Returning Wealth from Space: Space Railway's True Value

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Abstract

A space settlement or space economy is dependent on returning wealth from space to Earth. Space mining is the most promising and requires bringing millions of metric tons of mass to Earth's surface. Space mining of asteroids, moons, and other planets has also been the subject of science fiction and the imagination of countless people desiring a different way of life. Space mining's rationale includes saving Earth from mining operations and the pollution processing produced, providing more abundant rare-Earth materials for various needs, creating wealth for entrepreneurs, and, more recently, a means by which space settlements can pay for themselves. No matter what rationality, the key is to bring thousands of millions of metric tons of material from space to Geosynchronous Orbit (GEO) to Earth's surface. Reentry vehicles have been used to return people and minimal amounts of material. Reentry vehicles also need to be launched from Earth or constructed in space. Alternatively, a Space elevator designed to transport 400-600 metric tons of personnel or cargo to GEO and beyond can also transport that mass back to Earth's surface. This, of course, depends on the space elevator's design and operating concept. Various space elevator ideas were explored for outbound focused transportation, and technological solutions were proposed. This paper will examine general concepts pursued by Space Railway Corporation who not only will transport considerable mass into space but can bring considerable wealth back. The capability of bringing six hundred metric tons of valuable rare earth metals makes a Space Railway™ system extremely valuable to the space economy and its interaction with the Earth's economy. Space Railway™'s dual pricing transportation model will also be explored as a means of supporting the space economy while being profitable for Space Railway™.

Introduction

Space mining for precious metals, construction metals, carbon, water, nitrogen, and other materials essential for life in space or valuable when transported to Earth has interested scientists, engineers, artists, dreamers, and businesses. Various concepts of systems, components, and technologies to meet the challenges of processing ore on moons or other planets are intriguing. Asteroid mining is even more interesting, especially for the metallic "M-class" asteroids. These asteroids have remarkably high concentrations of metals, the majority over 90%, and exceedingly high concentrations of Precious Metals (PM) and Platinum Group Metals (PGM) compared to ore on Earth.

Griggs (Griggs, 2025) discussed a method and system to pay for space settlement, Figure 1. His approach is to have settlements, which are

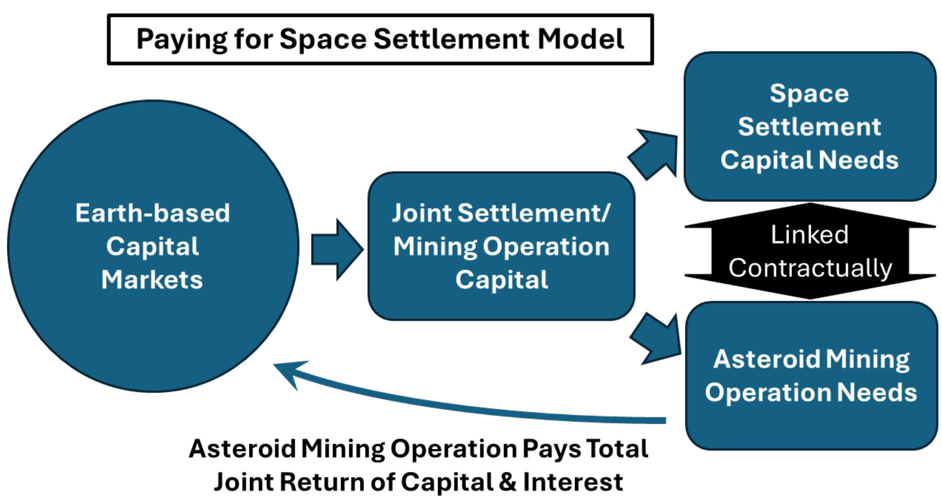

Figure 1 Paying for Space Settlement Financial Model Requires Asteroid Mining Operations.

cost centers, linked contractually to an asteroid mining operation, which is unique in that capital markets would provide capital to both the space settlement and the mining operation. The intention is that the mining operation will provide the means for the settlement and enable the mining operation to repay the Earth-based capital markets with an adequate risk-adjusted return. Space settlements appear unable to generate the wealth required to repay in a reasonable time, if ever (Griggs, 2024b). The mining operation's potential for paying trillions of dollars in loans or expected return on equity is based on the trillions of dollars in PM and PGM valued by Earth. This requires that the PM and PGMs be able to return to Earth, and their value captured by Earth commodity markets, which will provide the capital markets with the desired currency.

The dependency on the Earth's capital markets and the need to bring back PM and PGM in millions of metric tons requires a tremendous down-Earth capability (the ability to transport mass from GEO or other Earth safely orbits to Earth's surface). Griggs recently challenged the decades-old space elevator requirements (Griggs, 2024a) (Griggs, 2024c). The new requirements were based on the transportation of cargo and personnel to space. GEO and beyond were the main target altitudes, providing the capability to promptly complete large-scale missions' transportation requirements, Figure 2. His original table of mission completion timelines was updated from a one hundred metric ton (mt) cargo capacity elevator to a 600 mt capacity based on his more recent work being pursued by Space Railway™ in conceptual design and analyses of a Space Railway™ Train (SRT) and Space Railway™ system (consisting of the SRTs, tether from Earth's surface to far beyond GEO, ground station, electro-propulsive mechanisms, and electric energy and power management systems).

Down-Earth capability for PM and PGM have also added to the Space Railway™ system mission needs mix for a particular asteroid. Griggs (Griggs, 2025) also suggests that after processing and capturing the PM and PGM the asteroid iron remain in space, due to its low value to Earth, to provide construction material for space settlements. This analysis can also be applied to other mining operations of asteroids or moon/planet projects. The current market value of the PM and PGM is approximately $70 trillion for asteroid 3554 Amun.

