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Investing or doing entrepreneurship in NewSpace? What does that mean? Defining the categories of investment, financing and technology development and why it is important.

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Abstract

Over the past fifteen years, commercialization and privatization of space-related activities have grown. This entails financing and investing from both government and private entities; as well as an increase in the development and use of disruptive or innovative space technologies. The increasing privatization of the space domain has also increased as a topic of geopolitical interest. It has also created the potential for nation-state competition as governments seek to best position their domestic industries for growth. The consequences of this competition may provide opportunities for nation-states to collaborate and experience mutual economic gains as well as generate destabilizing international tension.

As the space domain becomes increasingly driven by the private sector, consistent terminology (or at least a shared understanding of terminology) becomes a key factor in state-to-state communication on space development; in businesses being able to direct strategy; and, in general, for audiences' understanding the benefits of space technology. Yet there is no standard approach to ensure that those in government or private sector (whether in entrepreneurship, investment or policy) have a common terminology to communicate the value of space activities and investment. The terminology that is used to describe those entering the market as players, as well as the technologies or applications they field, varies across community, segment, and national boundaries. This creates significant confusion and, in many cases, erodes academic and market analysis of the space industry. This leads to poor strategic decisions by new entrants to the space-market market and wastes resources (time, people, and capital).

This paper presents findings from a research project that analysed the role of terminology in describing growth in the space domain. When ambiguous and inconsistent terminology is used in conjunction with established and well-defined business terms, it can create confusion and lead to undesirable consequences. Based on targeted interviews with stakeholders, this study seeks to provide insight into these issues and has three primary objectives:

1. Verify that language inconsistencies are occurring in the space industry, and identify significant examples.
2. Investigate and illuminate challenges/points of tension emerging from these inconsistencies.
3. Document these challenges to improve consistency in understanding.

The authors contend that providing an understanding of common terms is important for achieving positive benefits from further commercial activities in space and in establishing supportive and appropriate regulatory frameworks.

Keywords: Space, commercialization, terminology, communication, commercial space, newspace

Acronyms/Abbreviations

EU – European Union
OECD – Organization for Economic Cooperation and Development
ROI – Return on Investment
UK – United Kingdom
US – United States

1.0 Introduction

Over the past fifteen years, the commercialization and privatization of space activities have grown in scope and significance. These activities are growing in importance as an element of national economic policy and as a sector for financing and investing interest. Technology leaders and governments are using space more than ever to develop services and applications that will expand human activity, improve the quality of life on earth, and generate capital growth. However, the terminology that is used to describe the energy and activities of those involved in commercial space activities varies across community, segment, and national boundaries. This creates significant confusion, and in many cases, erodes academic and professional business analysis of the space industry. This leads to poor strategic decisions by those entering the market and ultimately wastes resources such as time, people, and capital.

This paper reports findings from targeted interviews aimed at understanding the challenges posed by vague and ambiguous terminology used in an increasingly complex, commercial space sector. The interviews indicate that the definitional ambiguity - stemming from different contextual applications and meanings - has led to confusion in policy, business, and investing situations. As more state and non-state actors pursue activities in outer space, this ambiguity may have profound political and legal consequences for commercial actors and state sovereignty. The most immediate and key underlying challenge for the space industry, however, is that the term, 'space,' does not readily convey value.

2.0 Motivations, Objectives, and Methods

2.1 Motivations & Objectives

Commercial activities in the space domain are becoming accessible to a wider variety of actors, a trend that will continue to become important for global sustainability and economic development. In an emergent environment such as this, having a common language for business practices is crucial for shaping the way the space domain develops and engages new stakeholders. Stakeholders are actively trying to encourage successful and sustainable models to promote further development. However, what makes these models successful is not always well-understood and is often described in broad, non-specific language. The space community faces challenges in communicating value within and beyond the space sector, in part because the word 'space does not convey any particular product, service, or resource, and because space in and of itself is already confusing and complex.

