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The Foreign Space Flight Participant Problem: Can a Space Flight Operator Balance Satisfaction of FAA Informed Consent Information Requirements with ITAR?

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I. INTRODUCTION

> "[T]here are known knowns; there are things we know we know. We also know there are known unknowns; that is to say we know there are some things we do not know. But there are also unknown unknowns—the ones we don't know we don't know."[1]
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> —Former United States Secretary of Defense, Donald Rumsfeld

[1] Press Release, U.S. Dep't of Def., DoD News Briefing – Secretary Rumsfeld and Gen. Myers (Feb. 12, 2002), *available at* http://www.defense.gov/transcripts/transcript.aspx?transcriptid=2636.

Access to outer space has been primarily achieved under the purview of State technological competence and authority.[2] Borne out of Cold War tensions, nation-states generally have had a monopoly over how, when, and what (objects or persons) can and cannot be launched into orbit.[3] In the United States, commercialization of outer space activities and operations has evolved to the point that private individuals can now seek a ride into outer space on a commercial launch vehicle.[4] For example, since the mid 2000s, several commercial firms—such as Virgin Galactic, X-COR, and others—have developed or are developing launch vehicles that will send adventurous, private paying individuals on suborbital flights into outer space.[5] The industry has grown substantially since Scaled Composites won the Ansari X-Prize in 2004, and shows promise for growing into a multi-billion dollar industry.[6]

In anticipation of this activity, Congress granted the Department of Transportation ("DOT") authority to regulate commercial human space flight in 2004.[7] The objectives of the Commercial Space Launch Amendments Act of 2004 ("CSLAA") include promotion of the research and development of launch technologies, growth of the commercial space transportation industry under a flexible regulatory regime, and mitigation of certain risk to the public, to the

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[2] *See* Thomas Neger & Alexander Soucek, *Space Faring: A Short Overview of the Present Situation*, *in* OUTER SPACE IN SOCIETY, POLITICS AND LAW 157, 157-77, 493-502 (Christian Brünner & Alexander Soucek eds., 2011).

[3] *See id.* at 493-94; *see also* JULIAN HERMIDA, LEGAL BASIS FOR A NATIONAL SPACE LEGISLATION 36-40 (2004) (discussing the legal basis by which States authorize national activities in outer space); Treaty on the Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies art. VI, *opened for signature* Jan. 27, 1967, 610 U.N.T.S. 205 [hereinafter Outer Space Treaty].

[4] *See* Jesse McKinley, *Out of This World*, N.Y. TIMES, Sept. 9, 2012, at TR1; *see also* Mike Wall, *Virgin Galactic Aims for 1st Rocket-Powered Flight This Year*, SPACE.COM (Feb. 28, 2012), http://www.space.com/14706-virgin-galactic-spaceshiptwo-powered-flight.html ("Virgin Galactic hopes to perform the first rocket-powered test flight of its suborbital spaceliner by the end of 2012, with commercial operations perhaps beginning a year or two later.").

[5] *See* Kenneth Chang, *Booking a Flight to Space, With Travel Insurance*, N.Y. TIMES, Jan. 4, 2012, at A1; Press Release, XCOR Aerospace, XCOR Aerospace Suborbital Vehicle to Fly Within Two Years (Mar. 26, 2008), http://www.xcor.com/press-releases/2008/08-03-26_Lynx_suborbital_vehicle.html.

[6] *See Ansari X-Prize*, X-PRIZE FOUND., http://space.xprize.org/ansari-x-prize (last visited Mar. 16, 2013); THE TAURI GROUP, SUBORBITAL REUSABLE VEHICLES: A 10-YEAR FORECAST OF MARKET DEMAND (2012), *available at* http://www.taurigroup.com/files/Suborbital_Reusable_Vehicles_A_10_Year_Forecast_of_Market_Demand.pdf.

[7] *See* Commercial Space Launch Amendments Act of 2004, Pub. L. No. 108-492, 118 Stat. 3974 (rule-making authority delegated to the Federal Aviation Administration's Office of Commercial Space Transportation ("FAA/AST") for commercial launch vehicle licensing and space flight operator and participant regulations).

government, to space flight participants, and to space flight operators.[8] The CSLAA legally defines and advances rules for space flight operators and space flight participants; it requires launch permits and licenses, insurance coverage, indemnity protection from third-party liability, operator financial responsibility, and participant informed consent regarding spaceflight risks.[9] Further, the CSLAA grants DOT wide latitude to protect public safety, but limits DOT's authority to promulgate safety regulations for space flight participants and operators.[10]

Before a potential participant can sign a contract and submit payment for a seat on a commercial launch vehicle, the operator must inform the participant of the risks involved.[11] Federal Aviation Administration ("FAA") regulations require space flight operators to obtain informed consent from space flight participants regarding the risks of government and commercial space flight; operators also must provide participants with information about a launch vehicle's technologies, and with an opportunity to ask questions about certain technical and risk aspects of space flight.[12] The purpose of the informed consent requirement is not necessarily to shift legal risk to the participant, but rather is to provide an alternative to imposing stricter design requirements on the operators.[13] Failure to provide informed consent to space flight participants would affect a space flight operator's culpability, liability for damages, FAA issued

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[8] *See* 51 U.S.C. § 50901(a)-(b) (2012). *See generally* Timothy Robert Hughes & Esta Rosenberg, *Space Travel Law (And Politics): The Evolution of the Commercial Space Launch Amendments Act of 2004*, 31 J. SPACE L. 1 (2005) (explaining the development, rationale, goals, objectives, and limitations of CSLAA).

[9] *See* 51 U.S.C. § 50901.

[10] *See* Hughes & Rosenberg, *supra* note 8, at 43-48. CSLAA does not grant DOT the authority to regulate "design features or operating practices" of launch vehicles for purposes of protecting crew and passengers unless "a serious or fatal injury" or "high risk of causing a serious or fatal injury" occurs on "a licensed or permitted . . . space flight . . . [until] October 1, 2015" unless an actual fatal or serious injury occurs, or "unplanned event that poses a high risk of causing a serious or fatal injury to a space flight participant or crew." 51 U.S.C. § 50905(c)(2)-(3) (2011) (language of subsection (c)(3) was changed to "Beginning on October 1, 2015 . . ." from "Beginning 8 years after . . . ."); 14 C.F.R. § 401.5 (2012). *See* Human Space Flight Requirements for Crew and Space Flight Participants, 71 FED. REG. 75,616, 75,624 (Dec. 15, 2006) (to be codified at 14 C.F.R. pts. 401, 415, 431, 435, 440, and 460). On Feb. 15, 2012, President Barack H. Obama signed the FAA Modernization and Reform Act of 2012, in which § 827 of the bill amended 51 U.S.C. § 50905(c)(3) by extending the moratorium prohibiting the FAA from regulating passenger safety until Oct.1, 2015. FAA Modernization and Reform Act of 2012, Pub. L. 112-95, 126 Stat. 11 (2012), http://www.faa.gov/regulations_policies/reauthorization/media/PLAW-112publ95[1].pdf.

[11] 51 U.S.C. § 50905(b)(5)(B).

[12] 14 C.F.R. § 460.45 (2012). *See* Tracey Knutson, *What is "Informed Consent" for Space-Flight Participants in the Soon-To-Launch Space Tourism Industry?*, 33 J. SPACE L. 105, 122 (2007).

[13] *See* Hughes & Rosenberg, *supra* note 8, at 43-48.

launch license, scope of operations, seat pricing, and insurance costs and requirements.[14]

Neither the CSLAA nor FAA regulations fully describe how an operator must meet its duty of obtaining informed consent from a U.S. or a foreign space flight participant. For example, state-promulgated informed consent laws create yet another layer of legal uncertainty because state tort rules vary from state to state.[15] Therefore, it is not clear how the CSLAA, and its implementing FAA regulations, either preempts state law regarding informed consent or affects an operator's duty to warn participants of space flight risks and potential exposure to liability.[16] Thus, it is argued that a space flight operator should tell a space flight participant *everything* about the hazards and consequences of the space flight, and about the underlying technologies of the launch vehicle.[17]

Given Virgin Galactic's announcement that over 500 persons have already paid a deposit for suborbital flight, it is assumed that each participant has already provided informed consent.[18] Some of these participants, including Virgin Galactic's owner Sir Richard Branson, are foreign persons.[19] Although

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[14] *See* 14 C.F.R. § 460.45.

[15] *See, e.g.*, Hildebrand v. Minyard, 494 P.2d 1328, 1331-32 (Ariz. Ct. App. 1972).

[16] *See* Meredith Blasingame, Comment, *Nurturing the United States Commercial Space Industry in an International World: Conflicting State, Federal, and International Law*, 80 MISS. L.J. 741, 768-86 (2010) (discussing preemption analysis as applied to the U.S. Constitution, U.S. state law, and international law over national and international space law).

[17] *See* Knutson, *supra* note 12. *See also* Zeldine Miamh O'Brien, *Consumer Protection and the Limitation of Liability in the National Regulation of the Space Industry*, 48 PROC. COLL. L. OUTER SPACE 229, 236 (2005) (arguing that "operators should be obliged to make disclosure of all material risks in order for the consent to be classified as informed.").

[18] *See* Ashton Kutcher, *Our 500th Astronaut*, VIRGIN GALACTIC (Mar. 22, 2012), http://www.virgingalactic.com/news/item/our-500th-astronaut/. Under FAA regulations, a space flight operator must inform the space flight participant of the risks of space flight before accepting compensation for the launch. 14 C.F.R. § 460.45(a). Moreover, a space flight participant is not a customer or a passenger, but a suborbital launch vehicle flight participant. *See* Stephan Hobe, Gerardine Meishan Goh & Julia Neumann, *Space Tourism Activities – Emerging Challenges to Air and Space Law?*, 33 J. SPACE L. 359, 367-71 (2007). This distinction provides the rationale for why Congress decided to exempt participants from third party indemnification. *See, e.g.*, Laura Montgomery, *Space Tourism and Informed Consent: To Knowingly Go*, 51 FED. LAW. 26, 27-28 (2004). However, there is some confusion about the use of the term "passenger" to describe a space flight participant, and whether reusable suborbital launch vehicles fall under the legal definition of "aircraft." *See* Stephan Hobe, *Legal Aspects of Space Tourism*, 86 NEB. L. REV. 439, 440-41 (2007). If the aviation law terms for "passenger" and "aircraft" apply, then it would trigger a legal inquiry that could affect the scope of meaning of the CSLAA. *See id.* Prima facie, however, the applicability of aviation law to the CSLAA was probably not Congress's intention. *See* H.R. REP. No. 108-429, at 13 (2004). *See also* 51 U.S.C § 50901(a)-(b) (2012). Nonetheless, it is possible that space flight operators have avoided the informed consent before accepting compensation issue through some contractual provisions that have not been publically disclosed.

[19] *Sir Richard's First Flight on VMS Eve*, VIRGIN GALACTIC (Nov. 2, 2009), http://www.virgingalactic.com/news/item/sir-richards-first-flight-on-vms-eve/.

the commercial space transportation industry and the FAA assume that companies like Virgin Galactic have considered these issues, it is unclear whether, in a rush to sell seats, some commercial space flight operators have underestimated the additional constraints on their business model—and the need for the model to adhere to FAA regulations.[20]

A major potential constraint with the informed consent requirement is the requirement for communication of technical data about the launch vehicle and its underlying technologies to foreign space flight participants. The Arms Export Control Act ("AECA"), and its implementing International Traffic in Arms Regulations ("ITAR"), prohibits exporting technical data to foreign persons without first obtaining an export license from the Department of State.[21] Under ITAR at 22 C.F.R. § 120.10, technical data includes "[i]nformation . . . which is required for the design, development, production, manufacture, assembly, operation, repair, testing, maintenance or modification of defense articles."[22] FAA commercial space flight regulations do not balance required disclosure of technical data to participants with the requirement to keep flight technology data secure from foreign persons.[23] Therefore, as the dream of

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[20] To be fair, several companies in the commercial space industry raised export-control issues during the formulation of the Final Rule for Human Space Flight Requirements for Crew and Space Flight Participants in 2006. *See infra* note 23. To date, Scaled Composites and Virgin Galactic have satisfied initial export control issues when these companies sought and received a Technical Assistance Agreement ("TAA") from the Department of State's Directorate of Defense Trade Controls ("DDTC") in 2005. *See* Leonard David, *U.S. Okays Virgin Galactic Spaceship Plans*, SPACE.COM (Aug. 15, 2005), http://www.space.com/1439-okays-virgin-galactic-spaceship-plans.html. Additionally, Bigelow Aerospace demonstrated due diligence by seeking exemptions from the DDTC over defense articles on its habitat modules. *See* Dan Leone, *Virgin Galactic Granted License Exemption for Spaceflight Experience*, SPACE NEWS (Apr. 11, 2012), http://www.spacenews.com/venture_space/120411-virgin-granted-exemption.html. However, subsequent discussions in the space law and policy literature have raised the issue of the tension between U.S. export-control regulations and FAA space flight participant informed consent requirements without much resolution. *See, e.g.*, P.J. Blount, *Informed Consent v. ITAR: Regulatory Conflicts That Could Constrain Commercial Human Spaceflight*, 66 ACTA ASTRONAUTICA 1608 (2010); John A. Ordway, *The U.S. International Traffic in Arms Regulations and Emerging Personal Spaceflight/Space Tourism Industry*, 50 PROC. COLLOQ. L. OUTER SPACE 226, 231 (2007) (raising the issue of foreign space flight participants aboard private launch vehicles, noting that the "mere flight aboard any such vehicle as a passenger appears to be the least likely private . . . activity to be ITAR-controlled"); Charles W. Stotler, *International and U.S. National Laws Affecting Commercial Space Tourism: How ITAR Tips the Balance Struck Between International Law and the CSLAA*, 33 J. SPACE L. 245 (2007); Mark J. Sundahl, *Space Tourism and Export Controls: A Prayer for Relief*, 75 J. AIR L. & COM. 581, 602-07 (2010).

[21] Arms Export Control Act, 22 U.S.C. § 2778 (2012); 22 C.F.R. § 120.1 (2012).

[22] 22 C.F.R. § 120.10.

[23] However, the Final Rule for Human Space Flight Requirements for Crew and Space Flight Participants noted that "[t]he FAA agrees and will require only a general system description . . . [and] [a]n operator only needs to disclose, for example, that a propulsion system exploded, not the details of how the explosion occurred." 71 FED. REG. 75,625 (2006).

space flight becomes a reality for those willing to pay, those same space flight participants will be subject to the broad language of the export control regulations imposed by U.S. law.[24]

This Article thus explores the tension between FAA commercial space flight regulations and ITAR with regard to requirements under each for space flight participant informed consent. Specifically, this Article focuses on the material information required for informed consent rather than on a space flight participant's cognizance of the information required in order to provide that consent.[25] In doing so, this Article answers three questions: (1) can a space flight operator legally provide a foreign person seeking a seat on an FAA-licensed launch vehicle with information that satisfies FAA informed consent requirements; (2) must a space flight operator seek an export license before sharing required information with a foreign space flight participant when that information comes within the sphere of ITAR-protected technical data; and (3) given the tension between the two legal requirements, what legal and policy options exist to mitigate the uncertainties involved in satisfying both the

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[24] *See* Ordway, *supra* note 20 (article does not discuss the tension between export control and human space flight regulations promulgated by the FAA, but discusses how ITAR could affect the space tourism industry, namely to operators of suborbital flights). *But see* Stotler, *supra* note 20, at 266 (arguing that "the specificity of the CSLAA prevails over the generality of the AECA" because "[n]othing in the AECA, through which ITAR has been promulgated, contravenes the CSLAA").