The value of the PM and PGM mining products warrants the capability to bring that mass back to the Earth's surface. Griggs (Griggs, 2024c)has previously discussed the technical capability to lift considerable mass to space for space settlement, manufacturing, exploration,

Major Off-World and Down-Earth Transport Needs - Millions of kg (Mkg)								600 mt Elevator
	Off-World (Mkg)	Down-Earth (Mkg)	# Falcon Heavy	Rocket Cost $ Billions	Years to Complete (1 L/wk)	Years to Complete (5 L/wk)	Years to Complete (1 L/day)	Years to Complete (5 L/day)
Moon Village	500		29,762	2,024	572	114	2.28	0.46
SpaceX Colony Mars	1,000		59,524	4,048	1144	228	4.57	0.91
Space Solar Power	5,000		187,000	11,594	3596	719	22.8	4.57
L-5 O'Neill Colony	10,500		392,700	24,304	7551	1510	47.9	9.59
Sun-Earth L-1 Sun Shade	20,000		748,000	46,376	14384	2876	91.3	18.2
Space Tourism	TBD	TBD	TBD					
GEO Manufacturing	TBD	TBD	TBD					
Asteroid 3554 Amun Mined Iron - Leave in Space		30,000,000	Unknown Vehicle					
Asteroid 3554 Amun PM & PGM: $70 trillion		4,677					20	
Other Asteroids and Space Products Returning to Earth		XXX,000,000	Unknown Vehicle					
Current Total Marketspace Needs	37,000	X30,000,000	1,383,900	$85,758	26,613	5,322	188.9	31.49

Figure 2 Transport Needs from and to Earth Requires a Heavy Lift Space Railway™

leisure, and scientific considerations. The down-Earth capability, mission, and economics have yet to be seriously discussed. In addition, the economics of an operating Space Railway™ system will be added to the discussion.

Outbound Transportation for Space Settlement and Other Uses

Previous well-defined missions have focused on transporting materials and personnel to space. The current description of the space economy focuses on Low Earth Orbit (LEO) applications, mostly satellites. Geosynchronous Orbit (GEO) is also attractive for certain types of satellites. Satellite launches targeting the LEO or Very Low Earth Orbit (VLEO) altitudes are still provided by rocket solutions. However, rocket solutions have limited capacity for transporting mass and volume with adequate frequency to accomplish large-scale missions beyond LEO. Human space settlement in the tens of thousands to millions of people must occupy space in decades, rather than hundreds of years. This is accomplished by drastically increasing the payload capability of an SRT well beyond the most considerable rocket capability and increasing the launch frequency. The Space Railway™ system can launch in terms of hours versus weeks. Unlike rockets, the elevators traveling along the tether do not have launch window restrictions and are not overly sensitive to weather. An SRT can provide outbound transportation capability for heavy-lift, very dense mass and provide considerably more cargo and personnel volume than rockets, enabling comfort for personnel and/or transporting large volumes of low-density materials or products.

The outbound transportation to space is incredibly competitive. Dollars per kilogram to LEO is the usual metric to select a preferred rocket solution. This metric has been the fallback position for a single-use rocket for a single-launch mission. However, other metrics must be considered when assessing large-scale missions that require launches in the thousands, as shown in Figure 2. The time required to complete the five hundred million kilograms and above missions is absurd. Even if rockets were more affordable, the time required would still be a mission failure. Volume is another consideration. Low-density materials and personnel will require volume for transportation. It may be low mass, but if a rocket's volume cannot accommodate the need, it is a mission failure. Launch windows are also of concern for rockets. The optimization of energy and flight trajectories to reach various destinations in the solar system provides a small window in time, which may be on a multi-year basis, for being able to launch and reaching a destination. Expanded launch windows or a system that does not require a launch window is preferred. These are all considerations beyond the simple metric of cost per kilogram that must be considered when the destination is beyond GEO.

The Space Railway™ system is well-suited for large-scale missions and can complete them in a reasonable timeframe. Unfortunately, they will be assessed using the single mission rocket cost metric per kilogram. This metric is based on a variable cost model. A Space Railway™ system requires an infrastructure to be created before use. That creates a high fixed cost model coupled with a low variable cost, with an overall mission completion cost less than the variable cost rocket model.

Rocket manufacturers and operators are vested in rockets and will make the case against a Space Railway™ system because it is in their interest to do so. However, people and entities wanting to settle in space and create a beyond-Earth economy must consider the big picture to enable large-scale human presence. There is an incentive for Space Railway™ to provide transportation services to facilitate space settlement and the space economy. Even though there are considerable benefits beyond the cost per kilogram metric, the SRT's larger payload and volume with more frequent launch capability should still be affordable. Reasonable profits should be considered over superior profits to assist in developing the economy and transportation needs that will provide the volume to diffuse the fixed cost associated with the tethered system. Thereby making the Space

Railway™ system the most affordable solution and providing the best performance for GEO and beyond.

Earthbound Transportation for Space Settlement and Economy

The Space Railway™ system is designed to transport large masses and volumes into space but can also provide tremendous down-Earth transportation capability depending on the system solution. Reentry vehicles have minimal cargo capacity on Earth. They cannot provide the means to bring back the millions of metric tons of PM and PGM to repay capital markets for space settlement and space economy investment.