Terms such as 'newspace' and 'commercial space' are widely used but appear to mean different things to different stakeholders and in different contexts. The creation of new terms leads to inconsistent definitions and understanding. When ambiguous and inconsistent terminology is used in conjunction with established and well-defined business terms, it can create confusion and lead to undesirable consequences.

This study seeks to provide insight into these issues and has three primary objectives:

1. Verify that language inconsistencies are occurring in the space industry, and identify significant examples.
2. Investigate and illuminate challenges/points of tension emerging from these inconsistencies.
3. Document these challenges to improve consistency in understanding.

2.2 Methods

The findings presented in this paper are based on targeted interviews. The interviews were complemented by a literature review consisted of a mix of academic, trade, and popular press sources. Interviews were conducted with stakeholders representing a range of roles within the space economy. Participants were predominantly from the United States, but also include stakeholders from the United Kingdom (UK), Japan, India, France, China, and Canada. Interviews were conducted with investors, industry professionals, entrepreneurs, analysts, government policymakers, and trade association representatives.

Table 1, below, is an outline of the interviews conducted for this research, categorized by profession and country of operation.

Table 1. Interviewees by Role and Country

Sector Roles	Base Country/ Regions
4 Investor	1 Canada
5 Analysts	1 China
5 Government - Policy	1 EU/ India
6 Industry/Entrepreneur	2 EU
4 Investor Relations and Advocacy	3 Japan
3 Industry/Business Development	2 UK
2 Industry/Engineer	13 US
3 Trade Association Rep	9 US/Global
32 TOTAL	

Throughout this analysis, we use the intentionally broad term 'space enterprise' to describe both activities and companies operating within or utilizing the space domain. We do this based on dictionary definitions of the term 'enterprise': A: a project or undertaking, typically one that is difficult or requires effort and B: a business or company. We use this term to distinguish between space companies and space activities on multiple occasions. Whenever we want to discuss both at the same time, we will use the term "space enterprise" to include both concepts.

2.3 Summary of Findings

This project finds that significant terminological inconsistencies exist among stakeholders in the space community. While many potentially problematic terms exist, 'commercial space' and 'newspace' readily presented themselves as strong examples of inconsistently used terms that create tension points in the industry. Both terms also highlight a key underlying challenge for the space industry: conveying the commercial value of the space domain.

Terms such as 'commercial space' and 'newspace' can be useful for simply conveying that there is value in space enterprises. However, confusion over varied definitions creates obstacles for communicating value. These obstacles present themselves in the form of tension points arising from different contextual meanings - and the implications of those meanings to different stakeholders. As different stakeholder groups adopt terms such as 'newspace' and 'commercial space,' they use the same words to communicate across the sector, but the same message is not always being received.

The interviews conducted for this analysis document several tension points that arise from this miscommunication. Tension points are instances where divergent understanding or applications of terms (and the imbedded concepts) manifest in conflicting action or negative impact on industry development. These tension points are largely based on the types of value that the user is trying to convey. Based on these interviews, we provide an outline of key factors that industry professionals identify as being important for describing the value of a given space enterprise. By presenting these factors, we hope that they can be used to improve clarity in communication between stakeholders.

3.0 The Vast Emptiness of Space

While this research revealed many potential communication challenges, it quickly emerged that the root cause is the word 'space' itself. There are many issues with the word 'space,' and at the most basic level, there is not even a legal consensus on where space begins. There is also no consensus on where the boundaries of space as a domain of commercial activity exist. Space is not a resource, nor a type of business. Space may be an area of operations, a place to do business – but it is not an industry segment itself. Consequently, 'space' does not convey any value or particular commercial potential.

In general, the term 'space' carries a lot of meaning. Owing to NASA's high profile, for many individuals the term 'space' conjures images associated with civilian space exploration, evoking feelings of imagination and inspiration—not economic return or commercial value. Although this inspirational aspect of space is a necessary stepping stool for space entrepreneurship, it does not convey associations with the strategic and economic value of outer space. This is amplified by the role of space in education by the efforts of a variety of space actors to bring attention to general audiences about space. Consequently, defining 'space' as an industry or economic sector does not make intuitive sense.