[25] This Article does not consider any issues that arise when foreign person(s) who assist(s) another foreign person(s) in developing a United States Munitions List ("USML") free launch vehicle for private participants who then seek an FAA launch license or experimental permit. If such a situation existed, it would most likely be one way out of the dilemma posed in this Article. Furthermore, the scope of this Article is limited to space flight operators that require FAA launch licenses for the purpose of launching foreign space flight participants. Any space flight operator that transfers foreign space flight participants to a space habitat, e.g., space station, could be subject to the FAA informed consent requirements as well as export control laws and regulations because a space station would presumably operate under a separate launch license if commercially developed. Other companies do and have offered to facilitate trips to outer space using government owned and/or operated launch vehicles, e.g., Russian Proton launch vehicles. *See, e.g.*, Space Adventures, SPACE ADVENTURES.COM, http://www.spaceadventures.com/ (last visited Mar. 16, 2013). Although companies like Space Adventures negotiate and book travel for wealthy individuals to go into outer space, these companies do not have independent launch capabilities. *See id.* These companies are not necessarily subject to the FAA's regulations because the FAA does not have authority over space flight facilitators, although it is possible for the operator and facilitator to be the same entity. *See* 14 C.F.R. §§ 415.8, 415.9. 415.11. Moreover, the FAA does not currently have on-orbit jurisdiction to regulate activities in outer space. *See* FED. AVIATION ADMIN. U.S. DEP'T OF TRANSP., SPECIAL REPORT: COMMERCIAL SPACE TRANSPORTATION LICENSING (1999) (describing the FAA's mission as regulation of the U.S. commercial launch industry). This limits the FAA's ability to promulgate regulations for crew, individuals, and launch license holders while on-orbit. Nevertheless, once a commercial space flight operator demonstrates the viability of continued operations, it is reasonable to assume that Congress could grant the FAA some extension of jurisdiction over some on-orbit activities and operations.

informed consent information requirements and the ITAR requirements in order to enable a foreign participant to purchase a seat on an FAA-licensed launch vehicle?

II. The Things We Know We Know: The Scope of Lawful Informed Consent

Obtaining informed consent from space flight participants underpins several important legal requirements: CSLAA's indemnification of and limited liability regimes for space flight operators from participant and other third party liability, the launch license requirements, and the moratorium on FAA-imposed technology requirements on operators.[26] Because of the importance of informed consent to both operators and participants, failure to meet this legal requirement could negate indemnification and/or limited liability and open the operator to potentially unlimited civil liability.[27] Hence, disclosing risk and obtaining informed consent requires due diligence on the part of the space flight operator to ensure it meets this legal requirement prior to launch. This Part briefly discusses the relevant underlying policies and laws that enable commercial human space flight in the United States.

A. Commercial Space Launch Amendments Act of 2004

The CSLAA authorizes the FAA to promulgate regulations for, *inter alia*, safety and licensing "[t]o promote the development of the emerging commercial human space flight industry."[28] As one of its stated policy goals, the CSLAA seeks to "encourage, facilitate, and promote commercial space launches and reentries by the private sector, including those involving space flight participants."[29] The CSLAA advances commercialization of outer space activity by enabling "space tourism"—the dream of many commercial space advocates—by promoting a supply shift toward private markets for suborbital and orbital launch vehicle services.[30] This shift is underway as commercial

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[26] *See* Human Space Flight Requirements for Crew and Space Flight Participants, 71 Fed. Reg. 75,616, 75,624 (Dec. 15, 2006) (codified at 14 C.F.R. pts. 401, 415, 431, 435, 440, and 460); *see also* Hughes & Rosenberg, *supra* note 8; Montgomery, *supra* note 18.

[27] *See* Hughes & Rosenberg, *supra* note 8, at 51-64.

[28] Commercial Space Launch Amendments Act of 2004, Pub. L. No. 108-492, 118 Stat. 3974.

[29] 51 U.S.C. § 50903(b)(1) (2012).

[30] *See* Fed. Aviation Admin., U.S. Dep't of Transp., The U.S. Commercial Suborbital Industry: A Space Renaissance in the Making 36-38, *available at* http://www.faa.gov/about/office_org/headquarters_offices/ast/media/111460.pdf. Furthermore, some space advocates and entrepreneurs look to loftier goals such as making the human race a multi-planet species. *See* Mike Wall, *Private Spaceflight Company SpaceX Has Lofty Goal: Help Save Humanity*, Space.com (Apr. 23, 2012), http://www.space.com/15361-spacex-dragon-mars-settlement.html (" 'Ultimately, the thing that is super-important in the grand scale of history is, are we on a path to

space flight operators have already started to hire crew and book seats for space flight participants.[31]

The CSLAA specifically defines the term space flight participant, but does not define the term space flight operator.[32] The CSLAA defines a space flight participant as "an individual, who is not crew, carried within a launch vehicle or reentry vehicle."[33] However, neither FAA regulations nor the CSLAA defines a space flight operator, but instead each defines operator as an entity that has obtained an FAA launch license or permit.[34]

The CSLAA provides two types of licensing regimes: experimental permits, and launch licenses.[35] Under the CSLAA, a space flight operator cannot compensate, or accept compensation for or from, a person who flies aboard a launch vehicle under an experimental permit.[36] On the other hand, a space flight operator can compensate, and accept compensation from, persons who launch aboard a launch vehicle under an FAA commercial launch license.[37] Moreover, the FAA commercial launch license regime only applies to commer-

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becoming a multiplanet species or not?' Musk said at a conference last year. 'If we're not, well, that's not a very bright future. We'll simply be hanging out on Earth until some eventual calamity claims us.'").

[31] *See, e.g.*, Doug Messier, *Victoria's Secret Model Doutzen Kroes to Fly into Space in 2014*, PARABOLIC ARC BLOG (Apr. 16, 2011, 1:52 PM), http://www.parabolicarc.com/2011/04/16/victorias-secret-model-doutzen-kroes-fly-space-2014/; Clara Moskowitz, *Ashton Kutcher Buys 500th Ticket for Virgin Galactic Spaceship Ride*, SPACE.COM (Mar. 20, 2012), http://www.space.com/14961-ashton-kutcher-virgin-galactic-space-ride.html. *See also* Brian Shiro, *Virgin Galactic Hires Second Pilot Astronaut*, ASTRONAUT FOR HIRE BLOG (Oct. 28, 2011, 11:07 PM), http://www.astronautforhire.com/2011/10/virgin-galactic-hires-second-pilot.html.

[32] *See* 51 U.S.C. § 50902 (2012). This Article focuses only on the space flight participant and not crew. The CSLAA and FAA regulations connect the definition of crew with the crew's relationship to the launch vehicle operator. *See id.* § 50902(2). The CSLAA defines ''crew'' as any employee of a licensee or . . . contractor or subcontractor of a licensee . . . , who performs activities in the course of that employment directly relating to the launch, reentry, or other operation of or in a launch vehicle or reentry vehicle that carries human beings. *Id.*

[33] *Id.* § 50902(17).

[34] *See* 14 CFR § 401.5 (2012) ("Launch operator means a person who conducts or who will conduct the launch of a launch vehicle and any payload. . . . Operator means a holder of a license or permit under 51 U.S.C. Subtitle V, chapter 509."). There seems to be some confusion between Title 14 of the C.F.R. and Title 51 of the U.S.C. about the meaning and scope of the definition of "operator." *See* 51 U.S.C. § 50902 (failing to define the term "operator"). Some states have retained the term "space flight entity" as synonymous with space flight operator—an entity that holds an FAA launch license or permit. *See* discussion *infra* Part IV.B.3.

[35] The FAA offers both an experimental permit and a launch license. *See* 51 U.S.C. §§ 50905-906. *See also* 14 C.F.R. §§ 415, 437. A discussion of the differences between these two requirements is beyond the scope of this Article.

[36] 51 U.S.C. § 50906(h) (2012).

[37] *See* 14 C.F.R. § 415.9 (2012).

cial space flight operators and not to government launches that transport private persons into outer space.[38]

The CSLAA and its implementation of regulations require a potential space flight operator to first seek a pre-application consultation, and to then file an application with the FAA for a commercial launch license.[39] As part of the application, "an applicant proposing to conduct a launch with flight crew or a space flight participant on board must demonstrate compliance with," *inter alia*, crew/operator and space flight participant training.[40] In addition, a space flight participant will need to know "how to respond to emergency situations, including smoke, fire, loss of cabin pressure, and emergency exit."[41] A violation of the informed consent or additional requirements could render a space flight operator's launch license void or in violation of the launch license provisions.[42] Therefore, a space flight operator must be careful to ensure it complies with all FAA regulations.

In enacting CSLAA, Congress specifically stated that space flight is an inherently risky activity.[43] The requirement of informed consent takes specific forms under the CSLAA and its implementation of regulations.[44] First, the

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[38] *See* 51 U.S.C. § 50914. A private person can be launched into outer space only if the U.S. government and the space flight operator sign cross-waivers of liability. *See* 14 C.F.R. § 460.19. The private person would also indemnify the U.S. government and the space flight operator. *Id.* §§ 460.45, 460.49. This is not to be confused with NASA's cross-waiver system. *See, e.g.*, Steve Mirmina, *Cross-Waivers of Liability in Agreements to Explore Outer Space: What They Are and How They Work, in* CONTEMP. ISSUES & FUTURE CHALLENGES IN AIR & SPACE L. 239-51 (Sagar S.P. Singamsetty, et al. eds., 2011) (noting these are agreements between NASA and other space agencies).

[39] 14 C.F.R. § 414.9.

[40] *Id.* § 415.8. A licensee applicant must satisfy 14 C.F.R. §§ 460.5, 460.7, 460.11, 460.13, 460.15, 460.17, 460.51 & 460.53 in order to obtain a launch license. *Id.* Recently, Virgin Galactic announced a three-day training program for its space flight participants. *See Training: Pre-Flight Experience Program*,VIRGIN GALACTIC, http://www.virgingalactic.com/overview/training/ (last visited Mar. 16, 2013).

[41] 14 C.F.R. § 460.51.

[42] *See id.* § 405.3. Civil penalties can accrue at a maximum of $110,000 per day, per violation adjusted for inflation. *Id.* § 406.9(a).

[43] 51 U.S.C. § 50901(12) (2012).

[44] 14 C.F.R. § 460.45. On the scope of risk, see Hughes & Rosenberg, *supra* note 8, at 59-61, and Montgomery, *supra* note 18, at 27-28. Recently, however, Virgin Galactic offered the chance to earn "Galactic" status to frequent flyers of Virgin Airlines. *See* Jason Koebler, *Save Your Miles! Virgin Airlines Offers Top Flier Free Trip to Space*, U.S.NEWS & WORLD REP. (Aug. 29, 2012), http://www.usnews.com/news/articles/2012/08/29/save-your-miles-virgin-airlines-offers-top-flier-free-trip-to-space. Virgin has instituted a contest in which the winner with the most frequent flyer miles by the end of August 7, 2013, will get upgraded and given a free flight on one of Virgin Galactic's suborbital launch vehicles. *Mission: Galactic*, VIRGIN AM., http://galactic-contest.virginamerica.com/ (last visited Mar. 16, 2013). Although Virgin Galactic will offer a free flight to one of its participants, that participant will launch at his or her own risk. *See* 51 U.S.C. § 50914.

FAA requires that a licensee (i.e., holder of an FAA launch license) inform, in writing, both the crew[45] and the space flight participant, "that the United States Government has not certified the launch vehicle and any reentry vehicle as safe for carrying crew or space flight participants" before the licensee can contract with or launch a person into outer space.[46] Second, the FAA directs a licensee to inform a space flight participant of the "risks of launch and reentry, including the safety record of the launch or reentry vehicle type" and to provide information that relates to the risk or probability of loss during flight.[47] Third, a space flight operator must provide a space flight participant with the opportunity to ask questions about aspects of preflight, launch, flight, reentry, and everything in between; and the operator must provide additional information if requested (verbally or in writing) by the space flight participant.[48] Fourth, a space flight operator must disclose facts it knows about space flight hazards, and about the general safety records of the launch and reentry vehicles.[49]

The space flight operator must obtain written informed consent from prospective space flight participants before accepting payment to conclude a contract in order to satisfy its legal duty to warn.[50] Moreover, "[a]n operator must inform each space flight participant in writing about the risks [of the activity] . . . . in a manner that can be readily understood by a space flight participant with no specialized education or training . . . ."[51] In particular, the space flight operator must inform the space flight participant of "each known hazard and risk that could result in serious injury, death, disability or total or partial loss of physical and mental function."[52]

The CSLAA further requires space flight operators to provide specific types of data to space flight participants.[53] The House Report, accompanying the CSLAA, instructs the FAA/AST to "compile the safety records of launch or reentry vehicle types based on available flight data."[54] The Report further instructs the FAA to provide the compiled data to passengers along with "copies of permit and launch license applications for the launch vehicle."[55]

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[45] 14 C.F.R. § 460.9.

[46] *Id.* § 460.45 (a)-(b).

[47] *Id.* § 460.45(a).

[48] *See id.* § 460.45(e)-(f).

[49] *Id.* § 460.45.

[50] *See* 51 U.S.C. § 50905(b)(5)(A).

[51] 14 C.F.R. § 460.45(a).

[52] *Id.* § 460.45(a)(1).

[53] *See id.* § 460.45 (including but not limited to the number of launches, accidents, people who have been on a space flight, and injuries).

[54] H.R. REP. NO. 108-429, at 13 (2004).

[55] *Id.* at 14.

Because such data only references general performance and failure rates,[56] it is not clear if the flight data transmitted to the FAA must also include data about the types of technologies used and their associated failure rates. Thus, some types of technical data could fall under export control restrictions especially if mandated under state law.[57] However, Congress probably never intended for space flight operators to provide controlled data to space flight participants to satisfy FAA informed consent requirements, but such data could be material if the information would help a participant understand the risks of space flight.[58]

In the final rule for the Human Space Flight Requirements for Crew and Space Flight Participants, the FAA considered the problem raised by commercial space companies on the issue of controlled technical data.[59] After the enactment of the CSLAA, the nonprofit federation of then current and potential commercial space flight companies—along with Amazon founder Jeff Bezos' company Blue Origin—were concerned that the informed consent requirements would limit the ability of the represented companies to attract potential foreign space flight participants because of possible conflicts with ITAR.[60] Blue Origin asked the FAA to "establish[ ] the same standard for disclosure to a U.S. and a foreign national, and limit that disclosure obligation only to 'general systems descriptions . . . .'"[61] Although such a rule would "conform to the ITAR's exclusion of 'general systems descriptions' from 'Technical Data' . . . ," the FAA agreed that "[a]n operator only needs to disclose, for example, that a propulsion system exploded, not the details of how the explosion occurred."[62]

Finally, the CSLAA excludes space flight participants from indemnification eligibility and denies them any benefit of liability insurance coverage.[63]

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[56] *See* 14 C.F.R. § 460.45.

[57] The Arms Export Control Act ("AECA"), and its implementing International Traffic in Arms Regulations ("ITAR"), prohibits exporting technical data to foreign persons without first obtaining an export license from the Department of State. *See* Arms Export Control Act, 22 U.S.C. § 2778 (2012); 22 C.F.R. § 120.1 (2012).

[58] *See* Human Space Flight Requirements for Crew and Space Flight Participants, 71 FED. REG. 75,616, 75,624 (Dec. 15, 2006) (to be codified at 14 C.F.R. pts. 401, 415, 431, 435, 440, and 460).

[59] *Id.* at 75,624-26.

[60] *Id.* at 75,625.

[61] *Id.*

[62] *Id. See* Policy on Designating and Determining Defense Articles and Services, 22 C.F.R. § 120.3.

[63] *See* 51 U.S.C. § 50914 (2012). *See also* Hughes & Rosenberg, *supra* note 8, at 59 n.188 ("Federal law mandates that insurance provided by the licensee for third-party liability also protect the customer and the U.S. Government and the contractors and subcontractors of each, as well as the licensee and its contractors."). However, the elimination of liability on the grounds of informed consent only arises under state laws that provide for such elimination of liability. *See, e.g.*, Turcotte v. Fell, 502 N.E.2d 964, 967 (N.Y. 1986) ("If a participant makes an informed

Nonetheless, the space flight participant and operator have the ability to make a contractual arrangement under the operator's insurance policy, or by private agreement, to hold the space flight participant indemnified for certain causes of action.[64] This most likely will take the form of a limited liability agreement between the space flight operator and the participant the legality of which is subject to state tort rules.[65]

However, no agreement could circumvent U.S. export control laws and regulations.[66] The space flight operator and participant could hold each other harmless for negligence, but neither the CSLAA nor the FAA regulations authorize the transmission of controlled technical data.[67] Therefore, if a space flight operator could potentially transmit controlled technical data to a foreign person, the operator would need to obtain an export license for any transmission of ITAR-protected technical data.[68]

B. Meaning and Scope of Lawful, Informed Consent Under U.S. Law

While the focus of this Article is not on the liability or indemnification regimes created by the CSLAA, it is important to note how informed consent relates to the CSLAA.[69] The CSLAA has created a legal regime that governs suborbital and orbital rockets, launch operators, orbital and suborbital rocket

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estimate of the risks involved in the activity [involving an elevated degree of danger] and willingly undertakes them, then there can be no liability if he is injured as a result of those risks."). *See also* Nalwa v. Cedar Fair, L.P., 290 P.3d 1158, 1163 (Cal. 2012) ("We agree with the dissenting justice below, and the court in *Beninati,* that the primary assumption of risk doctrine is not limited to activities classified as sports, but applies as well to other recreational activities 'involving an inherent risk of injury to voluntary participants . . . where the risk cannot be eliminated without altering the fundamental nature of the activity.'" (quoting Beninati v. Black Rock City, LLC, 96 Cal.Rptr.3d 105, 109 (Cal. Ct. App. 2009))).