Griggs(Griggs, 2025) argued that space settlement and asteroid mining operations should be contractually linked to the capital market. The wealth available from asteroid 3554 Amun is approximately $70 trillion and consists of a variety of PM and PGM totaling 4,677 million kilograms or 4,677,000 metric tons. Griggs suggests that the mining operation should be scaled to process asteroid 3554 in twenty years. This coincided with a twenty-year build-out of a one-billion-kilogram SpaceX Mars-type settlement. Griggs also assumed a two-year delay between the start of asteroid mining operations and the first processed metals returning to Earth. That would result in a daily bring-back of a portfolio of metals with a mass of 640.7 metric tons. Using concentration weighted average of PM and PGM would be approximately $14,760 /kg or $9.46 billion per descending SRT.

Reentry vehicles can bring back several tons, but bringing back 640.7 metric tons daily would be unaffordable and require tremendous infrastructure, Figure 3. The space shuttle system, as an example, would have to be redesigned to attain GEO altitudes versus the LEO altitudes it was designed to reach. An SRT based on Griggs' new recommended requirements (Griggs, 2024c) can transport that mass to GEO and beyond. Exemplary system design and architecture could also transport that mass to the Earth's surface. The daily, wealth bring-back of $9.46 billion is more than an incentive to design the Space Railway™ system and architecture (architecture is considered to be a multi-tether-based operation) to bring back 640.7 metric tons per elevator. Space Railway™ is pursuing system designs that can bring back multiple SRTs per day. This will provide even more capability to bring back other sources of wealth to Earth daily.

Although transporting off-world is still considered competitive financially, the down-

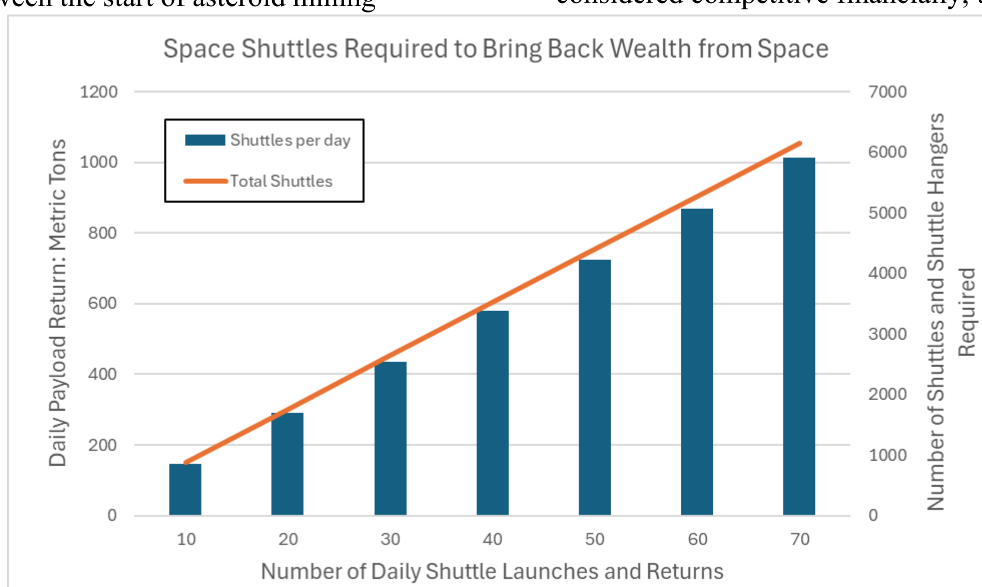

Figure 3 Reentry Vehicle Solutions Requires Tremendous Infrastructure

Earth capability is not. Current off-world rocket prices are over $1500 / kg. A down-earth of $1500 per kilogram would mean a transportation cost of $ 961 million. If transportation is discounted to $1000 / kg, it would be $640.7 million. The daily transportation cost would finance heavy lift tether systems and ensure that space settlement can pay for itself. This bring-back capability is the value of the Space Railway™ system, enabling space settlement and economy. Only when a down-Earth extensive mass system is available, is a financial method to repay debt or offer a return on investment for the magnitude of capital a 10,000+ person settlement would require, will settlement be possible.

Space Railway™ Financial Assessment

The Space Railway™ system has a high fixed cost and, if appropriately designed, will have a low variable cost. An equity return, debt repayment, or a combination of both will require an adequate volume of transportation services to generate revenue and minimize the debt's cost. Space Railway™ system operators are incentivized to provide low transportation fees from Earth's surface to other locations in the solar system beyond LEO to GEO. Significantly lower costs than current rockets can provide will ensure that space settlements and a space economy develop. Once the economy develops, especially space asteroid mining, the need to bring the wealth of space back to Earth will emerge and grow. With no other viable extensive mass down-Earth cargo possibilities, Space Railway™ system operators can compensate their investors or debtors with adequate returns, even by charging less than an ascending rocket cost, as a basis for comparison.

A competitive off-world transportation cost and a higher down-Earth transportation cost were explored to determine the right mix for long-term Space Railway™ system profitability and operations. Various price combinations are considered to provide flexibility in the final pricing decision.

Space Railway™ is expected to operate under a dual pricing model in the early years to stimulate space settlements and economies, providing a decent return when the wealth of space returning to Earth is realized. The risk and return potential for Space Railway™ depends on the dual nature of this concept of one price to ascend, which has a higher cost, and a more significant price to descend, which has a lower cost. The descending profit is a financial subsidy to interested parties in the ascending space settlement and space economy. The Space Railway™ system operator would take a long-term view with this strategy and should be compensated for risk. The risk is that bringing back wealth from space will not occur at the magnitude or a planned timeline.

