

Spring 4-10-2019

Interstellar Travel and Tourism: The Possibilities in the Dawn of the New Face of Business and its Structure

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PATRIAM MINING COMPANY

EASTERN KENTUCKY UNIVERSITY

Interstellar Travel and Tourism: The Possibilities in the Dawn of the New Face of Business and
its Structure

Honors Thesis

Submitted

In Partial Fulfillment

of the

Requirements of HON 420

Spring 2019

By

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Mentor

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Professor of Corporate Communication & Technology

Abstract

Interstellar Travel and Tourism: The Possibilities in the Dawn of the New Face of Business and
its Structure

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Business faces a new frontier, and it is my argument that there is a possibility that business will develop an entirely new structure to face the space age. I will be investigating the scientific, legal, and business structure currently in place and how these structures intend to adapt or may be abandoned in this quickly developing age. This new frontier will affect everyone on this planet, in the environment, technology, business as a market, and life as we know it. This paper explains the science, law, and business issues that must be dealt with before humans can travel and sustain life on another planet. This is a proposed set of laws and business plan for a mining company that would be placed on Mars and used as a leader for all businesses to come after and a foundation for a colony. There is an established history of law that the current law and future law must be founded in and furthered before effective space business can continue. The science portion of the paper explains what current sustainability looks like and where it can go from there. The business plan is the face of how new companies will look when they are interplanetary and require a space office and an Earth office.

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Illustration 1

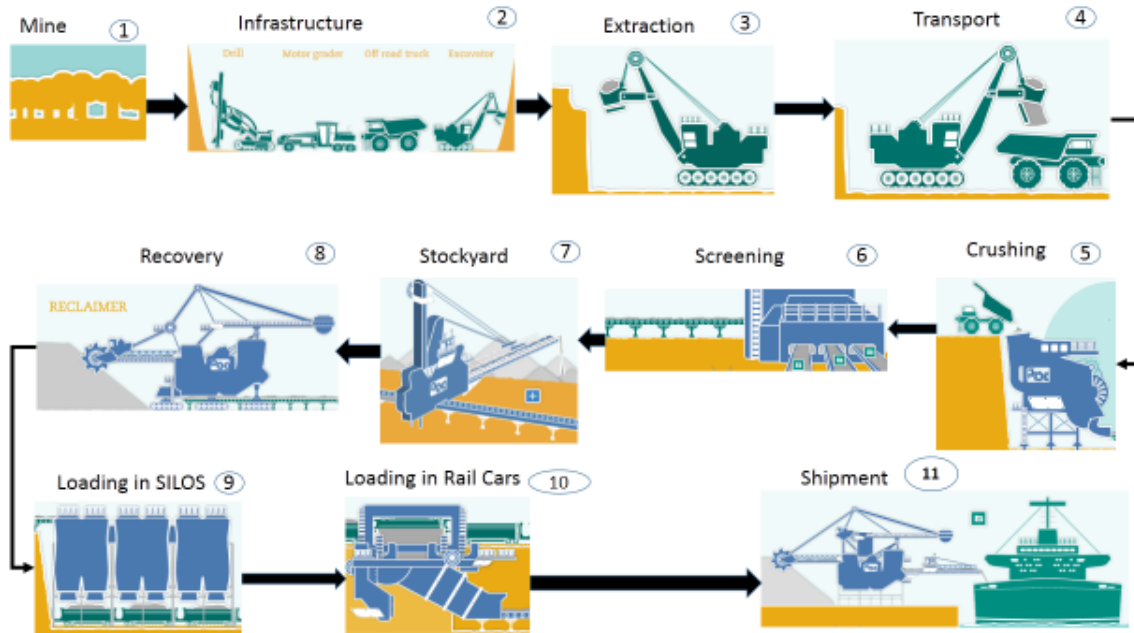


Table 1

<h1>Sales Forecast</h1>				
Industry Sales	Probability of Occurrence	Sales Growth Rate	Totals	
Optimistic	0.4	24%	9.6%	
Most likely	0.2	16%	3.2%	
Pessimistic	0.4	10%	4.0%	
Average Expected Value			16.8%	

Table 2

Income Statement	Year 1	Year 2	Year 3	Year 4	Year 5
Revenue	\$185,153,618	\$191,951,075	\$200,108,024	\$210,304,209	\$223,899,123
Expenses					
<i>Transportation</i>	\$100,000,000	\$75,000,000	\$75,000,000	\$75,000,000	\$75,000,000
<i>R &D</i>	\$30,000,000	\$30,000,000	\$30,000,000	\$30,000,000	\$30,000,000
<i>Equipment</i>	\$10,000,000				
Revenue Growth		3.6713%	4.2495%	5.0953%	6.4644%
EBIT	\$45,153,618	\$86,951,075	\$95,108,024	\$105,304,209	\$118,899,123

Acknowledgments

To my parents, Melissa Farrar and Matthew Barber, who taught me my best was all I could do.

To my mentor, Dr. Lana Carnes, who taught me the sky is not the limit.

To my professors, who taught me they won't remember what you said, but they will remember
how you made them feel.

To my grandparents, for teaching me to fly instead of walk.

To my friends, who never let me give up.

And to my Love, for being by my side every step of the way.

No one does anything without a village of support behind them, thank you all for being my
village.

Literature Review

Law

Getting to Space

Roy Bastelle (2017) analyzes the legal headway made for the commercial suborbital space industry and proposes a solution for the boundaries that have yet to be crossed with the United Nation's Committee on the Peaceful Use of Outer Space. He seeks to define each demarcation previously speculated for astrospace and evaluate them as a group to merge them as one definition which can be determined using his proposed equation. This definition would allow for a clear path to establishing international boundaries not previously created and allow those, in turn, to be enforced. Utilizing the previous historical demarcations of aerospace and astrospace, laws, and engineering advancements, Bastelle creates a framework for his own idea for a course of action.

The proposals that currently exist for a possible demarcation are as follows: geophysical boundary, meteorological boundary, propulsion of vehicles boundary, satellite's pedigree boundary, multilevel frontier boundary, effective control boundary, geostationary orbit boundary, No Present Need Theory, Aerodynamic Lift Theory, Bogota Declaration View, Usque Ad Infinitum Theory, and the Lowest Point of Orbital Flight Theory (Bastelle, 2017). Bastelle suggests that because all these theoretical boundaries exist, it is hindering the process of establishing one universal demarcation, therefore halting the process of all legal guidelines being created because of the ambiguity of the foundation they should be built on. Bastelle proposes his own simple equation to use as a guideline for the demarcation that is altitude + velocity + physiology = potential delimitation (Bastelle 2017, 1048).

His equation is one solution to that problem; there are, however, several other factors that are important such as the space vehicle and the difference between airplanes and astroplanes. Defining those differences to involve lawmaking and the regulation that would follow them is something Bastelle emphasizes. His final evaluation is using the multilevel frontier boundary and supplementing those characteristics of the staggered demarcation regime we can create a legal foundation and a new United Nations committee that focuses specifically on suborbital flights.

Bastelle pulls from each of those boundaries and theories the most important information and compiles them together so that his thought process is clearly visible when he selects the two theories, he demonstrates would be best for creating that foundation. His goal is to push past this area of ambiguity by not just creating a definition that will allow lawmakers a path to the destination but to encourage the industry of suborbital space flight to expand without fear of either legal ramification or legal withholding. There is strength in his layout because it shows he has considered more than just the one theory; he has explored the possibility of more than his solution. Bastelle does not allow for demonstration of his own proposed equation and if it will work to provide correct outcomes every time. Encouraging an international standard is what needs to be done to speed the process along, but proposing an entirely new committee for this specific industry could take an unspecified amount of time which would contradict his idea of getting this foundation established quickly.

Bastelle directly related to this thesis from a legal standpoint. Developing an interplanetary business starts with interplanetary travel. Though Bastelle is concentrating on this travel being suborbital, this legal foundation would also regulate the space vehicles entering and exited Earth's orbit on interplanetary flights. Before humans can truly become space travelers, we must establish guidelines for the area around our Earth and the International borders that lie

within not just the airspace we currently occupy. Bastelle's definition of demarcation is currently the definition I will be using to better classify my own recommendation for Interplanetary Law. He also brings up solid points of the legal system struggling to keep up because of the constant muddling of definitions at the hands of newly developed technology. This is a thorough documentation of the current legal atmosphere that business must work within, in their quest for interplanetary business conquests.

Definitions and Lack Thereof

The comment in the Emory International Law Review by Juan Davalos (2016) is an exploration of the current international regulations and laws and how they have been influenced by single state space programs; he further details the grey areas the United Nations has kept grey and emphasizes why those terms need to be defined to allow for a future that involves regulated space travel. Davalos begins by explaining the current archived international legislation that consists of: the 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (TPGASEUOS), 1972 Convention on International Liability for Damage Caused by Space Objects (CILFDCSO), and the 1974 Convention on Registration of Objects Launched into Outer Space (CROLOS) (Davalos, 2016). The United Nations attempted to regulate some space activities, but they did this in anticipation of a weaponized outer space. Davalos investigated each document and pulled information from each that summarized them but also highlighted their flaws.