64 *See* Hughes & Rosenberg, *supra* note 8, at 59. However, the nationality of the space flight participant could change the scope of any agreement between the space flight operator and foreign participant.

65 *See, e.g.*, Evans v. Pikeway, Inc., 793 N.Y.S.2d 861, 862-63 (N.Y. App. Div. 2004) (noting plaintiff completed a waiver form expressly releasing defendant from liability for negligence); *see also* Blog v. Battery Park City Auth., 234 A.D.2d 99, 100, 650 N.Y.S.2d 713, 714 (1996); Blog v. Battery Park City Auth., 650 N.Y.S.2d 713, 714 (N.Y. App. Div. 1996) ("The release explicitly provided that the activity to be engaged in was dangerous and that the defendants were released from liability for personal injuries arising out of or related to the race. Such a release, while subject to close judicial scrutiny, is enforceable '[w]here the language of the exculpatory agreement expresses in unequivocal terms the intention of the parties to relieve a defendant of liability for the defendant's negligence.'" (quoting Lago v. Krollage, 575 N.E.2d 107, 110 (N.Y. 1991))).

66 *See supra* note 16.

67 *See* 22 C.F.R. §§ 120.1-.39 (2012).

68 *See id.*

69 For an evaluation of space flight liability, see Michael C. Mineiro, *Assessing the Risks: Tort Liability and Risk Management in the Event of a Commercial Human Space Flight Vehicle Accident*, 74 J. AIR L. & COM. 371 (2009).

operators, crew, operator contractors and subcontractors, and space flight participants.[70] As such, the CSLAA provides for a limited liability regime and an indemnification regime using a system of cross-waivers.[71] The launch site operator, space flight operator, operator's contractors and subcontractors, and flight crew enter into cross-waivers of liability with the U.S. government.[72] The parties agree to indemnify or hold harmless each party for the negligent actions of the other.[73] Under this arrangement, however, the space fight participant is exposed to the greatest amount of liability because he or she assumes the risk of the space flight and is not covered under CSLAA. However, in order for a space flight operator to satisfy the terms and conditions of the FAA launch license and to receive indemnification, the operator must adequately inform the space flight participant of the risks of space flight, which includes[74] the meaning and scope of the space flight participant's assumption of risk and the space flight operator's duty to warn.[75]

1. Assumption of the Risk and the General Duty to Warn

The participant to and provider of an inherently risky activity are two sides of the same coin: each has duties and obligations to the other and to foreseeable third parties. A participant has the responsibility to understand and appreciate the risks involved in an inherently risky activity he or she desires to undertake.[76] A provider of an inherently risky activity has corollary duties and obligations that require it to properly warn the participant of known and material hazards and associated consequences.[77] To facilitate an engagement in the inherently risky activity, the participant assumes the risk of the activity and the provider warns the participant of the material risks involved.[78]

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[70] *See* 51 U.S.C. §§ 50901-50923 (2012).

[71] Mineiro, *supra* note 69, at 392.

[72] *See* 14 C.F.R. §§ 440.17, 460.19, 460.49.

[73] Except when the operator has committed gross negligence in its operation of the launch vehicle. *See* Mineiro, *supra* note 69, at 381.

[74] *See id.* at 395 ("[F]ulfillment of [CSLAA's] informed consent requirements will not serve as enforceable release and waiver contracts or satisfy requirements for common law defenses associated with assumption of risk simply because the term 'implied consent' has been adopted in parlance. The legal effect of . . . operator compliance with [CSLAA's] 'implied consent' provisions, as either contractual or common law tort defenses, will be determined under applicable state law.").

[75] *See id.* at 394-95.

[76] *See, e.g.*, Phelps v. Firebird Raceway, Inc., 111 P.3d 1003, 1004 (Ariz. 2005).

[77] *See id.*

[78] *See* Tiller v. Atl. Coast Line R.R., 318 U.S. 54, 68-69 (1943) (J. Frankfurter, concurring).

First, assumption of the risk is a common law defense to a negligence claim against a provider of an inherently risky activity.[79] The premise of the doctrine "is to place responsibility on a participant or spectator for their actions when they choose to voluntarily encounter a known and appreciated risk in a[n] . . . activity."[80] Inherent risks of an activity are certain identifiable hazards and consequences of an activity that a reasonable person would assume to occur if he or she voluntarily chooses to engage in such an activity.[81] Participants in the inherently risky activity assume the risks orally (by oral instruction or through asking questions), in written form (clearly expressed by a waiver of liability or some other exculpatory document), and/or implicitly (implied knowledge from the circumstances based upon the participant's level of knowledge about and skill in the activity).[82]

A participant in an inherently risky activity can waive liability against a provider when that participant reads, understands, and voluntarily signs a clearly written and specific waiver.[83] Moreover, because some inherently risky activities—like space flight—require extraordinary care, training, and specialized equipment, the knowledge required of the participant to give informed consent is greater than required in most other types of activities.[84] This raises the issue of the participant's cognizance of the risks and his requisite ability and skill to participate in the activity.[85]

When it comes to assuming the risk of an activity, commentators make a distinction between providing adequate and material information to a participant and the ability of that participant to understand the information.[86] Satisfying the adequate and material information requirement turns on the nature of the activity, while the participant's cognizance of the risks of an activity "turns on one's appreciation of the information rather than adequacy of the information itself."[87]

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[79] BRUCE B. HRONEK & JOHN O. SPENGLER, LEGAL LIABILITY IN RECREATION AND SPORTS 68 (Sagamore Publ'g 2d ed. 2002). *See Tiller*, 318 U.S. at 68-69 ("'assumption of risk' has been used as a shorthand way of saying that although [a] [provider] may have violated the duty of care which he owed [to a participant], he could nevertheless escape liability for damages resulting from his negligence if the [participant], by accepting or continuing . . . with "notice" of such negligence, 'assumed the risk.'").

[80] HRONEK & SPENGLER, *supra* note 79.

[81] *Id.* at 69.

[82] *Id.*

[83] *Id.* at 77-83. Assumption of the risk can take the form of an express or implied waiver. *Id.* at 118.

[84] *Id.* at 228.

[85] *Id.* at 60.

[86] *See* Melanie Walker, *Suborbital Space Tourism Flights: An Overview of Some Regulatory Issues at the Interface of Air and Space Law*, 33 J. SPACE L. 375, 384-85 & n.58 (2007).

[87] *Id.* at 385.

Rather than focusing on the cognizance requirement, this Article focuses only on the need to satisfy the requirement for adequate and material information because cognizance does not necessarily affect the types of information a space flight operator needs to present to a space flight participant that could be controlled under ITAR.[88] This distinction is significant because a participant's cognizance relates to his or her understanding of the information presented, rather than to the types of information that the space flight operator provides. Moreover, the requirement for adequate and material information directly relates to the evaluation of ITAR restrictions on sharing technical data with foreign participants.

Second, the duty to warn has a long history at common law and has developed to a great extent under state law.[89] Generally, the duty to warn requires that a provider of an inherently risky activity must inform a participant of the inherent risks of that activity.[90] In particular, a reasonable and material warning of the possible dangers provides the participant with a means by which to assume and mitigate personal risk.[91]

The duty to disclose reasonable and material information about the risks to a participant is required for informed consent.[92] The law on informed consent involves warning participants of death or injury related to the activity in a vari-

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[88] Because the commercial space flight is still in its infancy, it is possible in the future that a space flight operator's duty to disclose could parallel those exceptions to the duty to disclose found in some jurisdictions. *See, e.g.,* Peter H. Schuck, *Rethinking Informed Consent*, 103 YALE L.J. 899, 919 (1994) (in the context of doctor-patient disclosures, exceptions include "disclosure [that] might adversely affect the patient's physical or psychological well-being[,] . . . the risk is either known to the patient or is so obvious as to justify a presumption on the physician's part that the patient knows of it[,] . . . procedure is simple and the danger remote and commonly appreciated to be remote[,] and . . . the physician does not know of an otherwise material risk and should not have been aware of it in the exercise of ordinary care."). However, the true problem of cognizance in the context of a foreign space flight participant could be one of language and comprehension. Assuming English is not the first language of a foreign space flight participant, cognizance of the risks might be impaired. Therefore, a space flight operator should consider designing briefing materials in multiple languages and possibly hiring translators to ensure it meets the cognitive requirement of informed consent.

[89] *See* RESTATEMENT (THIRD) OF TORTS: GEN. PRINCIPLES § 16 (1999).

[90] *See* HRONEK & SPENGLER, *supra* note 79, at 233.

[91] *See* Knutson, *supra* note 12, at 111-12; Hughes & Rosenberg, *supra* note 8, at 53.

[92] *See, e.g.*, RESTATEMENT (THIRD) OF TORTS: GEN. PRINCIPLES § 16, cmts. d-h (1999); BLACK'S LAW DICTIONARY 346 (9th ed. 2009) ("A person's agreement to allow something to happen, made with full knowledge of the risks involved and the alternatives"); A-P-T RESEARCH INC., STUDY ON INFORMED CONSENT FOR SPACEFLIGHT PARTICIPANTS, Doc. No. APT-CFA-230-0001-02F, 4-5 & nn.14-18 (Sept. 26, 2008), *available at* http://www.faa.gov/about/office_org/headquarters_offices/ast/reports_studies/library/media/Informed_Consent_for_Spaceflight_Participants.doc (citing U.S. case law on informed consent). However, a distinction exists between the failure to obtain informed consent and the claim that the provider of the activity was negligent in recommending or performing the action. *Id.* at 7 & n.19 (citing Aaron D. Twerski & Neil B.

ety of ways, and providing the participant with an understanding of the hazards associated with the necessary technologies that enable the activity.[93] In some cases, the activity's provider is required to inform the participant of—or with—technologies that could potentially limit the risk of injury or death.[94] The provider of a risky activity must warn a participant in writing that he or she might be injured by or die in the activity, and must require the participant to confirm in writing that he or she understands and agrees to the risks involved; the writing must list all relevant risks and consequences, and sometimes disclose the operational tolerances of the enabling technologies.[95] In return, the participant waives liability for any potential negligence on the part of the provider, except for willful or wanton (gross) negligence.[96]

The information required about the risks generally includes disclosure of all identifiable hazards to the participant.[97] For example, in the case of skydiving, this includes, *inter alia*, death or injury due to the plane crashing, failure of the main or backup parachutes, collision with debris or other objects during free-fall, or impact with the surface of the Earth.[98] With all types of inherently risky activities, like skydiving, however, providers and participants can become aware of additional risks and hazards via repeated engagement in the activity.[99] Thus, experience enables the provider and participant to learn from mistakes and miscalculations of the risks involved.

2. A-P-T Research, Inc. Study

Traveling on a launch vehicle that propels a person at high velocity and acceleration toward the upper atmosphere of the Earth in an attempt to reach suborbital or orbital velocities is, without dispute, inherently risky.[100] Because commercial human space flight is in its infancy, the industry standards against which to judge such risks have not fully developed.[101] Thus, a space flight participant needs to be aware of all material hazards and consequences before he or she can assume the risk of the activity.

Cohen, *Informed Decision Making and the Law of Torts: The Myth of Justiciable Causation*, 1988 U. ILL. L. REV. 607, 616-17 (1988)).

93 *See* Knutson, *supra* note 12, at 114.

94 *Id.*

95 *Id.* at 114-15.

96 *See* Mineiro, *supra* note 69, at 381.

97 *See* Knutson, *supra* note 12, at 106, 114.

98 *See, e.g.*, *Tandem Waiver Part I*, SKYDIVECT.COM, http://www.skydivect.com/video/tandemwaiver-2006.pdf (last updated Jan. 27, 2012).

99 Knutson, *supra* note 12, at 117.

100 *Id.* at 106-07.

101 *Id.* at 117-18.

FIGURE 1. INFORMED CONSENT: CONNECTIONS WITH SPACE FLIGHT LIABILITY REGIMES

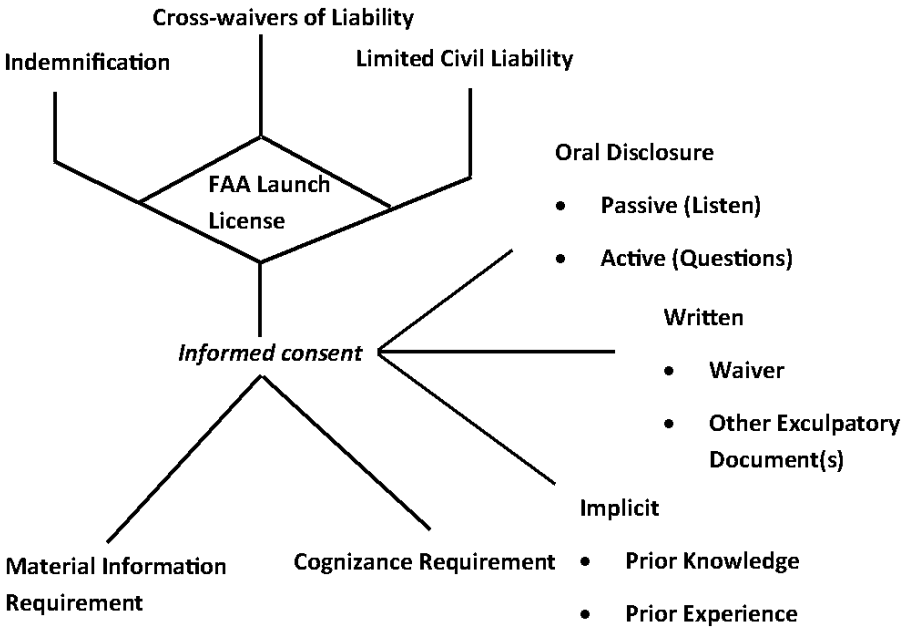

Figure 1 represents the connections that exist between liability regimes formed under the CSLAA and under general informed consent requirements. Because satisfying informed consent requirements underpins the CSLAA requirements, the question becomes: which types of information and to what extent must a space flight operator inform a space flight participant to legally shift the risk to the participant?[102]

In 2008, A-P-T Research, Inc. published a study on the FAA commercial space flight informed consent requirements.[103] A-P-T conducted a review of U.S. case law regarding the scope of informed consent and the general duty to warn. Specifically, the study compared the informed consent requirements of a variety of inherently risky activities to the informed consent requirements of 14 C.F.R. § 460.45.[104]

A-P-T argues that Congress "intended to impose on operators a statutory or codified 'duty to warn' when it used the phrase 'informed consent.'"[105] The

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[102] *Id.* at 111.
[103] *See generally* A-P-T RESEARCH INC., *supra* note 92.
[104] *See generally id.* at 9-15.
[105] *Id.* at 8.

duty to warn provides a basis for evaluating the standard of care that a space flight operator owes a space flight participant. The information an operator gives to a participant may affect the participant's decision whether to accept or reject the risks of the space flight. The study defines the basic parameters of informed consent as

> a consent in writing to any . . . procedure or course of procedures which (a) sets forth in general terms the nature and purpose of the procedure or procedures, together with the known risks, if any, of death, [injury or other damages] (b) acknowledges that such disclosure or information has been made and that all questions asked about the procedure or procedures have been answered in a satisfactory manner and (c) is signed by the [participant] for whom the procedure is to be performed.[106]

In addition, the A-P-T study lists all the potential hazards of space flight that a participant might encounter. First, a participant could encounter physical hazards such as high decibel noise, high pressure, low pressure, high G-forces (i.e., sustained acceleration), microgravity, high temperature, low temperature, high radiation level, sunlight, physical impact trauma, exposure to toxic chemicals, electrical shock, loss of breathable atmosphere, change in composition of atmosphere, contaminants and particulates in the atmosphere, and loss and/or damage of personal effects before, during, and after the launch.[107] Second, a space flight participant could encounter psychological response hazards such as claustrophobia, excitement, agitation, fear, motion sickness, vertigo, rapid pulse, and increased blood pressure.[108] A-P-T ranks the likelihood and severity of each hazard and suggests that the space flight operator relate all such hazards to space flight participants.[109]

The A-P-T study advises a space flight operator to also consider not only the types of information it provides but also how it disseminates that information to a space flight participant. The A-P-T study argues that a space flight participant "should be appraised of [the] dearth of standardized knowledge, awareness and response [in commercial human spaceflight because] . . . there are no accepted standards guiding the [commercial space transportation] industry."[110] The study suggests that space flight operators should "laminat[e] . . . instructions on cards so guides/instructors don't forget something, recording or

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106 *Id.* at 10 (citing Hondroulis v. Schumacher, 521 So. 2d 534 (La. 1988)).
107 *Id.* at 16-19.
108 *Id.* at 21-22.
109 *Id.* at 22-24.
110 *Id.* at 12.

taping safety briefings for consistency and creating (warning/instruction) witnesses who mark off a checklist and then sign/acknowledge that the guide/instructor has covered all of the requisites on the list."[111] Moreover, the space flight operator should discuss "what can be expected on the trip, inherent dangers/risks, proper equipment use, proper techniques demonstration, what to do in the event of an emergency, that clients/participants must follow the guide/instructors directions at all times."[112]

The A-P-T study makes several important points about the scope of the duty to warn. First, a claim for breach of the duty to warn could include: "1) an operator/provider failed to disclose a material risk of the activity undertaken or reasonable alternatives (mitigation) to it; 2) that the participant would have chosen against the activity had they been informed; and 3) that as a result of the activity the participant suffered harm/injury."[113] Second, the study notes that "courts find that only material risks need be disclosed; an operator/provider cannot be expected to disclose all risks, including those for which the risk is so minimal that it would not influence a reasonable person's decision."[114] The study also points out that

> courts routinely find that where there are statutes or regulations in place that govern the amount of information that must be given to a person from whom informed consent is being sought and where a provider satisfies those statutory and regulatory disclosure guidelines, there is created a presumption in favor of the operator that informed consent was obtained.[115]

Hence, compliance with the wording of a statute or regulation can generally satisfy a space flight operator's duty to warn.