Paying for space settlement was focused on a SpaceX Mars-type settlement. The assumption was that one billion kilograms of mass (cargo and personnel) would be sent to Mars over twenty years. At the same time, an asteroid mining operation would be sent to asteroid 3554 Amun, and mining operations would begin returning the first PM and PGM two years later. It was assumed that the entire asteroid would be mined in twenty years. It was further assumed that the iron would remain in space for other construction purposes. A low percentage of non-value byproducts of metal processing will remain at the mining site but could be used for shielding or other purposes.

Mars Outbound Assessment

First, we will consider a dedicated tether and Space Railway™ system for a coupled Mars settlement and asteroid mining operation after assessing a combination tether that includes the Mars, Moon, and space solar energy missions. We assume the operator will encourage transportation to keep costs low on the outbound. This will be accomplished by minimizing the price of transportation to cover the cost of principal repayment but with no interest. The price based on per kilogram is approximately $500/kg, as shown in Figure 4. This is one-third the cost of SpaceX Falcon Heavy. Lower prices for outbound customers could be used to stimulate more demand. This would make sense only if the space wealth down-Earth transportation revenue makes up for the loss of outbound stimulation pricing.

Asteroid 3554 Amun Down-Earth Assessment

The Down-Earth revenue from asteroid mining of Asteroid 3554 Amun is vastly more significant than the outbound Mars mission. The Mars mission assumes a one-billion-kilogram cargo and personnel transportation over twenty years. Down-Earth precious metals are over four times that, Figure 2, over a similar twenty-year period. The 4.7 times more cargo per year with a $/kg pricing model equates to substantially more revenue, most of which is profit. The returns to debtors or investors can be over 45%, Figure 5, even charging less than a SpaceX Falcon Heavy rocket, which is going in the wrong direction. The tremendous financial return over twenty years incentivizes capital markets to fund long-term space settlement and space economy projects. This will depend on large-scale asteroid mining operations and heavy lift Space Railway™ system to transport equipment and personnel into space and return the wealth of space to Earth.

Dual Pricing Assessment

A dual pricing model was suggested earlier to stimulate space settlement and develop a space economy. After a brief time lag, the wealth of space is expected to return to pay for the settlement, mining, and other large-scale space projects that have been the subject of science fiction, dreams, and people desiring a different way of life away from it all. The question is, what will the dual pricing strategy be with the missions just discussed?

The outbound and down-Earth financial assessments mentioned previously assume that the mission pays for the total fixed cost investment. It also does not consider the Space Railway™ system to be used for other missions. A fixed cost-sharing concept must be considered when both missions are evaluated together for investment return. A “fair” cost-sharing concept proposed is a weighted average usage based on the number of transports. The assumption is that only a fully loaded SRT is transporting the outbound or down-Earth cargo or personnel. The first two years would only have outbound transport, then 18 years of dual transport with a 1 to 4.7 split between outbound and down-Earth, after which an additional two years with down-Earth only. The down-Earth transport will

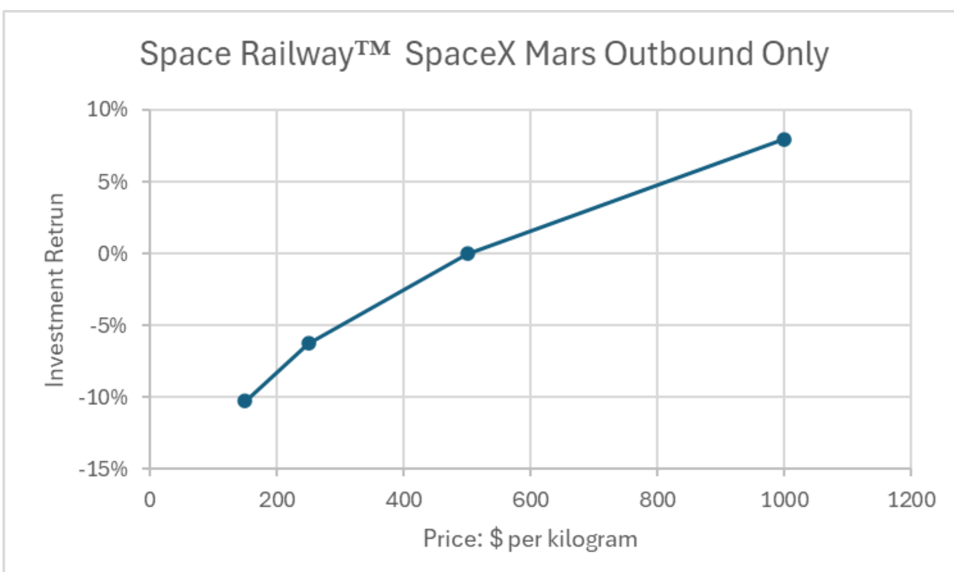

Figure 4 Return to Investors Based on Outbound 20-Year Mars Mission is Price Sensitive Using a Price per kilogram Metric.

absorb approximately 80% of the fixed cost, with an outbound 20% during dual operations. Other missions, both outbound and down-Earth, are expected to be conducted simultaneously. However, building and finding sensitivities based on various scenarios is vital to assess the financial aspects of a dual pricing model for a Space Railway™ system.

Analyses of the dual pricing model based on a range of outbound and down-Earth prices were conducted to determine the range of dual prices that will stimulate outbound transportation to settle and develop space by subsidizing outbound transport with wealth returning down-Earth profits, Figure 6. Revenue and return on investment were calculated over a variety of price ranges that are less than the lowest price rocket solution for just an outbound payload price.