Current discussions have largely coalesced around the distinction between the space 'sector' and the space 'economy' [1-3]. The space sector is generally intended to identify enterprises in which the direct production or operation of space-borne assets is the core focus, and is commonly split into upstream and downstream segments. Conversely, the concept of the space economy is far more inclusive and includes secondary industries that utilize space technology as a means to an end. But according to our interviews, boundaries around these concepts are applied inconsistently, making it difficult to fully understand the current state of either the space economy or space sector.

The increasing diversification of enterprises that comprise the space economy has given rise to a challenge in disaggregating such activity within national and international industrial classification systems [4-7]. Specifically, space-related activity across different classification systems are inconsistently aggregated within other disparate and broader classifications of activity, such as 'aerospace', and there is typically no clear "space activity" subcategory within these systems [8]. It is important to understand how space fits - or does not fit - within economic classification systems, because as the space economy grows, consistent tracking will be increasingly necessary to underpin analyses.

While industry analysts and economists actively consider the industrial classification issue, today's

investors and business leaders face an immediate communication challenge. Interviews reflected a perception that association with space has the effect of catching people's interest and in starting conversations - a theme that ties back to the inspirational nature of space. According to one representative from a non-US government: "*the word 'space' has the power to attract people*." A U.S. private space sector business development executive responsible for sales to clients from non-space industry segments reported that a space connection makes introductory conversations easier: "*and so, they are talking just because space is cool.*"

However, despite the seeming value of the term in attracting attention, consistently throughout the interviews both investors and entrepreneurs expressed concern that the use of the term "space" to identify a sector of interest and potential for the investing community is, at best, too broad to have any value or use and is, at worst, confusing and off-putting. Selected impressions collected during interviews are shown in Table 2, below. These stakeholders expressed a need to move beyond the use of 'space' in investment-related conversations, towards instead describing the activities of a company in more industry, application, or customer-specific terminology. Typically, when 'space activities' are expressed in a business/enterprise context, this activity falls under either the space industry or the space economy. Opportunities for miscommunication (especially across diverse stakeholder groups) arise when an enterprise is inconsistently or inaccurately communicated through one of these lenses, as each comes with specific business model characteristics and concepts. These concepts and characteristics are further discussed in Section 5 of this paper.

Due to the difficulty of communicating value with the term "space," terms such as 'commercial space' and 'newspace' are often used to describe new value propositions for the space domain. However, we find that there are also various definitions of 'commercial space' and 'newspace', largely based on the types of value that the users are trying to convey.

Table 2. Interviewee Impressions of the Term "Space"

"space" is...	**Investors**	**Entrepreneurs**
Too broad	"Ah, it's so broad to be useless. So the problem is, if the person you're speaking to, doesn't really have a framework to be able to see where it fits, um, mostly because people aren't exposed to it." - U.S. Venture Capitalist (1)	"I believe that, you know, if to say you're a space company, you kind of don't communicate anything at all…you are communicating nothing because space, is not a product or a service or whatever." - International Entrepreneur (3)
	"The space sector is kind of like saying I'm in technology. It could mean anything." - International Venture Capitalist (2)	"Space is too nebulous, right?" [Concerning sales to non-space industry companies] - U.S. Business Development Lead (3)