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111 *Id.* at 15.

112 *Id.*

113 *Id.* at 10. *See, e.g.*, Canterbury v. Spence, 464 F.2d 772, 787-89 (D.C. Cir 1972), *cert denied*, 409 U.S. 1064 (1972); Williams v. Boyle, 72 P.3d 392, 397 (Colo. App. 2003); Barton v. Estate of Buckley, 867 So. 2d. 271, 272 (Miss. Ct. App. 2004); Grasser v. Kitzis, 553 A. 2d 346 (N.J. Super. Ct. App. Div. 1988); Scott v. Bradford, 606 P. 2d 554, 559 (Okla. 1979).

114 A-P-T RESEARCH INC., *supra* note 92, at 10 ("Informed consent is not intended to include disclosure of all risks and so will not require warnings for which the risk is minimal enough that it wouldn't influence a reasonable person's decision making process."). *See* Pennick v. Chritensen, 912 S.W.2d 276 (Tex. Ct. App. 1996) (concluding that a physician who makes disclosure for a List A procedure or treatment as prescribed by the Panel can nevertheless be negligent for failing to make additional disclosures).

115 A-P-T RESEARCH INC., *supra* note 92, at 10-11.

3. Some General Conclusions About the Scope of Space Flight Participant Informed Consent Requirements

As the A-P-T study warns, under the scope of informed consent case law "[i]t is clear that the Courts differ as to the standard that governs the determination of whether a risk is material such as it warrants disclosure . . . ."[116] Because what is material depends on the information a reasonably prudent provider would disclose, what determines lawful informed consent could vary from jurisdiction to jurisdiction.[117] However, the activity of space flight, while developed from historically governmental activities,[118] provides a sufficient baseline for evaluating the risks of space flight itself. Even so, an argument could be made that government experience in space flight, coupled with the requirements of informed consent under FAA regulations, could provide a basis to preempt state law as to space flight activities only.[119] This line of reasoning, however, would contradict the rationale and purpose of the CSLAA because space flight participants are not government employees flying on government-operated launch vehicles—and would probably fail general preemption analysis. Such an argument could undercut the purpose of developing an independent regulatory regime for the commercial space transportation industry.[120]

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[116] *Id.* at 25.

[117] *See id.* ("Because [CSLAA and its implementing regulations] mandate[ ] written informed consent and . . . informed consent only provides legal protection (defense) from the inherent risks of an activity and not from negligence, there is some confusion as to whether any private contract (release and waiver document) that seeks pre-activity exculpation from inherent risks *and* negligence (standard in the adventure world) would be valid. . . . How these documents would legally interact with and/or be affected by the requisite of written informed consent needs to be clarified.").

[118] *History of Human Space Flight*, NASA, http://www.nasa.gov/centers/kennedy/about/history/spacehistory_toc.html (last updated Dec. 2, 2009).

[119] *See generally* Blasingame, *supra* note 16, at 768-87 (discussing and analyzing the scope of federal preemption under CSLAA and the Outer Space Treaty).

[120] Current U.S. National Space Policy reiterates the need for an independent commercial space industry with rules to help it grow. *See* Office of the President, National Space Policy of the United States 4-6, 10-11(2010), *available at* http://www.whitehouse.gov/sites/default/files/national_space_policy_6-28-10.pdf (last visited Sept. 28, 2012). *See also* Press Release, The White House – Office of the Press Secretary, Fact Sheet: The National Space Policy (June 28, 2010), http://www.whitehouse.gov/the-press-office/fact-sheet-national-space-policy. The current FAA regulatory regime furthers this policy and provides latitude and fosters cooperation between federal agencies and departments in rule-making. For example, the FAA has already started to discuss safety issues with commercial space flight operators via planned monthly dialogues. *See* Dan Leone, *Private Spaceflight Industry, FAA to Start Safety Talks Next Month*, SPACE.COM (Jul. 23 2012), http://www.space.com/16710-commercial-space-safety-faa.html. *See also* H.R. REP. NO. 122-381, at 293 (2012) (Conf. Rep.), *available at* http://www.gpo.gov/fdsys/pkg/CRPT-112hrpt381/pdf/CRPT-112hrpt381.pdf ("Nothing in this provision is intended to prohibit the FAA and industry stakeholders from entering into discussions intended to prepare the FAA for its role in appropriately regulating the commercial space flight industry when this provision expires.").

Nonetheless, the legal tension exists and will probably be resolved by the courts before Congress takes up the issue.

Because no commercial human space flight experience has yet to occur, some commentators have argued that space flight operators should tell a flight participant *everything* he or she would want to know in order to effectively assume the risk of the activity.[121] Although the informed consent requirement does specify particular requirements, it does not necessarily place limits on the types of questions a space flight participant may ask or get answered.[122] However, as already discussed, the space flight operator cannot legally divulge some types of information without satisfying additional legal requirements under U.S. law. Because space flight operators are required to give all space flight participants requisite knowledge of the hazards and consequences involved in space flight, the U.S. export control regime necessarily limits the scope of information a space flight operator may be required to divulge to a foreign space flight participant.

III. The Things We Also Know We Know: An Overview of the U.S. Export Control Regime

This Part discusses the two export control regimes that might affect foreign space flight participants. In particular, this Part compares and contrasts the export regimes administered by the Department of State and the Department of Commerce, and examines how each regime operates over the commercial space industry in the United States.

Additionally, the National Aeronautics and Space Administration ("NASA") and the FAA have signed a Memorandum of Understanding to work out issues relating to NASA's Commercial Crew Program ("CCP"). *See* Memorandum of Understanding between the National Aeronautics and Space Administration and the Federal Aviation Administration for the Achievement of Mutual Goals in Human Space Transportation, NASA – Fed. Aviation Admin., June 4, 2012, *available a*t http://www.nasa.gov/pdf/660556main_NASA-FAA%20MOU%20-%20signed.pdf ("NASA and FAA agree to collaboratively engage to understand and coordinate their respective roles to: Provide a stable framework for the U.S. space launch industry[,] [a]void conflicting requirements and multiple sets of standards[,] [a]dvance both public safety and crew safety[,] [a]dvance the interests of NASA-certified U.S. commercial launch operators responsible for transporting U.S. and U.S. operating segment astronauts to the ISS.").

[121] Knutson, *supra* note 12, at 122.

[122] *See* 14 C.F.R. § 460.45 (2012).

A. *The "Spacescape" Export Control Regime That Space Flight Operators Must Navigate*

The U.S. export control regime functions by capturing all goods, services, and information about goods and services under two jurisdictions.[123] First, the Arms Export Control Act ("AECA") authorizes the Department of State, through the Directorate of Defense Trade Controls ("DDTC"), to administer ITAR, which covers items on the United States Munitions List ("USML").[124] Second, the Export Administration Act ("EAA") authorizes the Department of Commerce, through the Bureau of Industry and Security ("BIS"), to administer the Export Administration Regulations ("EAR"), which covers items on the Commerce Control List ("CCL").[125]

The main difference between these two regulations "is that the EAR controls goods and technologies generally, with special consideration given to domestic economic impact of export controls, [and] ITAR controls defense articles and services."[126] Under the EAR system, BIS gives presumptive approval to export license applicants.[127] Conversely, under ITAR, the DDTC gives "presumptive denial" to export license applicants.[128] Nonetheless, under both

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[123] Both the *Arms Export Control Act of 1976* (AECA), 22 U.S.C. § 2778, and the *Export Administration Act of 1979* (EAA), 50 U.S.C. § 2402, trace back to the *Export Control Act of 1940*, 54 Stat. 714 (1940), which was the first U.S. law "to control, during peacetime, commercial products and material of military significance." *See* MICHAEL C. MINEIRO, SPACE TECHNOLOGY EXPORT CONTROLS AND INTERNATIONAL COOPERATION IN OUTER SPACE 44 (2012) ("These controls were premised on a policy rational[e] [sic] of 'national defense.'"). After an almost forty-year evolution, the *Export Administration Act of 1979* expanded the export control regime to include dual-use items. Export Control Act of 1940, 54 Stat. 714, §6 Pub. L. No. 703 (1940). While the EAA technically terminated in August 2001, it has continued to be in force under the International Emergency Economic Powers Act ("IEEPA") by Executive order. International Emergency Economic Powers Act, 91 Stat. 1626, Pub. L. No. 95-223 (1977) (codified at 50 U.S.C. §§ 1701-1707).

[124] *See* 22 U.S.C. § 2778(a) (2012) (AECA promotes the policy goal of advancing world peace and security and foreign policy of the United States).

[125] *See* 50 U.S.C. § 2402(c) (2012). The policy of EAA is to encourage international trade and minimize the uncertainties in export control policy with full consideration of its impact on the U.S. economy. *See also id.* at § 2402(a)(2)-(3). However, given that the EAA has expired but continues under executive order, it is unclear whether any enforcement action under the EAA would be effective.

[126] MINEIRO, *supra* note 123, at 47.

[127] 50 U.S.C. § 2402(d); *see also* 50 U.S.C. § 2403(d) ("No authority or permission to export may be required under this Act or under regulations issued under this Act, except to carry out policies set forth in section 3 of this Act"); DEP'T OF COMMERCE, OFFICE OF SPACE COMMERCIALIZATION & DEP'T OF TRANSP., FED. AVIATION ADMIN., INTRODUCTION TO U.S. EXPORT CONTROLS FOR THE COMMERCIAL SPACE INDUSTRY 3 (Oct. 2008) [hereinafter INTRODUCTION TO U.S. EXPORT CONTROLS], *available at* http://www.space.commerce.gov/library/reports/2008-10-intro2exportcontrols.pdf.

[128] *See* INTRODUCTION TO U.S. EXPORT CONTROLS, *supra* note 127, at 3.

the AECA and the EAA, the President has the authority and discretion to determine whether items go on the CCL or the USML.[129] Lastly, the DDTC charges fees for a license, while BIS charges no fees for a license.[130]

The export control regimes of ITAR and EAR have divergent purposes and scope. ITAR strictly regulates defense articles and services including: those largely of a military or dual use nature, arms and munitions, and technical data and assistance.[131] In contrast, the EAR regulates commercial dual-use technologies and goods including "goods sold for commercial purposes that would make a significant contribution to the military potential of another [nation-state], [or] a contribution [that] could prove detrimental to the national security of the United States."[132] As such, the scope of ITAR concerns foreign policy, and destination and end-user controls, while the scope of the EAR concerns mostly economic growth and international trade objectives balanced by national security concerns.

ITAR and EAR regulate both U.S. and foreign persons.[133] ITAR defines a U.S. person as "a person . . . who is a protected individual[,] . . . any corporation, business association, partnership, society, trust or any other entity, organization or group that is incorporated to do business in the United States[, and] any governmental (federal, state or local) entity."[134] EAR defines a U.S. person as

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[129] Denial of judicial review under the AECA allows an administrative challenge to how the DDTC determines how items are placed on the USML, but judicial review is allowed under the EAA for items placed on the CCL. *Compare* 22 U.S.C. § 2778(h), *with* 50 U.S.C. § 2412(a). *See* Butterfield v. Stranahan, 192 U.S. 470 (1904) (noting that the President has great latitude in making executive determinations). However, the Department of State and the Department of Commerce periodically assess and reform the CCL and USML. *See, e.g.,* JOINT DEP'T OF DEFENSE & DEP'T OF STATE FINAL REPORT TO CONGRESS, RISK ASSESSMENT OF UNITED STATES SPACE EXPORT CONTROL POLICY: REVIEW OF SECTION 1248 OF THE NATIONAL DEFENSE AUTHORIZATION ACT OF 2010 (PUBLIC LAW 111-84) (Apr. 18, 2012) [hereinafter JOINT REPORT], *available at* http://www.defense.gov/home/features/2011/0111_nsss/docs/1248_Report_Space_Export_Control.pdf (this assessment was completed with input from Representative Dana Rohrabacher (R-CA), and required the DDTC to negotiate parameters for changes with the Department of Commerce to alleviate concerns of espionage).

[130] *See* Amendment to the International Traffic in Arms Regulations: Registration Fee Change, 73 FED. REG. 55,439-01 (Sept. 25, 2008) (codified at 22 C.F.R. § 122.3). *See also* U.S. DEP'T OF COMMERCE, BUREAU OF INDUS. & SEC., A GUIDE TO EXPORT LICENSING REQUIREMENTS (2007), *available at* http://www.bis.doc.gov/pdfpublications/bis_booklet.pdf.

[131] MINEIRO, *supra* note 123, at 48.

[132] *Id.*

[133] On the definition of person, natural or juridical, see 22 C.F.R. § 120.14 (2012); *see also* 15 C.F.R. § 772.1 (2012). Furthermore, EAR and ITAR exclude permanent residents of the United States from the definition of a foreign person. *Compare* 22 C.F.R. § 120.16, *with* 15 C.F.R. § 734.2(b)(2)(ii).

[134] 22 C.F.R. § 120.15. *See* 8 U.S.C. § 1324b(a)(3) (2012) ("the term 'protected individual' means an individual who—(A) is a citizen or national of the United States, or (B) is an alien who

> [a]ny individual who is a citizen of the United States, a permanent resident alien of the United States, or a protected individual . . . [, a]ny juridical person organized under the laws of the United States or any jurisdiction within the United States, including foreign branches; and . . . [a]ny person in the United States.[135]

On the other hand, ITAR defines a foreign person as

> any natural person who is not a . . . protected individual . . . [a] foreign corporation, business association, partnership, trust, society or any other entity or group that is not incorporated or organized to do business in the United States, as well as international organizations, foreign governments and any agency or subdivision of foreign governments (e.g., diplomatic missions).[136]

However, the EAR does not specifically define foreign person, but relates the term to a citizen of a foreign country—which the EAR also does not define.[137]

The policy differences between ITAR and the EAR have a large impact on the commercial space industry and its growth. At the center of the problem lies the export control lists: the USML and the CCL. Because of the types of technologies used in the commercial space sector, the USML and the CCL blur the line between dual use and military use technologies.[138]

EAR and ITAR categorize controlled goods, services, and information in different ways. First, the EAR defines a good as "any article, natural or man-made substance, material, supply or manufactured product, including inspection and test equipment, and excluding technical data."[139] Further, the EAR defines technology as

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is lawfully admitted for permanent residence, is granted the status of an alien lawfully admitted for temporary residence under section 1160(a) or 1255a(a)(1) of this title, is admitted as a refugee under section 1157 of this title, or is granted asylum under section 1158 of this title; but does not include (i) an alien who fails to apply for naturalization within six months of the date the alien first becomes eligible (by virtue of period of lawful permanent residence) to apply for naturalization or, if later, within six months after November 6, 1986, and (ii) an alien who has applied on a timely basis, but has not been naturalized as a citizen within 2 years after the date of the application, unless the alien can establish that the alien is actively pursuing naturalization, except that time consumed in the Service's processing the application shall not be counted toward the 2-year period.").