None of the aforementioned adoptions were successful in defining the very thing they were regulating. This is when Davalos looked to the national space programs, because the original 1967 treaty allowed single space programs to regulate themselves. Beginning with the

United States he evaluates the launching policy, the registration of the launched item, and the insurance policy for reentry. Then compares other space-faring states such as The United Kingdom, China, Australia, Russia, South Africa, and Japan on the same aspects. Each spacefaring state holds similar policies, some more strict than others. The United States established an International Code of Conduct for Outer Space (ICCOS) (Davalos, 2016). This code of conduct was to ensure that other spacefaring states had a set of guidelines to follow when conducting space travel.

After identifying that all these treaties never defined the terms they used it allowed for a concerned author to describe the problems with this lack of information. The terms are Space Object, Boundary between Earth and Outer Space, Celestial Bodies, resolving the launch state selection process, and Space objects registration. Neglecting to determine what a space object is, in the matter of its being allows for the word to be used as a catch-all for anything from space; this causes conflict when creating new laws for space travel. The Boundary between Earth and Space, having never been officially established is the primary issue when it comes to commercial space travel. Not knowing where, when, or how commercial space flights begin will keep all space vehicles grounded until boundaries can be placed which in turn indicates liability. Celestial bodies are not considered outer space but are areas within outer space, this causes confusion for any regulation to be made for the protection of those environments and who will oversee securing them. The current launch state selection allows for space vehicles to travel from foreign launch states shifting the liability to the launch state when that may in fact not be the case. Finally, the space objects registration cannot be used correctly until space objects are clearly defined.

The terms in the treaties may be ambiguous for the purpose of allowing governments to use the grey area to their advantage. The legal aspect of this thesis will rely heavily on the already adopted legislation and will supplement my own recommendations for laws that should be considered before space travel makes its easily accessible commercial debut. This will also give me an inside look as to what the private companies crusading their way through space must do before they can enter the new field of interstellar business. I will also be analyzing the treaties for my own interpretation.

Hobe in the Cologne Commentary outlines every specific article of the TPGASEUOS and dissects it apart so that it can be examined much more closely. There is consideration brought forth that has been stated many times over, this treaty was made more for limitations for outer space activities rather than listing the freedoms of those activities (Hobe, 2017). The wording of the treaty has come under much scrutiny in recent years because it was created so long ago, and it is now allowing for perhaps, too much interpretation as to the limitations it sets forth. The treaty is so unique in that it did not necessarily create legislation for the environment of outer space it just set rules. We are now at a time that unprecedented legislation must arise and protect outer space. As with all the other literature written about TPGASEUOS, there is an issue with the lack of definition. This is peculiar for such an important document to remain so vague in reading (Hobe, 2017).

Commercial Use of Space

Property law in space is also going to be an issue when we cross that threshold. Erlank (2015) discusses what we could see in the coming years as to how property law is going to be fleshed out on an interplanetary scale. The argument in this article is that there are no current laws standing in place of exploration of Mars there will be in the coming years an issue with

exploitation and that those issues will need to be addressed under correct property law and he proposes how property will be dealt with in space. This argument takes into consideration those same treaties worked through in the Davalos article.

The argument includes three separate sections addressing ownership, characteristics of laws applied to heavenly bodies, and movables and immovables in relation to their definitions in space. Ownership is dictated by the current international law and Erlank seeks to expand on the current law by introducing the idea of creative control and how that will be used. “Therefore, it is proposed that any nation, company or person will be able to appropriate only such a part of a heavenly body as that nation, company or person can effectively control.” (Erlank 2015, 1767). It is this idea that would allow private companies to occupy a portion of any territory in space and “claim” it so that it can be used. This would create a way around the treaties in the Davalos article because not sovereign nation could claim an entire celestial body.

The characteristics of the laws applied to heavenly bodies seek to define those terms that would create a basis for property law beyond the limits of our Earth. Erlank is doing precisely what was done in the Bastelle article by exploring the possibilities once those foundations are defined. Property law in space will be similar to earth in that there will be tangible and intangible space that one can “own” and those definitions will be crucial in setting property law (Erlank, 2015). Human control is an extremely important aspect of property law because of the appropriation that humans have on earth. If the object is susceptible to human control, then it can be deemed property in this sense such as that of a celestial that could be mined in space. Jupiter and other gaseous planets could not have physical susceptibility because of their lack of tangibility. Defining these terms will allow a basis for property unlike any seen before.

The last argument is that of movables and immovables in space. The definition of these things is a critical factor in establishing property laws. “Generally speaking, spacecraft and satellites could be considered to be movables, while a lunar base or a section of celestial real estate will be considered to be immovable. However, celestial bodies such as planets, asteroids and comets are more difficult to classify since by their nature, all these bodies do move.” (Erlank 2015, 1772). As stated, this is a general idea. Those celestial bodies that can be occupied but not moved would be considered immovable. However, Erlank uses the example that an asteroid could be caught and brought to a location for mining which would make it susceptible to humans and therefore classify it as property whereas the existence of it as a noncontrolled body would be just a moveable that was not classified as property. He brings up these points because it is applying property law to space will be difficult especially if there is no foundation in the definitions in their relation to space and the activities therein.

Private property in space has been a highly debated topic for those entities that choose to pursue space exploration. Brehm (2015) does a wonderful job of explaining why the laws in place now are not suitable for privatization of space. No sovereign state can own property outside of Earth so no state can give something away that they do not have. This creates an interesting problem discussed heavily in property law concerning space. Brehm proposes a plan that would allow private entities to lay claim on property within their control after one year of residency on a celestial body or other land in space. “...the right to be free from interference, the exclusive right to appropriate resources within an established safety zone, and the right to sell real property further encourage private space exploration and create strong associated incentives... creates a system that encourages new entities to enter into the field of private space exploration. Increased space exploration across the board would have nearly unlimited benefits

in terms of societal, economical, and technological advancement.” (Brehm 2015, 375). All space law is about creating a way to get people to space in the safest way possible and with the most benefits for everyone involved. This property law would be beneficial to a mining company and then later on to the other businesses or colonies that would come.

The existing outer space law regime is hindering the continued human exploration and development of space (Widgerow, 2010). This comment is right on the nose with current property law in space. The basis on which those laws exist is created without the regard for space at all. Those laws, however, are the only ones that exist and must be amended or abandoned entirely. Private enterprises are developing a lot faster than law can be produced, but before they can ever get off the ground and placed on a different ground, law must create a path.

Ferreira-Snyman (2014) poses important issues in *Legal Challenges Relating to the Commercial Use of Outer Space, with Specific Reference to Space Tourism*. In concurrence with Bastelle (2017), this author first discusses all the issues with the current laws and their lack of definitions or their lack of inclusive definitions. The treaties discussed in Davalos (2016) were written nearly sixty years ago and have gone without an update for nearly forty years. With relation to space tourism, this has a crippling effect on the safety measures in place for tourists. The lack of an inclusive definition in the treaty laying out the ground rules for rescuing astronauts leaves space tourists at a risk for abandonment if they were to run into issues in space (Ferreira-Snyman, 2014). The argument to install proper definitions as amendments to these treaties or creating new conventions all together is the basis of this article. Before space tourism can be properly performed there must be a law set into place to protect all mankind in their pursuits beyond the stars. It has not gone unnoticed that both Ferreira-Snyman and Bastelle were able to clearly identify the issues with the lack of definitions involving air and space travel.

Whether the flights were suborbital or interplanetary these international laws that were in place were not effective in creating guidelines for companies or countries to follow when sending people to outer space.

Ferreira-Snyman also discusses the issues with training and the lack of an international standard. This is more of a scientific standpoint from the issues of the law being discussed. The training is something science is going to have to help regulate and inform international lawmakers of the proper ways of training. The lack of international standards for training for either astronauts or space tourists is an issue where safety is concerned. For private companies, there can be as low as a three-day training requirement or a governmental six-week requirement (Ferreira-Snyman, 2014). Liability is the last major issue in this article. The only liability established is from the Liability convention mentioned in the Davalos article. The liability is primarily for stray parts and rogue satellites that cause damage to other satellites in space. IN relation to space tourism, liability is something that will have to be heavily regulated because of the intense nature of the flights both suborbital and into space. Liability will be for more than the investment of the damaged space satellite it should also include the liability of human life beyond Earth's atmosphere.

New Legislation as a Foundation

No outer space law scholar has gone without remark on the vastly vague wording in the Outer Space Treaty. This holds true in *The Law of Outer Space: An Experience in Contemporary Law-making* (Lachs, 2010). The difference in this work is that the author decided to explain the lawmaking process and explain how they came to the decision to pass this treaty. "In this and in a wider ... it ought to be made clear that principles as enumerated do not constitute a closed chapter. We must welcome what has been achieved and strive for further agreements. The law of

outer space is in its formative stage only. We must proceed with prudence and caretake full benefit of agreements reached ... make them a living reality and continue with our efforts for further agreements ... The draft once adopted by the General Assembly could and should become a document of basic importance for our future efforts to facilitate international co-operation, to regulate and offer protection of law to the great achievement of man's genius in outer space for the benefit of our generation and those who will succeed us". (Lachs 2010, 128). Lachs made the point that the wording of the treaty is terribly vague, but it was not meant to dictate space law in all interests. It is the foundation for which new law will be created and the precedent for which all space law should grow.