"space" is...	**Investors**	**Entrepreneurs**
Off-putting or Confusing	"Two weeks ago we were in Bahrain, and the first confusion point was space. … A lot of the folks, thought were talking about space like WeWork." - U.S. Early Stage Investor (5) Different "definitions and association[s] and connotation[s] between people who are deep in the space industry and people who are not. in the sense where maybe we use a word or phrase or something within, within space, that is used very differently externally" - U.S Early Stage Investor (9) "Space gives the impression that it is going to be a long time before any return on investment. It's a knee jerk reaction." - International Venture Capitalist (2)	"Also a lot of times means that you're only going to be able to do space-familiar investors, you know, investors that have done it in the past or are looking to do it now. It's very difficult to convert a non-space investor to a space investor" - U.S Start-up Founder (6) There is a need to show "I'm not just a space nerd that, you know, wants to spend people's money so I can play around space" - U.S Start-up Founder (7) "The kind of anchoring point that lots of people have about space is NASA and NASA is, you know, supplied by legacy aerospace firms. And when you describe that industry relationship, the very vertical relationship, then there's not really a place to talk about entrepreneurial and innovation activities." - U.S. Space Advocate (8)
Lacking specifics	""I think that it would immediately require, further elaboration to specify what it is that the company really does. Are you going to space? Are you leveraging space-based data? Or are you generating that data? Do you ever return to the ground or do you stay in space? Are you doing interplanetary or are you just staying in Earth orbit. Just calling something a space company doesn't answer any of those questions. And it sets the expectation that okay, this person is doing something in regard to outer space or somehow leveraging space resources. But it doesn't specifically state how or why." - U.S Early Stage Investor (9)	"I mean, at the end of the day, you can call yourself whatever, you know, nobody, no investor cares about what you call yourself, right? It's, what is the value that you are building that they care really about?" - International Entrepreneur (3) "I think it all really comes down to that industry-specific terminology. The more I talk to investors, the more I use these kind of similes ... just because it can pre-empt so many questions and you know, it makes it a lot clearer." - U.S Start-up Founder (7)

4.0 Communication Challenges Related to the Terms 'Commercial Space' and 'Newspace'

4.1: Definitional Factors for 'Newspace' & 'Commercial Space'

The definition of 'commercial space' has been debated for over a decade [9]. However, as our interviews indicated, a universal definition has yet to be adopted. Interviews also indicated that, in practice, there is still no universally accepted definition of 'newspace.' Moreover, its range of usage has made it resistant to a firm definition.

Most interviewees agreed that 'commercial space' refers to non-government space activities and actors. However, what that meant in reality varied in significant ways. The main differences stemmed from two key points. The first being to what extent a government can be involved in a commercial space enterprise, whether it be through funding or as a customer. The second point being whether commercial space pertained to the conceptualization of a Business-to-Business ('B2B') and Business-to-Consumer ('B2C') space economy, or referred to establishing a competitive procurement environment for government-led space programs. Selected definitions offered for 'commercial space' during the interviews included:

- "*There's several different definitions I've used [for commercial space] before. The one that I always go to is the intent for the [company]... Why does the company exist? And if the company's intent*

was to be a commercial company and its goal is to have the majority of its revenue coming from other commercial entities or individuals, then it's commercial." [an US-based investor]

- "*If they sell only to the government, in my mind, they're not really a commercial space company...to be more specific, if they're selling to a government agency using the federal acquisition regulations where it's that type of highly regulated government contracting environment, then I would not consider that a commercial company.*" [Industry consultant]
- "*I would say, if you look at it on the basis of revenue and who their revenue comes from... Commercial is business to business.*" [Industry business development representative]

Some interviewees suggested that 'newspace' and 'commercial space' meant the same thing, while most considered them to be different. In general, there were some broad aspects of what 'newspace' referred to that were predominantly agreed upon. Most agreed that 'newspace' referred to a change in the way space activities are conducted. There was also a general agreement that moving from cost-plus to fixed-price contracting is a key underlying principle to the newspace concept. Beyond that, however, definitions varied considerably. There was a strong association with either start-ups or a start-up mentality. Selected definitions offered for 'newspace' during the interviews included:

- "*I would say that it's, that group of startup companies, this completely new way of doing business with a Silicon Valley startup mentality that has never been possible before in the aerospace industry. Cutting costs, cutting time to product delivery, and really putting the way space is done down on its head.*" [an investor]
- "*I would say that it is not a who but a what that defines newspace... Boeing and ULA are trying to do newspace activities and I wouldn't say that no, they're too old and too big and they don't count. I'd say in particular it is people who are using modern off-the-shelf hardware to make cheap...products that utilize space and, you know, that might be disposable or semi-disposable or have a shorter lifespan; and who are applying this kind of Silicon Valley-ish start-up thought to it.*" [an entrepreneur]
- "*So in [our government] when we use [newspace], we're tending to refer to the increased kind of commercial ownership of space programs. So old space being the big institutional players, newspace being, you know, funky little startups doing mini-constellation missions.*" [Non-US space agency]
- "*I see it as the same as commercial space. I hear it all the same. I hear no different meaning for space 2.0 or space 3.0 to new space versus old space, which was government when newspace now is private and commercial."* [Investor]

Further discussion of definitions for 'newspace' and 'commercial space' arising from this study's interviews can be found in the Secure World Foundation publication "The Terminology Challenges of Communicating Value in Space Enterprises: Summary of Findings." [10]

4.2: Tension Points Around 'Newspace' & 'Commercial Space'

A consistent theme in the interviews was a perception of a current government emphasis on – and a general preference for – commercial space. Interviewees described the current use of the word 'commercial' as a buzzword in government policy and regulation. Interviews also noted that inconsistencies in uses of the term in government – both inconsistencies domestically in the U.S. and in differences in different national contexts – are creating points of potential confusion. Sources of confusion around the term 'commercial space' start from the perception, as suggested by a mid-level manager at an established American aerospace company, "*there is a push from the government to commercial that is seen as very favorable*." This preference for commercial space is seen as focusing on creating capabilities, that can both support government space programs needs and serve markets beyond (and in addition to) government use. As one U.S. government space agency employee says: *"So for example, if you say it's a commercial space program, people ask, well, what commercial revenues are involved? And they'll assume that there are commercial revenues and in actual fact, sometimes that's not the goal of the program. The program is to create a capability."* This demonstrates that in certain contextual applications "commercial" is seen as a means to desired end, but it is the capability outcome that matters, not the economic nature of the activity.

Governments are trying to leverage commercial capabilities, but there is confusion about what those capabilities are, and how they relate to investable markets. An American, early-stage space-sector investor states: "*I think a lot of the space agencies don't realize that there are commercial opportunities...they really don't have the perspective to see what's commercializable or, investable.*" Language may be used to describe something as "commercial" when in reality the downstream market potential is unknown. A U.S. trade association official states: "*what do they even*

mean by commercial when NASA says they're going to use commercial services for some thing or another. There's some frustration on, some companies' parts about what that perception of that word means versus the realities of the industry." Anecdotal reports collected during the interviews – in particular expressed by space industry analysts in both the U.S. and Europe – also suggest concerns about creating specific policies to promote commercial capabilities (as opposed to the traditional contracting model), when the sustainability of those commercial entities, services, or practices is unknown and there's no common understanding of what is meant by commercial.

The interviews also indicate a tension point between identifying (or labeling) as a government contractor as compared to a commercial space company. There are incentives to identify as a commercial company, as a US government space sector employee states: "*You want to project the idea that you are doing commercial activities and you are going to lead to commercial revenues, when in actual fact maybe the only actual revenue you have currently is a government contract for R&D.*" This identity has implications for how investors and customers view a company. Several interviewees argued that a commercial company and a government contractor are ultimately very different business models. As a business development executive at a U.S. space-related services provider stated about the term "commercial space company" including a range of different company types: The term includes *"the large contractors that get paid to develop versus private companies. [The private companies] have to take risks on their own, bringing into the market and hope that they understand what their marketplace market demand and needs are before they generate revenue. There's not a right or wrong, but they are different. The term [commercial space company] is just used in a very lackadaisical way."* Some interviewees reported the unclear delineations and self-identity between commercial space companies and government contractors are confusing within the investment community. Others indicated that it makes a difference in decisions on where to invest. One of the early-stage investors interviewed indicated that "*we tend to stay away from companies that looked like a dominant part of their business model is based on a government contracting or at least in the younger stages.*"

By contrast, the tension points identified by interviews related to the term 'newspace' almost uniformly related to industry and investor perceptions and use of the term, rather than governmental or policy use (only a few interviews mentioned policy connotations of the terms). The most frequently referenced tension points related to three areas: 1) utility of the term as a marketing tool 2) investor impressions of the term and its connotations 3) tribalism and divisiveness related to the term.