If the outbound transportation is assessed by itself, it would be hard to justify a price below $500/kg. Only the principal would be returned with no interest, even at that price. The profitability of the down-Earth transportation is ample enough to allow a much lower outbound transportation price and still provide a respectable return. Space Railway™'s claim to reduce outbound costs to 1/10th of SpaceX Falcon Heavy is attainable under a dual pricing model. The outbound pricing model, which would be only $150/kg, would be a financial failure, but under the dual model, respectable returns for the total Space Railway™ system are achievable. The data also identifies multiple combinations of prices that could meet a target return to investors. This provides excellent flexibility in ensuring that success in capital markets is not highly dependent on a narrow price range.

Numerous pricing combinations provide a return above 20%, which should be enticing for Earth's capital markets, even considering the risks. The annual revenue generated can also range from $100-275 billion. As a comparison, the upper end of the range would make it the 19th largest company by revenue in the world.

Other Missions and Financial Assessment

This analysis focused on transportation, enabling a space economy and space settlement while providing the capability of bringing back the wealth of space to pay for settlements. Settlements alone cannot reimburse trillions of dollars in investment (Griggs, 2024b).

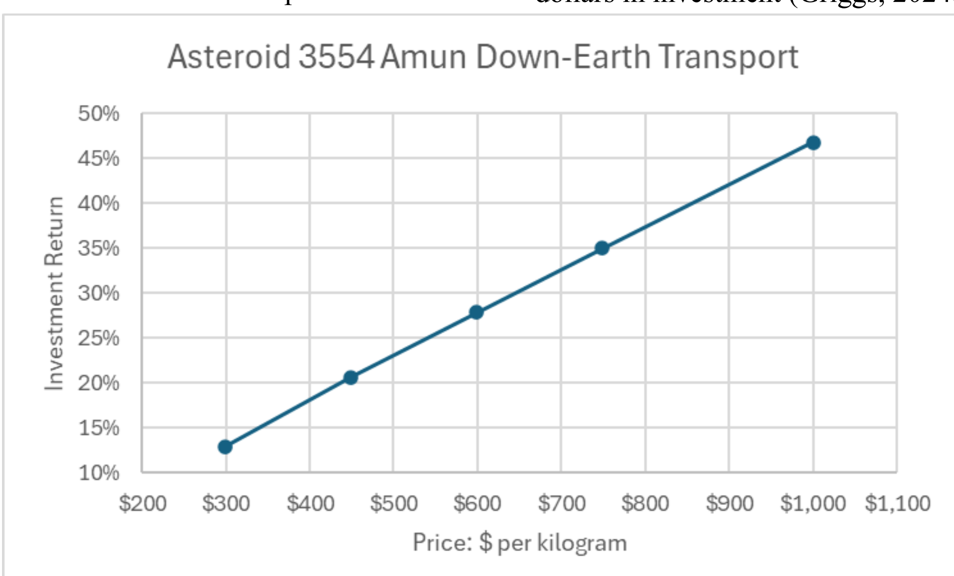

Figure 5 Return to Investors Based on Asteroid 3554 Amun Down-Earth Transportation has Tremendous Financial Return Potential.

However, a contractually coupled asteroid mining operation can provide the wealth required to repay the debt or equity markets. The limitation was transporting the amount of wealth down-Earth. Space Railway™ system design requirements and operational capability provide a technical solution to the down-Earth problem. Financing the considerable fixed cost associated with developing the infrastructure is a question. A dual pricing model is an excellent solution to stimulate space settlement and economy while providing returns for the financial markets that provide the capital to develop and deploy a large-scale Space Railway™ system.

Upon review of the Mars mission, it was noticed that the refined mining products needing down-Earth transportation far exceed the outbound transportation needs. These transportation needs provide Space Railway™ with the profitability required to make it a reality. This leads to consideration of other missions operating concurrently with the Mars mission.

Inclusion of the Moon Mission

Adding the moon mission to the outbound transportation requirements adds additional SRT launches and increases outbound revenue by ½ that of the Mars mission. If the Moon mission coincides with the Mars mission and is accomplished over the same twenty years, the new dual pricing model revenue and investment return profile is presented in Figure 7. The increase in transportation traffic provides extra revenue and return, but the down-Earth transportation revenue still subsidizes the Moon and Mars missions. This assumes that there will be no wealth returning from the Moon. However, the potential $25 billion in extra revenue is still respectable and an additional 5% return on investment adds to the incentive for capital markets.

Inclusion of the Solar Energy Mission

The inclusion of the Solar Energy mission adds tremendous transportation demand due to the amount of mass needed in space. This demand exceeds the amount of mass the down-Earth PM and PGM need. Figure 8 shows that the