As with Lach (2010), Lee (2014) also felt like surpassing the ambiguity of the Outer Space Treaty and offered suggestions of where the possibilities of commercial space flight could go. History is our greatest teacher, and Lee suggests that we use conventions similar to maritime law that will progress safety and regulation to create standards for space flight. "Such a regulatory framework must also be armed with sufficient enforcement mechanisms to achieve uniformity and certainty in the industry, regardless of its financial state and the prevailing international political climate." (Lee 2014, 284). The scholarship of law in regard to space interest has been renewed with the Outer Space Treaty being used as foundation and growth happening from that seed. Lee is doing exactly what Lach suggested.

The discussion of legislation and regulation is something Stephen (2016) talks about in his journal article. There must be regulations made by nations on Earth that govern space activities. As it stands in CROLOS there is registration of objects launched into outer space but there is not a regulation of what is done in space other than the generalities of TPGASEUOS (Davalos, 2016). "The obligation of States to authorize space activities and provide for continued

supervision generally requires the establishment of a licensing and regulatory regime under domestic law, along with a system of enforcement.” (Stephen 2016, 14). That is something that a lot of the other articles in the scholarship failed to identify. There will need to be laws on Earth governing action in space as well as laws in space for space. The other articles sought to argue the laws that would govern space were only for space, not for their counterparts on Earth.

Using soft law as a means of creating more of a guide to the treaties already created is also an option for updating them. Soft law could be a way to introduce new ideas and better feelings about making changes from other countries. “Instead of trying to enact more hard law, the United Nations’ Legal Subcommittee decided to start establishing principles to deal with more specific outer space issues. These policies are a type of soft law. Former Chairman of the Legal Subcommittee of the United Nations Committee on Peaceful Uses of Outer Space, Sergio Marchisio, explained the non-binding aspect of these principles when he stated” (Urban 2016, 46)

[a]s regards to the legal status of these Principles, although being merely recommendations, they can pave the way for the consolidation of customary rules of international law. In this perspective, the decisive element comes from the practice of States prior to, concomitant with, and following the United Nations recommendation process. (Urban, 2016)

These ideas being put into use are the first steps toward enacting the hard law that will need to be created.

Weeks (2012) does a wonderful job of explaining the possibilities in space expansion and pulls together the recent events that have taken place to push for space exploration. Companies

created for the privatization of space are pushing the United States to create new legislation that allows for a more open arena for space. The United States is taking steps toward a space expansion and this author offers insight into what exists and how this can positively and negatively affect the Earth's population as a whole. Weeks' main claim is that humankind can benefit from space expansion. TPGASEUOS was created as a way to keep humans from being too aggressive in space and now new legislation will need to be created to push for a more developed space creating a way for commercialization.

Currently, there is no code of conduct for space that is conclusive. The general guidelines listed in the TPGASEUOS are not conclusive and they were written over 50 years ago. As companies and governments begin to make headway into entering space for an extended period, there must be conduct that is followed internationally. Arbatov and Dvorkin (2010) explains that the larger issue surrounding this conduct is that it needs to focus on the militarization and weaponization of space. These two issues were included when the TPGASEUOS guidelines stated that space was only meant for peaceful use. Unfortunately, tensions have not completely dissipated since the Cold War and when considering conduct in space it should be considered an issue of great importance. There should be no weapons in space. "The COC could be developed conceptually in several ways. One of these, preferred by Western colleagues, involves making a declaration of rather general principles that would evoke no objections and would be acceptable to most parties...The goal of the COC should not be to prohibit outright, but rather to allow the nations to declare their intentions to keep within certain developmental limits and to refrain from pursuing certain kind of activity." (Arbatov & Dvorkin 2010, 73). This suggestion of how the Code of Conduct (COC) should be written is a positive step in the right direction toward pushing leaders to create a neutral and explorable outer space.

In addition to a code of conduct, there have been proposals for a Common Security in Outer Space. This would generally be the organization that would hold all of the nuclear superpowers accountable for keeping all nuclear war out of space and preferably from being used. There is an overall theme in the literature that militarization of space is an imminent threat and it is something that needs to be gotten ahead of. By proposing institutions and laws that prevent these things from happening, it will be upholding the guidelines put forth in TPGASEUOS. “Such an institutional framework will enable the non-proliferation of space technology for active military uses of space on the one hand, and the promotion of peaceful cooperation for civil and scientific purposes on the other.” (Wolter 2006, 188). In pursuing a commercialized space, it must be considered that there will be a sharing of the skies and unfortunately right now that looks like it will be from militaries; no one wants to own a business in the middle of a battlefield beyond proportions known even to Earth.

The Presidents of the United States have made space policies that are an attempt to progress US interests into space. The policies have been aggressive stating that they will not be prohibited by any legislation from doing exactly what they are doing now. This wordage could be considered too aggressive, which would then cause other nations to make a similar statement and pursue a militarized space. The need for new legislation that continues the peaceful use of space is necessary. TPGASEUOS is not updated and lacks the backing necessary to keep space from becoming a militarized zone. This would not only be an issue for inhabitants of Earth but if it were to become an issue, any other business or civilian craft would be collateral in space. That is why Taft (2017) is bringing this issue to life by suggesting some remedies to the rising issue. “The first option, which is more realistic, to address these issues and ambiguities is to amend the Outer Space Treaty... Such an amendment would allow nations to continue to develop space

weaponry and even put that weaponry in orbit, but it would keep space from becoming an active battlefield, a necessity for allowing the continued free research and exploration of space.” (Taft 2017, 376). This option would prove to be effective because it would seek to define the ambiguities that already exist.

One author argues that the US has an obligation to help carry out outer space legislation. That is a large argument, but the foundations are true. The US has an obligation to ensure space law is passed, if not for international interests, for national interests of safety and development. “Congress should reject overly broad interpretations of the scope of activities needing oversight, but so too should it recognize that overly narrow interpretations could be equally illegitimate, especially interpretations rendering the obligation completely meaningless.” (Goehring 2018, 123). This is the guidance that all interplanetary lawmakers should take. There should be no broad and no narrow interpretations that can be made on future legislation. All laws passed should serve a purpose and should encourage development and exploration without overburdening with red tape.

Business

Managing

Managing business in space is going to be the beginning of a whole new frontier. Wheeler (2012) brings to light the same issues that have been discussed for years, the laws preventing businesses from excelling. Wheeler provides and analyzes the previous treaties brought forward concerning International Space Law and how that, in turn, has affected environmental management, commercialization, and human space flight. Unearthed from the archives is the timeline of all the international law treaties and their descriptions.

The main finding in this article is that the treaties, though ambiguous, seek to remain that way as a means of allowing free reign of the cosmos when in truth it could be inhibiting the process. It addresses the counter-argument of should we consider that maybe we should be taking advantage of the non-defined words and explore more before we add layers of red tape to the frontier of space. Wheeler notes the ambiguity and compares the pros and cons of that. She notes that the business side of this argument such as environmental management does perhaps need a more thorough outline of what can be done, for the benefit of humanity. Commercialization also may require more of a definition as it can be used for military purpose. The satellites currently in outer space have some militaristic use making private trading of ownership risky. Then she reviews the idea of human spaceflight and how that absolutely should be considered when drafting reforms.

By using the treaties and their summaries, Wheeler has discussed real problems that businesses are facing because of the ambiguity in these treaties. The author was able to pull out the terms and ask thought-provoking questions about why they are not defined and at what level should they be defined. Wheeler is strong in addressing her own counter-argument by stating that perhaps new reforms are preemptive because the space race has changed so drastically in forty years it could change even more within the next two. As with most of the sources selected her downfall is the time in which the article was written. The outer space articles go very quickly out of date but the recurring theme at this point is the ambiguity that remains in the outer space treaties and the government's lack of revision or adoption.

Business in space even in the eighties was a topic of hot discussion. There was an obvious gap in international space law as there is now, and it was /is an issue. Governments must play a central role in the economic development of outer space, just as they did in the

development of the aviation, shipping, and railroad industries (Goodrich, 1987). Governments are absolutely necessary for moving forward in legislation and that legislation would be to the benefit of businesses in space. There are so many aspects of business in space that will change when it is transported to space. New markets, antitrust, space laws, insurance, etc. are things that will have a completely new face.

The economic makeup of space is becoming very intriguing. Because of the current success in the market and the billions of dollars being made by space exploration companies, investors have taken an interest. “a wider range of investors seek information and access. Leading examples of these include Bryce Space and Technology and an array of investment firms ranging from those focused-on space (for example, Space Angels) to those devoting a small share of their large resources to space (for example, Bessemer and Draper Fisher Jurvetson).” (Weinzierl 2018, 177). This is a tell that despite not having any proof that space exploration will work out, investors are excited. Since the retirement of the NASA Shuttle program, there has been an opening into the economic sector of space like never before. Weinzierl does a wonderful job of explaining why economics will be booming into the space age. All of the historical events that have led space business to become commercial has also carved a path for economics to be a major player in how the frontier will develop.

When bringing investors into the detailed complexities of outer space business that is where public relations comes into play. Public relation specialists, “Our Federal government, particularly the Departments of Commerce and Transportation, and the National Aeronautics and Space Administration, should cooperate with each other and with private sector aerospace and travel and tourism business interests to hasten the creation of a sound and potentially very large space-related business,” O’Neil et. Al (1998) concluded (“General Public Space,” 3).” (Gibson

2006, 31). Public relations are an integral part of business and doing business in space will require the use of that. There must be a public understanding of the space frontier and the people to deliver that knowledge will be public relations specialists.