135 15 C.F.R. § 772.1.

136 22 C.F.R. § 120.16.

137 15 C.F.R. § 772.1.

138 MINEIRO, *supra* note 123, at 49.

139 50 U.S.C. § 2415(3) (2012).

> the information and know-how (whether in tangible form, such as models, prototypes, drawings, sketches, diagrams, blueprints, or manuals, or intangible form, such as training or technical services) that can be used to design, produce, manufacture, utilize, or reconstruct goods, including computer software and technological data, but not the goods themselves.[140]

In contrast, ITAR categorizes defense articles as follows:

> I. Any weapon, weapons system, munition, aircraft, vessel, boat, or other implement of war,
> II. Any property, installation, commodity, material, equipment, supply, or goods used for the purposes of making military sales,
> III. Any machinery, facility, tool, material, supply, or other item necessary for the manufacture, production, processing, repair, servicing, storage, construction, transportation, operation, or use of any article listed in this paragraph, and
> IV. Any component or part of any article listed [on the USML] . . . .[141]

In addition, defense article also includes associated technical data. ITAR categorizes technical data as follows:

> I. Information which is required for the design, development, production, manufacture, assembly, operation, repair, testing, maintenance or modification of defense articles. This includes information in the form of blueprints, drawings, photographs, plans, instructions or documentation.
> II. Classified information relating to defense articles and defense services;
> III. Information covered by an invention secrecy order;
> IV. Software . . . directly related to defense articles.[142]

Further, a defense service "includes any service, test, inspection, repair, training, publication, technical or other assistance, or defense information . . . used for the purpose of making military sales, but does not include design and con-

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[140] *Id.* § 2415(4).
[141] 22 U.S.C. § 2794(3).
[142] 22 C.F.R. § 120.10.

struction services . . . ."[143] Defense service also includes "[t]he furnishing of assistance (including training) to foreign persons, whether in the United States or abroad in the design, development, engineering, manufacture, production, assembly, testing, repair, maintenance, modification, operation, demilitarization, destruction, processing or use . . . ."[144] Lastly, "'[d]efense information' includes any document, writing, sketch, photograph, plan, model, specification, design, prototype, or other recorded or oral information relating to any defense article or defense service . . . ."[145]

Because the EAR and ITAR classify an export in different ways, the scope of the term export varies depending on the regime. Under the EAR, export means "an actual shipment or transmission of items subject to the EAR outside of the United States or the release of technology or software subject to the EAR in a foreign country."[146] However, ITAR defines an export

> as the sending [or] [sic] taking of a defense article (e.g. an item subject to ITAR) outside of the United States *or* the performance of a defense service (whether or not in the United States) *or* the disclosure or transference of technical data to a foreign person (whether or not in the United States).[147]

Further, the transmission of protected items or data can also take the form of a "deemed export" or "re-export," and EAR and ITAR distinguish each.[148] First, the EAR terms "[a]ny release of technology or source code subject to the EAR to a foreign national" in the United States as a deemed export.[149] A deemed export under ITAR means "the discourse or transference of any defense article or defense service (including technical data) to a foreign person in the United States."[150] Second, the EAR and ITAR also cover what can be termed re-exports, i.e., the same item exported again to a new licensee.[151] Consequently, the potential licensee would have to obtain a new export license to transfer the article or service.

EAR and ITAR operate in different ways, but act in tandem to cover all goods, services, and information that a person could export segmented into cat-

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143 22 U.S.C. § 2794(4).

144 22 C.F.R. § 120.9(1).

145 22 U.S.C. § 2403(e) ("but shall not include Restricted Data as defined by the Atomic Energy Act of 1954.").

146 MINEIRO, *supra* note 123, at 51. *See* 15 C.F.R. § 734.2(b) (2012).

147 MINEIRO, *supra* note 123, at 51 (emphasis in original). *See* 22 C.F.R. § 120.17.

148 *Compare* 22 C.F.R. §§ 120.17(a)(2)-(5), 120.19, *with* 15 C.F.R. § 734.2(b)(2)(ii), (b)(4) (providing the "deemed export rule").

149 15 C.F.R. § 734.2(b)(2)(ii).

150 MINEIRO, *supra* note 123, at 51. *See* 22 C.F.R. § 120.17(a).

151 *See* 15 C.F.R. § 734.2(b); 22 C.F.R. § 120.19.

egories of sensitive technologies, particularly dual-use technologies. EAR captures specific items the government wants to regulate, while ITAR operates as an open-end regime for items generally used in military applications.[152] Consequently, any person who seeks to obtain authorization to export any relevant item must go through either BIS or DDTC for approval.[153] The process by which to seek approval can operate from BIS to DDTC or DDTC to BIS with review by relevant government agencies and departments.[154] For example, if DDTC reviews an application and determines an item under review is not licensable under ITAR, it will transfer the application to BIS for review and *visa versa*.[155] However, if both agencies find that neither have jurisdiction, the applicant will receive a notice export license in the form of a favorable EAR99 ruling.[156]

In general, for items that could fall under Department of Commerce jurisdiction, a potential applicant who wants to export an item must obtain an EAR99 ruling if the item in question is not listed on the CCL.[157] An applicant seeks an EAR99 ruling to determine what authorization BIS should grant him or her. Since EAR99 rulings usually involve low-technology consumer goods, an export license is usually not required.[158] Once BIS makes an EAR99 determination, it can require an applicant to obtain an export license provided the applicant does not seek to export the item to an embargoed country, to a prohibited end-user, or in support of a prohibited end-use.[159]

In the event that uncertainty arises as to whether a license applicant needs to seek approval from the Department of State for items that could be on the USML, an applicant can seek a resolution by asking for a "commodity jurisdiction request" ("CJR").[160] The DDTC considers each CJR and decides on a

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[152] *See* 15 C.F.R. § 734.2; 22 C.F.R. § 120.10.

[153] 15 C.F.R. § 748.1(b).

[154] *See id.* § 734.2(a)(1).

[155] *See id.*

[156] *Id.* § 748.3(a).

[157] *See id.*

[158] *See id.* § 740.9(f) (listing the temporary import, export, and re-export rules).

[159] *Id.*

[160] *See* 22 C.F.R. §§ 120.3, 120.4. *See also* 15 C.F.R. § 770.2. Under ITAR, the Defense Department may review any license application submitted to the Department of State, but the Department of Commerce has no role in ITAR license reviews. *See* 22 C.F.R. § 120.1 (delegating export regulations to the Secretary of State under Chapter I: Department of State). Moreover, the DDTC can issue an informal veto on any license application if a license for an item sought would raise important foreign policy or national security issues. *See* Interview by Vago Muradian with Frank Ruggiero, Deputy Assistant Sec'y of State, Def. Trade and Regional Sec., in Washington, D.C. (April 21, 2008), http://2001-2009.state.gov/t/pm/rls/rm/104012.htm (discussing the veto right in the context of items using U.S. controlled parts or technologies). Under the EAR, no federal department or agency has veto power over license applications. H.R. REP. NO. 107-297, at 56 (2001). The Department of Commerce's Advisory Committee and the Review Board grant a

case-by-case basis.[161] In most cases, an applicant makes a commodity jurisdiction request to the Department of State before filing an EAR99 because ITAR can cover any product that has been designed, designated, developed, configured, or adapted for military application.[162] Because CJRs require specific facts, sometimes an applicant who seeks clarification of whether an item falls under the USML or the CCL is unable to attack the regulation's ambiguities.[163] Moreover, DDTC does not publish CJR decisions and the decisions do not bind the respective agencies as legal precedent.[164] Thus, the commercial space sector as a whole is unable to acquire information about DDTC's CJR decisions in order to reduce regulatory uncertainty unless a person releases the CJR decision obtained from the DDTC.[165]

Under the EAR authorization regime, a person can obtain a classification request, an advisory opinion, or an export license.[166] A person who seeks a classification request asks the BIS to determine whether the CCL lists the item described in a person's request.[167] A BIS issued advisory opinion "determine[s] whether a license is required, or the licensing policy related to a particular end-use, end-user, and/or destination."[168] An applicant asks the BIS to grant an export transaction that will send an item on the CCL outside the United States or re-export a CCL item form one foreign State to another.[169]

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license application on a majority vote. *See* SELECT COMM., U.S. HOUSE OF REPRESENTATIVES, U.S. NATIONAL SECURITY AND MILITARY/COMMERCIAL CONCERNS WITH THE PEOPLE'S REPUBLIC OF CHINA, H.R. Rep. No. 105-851 at 39 (1999), *available at* http://www.gpo.gov/fdsys/pkg/GPO-CRPT-105hrpt851/pdf/GPO-CRPT-105hrpt851.pdf.

161 MINEIRO, *supra* note 123, at 51.

162 *See* 22 C.F.R. § 121.1.

163 MINEIRO, *supra* note 123, at 51.

164 *Id.*

165 With respect to the problem addressed in this Article, this has occurred twice recently with Bigelow Aerospace and Virgin Galactic's "passenger experience" exemption granted by the Department of State, but the specifics have not yet been announced to the public. *See* Leone, *supra* note 20; *see also* Interview by Amy Klamper, with Mike Gold, Corp. Counsel and Director of Washington Operations, Bigelow Aerospace, in Washington, D.C. (Aug. 31. 2009) [hereinafter Klamper Interview], http://www.spacenews.com/profiles/091009profile-mike-gold.html.

166 15 C.F.R. § 748.1(d) requires a person to file an application for any authorization request electronically through the Simplified Network Application Process Redesign. 15 C.F.R. § 748.1(d) (2012); *see also* SNAP-R, DEP'T OF COMMERCE, https://snapr.bis.doc.gov/snapr/ (last visited Mar. 20, 2013). A person may file a paper application if BIS has received no more than one submission within twelve months of the last application, a person does not have access to the internet, rejected a previous electronic filing or revoked eligibility to file electronically, requested the person to submit a paper application, or determined a need based on urgency to implement U.S. Government policy or circumstances outside the control of the person prohibits electronic filing. 15 C.F.R. § 748.1(d)(i)-(v).

167 *See id.* § 748.3(b).

168 *Id.* § 748.3(c)(2).

169 *Id.* § 748.4(a)(1)-(3).

Under the ITAR authorization regime, the DDTC provides an export license seeker with one of two types of authorizations: license or agreement. A license "generally permit[s] the simple one-way export of a defense article and/or technical data."[170] An agreement approved by the DDTC can take the form of a "technical assistance agreement" ("TAA") that "permits technical interchanges between the parties to an agreement."[171] Additionally, the DDTC "issues 'reexport authorizations' to U.S. or foreign persons . . . [which] is the only authorization that a foreign person can request directly from the DDTC."[172] Under limited exceptions, a person can export items on the USML without DDTC authorization; however, "most space related exports subject to the ITAR require prior DDTC authorization."[173]

While, the BIS provides an easier method to obtain a license for items on the CCL, the DDTC does not provide a similar method. DDTC requests for an export license, especially for USML Category IV and XV items, are costly, time-consuming, and can produce unpredictable results.[174] On average, "exchange of Category IV and XV technical data . . . [can take] approximately two to three months," but can take between one and six months depending on whether a person seeks a license or a TAA.[175] Furthermore, changes to DDTC license and agreement processing can significantly affect process times.[176]

When the DDTC or the BIS decides to grant an export license to an applicant, that office considers the specific destination where the item will travel, the nationality of the person who seeks the license, and the nationality of the end user.[177] The DDTC can make exceptions to the export license requirement if the destination or the nationalities of the persons involved with the item subject to an export license fall under permitted or exempted States.[178] A person may not export an item on the USML to states subject to, *inter alia*, arms and United Nations Security Council embargoes, or entities that engage in terrorism.[179]

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170 Ordway, s*upra* note 20, at 232.

171 *Id. See* 22 C.F.R. § 124.1(a) (2012); *see also* Sundahl, *supra* note 20, at 588 (TAAs required "whenever a[n] [operator] discloses technical data to a foreign person or engages in a 'defense service.'").

172 Ordway, *supra* note 20, at 232 n.14.

173 *Id.* at 232.

174 *Id.*

175 *Id.* TAAs can take within sixty days or longer to process. *See* Sundahl, *supra* note 20, at 599.

176 *See* Sundahl, *supra* note 20, at 599.

177 *See* MINEIRO, *supra* note 123, at 47-48.

178 *See* 22 C.F.R. §§ 126.5, 126.14, 126.15, 126.17 (2012).

179 *See* 22 C.F.R. § 126.1 (listing Belarus, Cuba, Eritrea, Iran, North Korea, Syria, Venezuela, Burma, China, the Republic of the Sudan, Cote d'Ivoire, Democratic Republic of Congo, Iraq, Lebanon, Liberia, Libya, and Somalia as subject to denial of an export license or a restricted export license upon approval by the Department of State and Department of Defense).

Additionally, the EAR and ITAR authorize cooperation with other States in the control of items on the CCL and USML, respectively.[180] To achieve this objective, the Department of Commerce and the Department of State have joint administrative jurisdiction to ensure that the United States remains compliant with international agreements.[181]

The EAR offers broader exceptions to an export license than does ITAR. Under the EAR, the BIS can grant *de minimis* content and foreign availability exceptions.[182] The *de minimis* rule allows a person to avoid submitting an application for a license if the re-export of the item on the CCL is below certain threshold requirements.[183] Additionally, the BIS can waive the license requirement for items on the CCL if the item in question is available in a foreign market, but the waiver is still subject to national security concerns.[184] Conversely, ITAR provides neither exception. In particular, "[t]he intended use of the [defense] article or service after its export (i.e. for military or civilian purpose) is not relevant in determining whether the article or service is subject to [ITAR] controls."[185] However, ITAR does not require a license if the information or defense article or service is in the public domain, which "means information [that] is published and . . . generally accessible or available to the public."[186] Further, a space flight operator could escape the need to obtain an export license under the general systems description if the information in question relates to an item that is

> [S]pecifically designed, developed, configured, adapted, or modified for a military application . . . [that] (i) [has] predominant civil applications, and (ii) [has] performance equivalent (defined by form, fit and function) to those of an article or service used for civil applications; or (b) [is not] specifically designed, developed, configured, adapted, or modified for a

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180 *See, e.g.*, 22 C.F.R. §§ 126.14, 126.17.

181 *See* MINEIRO, *supra* note 123, at 51.

182 *See id.* at 52.

183 15 C.F.R. § 734.4(b) (2012).

184 *See* MINEIRO, *supra* note 123, at 52.

185 22 C.F.R. § 120.3(b).

186 22 C.F.R. § 120.11 (Public domain information includes those available to the general public "1) [t]hrough sales at newsstands and bookstores; 2) [t]hrough subscriptions . . . [t]o published information; . . . 4) [a]t libraries open to the public . . . ; 5) [t]hrough patents available at any patent office; 6) [t]hrough unlimited distribution at a conference, meeting, seminar, trade show or exhibition, generally accessible to the public, in the United States; 7) [t]hrough public release (i.e., unlimited distribution) in any form (e.g., not necessarily in published form) after approval by the cognizant U.S. government department or agency . . . ; [and] 8) [t]hrough fundamental research in science and engineering at accredited institutions of higher learning in the U.S. where the resulting information is ordinarily published and shared broadly in the scientific community.").

> military application, and has significant military or intelligence applicability . . . .[187]

Lastly, violating EAR or ITAR can result in civil penalties, criminal prosecution, and exclusion from future export licensing.[188] Any foreign or U.S. person can be held liable for exporting, attempting to export, or re-exporting prohibited items; violating the terms and conditions of an export license; or inducing a person to violate any provision of the export license or export control regulation.[189] Additionally, the DDTC and the BIS provide for self-disclosure of violations. Thus, when a person discovers violations of ITAR and the CCL, the DDTC and the BIS encourage such persons to divulge violations to the respective agencies to mitigate any harm to the violator.[190]

The greater risk to both space flight participants and operators is not satisfying ITAR. ITAR tightly controls most of the technologies used by space flight operators and therefore has some of the harshest penalties associated with violations. The aerospace community knows very well that the DDTC will seriously prosecute cases of export control violations when those cases are discovered.[191] Consequently, the aerospace industry takes export control requirements seriously.[192] Moreover, the DDTC can and does require the use of ITAR

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[187] *Id.* § 120.3. *See* David M. Dunbar, Key Concepts and Definitions under the International Traffic in Arms Regulations 3–4, *available at* http:www.umresearch.umd.edu/ORAA/export_control_guidance/docs/Key%20Concepts%20and%20Definitions%20under%20the%20ITAR.pdf.