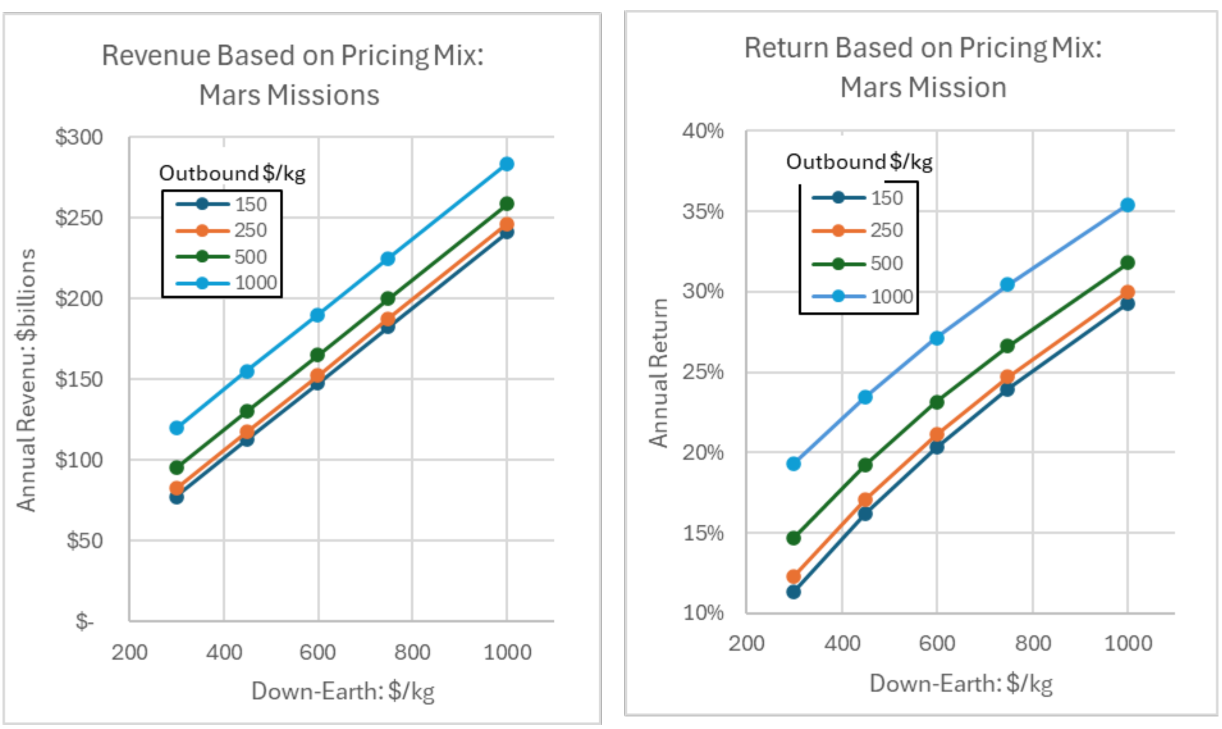

Figure 6 Dual Pricing Model for Mars Mission Demonstrates the Flexibility in Pricing Both Outbound and Down-Earth Transportation that Provides Respectable Revenue & Returns to Debtors/Investors.

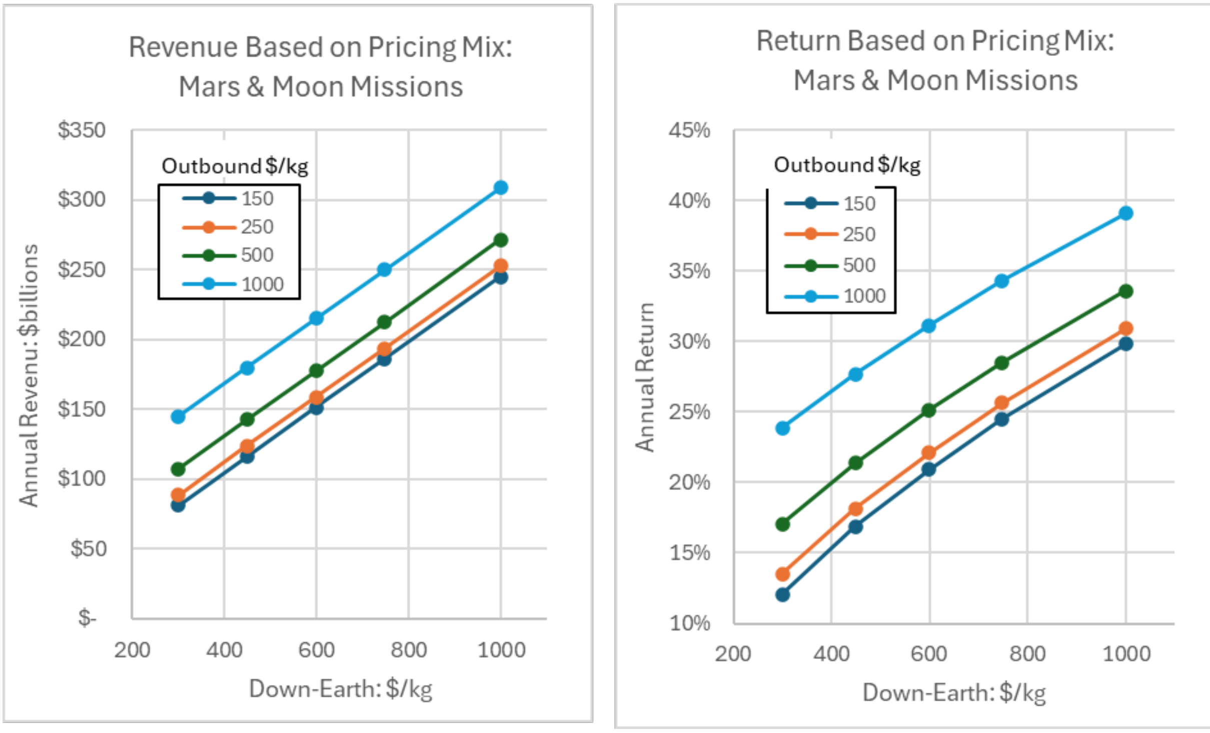

Figure 7 Dual Pricing Model for Mars & Moon Missions Demonstrates the Flexibility in Pricing Both Outbound and Down-Earth Transportation that Provides Respectable Returns to Debtors/Investors.