Commercialization

Meyer (2010) takes a direct focus in the legislation that is currently set for all space activity as it is the only legislation. His main argument is, this is what the laws are saying and what are we going to do about it? Meyer believes that despite what other commenters have explained, there is no need to abandon the already established international space law; he also investigates his own ideas about an adequate solution to the non-specific laws.

There is a method of reviewing historical documents in which he takes time to consider the international law interpretations in contrast to the previous studies and seeks to find interpretations that are flexible. It is concluded that the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies and the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies are both used as the main reference point when it comes to international space law, and instead of destroying those ideas all together he proposed a new idea on how to interpret it to hold enough ambiguity for commercial enterprises to break through. Both documents are clear on the use of outer space for the good of all mankind and for the advancement of all mankind. These at first glance seem to infer that outer space can only be explored and utilized by nations, not private enterprises. The author suggests that the stipulation remains the same, but the United Nations consider developing a state in space that is free from Earth sovereignty and operates for the good of mankind.

By providing all the necessary information from the treaties the author can connect his main arguments directly back to the historical records. Meyer uses the specific wording such as “all mankind” and “common heritage of mankind” to create his own interpretation as to what that could mean for public and private enterprises wanting to explore and exploit the resources of outer space. The strength in the article is that he does not only acknowledge the treaties and their ability to be the foundation, but he also expands on those ideas in a way he thinks the international regime should take hold. The source neglects to consider funding for his supranational district. That remains the sole issue with most ideas of resolving the space authority.

The commercial use of space is not a new idea. Gilliam (1985) writes a foundation can be developed that our ideas are not so far out, and they are not new, these ideas of space being the new frontier spans decades and there have been hundreds of proposals on how space should be used commercially. This article serves as a motivator, because the information in it is now out of date to an extent, all the ideas remain to be good ideas because they represent a push for more research and development so that humans can extend into space. “The commercial development of space beckons us. It is our new frontier, and for the sake of the future of our nation, the continued health of our economy, and the continued high living standards for our citizens, we must grasp these opportunities today while they are open to us.” (Gilliam 1985, 120). That mantra has not changed, those developments are happening now and research and development of business in space is going to be necessary going forward.

Outer Space: A Very Creative Business (2014) is written on how key players are making themselves a name in private space exploration. More specifically the author focuses on SpaceX and Boeing. These companies are giants in the industry as they are the companies with the

largest milestones in space travel. SpaceX has successfully transported cargo to and from the ISS as well as returned a ship from low-earth orbit, the only private company to ever be able to do that (Harper, 2014). Boeing has also been successful in working with NASA as well as other countries around the world. SpaceX plans to enable to place people on another planet to live, that is something no other company is even talking about doing. The significance of the creativity is something that the literature has not taken into consideration. It is a much broader idea than just sending stations into Earth's orbit. The reach goes further, and that plays a very important role in creating new ideas for the coming years.

Pelton (2012) glances at the businesses that currently exist and comprise the new age of space travel. The argument the author makes is that, despite the national government taking a step down from the space platform and the retirement of the shuttle, these are not an indication that the space race is slowing. Conversely, it is getting faster in pace so much so that the old equipment cannot keep up. Pelton investigates the different space programs that are currently in use and private. In doing so, the author can understand the magnitude of the space community. The author is clear on the intent of letting the reader know what the future for space consists of space tourism and commercial flights. There is currently a lot of testing for transcontinental flights that break the sound barrier and how that can influence the ozone layer. There are also private companies selling seats on flights that are some years in the future but will allow people to see the northern lights up close and some that will fly to the moon and back.

While celebrating these great advances, the author also touches on the challenges this may present and what are some things to consider when moving upward. This author also believes there should be some sort of base on the moon that could be for both tourism and commercialization but as an extension of the International Space Station. The weakness that the

author does not consider with that is the amount of money, labor, and law that would follow and the amount of time that specific venture would take. Pelton is very optimistic about the companies both public and private that have taken an interest in space travel as it is easier for private companies to fund space expeditions as opposed to countries trying to fund them. This is opening a new gap in the market never seen before and the author is aware of that.

Commercial use of space will benefit the global economy. Including faster development of useful products, growth of the US economy, and promotion of competition among U.S. firms and among nations (Levine, 1985). Those benefits are more than motivation as a nation to pursue outer space technologies and exploration. Businesses need to push for legislation and lawmakers should also be pushing legislation because of the benefits everyone will gain from space business.

Science

Smith (2013) focuses on what humanity could look like in 150 years. The purpose of the article is to dive deeper into certain scientific matters in space and how they will affect humanity on its trip through the stars. The framework is that of what the selected humans for space exploration will look like. Smith seeks to explain what process will have to be followed when selecting a group of humans to enter outer space and essentially lays out what their timeline for evolution would look like.

Smith breaks down the selection process into simple terms of what the gene pool would look like, in that he discusses the possible negative impacts of collecting that many humans into one place would do, like an outbreak of a disease. In that same aspect, he considers what the gravitation, the air purity, and radiation level could do to humans over an extended period,

during childbirth, and for the following generations. Passed genetics he develops the idea that humans will probably change in culture altogether as the first colonizers did when they came to America. The language will change, the dialect will be its own, and those experiences of people never born on Earth will be far different than that of their predecessors. The evolution professor predicts there will be a clear biological difference within three generations of humans in space and they may not even look like humans anymore as their bodies will change based on their surroundings. These changes will be different if they are on Mars, an orbital habitat of some kind, or in a type of space ark. He proposes three ideas to put humanity in motion to proceed off this planet. The first is to procreate off of Earth's surface so that we can have an idea as to what the possible genetic implications are; secondly, experimenting with human growth requirements off of Earth-like plants and animals, and the third, is be bold in our ambition to branch from Earth because we are on track to outgrow this planet and it is best we prepare now while we have time.

This source is mainly using his own knowledge of evolution. He does back up his genetic theory with the examples of genes that currently exist. There is some basic knowledge and thought process that goes along with what he is saying. Things such as selecting a crew and population from various backgrounds with desirable genes and ensuring things that are required for our sustainability can survive in space is important before launching anyone into space seem logical. The strength is that there are logical arguments in the document about how to go about setting this new age into motion, but the weakness is that the author disregards the laws currently in place that either allow or deny these motions. Smith estimated the generations for which we would see biological differences which may be sort of misguided as they are only estimations for which no research is drawn.

Delgado et al. (2014) seeks to establish the current space sustainability and further elaborate on the possible code of conduct needed to guide space activities so that we may achieve space sustainability. The main argument in this article is that space sustainability needs guidelines. There is an exorbitant amount of space debris orbiting Earth in the LEO and GEO region of orbit that is causing havoc among orbiting satellites. The COPUOS later led to a registration of all space objects launched into orbit so that there was a liability system in place in case this exact issue was to occur, the space debris is causing degradation to the current larger orbiting satellites such as the ISS which can currently not be faulted due to the overwhelming amount of space debris under ten centimeters. This has caused unrest among the space-faring states that are being forced to replace some very expensive equipment because of the lack of liability. This has prompted the COPUOS to assign new committees to oversee these guidelines that will further prevent this degradation.

The guidelines came out of fear that when the lack of liability came to fruition the country that received the damage would begin using outer space as a military zone. There has since been legislation preventing the militarization of outer space alleviating some tension, but the issue of no liability remained. As a result, new guidelines were established. These guidelines were issued to create space sustainability. Delgado et al. (2014) are opening the discussion on how we must ensure stability and safety within outer space because no law exists for property in space. The lack of property law then requires all space-faring parties to act responsibly when conducting themselves in space. The issues presented fall directly on the lack of legislation present for the use of outer space. There is no property law, no code of conduct, and no sustainability effort in use that will help build a gateway for a more complex system of law that will allow responsible practice in outer space.

By use of examples of UN conferences and committees convened it is clear the authors have a lot of support on how this issue is being dealt with. The authors find strength in their examples of all the drafts presented for potential guidelines for space-faring states but fall weakness to the lack of conclusion. The authors do a wonderful job of explaining the issues but fail to present a solution just that there should be a solution. There is neglect in the investigation of how this is immediately affecting the current space-faring states, at this point is apparent those states are not weaponizing outer space; it does appear that the United Nations fear a threat that has yet to appear, that is preemptive, but they also have no solution to the problem.

Delgado et al. (2014) go into more thorough consideration of the committees in place that are attempting to pass a space code of conduct. That is important in my research because a basic code of conduct will come out of the laws created for governing space activities and it is something that I would like to investigate further. The source establishes that there is no current solution to space sustainability and that it should be investigated by the proper authorities. The specifics on how the United Nations is handling the legal issues regarding space is vital to my research and I will be using it to explain some of the guidelines set in place currently.

Ksanfomality (1999) is a complete look at the science behind interstellar travel. The author evaluates the energy necessary for an interstellar expedition both to the nearest star and back. The author used a method previously established by the person he was evaluating that used thermonuclear energy to make the expedition possible. The title itself is the question that the author uses for his main argument. The source found that in 1999 the expedition could not be completed in a single generation's lifetime.