[188] 15 C.F.R. § 764.3.

[189] 22 C.F.R. § 127.1 (2012). *See also* 15 C.F.R. § 764.2.

[190] *See* 15 C.F.R. § 764.5(a); 22 C.F.R. § 127.12 (the DDTC "strongly encourages the disclosure of information . . . by persons . . . that believe they may have violated any export control provision of the Arms Export Control Act, or any regulation, order, license, or other authorization issued under the authority of the Arms Export Control Act. The Department may consider a voluntary disclosure as a mitigating factor in determining the administrative penalties, if any, that should be imposed. Failure to report a violation may result in circumstances detrimental to U.S. national security and foreign policy interests, and will be an adverse factor in determining the appropriate disposition of such violations.").

[191] *See, e.g.*, Press Release, U.S. Attorney's Office for the E. Dist. of Tenn., Former University of Tennessee Professor John Reece Roth Begins Serving Four-Year Prison Sentence on Convictions of Illegally Exporting Military Research Data (Feb. 1, 2012), http://www.fbi.gov/knoxville/press-releases/2012/former-university-of-tennessee-professor-john-reece-roth-begins-serving-four-year-prison-sentence-on-convictions-of-illegally-exporting-military-research-data.

[192] *See* Ordway, *supra* note 20, at 235 ("it is highly recommended that no one make . . . a determination [regarding the need for a license under ITAR] without expert ITAR advice [because the CJR] process is the only official mechanism by which questions regarding ITAR jurisdiction may be addressed."); *see, e.g.*, Boeing Company, Dep't of State, Bureau of Political-Military Affairs (Mar. 28, 2006) (consent agreement), *available at* http://www.pmddtc.state.gov/compliance/consent_agreements/pdf/Boeing_ConsentAgreement_06.pdf.

compliance monitors when the potential for unlawful disclosure arises, but a space flight operator must bear the cost of the monitors.[193]

B. The Content and Scope of USML Categories to Space Flight Operators and Participants

The USML incorporates four major categories of space-related defense article exports that the United States controls. First, Category IV controls the export of launch vehicles, underlying technologies, and related technical data.[194] Moreover, 22 C.F.R. § 121.5 modifies Category IV to include "components specifically designed, modified or configured for items listed in [Category IV] . . . and specialized handling equipment, including transporters, cranes and lifts designed to handle articles [that include rockets and launch vehicles] for preparation and launch from fixed and mobile sites."[195] Second, Category V controls propellants and related substances that enable space flight.[196] Third, Category XI controls space-related technologies designed or modified for spacecraft, space flight, and communication satellites—except for items in common commercial use.[197] Fourth, Category XV of the USML controls spacecraft, underlying technologies, and related technical data.[198] The USML also identifies many of the defense articles in categories IV, V, XI, and XV as Significant Military Equipment ("SME").[199] The USML subjects defense articles designated as SME to tighter restrictions than non-SME items under ITAR.[200] Furthermore, the USML designates all classified articles as SME.[201] Most of these categories include items that a space flight participant would not generally have access to before, during, or after launch, either physically or related through some form of communication.

The USML provides some possible issues that space flight operators and participants need to consider. First, as long as a space flight operator launches from and lands in the United States, its launch vehicles do not require an export license under Category XV.[202] Otherwise, the DDTC could consider the launch and reentry of the launch vehicle an export.[203] For example, a few

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193 *See* Blount, *supra* note 20, at 1610, 1614.

194 22 C.F.R. § 121.1 cat. IV.

195 *Id.* § 121.5.

196 *Id.* § 121.1 cat. V.

197 *See id.* at cat. XI.

198 *Id.* at cat. XI.

199 *Id.*

200 *See id.* §§ 121.1(b), 120.7.

201 22 C.F.R. § 120.7(b)(2) ("Significant military equipment includes . . . [a]ll classified articles enumerated in § 121.1 of this subchapter."). *See generally* 22 C.F.R. § 121.1(b).

202 22 C.F.R. § 120.17.

203 *See id.*; *see also* Sundahl, *supra* note 20, at 592.

suborbital commercial launch companies have sought agreements with foreign States to land and launch.[204] This situation could be problematic because, depending upon the scope of the export license and nationalities of persons involved, unauthorized transmission of controlled defense services (i.e., technical data) could subject the operator and participant to significant legal risk in the United States. However, no commercial space flight firm has moved significantly forward with foreign agreements or memoranda of understanding ("MOUs").

In regards to CSLAA safety disclosures, a space flight operator's ability to satisfy informed consent requirements induces problems for the operator when such safety information falls within the sphere of ITAR-protected technical data. Any information relating to items found in Categories IV, V, XI, or XV could be transferred (exported) not only in the technical briefings, but also between space flight participants. In such cases, a TAA might be required depending on the nature of the defense service transmitted. However, if the DDTC determines that "training in the basic operation and maintenance of defense articles" does not require a TAA, then the DDTC would only require a space flight operator to obtain an export license that covers safety training and hardware and software used by foreign space flight participants as enumerated under the export license.[205]

Moreover, a majority of the items listed on the USML are not items to which a space flight participant would necessarily be exposed. It is more likely that a space flight participant would be exposed to the related technical data or defense articles that operators have installed on the launch vehicle, such as hardware and software designed for participant use, the seats, harnesses, etc., and data about the failure rates of the launch vehicle and its underlying technologies. Nonetheless, the FAA does not currently have the authority to regulate participant safety, or medical standards for that matter.[206] The issue thus persists as to whether the disclosure of related technical data satisfies the informed consent requirements under CSLAA.

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[204] *See, e.g.*, Peter B. de Selding, *Virgin Galactic Strikes Deal with Swedish Government*, SPACE.COM (Jan. 28, 2007), http://www.space.com/3395-virgin-galactic-strikes-deal-swedish-government.html; Shane McGinley, *Branson's Virgin Galactic to Build Spaceport Abu Dhabi*, ARABIAN BUSINESS.COM (Apr. 17, 2012), http://www.arabianbusiness.com/branson-s-virgin-galactic-build-spaceport-abu-dhabi-454221.html.

[205] *See* Sundahl, *supra* note 20, at 599.

[206] *See* Commercial Space Transportation Reusable Launch Vehicle and Reentry Licensing Regulations, 65 Fed. Reg. 56,618 (Sept. 19, 2000).

C. The National Defense Authorization Act for Fiscal Year 2013

Congress recently enacted the National Defense Authorization Act (NDAA) for Fiscal Year 2013 which amended section 1513 of the Strom Thurmond National Defense Authorization Act for Fiscal Year 1999 (NDAA of 1999) that transferred "all satellites and related items" from the CCL to the USML.[207] Section 1261 of the NDAA now gives the President discretion to transfer space-related hardware and services from the USML back to the CCL subject to appropriate national security reviews.[208] Section 1262 of the NDAA also requires the President to submit a report to Congress "summarizing all licenses and other authorizations to export satellites and related items that are subject to the Export Administration Regulations . . . ."[209] After the mandated reviews, the aerospace industry is hopeful that the transfer of space related items from the USML to the CCL will help alleviate the costs associated with seeking an export license.[210] However, it is unclear how the mandatory review process will affect the ability of space flight operators to figure out how to approach disclosure of technical data to satisfy FAA and/or state informed consent requirements.

IV. The Things We Know We Do Not Know: Analyzing the Possible Effects of ITAR on FAA Informed Consent Information Requirements

This Part analyzes the intersection between CSLAA's informed consent information requirements and ITAR. As the reader may glean from a description of the process thus far, a space flight operator faces complex legal requirements to ensure foreign space flight participants can purchase seats on a commercial launch vehicle. Those technologies utilized on a launch vehicle will affect the FAA launch license and raise the potential for liability for export violations if the operator is required to obtain an export license in order to provide information in conformity with FAA or state informed consent rules.

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207 National Defense Authorization Act for Fiscal Year 2013, Pub. L. No. 112-239, 126 Stat. 1632, 1645 (2013).

208 *Id.*

209 *Id.*

210 *See, e.g.*, Warren Ferster, *New Export Law Seen as a Boon to U.S. Satellite, Component Makers*, SpaceNews.com (Jan. 4, 2013), http://culberson.house.gov/new-export-law-seen-as-boon-to-u-s-satellite-component-makers/. Many commentators have lauded the change in the law as a step in the right direction for export control reform. *E.g.*, Debra Werner, *At Space Entrepreneurship Forum, Praise for New U.S. Export Control Law*, SpaceNews.com (Feb. 4, 2013), http://www.spacenews.com/article/at-space-entrepreneurship-forum-praise-for-new-us-export-control-law#.URclWaXg2Sp. However, it is unclear how such changes will impact the issues presented in this Article as of the date of publication.

However, the main issue explored in this Part is the degree to which a space flight operator can satisfy, at a minimum, FAA informed consent information requirements in order to allow foreign space flight participants to travel into outer space on an FAA licensed launch vehicle given ITAR restrictions.

A. Categorizing the Types of Information That Satisfy Informed Consent Information Requirements

1. How Informed Consent Connects to the Commercial Space Flight Liability Regimes and ITAR

Figure 2 below represents how informed consent requirements underpin the commercial space flight liability regimes and their interactions with ITAR. A space flight operator could provide informed consent to a foreign space flight participant without an export license provided that the operator does not disclose controlled technical data under ITAR.[211] However, ITAR can restrict the ability of an operator to provide adequate and material disclosure of information necessary for the participant to assume the risk of space flight, notwithstanding a space flight operator's ability to satisfy the three methods of disclosure (oral, written, implicit) and a participant's cognizance of the risks.[212] ITAR provides four means by which to mitigate the risk of violating ITAR: technical assistance agreement, export license, DDTC exemption, and compliance monitors.[213] The use of any of these methods would allow a space flight operator to disclose controlled technical data that satisfies the FAA's informed consent requirements subject to the terms and conditions of each remedy, but imposes additional costs and delays on operators.

The possible disclosure of technical risks related to launch vehicle technologies, on-board electronics, and supporting infrastructure and information related to training and safety represents the types of ways an operator could open itself up to liability. The central question thus is to what extent does the controlled technical data related to launch vehicles technologies, training, and safety provide adequate and material information for the participant to weigh appropriately the risks of space flight?

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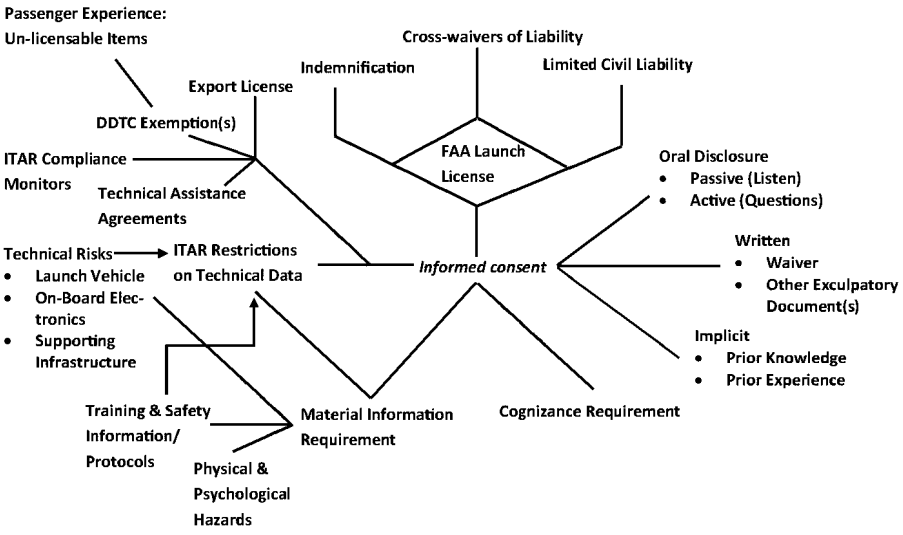
211 *See* Sundahl, *supra* note 20, at 598.

212 *See id.* at 597-98; *see also* discussion *supra* Part II.B.1.

213 *See* discussion *supra* Part III.A.

FIGURE 2. THE CONNECTIONS AMONG SPACE FLIGHT LIABILITY REGIMES, ITAR, AND INFORMED CONSENT



2. The Informed Consent-ITAR Problem

Space flight operators face a tricky balance between satisfying informed consent information requirements and complying with ITAR. A-P-T's suggested protocols, though common to inherently dangerous activities, provide a good basis for a space flight operator to comply with informed consent/duty to warn requirements under the CSLAA.[214] Thus, it is suggested that a space flight operator disclose everything to a space flight participant.[215] This suggestion raises serious export control issues due to the potential of a deemed export (or re-export) of technical data in audio and visual presentations by space flight operators, oral statements made in response to space flight participant questions, explanations regarding safety protocols (pre-, in-, post-flight), and the use of technologies on board a launch vehicle.[216] A violation of either the FAA launch license and/or ITAR would certainly, if not potentially, ruin a space flight operator's business venture and subject it to civil and criminal liability.

Figure 3 below represents the tricky balance that a space flight operator must navigate if he desires to fly foreign space flight participants as part of its business model. The situation may arise when a space flight operator presents

214 14 CFR § 460.45 (2012).

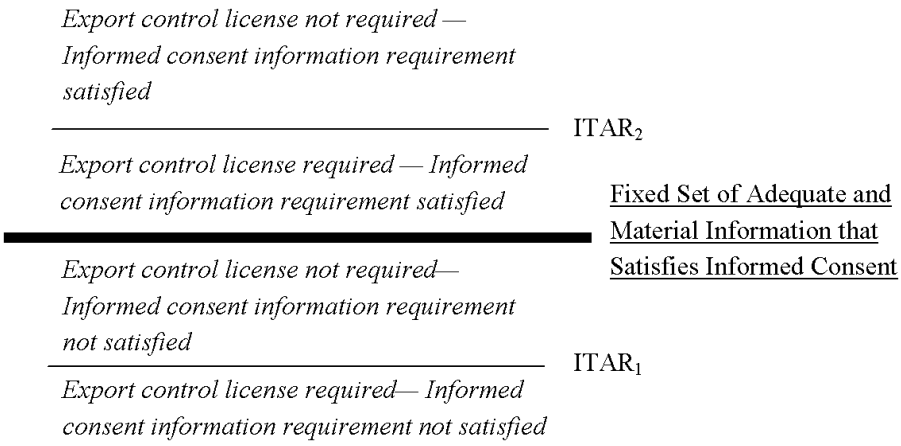
215 Knutson, *supra* note 12, at 122.

216 *See* 22 C.F.R. § 120.17 (2012).

a foreign space flight participant with launch information during the informed consent briefing that would satisfy informed consent information requirements, but that could require the operator to obtain an ITAR export license. A-P-T's review of case law on informed consent/duty to warn indicates that when a space flight operator meets the requirements spelled out in a statute or regulation, informed consent should be satisfied because courts generally look to material rather than *de minimis* breaches of informed consent.[217]

However, commercial space flight is a new and untested industry without industry-wide standards, practices, or regulations, and therefore space flight operators should disclose everything. But what does *everything* mean? What exactly is the perimeter of the problem a space flight operator could face?

FIGURE 3. EXPORT CONTROL LIMITATIONS RELATIVE TO SATISFYING INFORMED CONSENT INFORMATION REQUIREMENTS



In Figure 3, the possible outcomes of $ITAR_1$ and $ITAR_2$ turn on a fixed set of adequate and material information that would satisfy informed consent. The dark bold line represents the fixed dividing line between satisfying and not satisfying FAA informed consent information requirements with respect to the types of information that a space flight operator must divulge to a foreign space flight participant. CSLAA and its implementing FAA regulations mandate the minimum amount of information that space flight operators must provide to

[217] A-P-T RESEARCH INC., *supra* note 92, at 10.

foreign space flight participants.[218] Thus, federal law provides the lower limit of information subject to addition by state law.

The lines $ITAR_1$ and $ITAR_2$ represent how ITAR divides the four positions in which a space flight operator could find itself. $ITAR_1$ divides two worst-case scenarios for a space flight operator. The first worst-case scenario would require a space flight operator to obtain an export license for information that would not satisfy informed consent requirements. Therefore, in the first worst-case scenario, the space flight operator would not divulge such information to a foreign space flight participant because it would be irrelevant information not required under FAA regulations. The second worst-case scenario would not require a space flight operator to obtain an export license for information that would not satisfy informed consent rules. Therefore, in both worst-case scenarios the space flight operator would not divulge such information to a foreign space flight participant because it would be irrelevant information that would not satisfy FAA informed consent requirements.