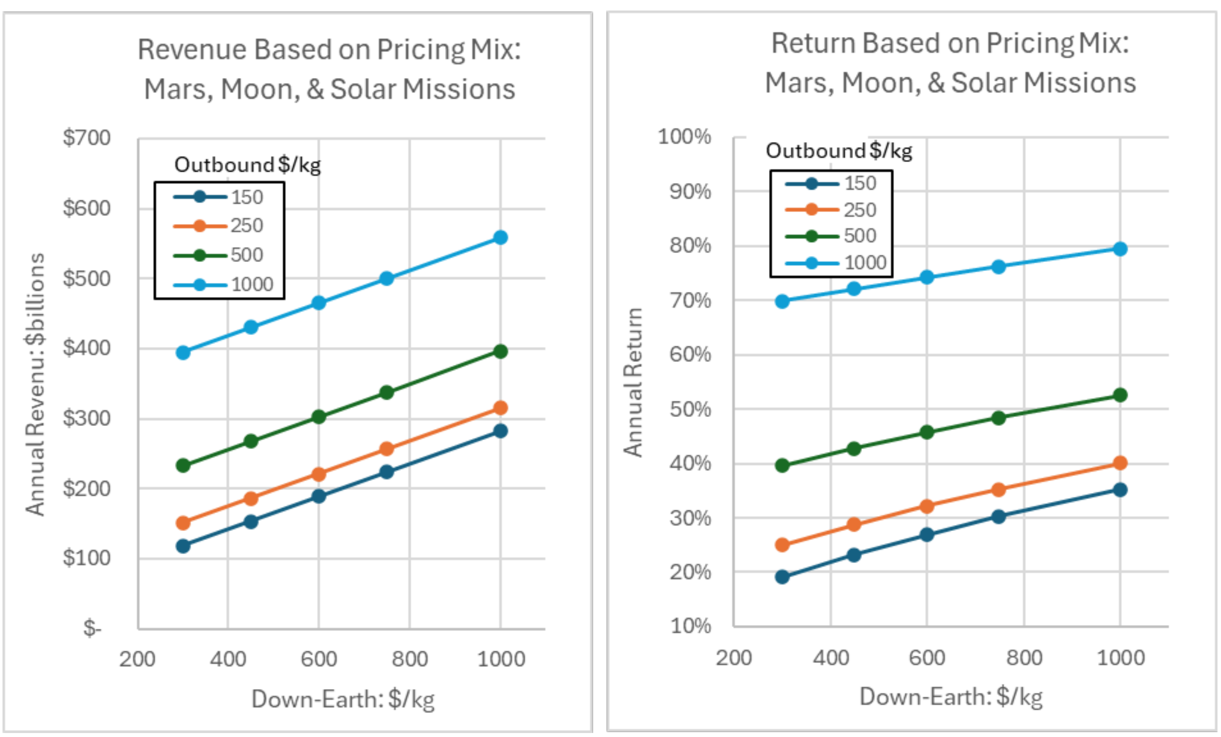

Figure 8 Dual Pricing Model for Mars, Moon, & Solar Energy Missions Demonstrates the Impact of Outbound Pricing on Returns to Debtors/Investors.

	Zero-g Manufacturing	Orbital Earth	Space Resources
Earth-Focused Value	• Crystal growth ○ Semi-conductors ○ Other electronic devices ○ Specialty windows and optics • Medicine manufacturing ○ Protein crystals • Advanced fiber optics • Human organ growth	• Mega structures • Solar power beamed to Earth • Sunshade to minimize global warming • Large-scale orbital manufacturing targeting Earth-based consumption	• Rare Earth metals • Construction materials for orbital Earth projects • Water, fuel, carbon, nitrogen for space applications
Potential Value	• Billions	• Billions to Trillions in cost avoidance	• Trillions of rare Earth metals

Figure 9 Space Settlement Sources of Value to Repay Earth-Based Investment.

outbound pricing significantly impacts the dual pricing model on return to investors, not just the Mars and Moon missions.

A potential increase of $200 billion in annual revenue and 40% additional return on investment for a total of a potential 80% return drastically improve the financial merits of financing a Space Railway™ system. Three heavy lift missions occurring simultaneously may spread Earth's resources too thin. However, the Space Railway™ system, once deployed has tremendous potential to enable space settlement and space economy development as well as providing a tremendous financial incentive for businesses to invest in such a project.

Other Missions

Other primary missions can be considered but are further out than the Mars, Moon, and solar energy missions. They are based on well-established missions from various sources. Additionally, Griggs identified other space wealth down-Earth needs (Figure 9) that must be matured to understand their transportation needs outbound and down-Earth. They are expected to add revenue and increase the return to investors. Wealth bring-back from settlements and the Earth's Moon were not assessed due to the uncertainty of what that bring back would be and payload and frequency of shipments to Earth.

The investment aspects of the Space Railway™ are assessed as financially attractive but require traffic. An unused tether-based system is unprofitable. The dual pricing model provides pricing flexibility for competitive and non-competitive markets. Space Railway™ system can be considered more affordable than rocket solutions for developing GEO and beyond.

Space Railway™ Train Annual Mission Requirements

A Mars settlement mission along with an asteroid mining operation mission were assessed followed by an outbound Moon and Solar Energy missions. Financial assessments were conducted to show the profitability and return for equity or debt capital markets. Outbound and down-Earth transportation is assumed to be available on a daily basis. The question becomes what the supporting requirements are for the Space Railway™ system.

The three missions discussed previously result in, as a minimum, 507 Outbound annual

Annual Equivalent Trains	Outbound	Down-Earth	Total
Mars Mission	78	365	443
Moon Mission	39	0	39
Solar Energy Mission	390	0	390
Annual Totals	507	365	872

Figure 10 Space Railway™ System Usage Mix is Achievable with Designing and Scheduling Multi-train Transport.

transportation trips if the SRTs are fully loaded with 641 metric tons of cargo and personnel. Down-Earth transportation requires 635 fully loaded trains, Figure 10, on an annual basis. Various combinations of system design and scheduling could manage the transportation needs with one tether. An alternative is to deploy more than one tether. This of course will increase fixed costs and Space Railway™ capital needs. However, for safety, backup, and available growth potential multi-tether architecture and usage concepts will be explored during a future assessment.