The source provides several equations that spell out the fuel needed for each step of the trio, the acceleration, the breaking down to a full stop at the goal, and the repetition of sequence

when returning (Ksanfomality, 1999). The conclusion was that it could not be done in less than 100 years. This source uses the examples of other, established equations to calculate the potential speed and time necessary for the 4.4 light year expedition. The weakness within the material is that someone who has no knowledge of thermonuclear reaction will be confused reading this as there is no definition of thermonuclear reaction, no definition of the equations and their use, no explanation of the terms used within the equations or their purpose. The strength is that someone with a working knowledge of these equations can clearly see their application and is able to comprehend the math involved. The source neglects to identify the main counterarguments to the claim.

I will be using the source not for the specifics within it but the conclusion that it reached. The conclusion was that it could not be done because of the sheer lack of energy needed to produce that sort of thrust that would allow for quicker travel speeds to the next star which results in the time taken to get to the next star much longer than a human lifetime. When opening a gateway to allow business to go on further than the confines of our planet we must consider the possibility of exiting our own galaxy eventually and looking for other habitable planets that the business of outer space could ultimately take us into.

Establishing some type of sustainability for humans in outer space is absolutely necessary to space travel. As done in the Vizitiu article, the authors talk about developing a competitive scientific and technological sustainability at the national level within the flourishing space sector through the establishment of multi/interdisciplinary collaboration platform between scientific sector and industry in the form (Vizitiu et al., 2015). By creating a platform that can be used and by several nations the ability to reach space and stay there, there will be much more

development. There is also a general international consensus concerning the threats listed and how to deal with them.

Science

Required Advancements

Science has gone leaps and bounds into this century. We could never have imagined the place it is in today. However, now is not the time to stop and marvel. To be able to take that leap into the new age of space exploration science will need to make some new advancements into human sustainability outside of the Earth's atmosphere. To be able to practically live and work on another planet we must have Maslow's Hierarchy of need covered. That consists of:

1. Physiological Needs – air, water, food, shelter, clothing, sleep, and reproduction.
2. Safety Needs - personal security, employment, property, health, and resources.
3. Love and Belonging – friendship, intimacy, sense of connection, and family.
4. Esteem – respect, self-esteem, and freedom.
5. Self-Actualization – becoming one's best self.

(McLeod, 2018)

Science will need to satisfy the physiological needs to achieve successful space exploration. There will have to be studies done on how food will be grown in a space environment both in containment and a study if the process could potentially be replicated on the surface of Mars to facilitate a human-friendly atmosphere eventually. One of the bigger issues is air, how will we be able to sustain enough humans to run a business and provide them with the oxygen to breathe. We have successfully sustained the International Space Station; and if that could be replicated on a facility on Mars, that would be optimal. There will have to be on-going studies on how livestock and other living creatures can sustain in space.

Testing how humans will survive and change on a different planet will be something that science will just have to watch as it happens. We could simulate a Martian environment, but that could border on cruelty if they are still on Earth. Sending humans to Mars and watching how their bodies change will have to be how it is done. In the plan of keeping humans on Mars and creating a mining colony, there is the assumption that eventually there will be procreation on Mars. That is another factor of the physiological needs, how will human's bodies react when giving birth on Mars, everything will be different including gravity and oxygen levels. Unfortunately, there is no way to create these results in a controlled environment.

Science must also consider safety. Before humans can reach beyond this Earth, they may require proof of life and sustainability. It is natural for people to want to know they will be safe if they decide to leave Earth. Human health could change significantly if we were to reproduce outside of Earth. Our DNA could change significantly, we could even need fewer organs or create new ones to survive. Science may not be able to catch up and provide the answers to all the questions before humans start exploring, but science may be able to create answers to those problems by studying the impact of Martian atmosphere on life. There is also safety in resources and knowledge that science will be able to help create resources from Mars that will be important. There are many questions that are unanswered, and science must keep up with the quickly developing age.

Plausibility

There has been a long controversy over the plausibility of going to Mars, colonizing Mars, or even being able to sustain human life in orbit for an extended period of time if not for a lifetime. Humans can live in space, it is plausible. Plausibility and feasibility are the differences

in being able to get humans to space and keeping humans in space. With our current technology, it is possible to send humans to space; and it is also possible to keep them there for a period of time. However, without being able to create proven sustainability practices for Mars, it will take longer for businesses to get off the ground. There need to be active efforts to create permanent sustainability outside the confines of the Earth.

Law

Current Law

The current law for affairs in outer space has consisted of three laws. Those treaties are the 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (TPGASEUOS), the 1972 Convention on International Liability for Damage Caused by Space Objects (CILFDCSO), and the 1974 Convention on Registration of Objects Launched into Outer Space (CROLOS). These laws are beautifully simple, which is either a problem or an asset depending on how you look at it. The problem with these laws is that they are quite vague, they lay out regular guidelines such as a weapon free outer space, all exploration of space must be to the benefit of all mankind, and there shall be no claim of sovereignty by any state. The other laws require spacefaring states to have a registry for items entering space for liability purposes.

Loopholes

The asset of these laws being so vague is that they allow for interpretation. TPGASEUOS is perhaps the most open to interpretation. The basics of the law are as follows:

the exploration and use of outer space shall be carried out for the benefit and in the interests of all countries and shall be the province of all mankind;

1. outer space shall be free for exploration and use by all States;
2. outer space is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means;

3. States shall not place nuclear weapons or other weapons of mass destruction in orbit or on celestial bodies or station them in outer space in any other manner;
4. the Moon and other celestial bodies shall be used exclusively for peaceful purposes;
5. astronauts shall be regarded as the envoys of mankind;
6. States shall be responsible for national space activities whether carried out by governmental or non-governmental entities;
7. States shall be liable for damage caused by their space objects; and
8. States shall avoid harmful contamination of space and celestial bodies.

(United Nations, 1967)

Beginning with number 1, “for the benefit and in the interests of all countries and shall be the province of all mankind,” this statement is by far the easiest for interpretation. The benefit and interests of all countries is a wonderful basis for the business of mining. A mining company would be beneficial in that it could employ people of all nations. The employees would be members of an international community would be representatives of spacefaring states and would be able to be their representatives as the face of mankind. The ability to explore space beyond what was done previously and doing so in a profitable manner by creating a company would also allow for the entire port to develop. All great journeys start with a home base, this Mars base could be the beginnings of a great tool for the human race to use to explore.

“Outer space is not subject to national appropriation by claim of sovereignty,” this statement makes it clear that no nation can lay claim on any celestial body. Which is why in our case would not be what we are doing. We are planning to create a private enterprise, controlled by no one nation, represented by people of many nationalities, and licensed and registered through a committee of the United Nations making it for the benefit of all mankind. The way in

which these laws were written it allows for private enterprises to exploit the range in which they can move without all the governmental red tape.

Number two states: “States shall avoid harmful contamination of space and celestial bodies.” is the last of the statements in these treaties that apply to a mining company. This statement makes it clear that humankind will make an effort to prevent pollution of space. The mining company would be relatively waste-free as they would revert to a settler like a colony that requires very little waste as everything will have to be used in its entirety due to scarcity. There will be an effort to send and use only biodegradable materials that could be used to create other environments to prevent any harm done to Mars.

The 1972 Convention on International Liability for Damage Caused by Space Objects (CILFDCSO) states that the space-faring state that sent the space object into space is now responsible for any damage done by that space object to anything else in space. This was created as essentially an insurance plan for space-faring states to launch objects into space. With this being the only liability plan it allows businesses to extend into space as long as those physical objects are registered. That registry is known as the 1974 Convention on Registration of Objects Launched into Outer Space (CROLOS). This registry is something I intend to expand on but as it stands, it allows for commercial businesses to launch space objects into space with no issue.

Development of New Laws

As shown above, there are few laws in effect today that will be beneficial to the new space race. Space has taken on an entirely new life with the ability to get there becoming much cheaper and much easier to do. Because of this ease of access business are taking a special interest in the new frontier. With the entrance of more than just governments into space, there

should be new laws developed to protect both the businesses and space. With that, I have a few laws I would like to propose.

First, a law needs to be developed for an interplanetary judicial system. Similar to that of the United Nations, it would also work with the United Nations and follow humanitarian ideals. Prosecution would take place on Earth, but the jurisdiction would be extended to the Asteroid belt, the Asteroid Belt is the likeness of “International Waters”. Before a business can transform into space there must be a set of guidelines to follow but there also must be accountability beyond Earth’s jurisdiction.

Secondly, taxation is another issue that all start-up businesses consider; for interplanetary purposes there are none. There is no tax law for other planets. Initially, it would stand to reason that the business’s owner would be taxed in their respective country. The issue with this is that the business would be on an entirely different planet and the regular cost associated with businesses will increase almost exponentially in the beginning stages and could not be scaled properly. There should be a general interplanetary tax law. Currently, the United Nations has no ability to tax the nations that comprise it. As aforementioned the mining colony would be an interplanetary business not claimed by a nation but run privately and by human representatives, so no nation can lay claim to taxing it as TPGASEUOS states that no nation can claim land on other planets or celestial bodies. This would mean the United Nations must tax the business in order for it to remain a benefit to ALL humanity. The tax collected would then go on to benefit all humanity.