Many interviews described the usage of the term 'newspace' as an attempt to collectively describe and identify a group of companies in the space sector that is believed to have a novel and disruptive operating approach and model. As a company the term can be used to identify oneself amongst a group of actual or aspirational peer companies. An early-stage start-up founder interviewed for this study reports that a "*reason I use the word newspace is because that's what pops up in the media. That's what journalists use to call it. And if an investor for example, has not heard newspace, I can kind of tell them what it is and then they Google it and it pops up like, hey this is what newspace is… And so I use that term because that's what people use to refer to companies like Planet and Spire and Blacksky and, and you know, all of these companies and what people use to refer to this burgeoning startup market and commercial space."* The same entrepreneur also uses the term to describe the firm's target group of prospective customers in conversations with investors.

However, there is a risk associated with corporate branding identity around 'newspace'. A significant number of interview subjects – including professionals from established companies, start-up entrepreneurs, industry advocates, and investors – noted a history of promises and potential from self-identified 'newspace' companies with only a limited historical track record of success. This is correlated with a certain degree of skepticism around the 'newspace' branding. The interviews conducted for this study suggest the delivery on promises is a key challenge for the continued utility of the 'newspace' term for positive branding value – or it risks becoming a negative brand.

Investors also fell into one of two perspectives on the use of the term 'newspace' in the context of investing decisions: A) expressing a position that the term is useful to distinguish or identify the general types of companies that they are interested in tracking for potential investment or B) use of the term by a company (or investor) makes them skeptical of that company. One U.S. based venture capital investor described 'newspace' as a useful term for providing a categorization of companies in the market: "*We are only investing in commercial companies, we don't invest in government, so that's great. But we've got to break it down further, we need more granularity...*" By contrast a founder of a space start-up, who is also involved in advising space-interested venture capitalists states "*the investors that make newspace like a front and center part of their branding, of their thesis...the more I do*

diligence on the founders of those funds and the people that are involved in all those, the less I respect the fund, the less I believe in the viability and the less I want to be affiliated with that group."

Consistently throughout the interviews, people referred to tribalism and divisiveness that stem from the 'oldspace' vs 'newspace' connotation that related to the term 'newspace'. Some interview subjects - predominantly from the entrepreneur space community - expressed the perspective that the term 'newspace' is a pejorative. As a start-up founder and venture capitalist advisor explains: "*Newspace, usually framed in the context of newspace vs. oldspace, which then makes oldspace a term that needs to be dealt with as well. Over the course of the last two or three years quite frankly, I cut both words out of my vocabulary entirely and I urge other people that I work with, or people that I am advising and mentoring to do the same because of the connotations, the negative ones associated with new space and oldspace*." Established companies may feel that the term 'newspace' implies that those established companies are not a source of innovation and technological achievement; while other companies may seek to take advantage of a perceived bandwagon effect associated with the term. Some interview subjects expressed concern the divisive aspects of the term may have e negative impacts on knowledge transfer in the space industry, by accentuating generational divides. As a CEO of a company in the satellite industry stated during the interview: "*We have a generation of people coming through who see themselves as newspace versus oldspace and then not listening to the old timers. They're losing those lessons learned…[They are] unintentionally tripping over their own naming and it's turning off a source of information and experience that they desperately could draw upon and desperately need*."