Single tether solutions can schedule tether usage by queuing multiple SRTs that would either transport cargo and personnel outbound or down-Earth using a one-way multi-train-on-tether-per-day concept that would increase the overall design requirements of the tether to manage more trains on the tether at the same time. This will increase the strength requirements and power requirements for the train in the outbound direction. Depending on the down-Earth propulsion and power solution this could also increase the need for power absorption and distribution of regenerative energy.

A variety of considerations can define the capability for a single tether to meet the requirements. Additional analyses, Figure 11, on train mass, speed, power sources, tether design, emergency operations, maintenance, and wear should be accomplished to determine if a single tether is more economical than a two-or-more tether architecture. Once the value of a Space Railway™ system is demonstrated and investment returns are realized a multi-tether system architecture will probably be implemented.

The smaller the SRTs become also limit the cargo size for outbound settlement transport and restrict transporting cargo such as construction equipment, and heavy machinery. A single tether lower payload SRT system can only make up for the total annual payload by increasing the number of SRTs on the tether at the same time. This increases the tether design requirements and any benefit of using a smaller car on the tether is nullified by an increased number of SRTs and frequency of launches. However, smaller SRTs may be of interest when considering tether maintenance and repair. Alternative business applications could also be considered such as private SRT ownership of businesses or wealthy individuals.

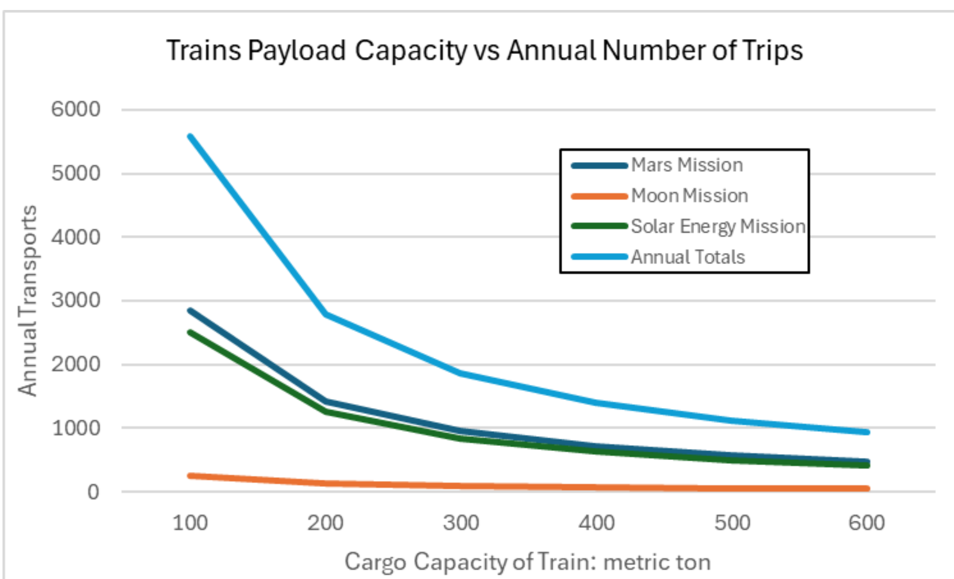

Figure 11 Space Railway™ Train Payload Capability Sets the Number of Annual Tether Transports and Drives a Multi-Tether System Architecture.

Summary: Returning Space Wealth

This paper explored the potential for returning wealth from space to pay for space settlement and enable a space economy. A SpaceX Mars-type mission and mining Asteroid 3554 Amun were assessed. A Space Railway™-designed Space Railway™ train can return daily PM and PGM from asteroid 3554 Amun to Earth's surface to provide the wealth required to pay for Mars settlement and the mining operation.

Additional analyses were conducted to provide a dual pricing strategy to lower outbound transportation prices below the down-Earth prices. Lower outbound prices well below rocket capability are believed to drive traffic to the Space Railway™ system and lessen the transportation cost for space settlement projects. Higher down-Earth prices are envisioned since there are no realistic large mass down-Earth transportation possibilities except for a Space Railway™. The analysis argued that a large variety of outbound and down-Earth prices could make Space Railway™ profitable for investors or debtors. The revenue generated would also create a top 20 company by revenue. This incentivizes capital markets to fund a Space Railway™, even considering the risk.

The Moon and Solar Energy missions were added to the analysis, demonstrating that the increase in use increases the revenue and returns to capital markets even with the outbound discount. Other down-Earth transportation for returning space wealth was discussed, and when those concepts mature, they will be included in the financial analysis.

The author made various assumptions about the missions, from payloads, transport frequency, timeframe, and overlapping missions. The financial assessment will change if these assumptions deviate substantially from the ones used.

In summary, these analyses argue that Space Railway's™ financial capability, even with its high fixed cost, can be very profitable—the return on investment based on multiple combinations of dual pricing more than compensates for the risk. A dual pricing model also provides flexibility in stimulating demand for outbound travel, enabling space settlement and developing a space economy.

The three missions analyzed were used to further define overall mission requirements for a Space Railway™ system. Whether a single tether is used, or a multi-tether approach is used the operational, system design, and financial impact will be determined. Further refinement of the overall approach for multi-mission and other transportation needs must continue. The capital, which could include government-backed securities, required for a Space Railway™ system that is capable of transporting outbound and down-Earth must be done right the first time. Flexibility of the Space Railway™ system is necessary for humans to settle space in mass and develop a space economy.

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