Thirdly, there must be employment and labor laws. The International Labor Organization seeks to establish a bare minimum set of rules that every nation must follow. Those consist generally of:

1. Freedom of Association and Protection of the Right to Organize Convention, 1948
2. Right to Organize and Collective Bargaining Convention, 1949
3. Forced Labor Convention, 1930
4. Abolition of Forced Labor Convention, 1957
5. Minimum Age Convention, 1973
6. Worst Forms of Child Labor Convention, 1999
7. Equal Remuneration Convention, 1951
8. Discrimination (Employment and Occupation) Convention, 1958

(ILO.org, 2019)

These laws are the bare minimum that is recognized at an international level. This works for the minimum; but based on the extreme conditions that astronauts will face when working on another planet, it would be my expectation that those standards would be raised to be representative of the sacrifice those first astronauts will be taking when they exit this planet.

Fourth, competition law is something that is practiced by a large majority of nations around the world but there is no international competition law that is all-encompassing. These laws are the basis for not being able to create an unfair marketplace. There is no marketplace for space materials sold by private companies, and because of that, the ability to turn the business into a no competition business would be far too easy. As a business person, I am not entirely against this but for other businesses to make their entrance into space some law must be set. All these laws must go through the UN, through the proposed judicial system and will be created as new law on an interplanetary scale to coordinate the proper use of space set forth by TPGASEUOS.

Fortunately, TPGASEUOS does a good job setting out basic environmental protections for space but as the space frontier because more populated there will have to be more laws

developed. Ensuring that space stays as free from human pollution as possible is in the interest of all mankind. There should be a mandate that all materials sent into space for the purpose of business should have a significantly small impact on the environment and should have the ability to degrade in space if non-reusable materials must be sent. This regulation could be the most expensive and hard to complete because of how little we know of the degradation process in space other than of metals.

Lastly, licensing is the last bit of law I want to touch on. When licensing a business and its patents the business would normally go through its nation. As established, that is not something that can be done in space in order to adhere to TPGASEUOS. With that, I propose that there be a licensing and registration committee be created specifically for the use of outer space commerce. Currently, there is just a liability committee that works in line with the space object registration committee, that will not be enough as we head into the new space age. It would be the equivalent of allowing insurance offices to pass patents.

UN Committee

The United Nations Committee for Interstellar Commerce, Licensing, and Registration is the committee I propose to create as a result of this new space age. This committee would oversee all the businesses planning to head into outer space and handle all of their licensing and business registration through the other committees for liability and space object registration. The committee would consist of leaders that hold expertise in international law, international communications, international business, and outer space experts. There needs to be a committee and office that can log interstellar businesses and decide if they are legally based on the treaties

already in place. This office would also ensure that the businesses are properly handled in regard to labor laws, safety measures for astronauts, and safety for the environment.

I had also previously mentioned a judicial system created for outer space. This committee would be called The Cosmic Court and would handle all complaints brought against businesses and private entities that are in space and commit infraction based on the laws set forth. There will be no need for actual law enforcement in the beginning stages of space exploration because most businesses will have a base on Earth and the complaints brought against them will be able to be judged in front of the Cosmic Court. The use of law enforcement will not be necessary.

Colony Settlers

As can be assumed, this business will grow into a settling colony on Mars. History has shown us that once we expand into a new place, we will eventually inhabit that place. It all starts with a business. The great silk road, the colonization of the new world, and missionaries trekking to every part of the world to spread the gospel, these are examples that all started with a business. The world we have created through triumphs and heartaches is because of businesses growing. It is only natural that when expanding our horizons, we start with businesses. Where businesses grow, a growth of human communities and compassion also grow. I anticipate this business will be the first step in drawing businesses to the Red Planet and creating a new human civilization starkly different from anything created before but all in the interest of humankind.

Business Plan

Executive Summary

Patriam is the dawn of a new age of space business and its structure. No business has been built on another planet before, and that is what we intend to do. This business will not have a traditional structure as it will not have traditional problems and this plan outlines exactly how we intend to tackle these issues. Humanity is vastly outgrowing our planet, at a rate never thought possible; this is a growing problem as our Earth cannot sustain this much life. So instead of looking down on our problems, unlike most humans, we are looking up. Outer Space is our new frontier, and businesses will be the vehicle to get us there.

As most civilizations began expanding on Earth, they were motivated by many things; but at the core of those reasons was business. Spices, gold, or youth -- there was a business to be created in a world far away. Our mining company is that business for the new age of space exploration. Doing as our ancestors have done before us, we are traveling for a reason much bigger than ourselves, we are creating a business that was created decades ago and modernizing it to accommodate this new era. Our market is humanity, our competition has yet to exist, and our team is global.

Within this business plan you will travel to a different world, but find one thing in common with our own, the need for more. This business will be the first of its kind in the global arena; and it will involve every person on this planet, how they view business, and how they do business. Our limitation is currently sustainability, and our stepping stones are the laws currently in place to foster an environment of growth and revenue for all humans. Our dreams of

exploration have not ceased to exist past our planet; they have grown into an entirely new playing field, the business of outer space.

Opportunity

Total Available Market

By creating a spacefaring state/industrial colony on Mars, our total addressable market will be the inhabitants of the Red Planet, but it will also be marketable to Earth-based companies given the value of the exportable goods. Our market reach is something with expansion possibilities as the supply of the export increases and becomes easier to produce and distribute.

Segmented Addressable Market

Assuming the mined minerals are not of extremely rare consistency, the segmented addressable market will be the inhabitants and how they will use those materials to build their environment.

Share of the Market

In inhabiting a new planet, and addressing mainly the inhabitants of the said planet, the share of the market would be nearly 100%, given one company will land and establish itself first. If the goods were to be exportable, the mineral would determine what the share of the market would comprise. If the minerals discovered were to be gold or silver, the market share would then be split to a smaller portion because those raw materials would be exportable to a profit. If the minerals discovered were to be nickel or iron, there would be a much smaller market share on Earth, but a complete market share on Mars.

Key Customers

Key customers, given the least valuable minerals, will be the inhabitants of Mars as they will be their livelihood and means of creating their environment. Given that the minerals are extremely valuable, the customers will be the upper class of society who can afford the Mars Export of the mineral.

The Future

Future products are services. This could go into an extremely long list of possibilities, which is the reason for colonizing Mars. The human ability to expand and explore the Solar System would increase as producing equipment to do those things could potentially decrease if they were already further into the Solar System. Currently, the only known product will be minerals of some facet, the minerals are most likely fewer valuable minerals found on Earth, however until further expedition and mining, we will not know the value of the minerals. The possibility of Mars becoming its own base further into an exploration of the solar system is very high, which would then produce new ways to feed, house, and entertain explorers.

Essentially the future of these services could extend into creating the colony on Mars as its own country, its own market, and economy. Likely it will start as a mining colony, and become a major hub for all space traffic and valuable resources from the solar system. We could eventually see farms producing produce or vegetation that could not be grown on Earth (i.e. flowers, and citrus fruits based on the harsh climate). Mining would be productive as the planet has not been mined by humans and could have untapped wealth just below the surface. Tourism will also be a service created out of this colony as it will give more than just a trip around the

cosmos but more of an immersive experience being on another planet. These separate markets will be created anew on this planet and create their own economy.

Execution

Marketing and Sales

The beautiful thing about this venture is that it practically sells itself. The venture to Mars is an amazing accomplishment, one that has never been done before. The venture would need to consist of nearly 100 people. Marketing this business will consist not only of the work that needs to be done on arrival but also the flight to Mars. Marketing the journey as the first step toward the space age is the most direct course of action.

Positioning

This company offers something no other company will offer, life on another planet. The offer will consist of housing on the Red Planet, a food source, and clothing. As this will be the first company on Mars, there will be no other supplemental activities other than the basic needs for life. We will offer safety and security while working on Mars and offer employee investment into the company by way of stocks. The workers on the planet are the primary consumers for the product that will be mined at the site. As with any new colony, the most important wants and needs will to survive and thrive. With the materials produced the colony, will use them to survive and find creative ways to use them to thrive. The customers after the initial mining will be governments in need of the raw materials and refining enterprises that will use the materials.

At this point, competitors are also preparing for interstellar flight. None have made significant movements to establish a colony on any foreign planet. This company would be the

first to take a step in establishing a colony. Interstellar flight is extremely important; and eventually, those companies would be chartering flights to the Mars colony. The customer should choose this path because their names will be forged into history as the first interstellar pioneers and the first people to colonize Mars. The workers on this planet would be making history, the offer of not only the flight to Mars but also the shelter and life once there is like nothing else on the market.

This company will be the first of its kind, but certainly not the last. By taking this first step toward interstellar travel and tourism, competition will develop, and assistance will become available. The assistance will come from other interstellar travel companies that want to sponsor flights to the one colony on Mars, and it may promote them to begin creating other colonies. This is the step that will begin the second great space race. This company could create answers for problems such as pollution, scarce resources, overpopulation, and an entirely new field of art and innovation. It will create a new way of life.

Pricing

The current bid for a single person flight to Mars is roughly \$500,000 or less (Wall, 2019). There is not much else that can be known about the price of housing until companies make bids to supply the product. This company is expecting to take a loss for the first several years as any company starting up will do. Initial funding will come from private angel investors who also want their name in the history books.

