitments will provide a mechanism to introduce these obligations into domestic regulation from the outset. This will create an opportunity to co-ordinate and align policy mechanisms across a variety of Federal Agencies reducing the financial policy burden. Aside from any Human Rights arguments which underlie proposed removal of U.S Civil Justice System protections related to liability for customers, there is a risk that failure to regulate will provide a system which is unwieldy and ultimately slows down innovation. Questions raised by extending the moratorium of FAA regulatory development without mechanisms to regulate equity, leaves the industry open to continued abuse of process such as that found within the EELV contract.⁵⁹ While there is no dispute that insufficient data exists for the FAA to regulate space operations (given the diversity of technology and the transition to commercial space industry provision of services) such a discretionary system leaves opportunity for abuse of process by both commercial and government actors. Many regulatory uncertainties in the governance framework for space operations will continue to exist despite the addition of these new proposed legislative instruments. Recommendation of appropriate mechanisms for reform is outside the scope of this paper, however further examination should be undertaken to ascertain the effect of an overall ‘holistic’ Space Traffic Management System on filling the identified governance disparities.

⁵⁷ Dillingham, G. L. (2011). DEVELOPMENT OF THE COMMERCIAL SPACE LAUNCH INDUSTRY PRESENTS SAFETY OVERSIGHT CHALLENGES FOR FAA AND RAISES ISSUES AFFECTING FEDERAL ROLES. *Journal of Magnetohydrodynamics and Plasma Research*, 16(1), 1-14. Retrieved from <http://search.proquest.com/docview/1702940774?accountid=36155>.

⁵⁸ Kai-Uwe Schrogl, Space traffic management: The new comprehensive approach for regulating the use of outer space—Results from the 2006 IAA cosmic study, *Acta Astronautica*, Volume 62, Issues 2-3 p272-276.

⁵⁹ 25 FEDCBJ 101 Federal Circuit Bar Journal SHIFTING SPACES: THE SUCCESS OF THE SPACEX LAWSUIT AND THE DANGER OF SINGLE-SOURCE 2015.