Despite the above tension points, a significant number of interview subjects described the overall prevalence of the term 'newspace' as declining in either use or connotations (positive or negative). The impression of nimble innovation and market focus that that term was originally coined to convey may be increasingly subsumed into the colloquial usage of the term 'commercial space' in today's space community parlance.

5.0 Addressing Communication Challenges

Due to the difficulty of communicating value with the term space, terms such as 'commercial space' and 'newspace' have emerged to describe value propositions for the space domain. Yet, even with these relatively common and basic terms, the complexity of different contextual uses and understandings is significant. These terms are intended to be used to increase clarity about the existence of value propositions in space. Yet, throughout the interviews, it was clear that stakeholders are attempting to convey a wide range of concepts that are implicit in their usage of these terms. Assumptions are made on types of value that are included or not within the assumed definition of a particular term. When these assumptions do not match between individuals, the tension points discussed in the previous section emerge.

When discussing why individuals used words such as 'commercial space' or 'newspace' to describe a space enterprise, it became evident that there were several collective underlying concepts of value that they wanted to understand or be understood. These value concepts emerged as either being ideas that were priorities for the interviewee's communication strategies, or were points of lacking clarity that frustrated the interviewee. By recognizing and more clearly articulating the value concepts of particular space enterprises these assumption misalignments can be more easily bridged. It is important to be aware these gaps in understanding.

Based on these interviews, we identified eleven key concepts that are contained with conceptual usages of the terms 'space', 'newspace' and commercial space.' Each of these represents a potential areas of confusion or miscommunication. Each of these concepts are implicitly considered within individuals' usages of terms, yet this implicit understanding is not common across stakeholder groups.

Table 3, below, presents these value concepts in detail. The significance of each concept is defined. Below each concept are lists of the potential variations of these concepts that can be applied to a given space enterprise. There are numerous possible combinations of these conceptual factors that could technically describe a space company or activity. So it is no surprise that a handful of terms are inadequate for communicating these ideas with any certainty

Table 3. Concepts for Describing Value

CONCEPT: Customer Base / Source of Revenue

Description: Customer base/source of revenue is significant for decision-making by all stakeholders. Whether a space enterprise has government or private customers helps determine potential influence toward gdp, roi potential, and overall business strategy. In space in particular, recognizing that current and intended customer bases may vary in many cases is important. Other can refer to universities, research institutions, etc.

Variants	Government	Business	Consumer	Other (Academic, Non-Profit)	Combination (Business, Consumer, Government)

CONCEPT: Funding Sources

Description: Primary sources of capital that invest into the development of the intellectual property of the company will have significant influences on the operations and incentives of a space enterprise. For example, government funding can be subject to additional regulations of control of whom the company can sell to and crowdsourcing (other) can require more transparency in business operations

Variants	Debt (loan)	Equity (shares owned)	Government (grants, other)	Other

CONCEPT: Corporate Controls

Description: The corporate controls of the company help explain to investors who will control the decision making within the company. Equity controls is for small businesses where the company ownership = board votes and control. Board controls is based on a selection process, may not be connected to the equity hierarchy of the company.

Variants	Government	Equity	Board

CONCEPT: Ownership

Description: Similar to sources of funding, the type of ownership an enterprise has can help investors, policymakers, and businesses determine how an enterprise might operate and what value potential it might have. Proprietary is usually for small businesses of a single owner or within a family.

Variants	Proprietary	Partnership	LLC	Corporation

CONCEPT: Contracting Model

Description: Key element of defining contractual agreements. Significantly different business models that investors and policymakers become increasingly concerned with. A cost-plus contract is a contract where a contractor is paid for all of its allowed expenses, plus additional payment to allow for a profit. Cost-reimbursement contracts contrast with fixed-price contract, in which the contractor is paid a negotiated amount regardless of incurred expenses.