$ITAR_2$ divides the two best-case scenarios for a space flight operator. In the second best-case scenario, the information a space flight operator could potentially transmit to a foreign space flight participant would satisfy informed consent, but would require an export license. In the best-case scenario, the information a space flight operator could potentially transmit to a foreign space flight participant would satisfy informed consent, but would not require an export license. Although the best-case scenario would be ideal for the space flight operator, the majority of the information ambiguity related to foreign space flight participants centers on the second best-case scenario.

Additionally, state law informed consent information requirements could exceed federal requirements under the CSLAA and its implementing regulations.[219] This could subject the space flight operator to several additional requirements that it must satisfy beyond what the FAA requires. However, as the reader will note *infra*, current promulgation of state informed consent rules closely mirror the FAA commercial space requirements. Every state that has promulgated such rules anticipates commercial suborbital and orbital launches with space flight participants on board in the near future.[220] Therefore, an examination of the categories of information that could satisfy informed consent requirements is warranted.

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[218] *See* 51 U.S.C. § 50901 (2012).

[219] *See* Blasingame, *supra* note 16, at 765-68.

[220] *See* discussion *infra* Part IV.B.3.

B. The Scope of the Informed Consent Information-Export License Problem

Title 14 Part 460 of the Federal Code of Regulations requires a space flight operator to divulge three categories of information: physiological, technical, and questions.[221] This includes quantified data about launch vehicle histories and previous persons launched into outer space, physiological risks of flight, and technical data related to launch vehicle performance and failure rates.[222] Moreover, a space flight operator cannot limit the scope of questions asked by the foreign participant during their informed consent briefing.[223] Thus, the operator is in the precarious position of choosing compliance with the space flight regulations and/or risk possible violation of ITAR.

Although Knutson recommends that a space flight operator divulge all information asked for by the space flight participant,[224] the space flight operator has some discretion over what it must divulge to satisfy informed consent information requirements. A space flight operator can easily explain the various physiological (physical and psychological) ways in which an orbital or suborbital flight could injure or kill the participant, which is not ITAR restricted.[225] Furthermore, under federal law, a space flight operator is only required to offer technical information related to quantifiable data gathered from experience in launch vehicle testing and flight.[226] This could imply that the scope of questions an operator must answer with respect to technical data is limited by the data possessed by the operator and the commercial space industry. It would thus seem that a common answer to some participant questions would be simply, "we do not know."

Thus, strict application of 14 C.F.R. § 460.45 limits the scope of information a space flight operator could provide to a space flight participant. Because the provisions of § 460.45 mandate that the space flight operator divulge quantifiable data about the risks involved in space flight, informed consent information requirements could be satisfied by explaining to a space flight participant that no data exists to answer many types of data-lacking technical question.[227] If a space flight operator clearly provides all the required information under § 460.45, the operator could avoid divulging information that falls within the

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221 *Compare* 14 C.F.R. § 415.8 (2012), *with* 14 C.F.R. § 460.45.

222 *See id.* § 460.45.

223 *Id.*

224 *See* Knutson *supra* note 12, at 122.

225 14 C.F.R. § 460.45

226 *Id.*

227 This creates an additional risk to a space flight operator if it turns out data exists to satisfy the question and the data is relevant in providing informed consent. This would again require due diligence on the part of the space flight operator.

scope of ITAR, but not necessarily satisfy a particular states' informed consent requirements.

1. Possible Limitations Under ITAR on Space Flight Operators and Foreign Participants

First, companies like Virgin Galactic must seek out international clientele for its business model to work.[228] Because ITAR places a potential limit on which foreign nationals could become space flight participants under U.S. law, some foreign space flight participants would be prohibited from flying if an export license is required. Space flight operators may be required to seek a restricted export license for potential participants e.g., if the participant is from a country that is under an arms embargo, under a United Nations Security Council resolution, or has been deemed by the Department of State as a supporter of terrorism. Thus, ITAR does limit the international clientele base (potential foreign flight participants) of space flight operators.

Second, the types of information required to meet the CSLAA's informed consent information requirements do not seem to implicate technical data under ITAR necessarily, but transmission of such data may be required in some circumstances.[229] This again raises a federal preemption issue whereby the CSLAA and its implementing regulations represent the minimum informed consent requirements. Individual state law can require more informed consent, but given federal experience in space flight, it is reasonable to assume that some states might defer statutorily (absent some public policy rationale or common law exception) to the federal minimum informed consent requirements of 14 C.F.R. § 460.45. The current trend among states is to enact space laws that focus on the scope of indemnification and limited civil liability and require a waiver signed by the space flight participant that is consistent with federal and state law, without requiring greater information disclosure.[230]

Third, if information used to satisfy informed consent information requirements for U.S. space flight participants significantly diverges from the information provided to foreign space flight participants, then this creates the potential for unlicensed disclosures. Consequently, this also creates a danger of not fully satisfying informed consent requirements. While costly, an ITAR monitor

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[228] *See* Blount, *supra* note 20, at 1609.

[229] For example, crew and space flight participants are subject to training, medical, and other standards developed at the direction of the Secretary of Transportation. 51 U.S.C. § 50905(b)(6)(A)-(B) to (c) (2012). By all indications, information related to such requirements could be outside the scope of protected technical data or covered under the passenger experience exemption.

[230] *See, e.g.*, Timothy M. Ravich, *2010: Space Law in the Sunshine State*, 84 FLA. B.J. 24 (2010).

could mitigate the threat of unlicensed disclosures of technical data by U.S. persons to foreign persons. This would disincentivize operators from segregating space flight participants for the purposes of disclosure of information that satisfies informed consent information requirements, but could require space flight operators to keep a seat on its launch vehicle for an ITAR monitor—not necessarily an attractive alternative for either party.

2. Passenger Experience Exemption

In January 2012, the Department of State announced that it had made a decision to exempt export licensing requirements for foreign space flight participants on Virgin Galactic's launch vehicles.[231] This decision followed the "passenger experience" exception granted to Bigelow Aerospace in April 2009.[232] According to news reports, Virgin Galactic received "a favorable EAR99 ruling."[233] In particular Virgin Galactic was told "that the company may fly non-U.S. citizens to the edge of space without first obtaining an export license . . . ."[234] In comparison, recent news reports have noted that Bigelow Aerospace also received a favorable decision from the Department of State, which "found that the presence of a non-U.S. citizen in a commercially manufactured U.S. launch vehicle did not require a license."[235]

In both cases, the Department of State granted Bigelow Aerospace and Virgin Galactic the "passenger experience exception."[236] Mike Gold, Corporate Counsel and Vice-President of Washington, D.C. Operations for Bigelow Aerospace, has repeatedly said that the

> passenger experience has been ruled non-licensable, [i.e., Bigelow does not] need to file paperwork for foreign passengers to receive training on how to live and function aboard a Bigelow station. [This] includes being exposed to the hardware externally and internally, learning how to operate systems such as communications, how to connect hardware for water

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231 *See* Dep't of State, Directorate of Defense Trade Controls, *Commodity Jurisdiction Final Determinations*, U.S. DEP'T OF STATE, DDTC (Jan. 22, 2012), http://www.pmddtc.state.gov/commodity_jurisdiction/determination.html; *see also* Leone, *supra* note 20.

232 *See* Leone, *supra* note 20.

233 *Id.*

234 *Id.*

235 *See* Blount, *supra* note 20; Sundahl, *supra* note 20, at 602-607. Given the reporting, however, it is unclear whether Bigelow's DDTC CJR ruling covers the space habitat or the launch vehicle required to launch the habitat. It is most likely the former.

236 *See* Sundahl, *supra* note 20, at 605-10.

> and air, ingress and egress procedures, and just being in the habitat. All of this would have required licenses previously.[237]

However, Virgin Galactic's and Bigelow Aerospace's export rulings only apply to those companies, respectively, and do not change any licensing procedures of, or defense articles under ITAR.[238] Moreover, the scope of the exception is unknown, except to those in the aerospace community who have seen them. The commercial human space flight industry must therefore take Bigelow Aerospace and Virgin Galactic at their word because the DDTC does not publish its decisions, and Bigelow Aerospace and Virgin Galactic have not published the decisions either.[239]

Only Virgin Galactic and Bigelow Aerospace know the extent of their DDTC exceptions. Thus, other commercial firms who wish to become space flight operators must apply for a CJR with respect to their own technologies if they desire to offer foreign space flight participants a seat on their respective FAA-licensed launch vehicles.[240] The reports about Virgin Galactic's and Bigelow Aerospace's CJRs do not dissolve the known unknowns and unknown unknowns of which technologies must be disclosed to a potential foreign space flight participant in order to avoid applying for an export license. Thus, any changes to ITAR should be worked out between the industry and the DDTC, and/or the DDTC and the FAA—sooner rather than later.

3. Survey of State Space Flight Informed Consent Laws

Six states have promulgated informed consent rules specifically for space flight: California, Colorado, Florida, New Mexico, Texas, and Virginia.[241] Each state statute requires a space flight operator (entity) to issue a written warning to space flight participants.[242] The warnings must include an acknowledgement that space flight can cause personal injury or death, and damage to property; and must warn that the space flight participant assumes the risks of the flight.[243] Every state law surveyed requires that the written waiver

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237 *See* Klamper Interview, *supra* note 165.

238 *See* Sundahl, *supra* note 20.

239 *Id.*

240 *See* Klamper Interview, *supra* note 165.

241 A currently existing or potential launch site (i.e., spaceport) exists in each state. *See* U.S. DEP'T OF TRANSP., FED. AVIATION ADMIN., 2011 U.S. COMMERCIAL SPACE TRANSPORTATION DEVELOPMENTS AND CONCEPTS: VEHICLES, TECHNOLOGIES, AND SPACEPORTS 47-59 (Jan. 2011), http://www.faa.gov/about/office_org/headquarters_offices/ast/media/2011%20devcon%20report.pdf.

242 *See id.*

243 *Id.*

comply with federal law.[244] No state statute surveyed requires the space flight operator (entity) to specifically disclose information beyond that listed by 14 C.F.R. § 460.45.[245] Hence, statutorily, § 460.45 creates an equal or greater duty for space flight operators than do the surveyed states' laws.

a. California

California's Space Flight Liability and Immunity Act requires that

> [a] space flight entity . . . [provide] a warning statement [to a space flight participant] that shall contain, at a minimum, and in addition to any language required by federal law, the following notice: "WARNING AND ACKNOWLEDGMENT: I understand and acknowledge that, under California law, there is limited civil liability for *bodily injury*, including *death, emotional injur*y, or *property damage*, sustained by a participant as a result of the *inherent risks* associated with space flight activities provided by a space flight entity. I have given my *informed consent* to participate in space flight activities after receiving a description of the *inherent risks* associated with space flight activities, as required by federal law pursuant to Section 50905 of Title 51 of the United States Code and Section 460.45 of Title 14 of the Code of Federal Regulations. The *consent* that I have given *acknowledges* that the *inherent risks* associated with space flight activities include, but are not limited to, *risk of bodily injury*, including *death, emotional injury*, and *property damage*. I understand and acknowledge that I am participating in space flight activities *at my own risk*. I have been given the opportunity to consult with an attorney before signing this statement."[246]

b. Colorado

Colorado's Limited Liability for Spaceflight Activities Act requires that

> [e]very spaceflight entity [shall] provid[e] . . . a spaceflight participant . . . [an] agreement and warning statement . . . [that] shall include the following language and any other language required by federal law: AGREEMENT AND WARN-

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244 *Id.*

245 *Id.*

246 CAL. CIVIL CODE § 2211(a) (West 2012) (emphasis added).

> ING Under Colorado law, there is no liability for any *loss, damage, injury* to, or *death* of a spaceflight participant in a spaceflight activity provided by a spaceflight entity if such *loss, damage, injury*, or *death* results from the *inherent risks* of the spaceflight activity to the spaceflight participant. *Injuries* caused by the inherent risks of spaceflight activities may include, among others, *death* or *injury to person or property*. I, the undersigned spaceflight participant, *assume the inherent risk* of participating in this spaceflight activity.[247]

c. Florida

Florida's Informed Consent for Spaceflight Act provides that

> [a] warning statement [to space flight participants]. . . shall contain, at a minimum, the following statement: "WARNING: Under Florida law, there is no liability for an *injury* to or *death* of a participant in a spaceflight activity provided by a spaceflight entity if such *injury* or *death* results from the inherent risks of the spaceflight activity. *Injuries* caused by the *inherent risks* of spaceflight activities may include, among others, *injury to land, equipment, persons*, and *animals*, as well as the potential for you to act in a negligent manner that may contribute to your *injury* or *death*. You are *assuming the risk of participating* in this spaceflight activity."[248]

d. New Mexico

New Mexico's Space Flight Informed Consent Act requires that

> [a] space flight entity provid[e] . . . each [space flight] participant . . . a warning statement. The warning statement shall contain, at a minimum, the following statement: "WARNING AND ACKNOWLEDGMENT I understand and acknowledge that under New Mexico law, there is no liability for *injury* to or *death* sustained by a participant in a space flight activity provided by a space flight entity if the *injury* or *death* results from the *inherent* risks of the space flight activity. *Injuries* caused by the *inherent risks* of space flight activities may include, among others, *death, bodily injury, emotional injury*

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247 COLO. REV. STAT. ANN. § 41-6-101(2012) (emphasis added).
248 FLA. STAT. § 331.501 (2012) (emphasis added).

> or *property damage*. I *assume all risk* of participating in this space flight activity."[249]

e. Texas

Texas's Limiting the Liability of Space Flight Entities Act requires that

> [a] space flight participant [to] sign an agreement and warning statement before participating in any space flight activity. The agreement must include the following language and any other language required by federal law: AGREEMENT AND WARNING I UNDERSTAND AND ACKNOWLEDGE THAT A SPACE FLIGHT ENTITY IS NOT LIABLE FOR ANY *INJURY* TO OR *DEATH* OF A SPACE FLIGHT PARTICIPANT RESULTING FROM SPACE FLIGHT ACTIVITIES. I UNDERSTAND THAT I HAVE *ACCEPTED ALL RISK OF INJURY, DEATH, PROPERTY DAMAGE*, AND *OTHER LOSS* THAT MAY RESULT FROM SPACE FLIGHT ACTIVITIES.[250]

f. Virginia

Virginia's Space Flight Liability and Immunity Act requires that

> [e]very space flight entity providing space flight activities to a participant shall have each participant sign the warning statement [that] . . . shall contain, at a minimum and in addition to any language required by federal law, the following statement: "WARNING AND ACKNOWLEDGEMENT: I understand and acknowledge that, under Virginia law, there is no civil liability for *bodily injury*, including *death, emotional injury*, or *property damage* sustained by a participant in space flight activities provided by a space flight entity if such *injury* or *damage* results from the *risks of the space flight* activity. I have given my *informed consent* to participate in space flight activities after receiving a *description of the risks* of space flight activities as required by federal law pursuant to 49 U.S.C. § 70105 and 14 C.F.R. § 460.45. The consent that I have given acknowledges that the *risks* of space flight activities include, but are not limited to, risks of *bodily injury,*

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249 N.M. STAT. ANN. § 41-14-4 (2012) (emphasis added).

250 TEX. CIV. PRAC. & REM. CODE ANN. § 100A.003 (West 2012) (emphasis added).

> including *death, emotional injury*, and *property damage*. I understand and acknowledge that I am participating in space flight activities *at my own risk*. I have been given the opportunity to consult with an attorney before signing this statement."[251]

C. *Possible Effects of ITAR on Informed Consent Information Requirements*

The operative rule for space flight operators is that to satisfy informed consent information requirements it must provide information sufficient to allow a space flight participant to make an informed decision as to the risks of space flight.[252] The information provided to a space flight participant must be material to decision-making and provide enough information to assume the risk of space flight.[253] Under 14 C.F.R. § 460.45, the material information listed includes physical and psychological hazards, technical risks, information related to participation in flight, and safety protocols.[254] Further, § 460.45 imposes a further right on space flight participants to ask questions during the space flight briefing.[255]

The space flight participant can understand these types of information in three ways: oral, written, or implicit.[256] First, information communicated orally enables the space flight operator and participant to have a dialogue about the associated risks of space flight through presentations and asking and answering questions. Second, the written waiver required under FAA regulations and state statute(s) provides methods by which the space flight participant can read, discuss, and comprehend the nature of the activity, as well as understand the hazards and consequences of space flight; the waiver underpins the informed consent requirement. Third, implicit knowledge of the hazards and consequences of space flight depends on the space flight participant. Either a space flight participant enters into a contract with knowledge based upon amateur or professional experience about the dangers of space flight or the participant has little or no knowledge of the risks. In the former case, the space flight participant has an implicit understanding of information that a space flight operator will present to him or her. In the latter case, the space flight operator

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251 VA. CODE ANN. § 8.01-227.10 (2012) (emphasis added).