Promotion

Promotion will be done as a type of dynamic job posting. Before we can promote the products that come off the planet, we must promote the life on the planet. There will be qualifications set forth, much like that of military entrance requirements, such as Astronaut training, DNA testing and a Physical exam, and a mental evaluation; education requirements for miners such as a high school diploma, some industrial training or college degree, and preferably some on-the-job experience. There would need to be carpenters and regular laborers.

There will be television advertisements taken out, newspaper inquiries, radio advertisements, and online job postings. By promoting these jobs for people to be, “the pioneers of the new frontier” we will be able to garner international attention. We intend to create an idea that this expedition is the beginning of a science fiction world made real. By presenting the job this way, we can communicate the absolute enormity of the expedition. It is expected that it will pull forth the true adventurers of this world and call to them. There is no competition in the field of promotion, but I feel that introducing the market to something that was once impossible but is now very possible is important. A lot of promotion will need to be informative.

Team and Company

Strategic alliances

Our strategic alliances first and foremost will be with airlines that can provide transportation from Earth to Mars. With the creation of the committee for commercial space travel, there will be designated countries with outer space transportation launch sites. Those launch sites will act as spaceports just on a bigger scale, they will require a large amount of

takeoff space. This is good because all spacefaring states currently have launch sites, the only renovation will be they have to be commercialized. Our first step toward an alliance will be SpaceX, the space exploration company founded by Elon Musk set to take commercialized trips to Mars. This is the only company with specific goals on reaching Mars. They are currently running a revenue of nearly \$1.8 billion. Developing an alliance with them would be mutually beneficial because of our shared company goals of placing humans on Mars.

Virgin Galactic is the next spaceline that we intend to connect with. This company will be able to provide a large bulk of transportation for our workers and customers. The capabilities of this company to transport people will provide a major asset as they too have similar goals as an organization. They want to provide travel for the next generations of space travelers, and that is fundamental to the success of our business.

Blue Origin is another outer space transportation company. They have yet to successfully send a manned rocket to outer space, but they are paving the way for introducing commercial space travel. Boeing is making its head for space as well. This company would be an invaluable asset because of its established customer base and reputation as a trustworthy company for travel. The rockets created by Boeing will provide not only human transportation but also cargo transportation. The key to tourism in the cosmos will not only be the accumulation of people at one destination but the transportation of goods or materials from those places to create a desirable economy for the tourists to visit.

The companies spearheading the accommodations once humans reach outer space will also be necessary as alliances. To create confidence in humans surviving outside of Earth's atmosphere, there has to be an example of how well it can be done. The hotels will also be a good place to house workers or their families once mining operations begin. These hotels would

provide a temporary solution to housing once permanent Mars housing was being created. When we look at Mars from a tourist perspective, the initial tourism component will rely heavily on accommodations outside the planet, these hotels provide that security. These companies, currently, are Orion Span and an ISS-like predecessor called Axiom Space. In concurrence with the hotels, there will have to be travel agencies that provide assistance to this ever-expanding field. This will be the use of Space Adventures, the space tourism company that has existing alliances with other spacelines.

Some of our strongest alliances will be with the space-faring states respective country space programs, the most notable being NASA. Upon creation of the subcommittee for space tourism, this committee would provide a strong bridge to link countries and companies together and create alliances. If we make strong movements to be inclusive with private enterprises, then there is a stronger chance our funding would soar. The more companies we can secure as alliances, the quicker that space tourism will take off.

Distribution

Direct Distribution Direct distribution will go to those companies that are registered through the UN committee to become certified distributors of space material. The law that requires all space matter to be used for the betterment of all humanity must be followed and that will be the responsibility of the UN as they control who the distributors will consist of. Those companies will consist of wholesale mineral distributors and mineral refineries. This is already a market, so thankfully this will only supplement the current market with more product and create a specialty.

Retail Distribution The retail distribution will be based off what minerals are mined off Mars. If it was to yield gold or diamond, then the retail market would benefit greatly from the influx of space luxury. If those minerals that are found consist of less profitable metals, they will still supplement the market; however, their supplementation will just contribute to the less saturated market where we may be facing scarcity. Retail will benefit regardless; the retail sector could go through the same certification through the UN committee to provide correct documentation that what they are selling is in fact material from space and profit off the novelty of it. I personally do not believe it would be required to be certified if the mineral was nickel; it would need to be tagged as other minerals are inventoried as space material in the interest of knowing where inventory was coming from. Space is still a novelty; and because of that, material that comes from space that can be used in a retail setting would be more profitable based on its novelty.

Manufacturers' Representatives Manufacturers' Representatives for this specific industry have not been employed. This would allow for an expansion of the market. It would create new jobs that allow people to become certified in determining if the mineral is in fact from space and how much it is worth. The mining aspect would also need an office on Earth, this would allow for much easier communication to Earth-based distributors, retailers, and manufacturers.

Operations

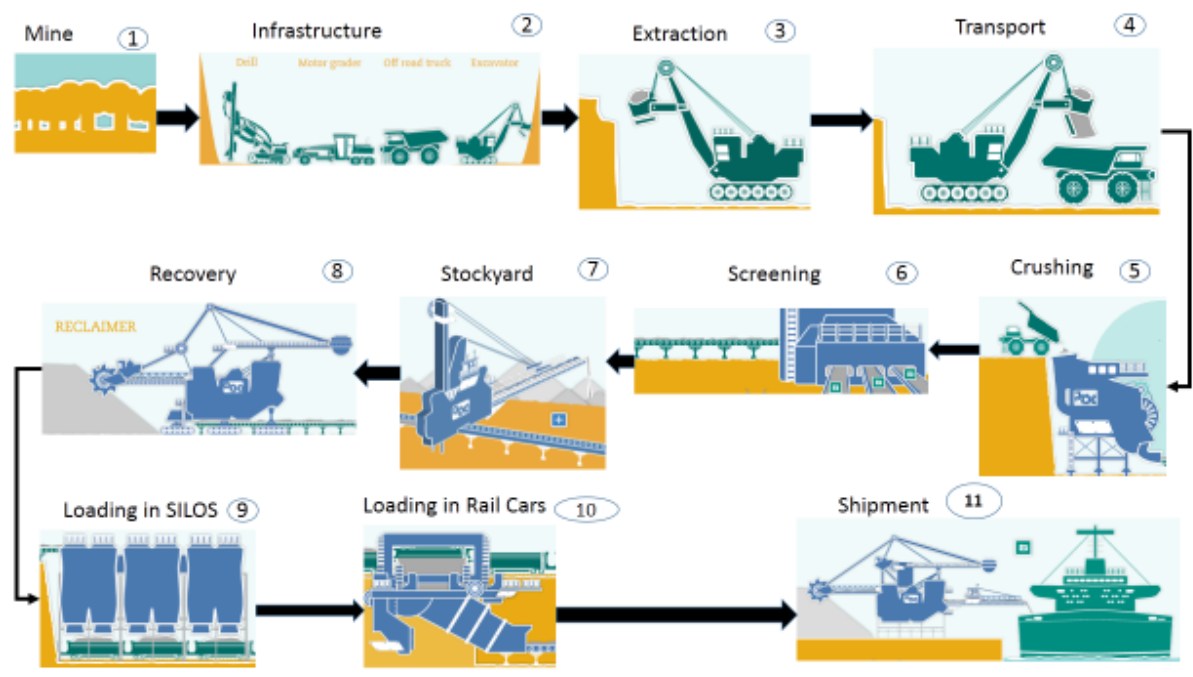
Inventory Management Our inventory will be stored in storage facilities on Mars until cargo ships arrive and can transport the inventory back to Earth. The lack of constant transportation will require storage of the materials until ships can export it, this will not be an

issue because of the amount of inventory that can be moved out per shipload. The first few years of mining there will be a bit of a delay in getting cargo ships to and from Earth. Once more ships become available, there will be a constant stream of material moved out. Cargo ships will be useful as not just an export but an import for goods and supplies for the miners on the planet so the transportation costs will not be in vain; they will be split in half for quantity purposes both importing and exporting.

Another issue we will face will be the transportation time to get to Mars; the average travel time is between six and eight months. As technology develops, the travel time will inevitably decrease, increasing production and efficiency. The transportation of metals back to earth will no doubt be trying but it will be worth it, based on our forecasted revenue.

Production Our Production process will be the same as other mining companies, but we will stumble upon very interesting problems. The mining process looks something like this:

Illustration 1



(https://blogs.sap.com/wp-content/uploads/2014/08/mining_process_515411.png)

For the purposes of a Mars mining company, we would modify slightly steps 9 and 10. The storage of the mineral and metals would go directly into a lighter version of a shipping container and would be stored outside of the spaceport in a bunker that could easily be accessed to move material onto the cargo ship. There will also be modifications to the infrastructure because the material that the equipment is made from would have to be with the metal used for the International Space Station. By investing money into equipment for space, the cost, in the long run, will decrease significantly.

Capacity The capacity at which the machinery can run will be less than that of earthly mining machinery because of the need to preserve it longer and protect maintenance costs from increasing too heavily. The decision to run machines at a lower capacity will be strategic. Our capacity for storage is going to have to be quite extensive because of the travel time between shipments as mentioned previously. Based on demand from Earth there will need to be a lot of storage available, enough to at the very least meet capacity if not more so than originally forecasted. It will be needed before production can begin so that there is a proper storage location and we do not immediately begin having capacity problems with inventory and machinery.