Variants	Cost-Plus	Fixed-Price	Cost Reimbursement

CONCEPT: ROI Timelines

Description: ROI is happening as soon as you invest. Crucial for investment decisions, and perhaps the aspect that appeared to be the most frustratingly unclear to investors and entrepreneurs. Space enterprises can have immediate short-term potential value, they can have mid-term potential in relation to markets that are at or near being established, and they can have more longer-term potential in markets that do not yet exist and require significant leaps in development such as asteroid mining. Many enterprises also have no real ROI potential, as they are intended to develop capacity rather than generate revenue. These are clearly not desirable to investors, but may be more interesting to government space agencies.

Variants	Short-Term (0-4 years)	Mid-Term (5-8 years)	Long-Term (8 years or more)	None	Immediate

CONCEPT: Technical Maturity

Description: Key part of investment evaluation. Different levels of development maturity are more interesting to different stakeholders. For example, Angel investors will be more interested in concept stage enterprises than venture capital investors will be. This should be established early in dialogues. Do not confuse technical maturity with Technical Readiness Level (TRL). Technical maturity includes the sale and distribution of the product.

Variants	Concept-Stage (Pre-initial funding)	Development Stage	At-Market (Ready to sell)	Established (Generating Revenue)

CONCEPT: Geographic Potential

Description: Whether an enterprise has international market potential is important to policymakers that want to promote the growth of national GDP. It is also important to investors who do not want to invest in companies that are restricted by government regulations, which a national focus would suggest.

Variants	National	International

CONCEPT: Market Spread (Industry)

Description: Whether or not a company focuses entirely on space-based activities, or if they also serve other industries, can have a significant influence on the desirability of an enterprise to investors and policymakers. In some cases, a focus on space is preferable and in others a diverse market spread can suggest a more secure business model.

Variants	Entirely Space-Focused	Diverse

CONCEPT: Area of Application

Description: For many investors, it is crucial that space enterprises have a clear terrestrial application. However, many entrepreneurs and space enthusiasts are trying to work toward establishing extraterrestrial market capabilities. This can lead to significant obstacles to overcome regarding funding, as extraterrestrial activities appear to be solely funded by government programs.

Variants	Terrestrial	Extraterrestrial	Multi-domain

CONCEPT: Enterprise Goals

Description: Key potential disconnects between entrepreneurs and investors. Investors typically only choose to invest in profit-oriented enterprises. However, many space entrepreneurs express an overarching goal to encourage space exploration. Many government-funded programs are also intended to develop exploration capabilities rather than profit potential.

Variants	Profit	Terrestrial Societal Benefit	Space Exploration (Scientific)	Space Exploration (Settlement)

6.0 Conclusions

In conclusion, space is an industry where academia, business, and government stakeholders require clarity in terminology. This is especially true for those entering the community across the globe. While the space industry is experiencing significant growth in terms of stakeholders, capabilities, and value, it continues to struggle with communicating this value across and beyond the sector. This research has revealed there are significant challenges with communicating the value of space enterprises given the common terminology used today. This is largely due to the root word for the industry, 'space', being a term that does not naturally convey any specific type of value. Terms such as 'commercial space' and 'newspace' attempt to compensate for this issue. Yet, as our interviews showed, the lack of clear and universal understandings of these words creates new challenges, while not fully addressing the obstacle of communicating the idea of space as a domain of economic and strategic value.

By presenting this research, we hope to increase awareness of these challenges to help entrepreneurs, investors, industry advocates, and policymakers navigate the space domain. To ensure the continued growth of the space sector, it will be important to effectively communicate the benefits and value of space to wider arrays of stakeholders.

Looking forward, we have presented a list of space enterprise value concepts as a starting point, with the hope of advancing communication strategies across the sector. By identifying the points of value most important to stakeholders within the sector, and creating a categorical guide to how those value points can be understood, stakeholders can craft communication strategies that effectively convey each of the value concepts identified in this research. We want to emphasize that this paper serves as a first step toward developing a common terminology. We, therefore, encourage stakeholders to work with these concepts and adjust them in practice. Establishing more effective value communication approaches will benefit all stakeholders in the space industry, and, as this research has shown, there is still much work to be done.

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