252 *See* Blasingame, *supra* note 16.

253 *See* discussion *supra* Part IV.A.2.

254 *See* 14 C.F.R. § 460.45 (2012).

255 *Id.* § 460.45(f).

256 HRONEK & SPENGLER, *supra* note 79, at 69; *see* 14 C.F.R. § 460.45.

will be required to make clear through oral and written transmission of information the risks of space flight.

Courts will also look at the issue of adequacy and materiality of information using two different tests. Both federal and state courts have adopted objective and subjective tests—i.e., from the viewpoint of the space flight participant or the operator—on the adequacy and materiality of the information presented to satisfy informed consent.[257] Because space flight operators may launch from multiple states, they cannot necessarily rely on the information presented to a participant to satisfy both federal and state informed consent requirements.[258] Thus, this situation has a large impact on the degree of information that a space flight operator can present to a space flight participant because the information requisite to satisfy informed consent in one jurisdiction might not be sufficient to satisfy informed consent in another.

1. Analysis of First and Second Worst-Case Scenarios

A space flight operator can distinguish the relevancy of the first and second worst-case scenarios because there is no reason to divulge information that does not satisfy informed consent requirements. The types of information that could exist under these two scenarios includes immaterial or *de minimis* information. A space flight operator could disclose immaterial and *de minimis* information provided that any disclosed information is not ITAR controlled. However, it is unclear what would constitute immaterial or *de minimis* information.

2. Analysis of the Second Best and Best Case Scenarios

A space flight operator desires to satisfy all material informed consent information requirements, and to avoid the requirement of an export license for any of the information presented. To some extent, a space flight operator can achieve these goals as part of its duty to disclose to the space flight participant the psychological and physical hazards of space flight. However, the space flight operator faces some doubt with respect to transmitting technical risks, safety protocols, and information related to participation in flight.

First, with respect to transmitting technical risks, and absent analysis on participant cognizance, a space flight operator need only provide the available data on launch vehicle failure and success rates as mandated by 14 C.F.R.

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257 *See* discussion *supra* Part X.B.2-3.

258 *See, e.g.*, Marshall v. H & R Block Tax Servs., Inc., 270 F.R.D. 400, 408 (S.D. Ill. 2010) (requirements not met for class certification under FED. R. CIV. P. 23 because of variations between states' statutes); A-P-T RESEARCH INC., *supra* note 92, at 10-11.

§ 460.45.[259] Depending on how the information is phrased and how material the statistics are, additional data related to performance may require an export license. The best guidance on this issue comes from the Final Rule for FAA commercial space flight regulations wherein the FAA agreed, "[a]n operator only needs to disclose, for example, that a propulsion system exploded, not the details of how the explosion occurred" to comply with FAA's commercial space regulations.[260] When read in conjunction with the general systems description policy under ITAR, a space flight participant could escape the need to obtain an export license if the information in question relates to an item's general systems description.[261] However, if the information relates to an item specifically listed on the USML, a space flight operator should nevertheless obtain a CJR seeking resolution of whether an export license is required.[262]

Next, information related to safety protocols and participation in space flight includes some overlapping elements. Category XV of the USML states that "safety" data related to "launch support activities" is deemed technical data "without exception."[263] An argument can be made that information relating to safety protocols should not be considered technical data by the DDTC because that information is not protected under ITAR or at least should fall under the general systems description exception. One commentator analogized it to aircraft safety noting, "just as the instructions given to airplane passengers seated in the exit row of an airplane prior to take-off regarding the opening of the emergency hatches does not provide them with the information needed to fly the airplane."[264] Because it is unclear whether the DDTC will follow the same reasonable standard it does with military aircraft at air shows, information related to safety protocols may require an export license or exception.[265]

The discussion of safety protocols leads back to the issue of the passenger experience. The information that is un-licensable under the passenger experience includes technical data and instructions for some types of hardware and software on board the launch vehicle.[266] Thus, a space flight operator would need to receive a CJR anyway in order to ensure that disclosure to foreign space flight participants could occur without an export license.

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259 *See* 14 C.F.R. § 460.45.

260 Human Space Flight Requirements for Crew and Space Flight Participants, 71 FED. REG. 75,616, 75,625 (Dec. 15, 2006).

261 *See* 22 C.F.R. § 120.3 (2012).

262 *See* 22 U.S.C. § 2778 (2012).

263 22 C.F.R. § 121.1.

264 Sundahl, *supra* note 20, at 595.

265 *See id.* at 595-96.

266 *See* discussion *supra* Part III.A.

V. Policy and Legal Considerations

Any unauthorized disclosure of technical data listed in the USML would subject a space flight operator to serious legal issues with the U.S. Government. Given recent developments with respect to Virgin Galactic's and Bigelow Aerospace's passenger experience exceptions and changes to the Arms Export Control Act,[267] it would seem that for particular types of technologies, a space flight operator could receive ITAR exemptions. However, space flight operators must use care prior to transmitting information that falls within the scope of the USML. A space flight operator therefore has four choices: (1) seek and wait for a decision from the DDTC for an exemption, a TAA, an export license, and/or pay for ITAR compliance monitors; (2) deny a foreign participant a seat on its launch vehicle; (3) lobby the State Department to transfer specific defense articles that frequently arise in question sessions with space flight participants from USML to CCL; or (4) request that the FAA, DDTC, and/or BIS form an agreement on an interagency memorandum of understanding or process on the scope of the FAA informed consent requirements.

A. Legal and Policy Alternatives

1. Seek a DDTC Decision

For a space flight operator to receive a decision on the scope of disclosure for an item that it must disclose to a space flight participant, it must seek a CJR.[268] This process, while burdensome and expensive, can have two relevant outcomes. The DDTC can take a request on certain USML items and determine whether the space flight operator needs an export license or TAA to disclose the information to satisfy informed consent information requirements, or whether the item is not licensable by the DDTC.[269] In the former case, a space flight operator falls under the second-best scenario whereby it expends resources to acquire an export license or TAA and possibly pay for ITAR monitors to ensure that the operator does not disclose information to a foreign participant beyond the export license's or TAA's terms and conditions.[270] This would limit the international clientele base for the operator, and undercut the purpose of the CSLAA. In the latter case, the operator will probably receive a similar or augmented passenger experience exemption and find itself again in the second best-case scenario, but only after expending additional resources to

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[267] *See* discussion *supra* Part IV.B.2; *see also* discussion *infra* Part V.A.3.

[268] 22 C.F.R. § 120.4; *see also* 15 C.F.R. § 770.2 (2012) (regarding USML items under the jurisdiction of the Department of Commerce).

[269] *See* 22 C.F.R. §§ 126.5, 126.14, 126.15, 126.17.

[270] *See* Blount, *supra* note 20, at 1611.

do so. In either case, this process could require a space flight operator to continually go back to the DDTC for a CJR determination.

Another possible solution is that an operator could seek a CJR from DDTC to sign off on all informed consent materials that the operator has determined, through their legal counsel, are adequate and material to disclose to a space flight participant in conformity with state and federal law. Bigelow Aerospace and Virgin Galactic have attempted this strategy to some effect, if not in the way described.[271] However, this solution maintains the status quo and it would still require a space flight operator to know how federal informed consent requirements conflict with the tort laws of each state in which the operator will launch its vehicle(s). Any change to informed consent requirements, at the federal or state level, or technology upgrades to a launch vehicle will require the operator to continually seek a CJR determination—another second best-case scenario. This process remains inefficient for space flight operators unless USML items specific to the potential disclosure to foreign space flight participants are transferred to the CCL or exempted altogether.

2. Deny Foreign Space Flight Participants a Seat on the Launch Vehicle

ITAR places the space flight operator in the unfortunate position of possibly limiting its clientele base—a worst-case scenario. Allowing foreign space flight participants on board without fully vetting the legal issues would create two legally problematic situations. On the one hand, a U.S. space flight participant could disclose material from an informed consent briefing to a foreign participant without DDTC authorization. If U.S. and foreign space flight participants get two different briefings, then that creates a major source of liability to the operator in that the operator would violate FAA or state informed consent requirements. On the other hand, an operator would be potentially in violation of the terms and conditions of any export license or agreement it obtained from the U.S. government. Without specific changes to informed consent rules, ITAR, or promulgated exemptions, a space flight operator would have to turn away some or all foreign customers who seek to participate in a launch to outer space.

3. Lobby the State Department to Transfer Specific Defense Articles or Services from the USML to the CCL

While it will take some time for the NDAA to be implemented, space flight operators should prepare to lobby Congress to ask for the movement of items

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[271] *See* discussion *supra* Part IV.B.2.

on the USML to the CCL that appear in space systems and spacecraft in common use in or, by a foreign space flight participant on board, their commercial launch vehicles.[272] While Virgin Galactic and Bigelow Aerospace have not stated what the DDTC has or has not considered un-licensable in their respective CJR decisions, only those companies and the Department of State can offer a specific list of items for movement from the USML to CCL. In the meantime, space flight operators do have a process to address whether certain USML items require an export license for the purpose of disclosure to a foreign space flight participant. An operator may ask for an article or service reclassification, a transfer from the USML to the CCL, or an exemption.[273] The NDAA only makes it easier for the President to justify changes to the USML to Congress.

Although NDAA's changes to the AECA loosen restrictions placed upon the President under the NDAA of 1999, specific changes should be requested. For example, under 22 C.F.R. § 120.3, launch vehicles like *SpaceShipTwo* should not qualify as defense articles under ITAR because they are not designed for military use, do have civilian application, and do not exceed performance standards of comparable civil equipment (because no comparable equipment exists).[274] While the national security reviews of USML items related to space flight enabling technologies will include several relevant national security agencies and departments, operators should be engaged in discussions with those entities and ensure that their representatives and their colleagues in Congress will not interfere in item transfers provided such transfers are justified over national security concerns.

4. Seek Inter-Agency Agreements

To sort through the various policy and legal issues present in the tension between export control regulations and informed consent requirements, operators could seek an interagency agreement between relevant agencies on the scope of information about technical data related to space flight enabling technologies. Although a space flight operator could request an interagency agreement, by no means must a federal agency or department pursue such an agreement. If, however, operators request such a decision and substantiate a

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[272] Although one commentator argues that the CSLAA overrides ITAR in some respects. *See* Stotler, *supra* note 20, at 266 (arguing the specificity of the CSLAA overrides the generality of the AECA).

[273] *See* Sundahl, *supra* note 20, at 599, 604.

[274] *See id.* at 591.

need for it, operators could seek three types of interagency agreements.[275] First, the DDTC and FAA could work out an agreement regarding those possible USML items that require a license but should be exempted for the purpose of providing informed consent to foreign space flight participants. Second, the DDTC and BIS could develop a protocol to transfer USML items to the CCL for the purpose of providing informed consent under the CSLAA. Third, the FAA and BIS could also reach an agreement that would possibly supplement any agreement with the DDTC on the scope of licensable items that could be transferred or exempted for the purposes of providing information to satisfy FAA's informed consent requirements under the CSLAA. However, it is difficult to say, *a priori*, which topics and items would be subject to an exemption, and surmise the scope of authority between the agencies. Nonetheless, any agreement negotiated between agencies should include input from the industry either in the context of Commercial Space Transportation Advisory Committee (COMSTAC)[276] or through the rule-making process.

The process by which operators could ask for an interagency agreement could get started under the guise of section 1265 of the NDAA which specifically requires an interagency review of modifications to USML Category XV items (spacecraft systems and associated equipment).[277] Because spacecraft systems and associated equipment form the bulk of launch vehicle technologies, the mandatory review could pave the way for additional interagency agreements. Thus, for the items the DDTC considers licensable, an operator could lobby the FAA, DDTC, and/or the BIS to seek an interagency agreement on the materiality of information an operator is required to disclose to a space flight participant. However, given the pace at which interagency reviews progress, it could be years before a review is completed and any review would include classified components that will inevitably hide what operators need, i.e., information about the extent to which an operator can disclose information necessary to offer a foreign space flight participant a seat on their commercial launch vehicle.

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[275] After inquiring to the FAA on whether it sought out an interagency agreement with the DDTC on the issue of items material to informed consent that could be licensable under ITAR, this author was told that, as of March 2013, no such process has been put in place.

[276] *See, e.g.*, *Office of Commercial Space Transportation*, FED. AVIATION ADMIN., http://www.faa.gov/about/office_org/headquarters_offices/ast/advisory_committee/ (last modified Mar. 14, 2013).

[277] Nat'l Def. Authorization Act for Fiscal Year 2013, H.R. Res. 4310, 112th Cong., 2nd Sess. § 1265 (2012).

B. No Legislation or Regulatory Changes Have Been Offered to Date

As of March 2013, neither a member of Congress nor a federal agency or department has offered an amendment, bill, or a proposed regulation that would limit or exempt items that could affect technical data disclosure to foreign space flight participants. However, the Department of State has offered notices of final rules that chip away at the USML categories that implicate items a space flight operator could end up disclosing to a space flight participant,[278] but it is unclear as to their relevance to the problems presented here. Unfortunately, none of these proposed rules offers clarity as to what items could be exempted because the NDAA first requires reviews of space flight enabling technologies for transfer from the USML to the CCL.[279] Furthermore, the FAA has not waded into this issue since its comments to the final rule for commercial space flight in 2006. Moreover, the NDAA does not authorize the FAA to be included in the mandated reviews[280] and therefore would not be the appropriate agency to lobby or seek a final determination as to which types of technical data could be exempted for the purposes of satisfying informed consent requirements.

VI. CONCLUSION

Suborbital commercial space flight is a relatively new industry and some commentators argue that no accepted practices properly evaluate the risks. Although FAA commercial space regulations have provided some guidance, the general sense is that the problem raises concerns for the industry and the legal community. Such concerns are overstated in light of recent changes in state laws, and the history of space flight in general, because the current state of space flight can be understood with one phrase: *res ipsa loquitur*. Although suborbital vehicles are new inventions currently under various degrees of testing, the dangers of space flight carry over without much variation to the suborbital launch vehicle industry. All those who have traveled or attempted to travel into space on a launch vehicle have been participants in the development of the technology and discovery of the hazards and consequences of space flight. Until the commercial human space flight industry reaches regularity in launching and returning space flight participants safely to a spaceport, it will continue to be an experimental industry. As such, space flight participants travel at their own risk.

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[278] *See generally* Nat'l Def. Authorization Act for Fiscal Year 2010, Pub. L. No. 111-84, 123 Stat. 2190, §1248 (2009) (Dep't of Def. and State's Report to Cong.).

[279] *Id.* § 1261-65. *See, e.g.*, JOINT REPORT, *supra* note 129.

[280] *See* Nat'l Def. Authorization Act for Fiscal Year 2010, Pub. L. No. 111-84, 123 Stat. 2190, § 1265 (2009).

The presumptive denial of ITAR will continue to create problems for space flight operators. Operators will continue to balance the need for an export license in satisfaction of informed consent requirements with their need to seek international clientele. While six states have enacted legislation that mimic FAA informed consent regulations, it is still unclear whether FAA informed consent regulations preempt state law in this area, though that may be the least problematic situation for operators. Space flight operators can offer foreign persons a seat on their commercial launch vehicle subject to limitations imposed by U.S. export control regulations, but if the USML review process under the NDAA runs its course, it could be a boon for some space flight operators but not others. Once the export control issue is addressed, the scope of required information to satisfy informed consent narrows to within the issue of what is material and adequate to satisfy informed consent. This would put operators into the realm of the best-case scenario, provided that there is some agreement on the materiality and adequacy of information that satisfies informed consent. Otherwise, the vagueness of both the scope of information required for informed consent and the scope of ITAR will continue to cause uncertainty in the law at a time when certainty is most needed for the developing commercial space industry.

Alternatively, the space flight operator could just assume the cost of the export license and monitoring and pass on the cost to the space flight participant. However, this is problematic and costly for a space flight operator and participant and will possibly undermine the commercial space industry's ability to grow into a sustainable international market. Without a correction in the law, it may be too risky to offer foreign persons a seat on an FAA-licensed launch vehicle. The legal connections between the FAA launch license, informed consent requirements, and possible export control violations of ITAR controlled technical data require uniformity in the FAA and state informed consent requirements, reform of or exemptions to ITAR, or an interagency agreement with specific regulatory changes as to the scope of technical data disclosure. Otherwise, space flight operators and participants will soon be forced to face both the known unknowns and the unknown unknowns at the nexus of FAA informed consent requirements and ITAR.