Company

Mission Statement The universe is within our reach, more than ever before. It is our mission to grasp it and take the first steps toward an interstellar community.

Intellectual property *Patriam* will be the name given to the mining company and will be filed with the U.S. Patent and Trademark Office. We will also be developing breathing

mechanisms for the miners while mining, sustainable food production houses, and launch/landing ports for the supplies entering and exiting the planet. We will be filing patents with the appropriate authorities.

A review of the company's legal structure and ownership The company is a corporation that will be filed under US law; however, this company will also register through *The United Nations subcommittee of Interstellar Commercial Activities*, a subcommittee of the United Nations Office for Outer Space Affairs. All the commercial licenses for outer space will be reviewed under this subcommittee and deemed legally appropriate for the use of outer space.

The business location The business will have several offices. We will have headquarters in Orlando, FL. We will have offices outside the main mineral refineries in the US and abroad such as Pittsburgh, PA, New York City, NY, Chicago, IL, and Portland, OR. Along with offices, there will be distribution centers in cities such as Ashland, KY, Minneapolis, MN, Denver, CO, and Portland, OR.

Financial Plan

Funding Requirements

Funding for this expedition will come from private investment sources and government contracts. We understand the funding for this expedition will go well into the billions, but we have no doubt the money will be raised. We will need money for the initial research and development. Fortunately, that research will be used primarily for providing sustainable food sources. We know the effects for astronauts exiting the Earth's atmosphere by past precedent and the effects of remaining outside Earth's gravitational pull. The sustainable food sources will be created in simulated zero-gravity conditions and will consist of growing fruits and vegetables as

well as discovering if any type of livestock can exist in conditions similar to Mars. This company will begin as a private company, outsourcing research and development until sufficient funds are raised to begin employing our own research and development. We are intending to use other companies as a means for transportation to Mars and back. We will require funding for research and development, travel, equipment, and employment.

Milestones and Traction

We have broken down milestones into years.

- Year one: Patents and Trademarks secured, and \$250 million secured for funding from investors. Preliminary research development will be concluded.
- Year two: We expect \$250 million or thereabouts will be raised by investors each year, A successful cargo launch to Mar, Astronauts being attained and trained per protocol with the assistance of NASA and training programs.
- Year three: \$250 million invested to be transferred to payments for one more cargo launch and preparations for a crewed space launch. Final stages of initial research and development will be in their final stages to prepare for sustainability on Mars.
- Year four: \$250 million invested. Developing offices this year close to launch sites. Securing more strategic partnerships this year with the various space travel companies and government registrations. Creating a strong base of astronauts and public support.
- Year five: \$250 million in new investments. Having the final launch of cargo sent to Mars. All astronauts in their final preparation for departure and developing alliances with distribution centers and making contracts for material to be sent back.
- Year six will be the year of the crewed ship to Mars.

Traction We will have no sales on Earth until the cargo from Mars is returned. We will be establishing those contracts with refineries, distributors, and governments to ensure the product will be evenly distributed among spacefaring states.

Metrics We should be experiencing low sales but an influx in investment should be enough to keep the business afloat. We anticipate a very low revenue for the first few years as our business will rely on the cargo sent back from Mars. We will focus on our business's health by measuring the number of investments we accumulate.

Key Assumptions and Risk

Key Assumptions

Our biggest assumption is the backing by investments. Based on the financials of other space exploration companies, the numbers assumed above seem to be fair assumptions. We also assume there will be profitable minerals on Mars, and people will be willing to make an investment in that assumption. We will be successful in sustainable research and development. Our astronaut pool will be large enough.

Key Risks

Sending people to Mars could prove to be fatal. It may take longer than projected to make Mars livable. We may lose investment money if we do not prove to be successful, quickly.

Sales Forecast

Table 1

<h1>Sales Forecast</h1>				
Industry Sales	Probability of Occurrence	Sales Growth Rate	Totals	
Optimistic	0.4	24%	9.6%	
Most likely	0.2	16%	3.2%	
Pessimistic	0.4	10%	4.0%	
Average Expected Value			16.8%	

The numbers listed above in the sales forecast are subject to change and are loosely based on the current market for minerals and their sales growth.

Table 2

Income Statement

Income Statement	Year 1	Year 2	Year 3	Year 4	Year 5
Revenue	\$185,153,618	\$191,951,075	\$200,108,024	\$210,304,209	\$223,899,123
Expenses					
<i>Transportation</i>	\$100,000,000	\$75,000,000	\$75,000,000	\$75,000,000	\$75,000,000
<i>R &D</i>	\$30,000,000	\$30,000,000	\$30,000,000	\$30,000,000	\$30,000,000
<i>Equipment</i>	\$10,000,000				
Revenue Growth		3.6713%	4.2495%	5.0953%	6.4644%
EBIT	\$45,153,618	\$86,951,075	\$95,108,024	\$105,304,209	\$118,899,123

Based on the numbers listed in the table above, we plan to see a decent increase in revenue growth for the first five years. The numbers above are loosely based on current market prices for the minerals already known on the surface of Mars as we will be conducting surface

mining. They were calculated using a general format of sizeable surface mines on Earth and what was yielded from those mines by the ton. It is fully anticipated that these numbers are subject to change perhaps even drastically as new discoveries are made.

Personnel Plan

Our personnel will consist of mostly volunteers for the miners. We plan to have nearly 500 employees on the ground of Mars. These will consist of miners, managers, mechanics, and manufacturers. Supervisors will be in charge of teams of 50 miners. Eight supervisors will be managed by their respective heads of department. Departments will be divided into metals and minerals, so there will be two department heads. Finally, the department heads will report to the Patriam Mining District 1 Chief of Operations.

In the future, we intend on expanding the company so separate districts of mining will be numbered. The first mining district being PMD-1, will be the basis for operations and will develop a housing colony to house the miners and their families. Miners will be given housing, no charge required, stock options, and will be provided food. Until sustainable resources and luxuries can be further developed to accommodate Mars, there will be a communist-like state to control economic development. Within 10 years of being established on Mars, it is our goal to have developed a civilization that will have strong economic development and can be turned into a capitalist structure.

Along with the 500 workers on Mars, there will be headquarters located on Earth with 200 workers that control Informative Technology (IT), marketing, human resources, management, and research and development (R&D). The IT department will have 40 personnel specialized in mining equipment, satellite software, and communication networks; there will be

one overall supervisor for this department. We will have 100 R&D personnel that will be continuously working on sustainability efforts, 5 of which will be supervisors. Marketing will have 30 personnel, with one supervisor. General staff will consist of five to ten people, one being a supervisor. Human Resources will have six department heads covering IT, R&D, marketing, management, hiring for Patriam Mining District 1, and one for the general staff; HR will also have a Chief Human Resources Officer that will be supervising the departmental HR representatives. The C-suite will consist of: Chief Executive Officer (CEO), Chief Financial Officer (CFO), Chief Operations Officer (COO), Chief Public Relations Officer (CPRO), President, Vice President (VP), Secretary; under these people will be the Assistant to the CEO, Assistant to the CFO, Assistant to the COO, Assistant to the President, and Assistant to the VP

HR Strategy

Payroll Payroll will be done by the additional staff hired for the Earth headquarters. The miners on Mars will not be receiving direct pay but will be offered stock options and the money made from these stock options will go into an Individual Retirement Account (IRA) that the company will match annually. The Payroll for the headquarters on Earth will also be handled by the additional general staff and positions will be paid every two weeks. All salaries on earth will be competitive to the industry average for that position.

Vacation Time Vacation time will be given based on merit and experience and will start at an average of two weeks per year for Earth employees. The miners on Mars will be given three weeks' vacation time to start. Vacation should not exceed six weeks per year for Earth employees and should not exceed eight weeks per year for Mars. Sick time for miners on Mars will not be penalized and should not exceed eight weeks per year until more sustainability efforts

are completed and we know the average sick and recovery time in that atmosphere. Sick time for Earth employees should start at five days per year and should not exceed ten days per year.

Maternity/ Family Leave should not exceed twelve months with an average of \$650 per week for 16 weeks. The only requirement is that the employee has worked at the company for 10+ months. The time to take leave before the due date is at the mother and father's discretion.

Education Leave, the employee can take up to one semester for educational leave per one-year period but may drop to part-time until education is complete. Upon completion of degree or certificate program, if the employee chooses to stay with the company, they will receive tuition reimbursement over a 5-year period up to 70% of their tuition cost. There will also be scholarship programs available to employees wishing to pursue a degree in business or space technology. Insurance will also be available.

Exit Strategy

If our optimism is a bit higher than our circumstances allow it to be, we intend on exiting through a strategic acquisition. We believe allowing another company to come in and provide a different perspective is what we believe is best for the business. Patriam is a wonderful idea, but the execution of a wonderful idea is always where businesses falter; we want Patriam to grow and be a gateway for humanity as long as the public chooses to keep it going. There are currently no other companies that are planning such a great step for mankind; but we are sure once entrepreneurship and private enterprises make their way to outer space, there will be hot competition. The first established company would be a no brainer acquisition in the face of such competition.

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