

TOFFLER
ASSOCIATES



FUTURE STATES

F O R U M

THE FUTURE OF THE SPACE INDUSTRY

OCTOBER 23, 2012

DINNER DISCUSSION HIGHLIGHTS

We discussed the **future of the Space Industry** and what we must do today to prepare for it.

The space industry is undergoing a transformation. Innovative, entrepreneurial commercial and privately-funded corporations are expanding at explosive rates and have become a vital component of human space exploration and the future space market as a whole. Some see **new markets such as space tourism, satellite servicing, space mining, on-orbit refueling**, and others beginning to emerge. Traditional aerospace companies are looking to **move into adjacent markets, leveraging their legacy technologies and developing new ones to create new value propositions in energy, healthcare, and other industries**. More government space agencies are collaborating to optimize efficiency, reduce development costs and timelines, and achieve shared aims. At the same time, international powers such as China, India, and Japan, are racing each other and the United States to push their space programs to the moon and beyond.



We explored questions such as:

“How can traditional space industry companies adapt their operating models (strategy, structure, processes, workforce, technology capabilities, and partnerships) for the business agility needed to succeed in new adjacent markets?”

“How must the working relationships between “emerging space” and “established space” enterprises (companies and government agencies) change to ensure the successful transformation of the human spaceflight paradigm and creation of viable new space markets?”

“What lessons can space industry leaders take from other organizations that have successfully adapted or attempted to adapt to new markets and industry transformations?”



On October 24th, Toffler Associates, in collaboration with the Space Foundation, hosted a dinner with leaders from both public and private sectors to discuss the future of the space industry. This report is a summary of our discussion. Please note that it is not a transcript, but rather a “rendering” that condenses, eliminates, expands, and recombines some areas of discussion to illuminate themes that we believe emerged. Any errors in the interpretation or nuances are ours.

We posed several questions to spark the conversation:

- How can traditional space industry companies adapt their operating models (e.g., strategy, structure, processes, workforce, technology capabilities, and partnerships) for the business agility needed to succeed in new adjacent markets?
- How must the working relationship between “emerging space” and “established space” enterprises (both companies and government agencies) change to ensure the successful transformation of the human spaceflight paradigm and creation of viable new space markets?
- What lessons can space industry leaders take from other organizations that have successfully adapted or attempted to adapt to new markets and industry transformations?

Participants shared diverse views on various aspects of the future of the space industry, and different ways organizations must adapt to retain and create value, innovate, and remain relevant among emerging competitors, both foreign and domestic. Over the course of the evening, several themes emerged:

- **The space industry is in transition** – government still plays a large, but diminishing role, as commercial entities continue to fill the gap. For many years, governments have served as “anchor tenants” for the space industry, but the **time has come to focus on the demands of the markets**. Government still has a role, but it should focus on the “grand challenges,” such as missions to the moon or Mars, while the private sector should focus on Low-Earth Orbit (LEO) and Near-Earth Orbit (NEO) to identify opportunities.
- To succeed in the future, **companies will have to examine new, innovative organizational structures, partnerships, and business model approaches**. What is more pressing, companies will have to consider **new ways to compete for talent in the global community**. Already the United States faces a dearth of graduates in Science, Technology, Engineering, and Mathematics (STEM); however, with organizations emerging from competitors in China, India, Japan, and Brazil, **the space industry will face increasing competition for the best and the brightest**. The space industry needs not only STEM talent, but also individuals who are

inspired by—and exceptionally capable of developing—innovative new business models to **serve as pioneers in the emerging business environment of space.**

- Just as President Kennedy laid out a challenge to reach the moon, **the space industry needs greater leadership regarding its objectives.** Where is the leadership in the space industry today? What is the next challenge? Identifying the challenge will help to address the issues of attracting talent from other industries as well.
- To encourage competition, innovation, and growth, the U.S. government (as well as other nations) will have to **change their regulations and procurement processes to remove barriers.** Agility is required to remain competitive and innovate in the face of changing market dynamics.
- At the same time, while participants highlighted the challenges of government regulations, they recognized that **space is a market and it would take a strong investment to build technologies that will change the industry.** If there is market demand, the needed technologies will be funded, similar to the information technology market. For the space industry to move forward and innovate **there must be companies willing to take big steps, planned risks, and not be afraid to fail.**
- **Space is an inherently risky business.** However, investors have proven that they are willing to accept this level of risk, basing investment decisions on market potential and unbiased, unemotional assessments.

During the course of the evening, participants explored a number of different aspects of the space industry. The main question the group tried to answer was, **“How is the space industry changing, and what must private and public organizations do to remain relevant, profitable, and successful?”**

Redefining the Space Industry

“Space industry” is an amorphous and perhaps too general term to use when discussing the future. To really understand the industry, one needs to understand the two different groups that comprise it. At the beginning of our discussions, we used the terms “old space” and “new space”. “Old space” referred to those companies that have been supporting government funded space programs for the past several decades; “new space” referred to those companies or entities that are privately funded vs. publically funded. Over the course of our analysis and discussions, however, it became clear that it would be better to refer to “Established” and “Emerging” space to describe the different groups. This captured not only the difference in their market perspective, but also their organizational structures, and, in many ways, their philosophical approach to the future of space.



Emerging space is working to create innovative business models that can support sustainable markets. What is more, these models will be agile enough to meet current and future demands. This business agility—the ability to adapt quickly and efficiently to changes in the fast paced business environment—will be a key differentiator for emerging commercial players in this industry in the near future. In the dynamic space market, the ability to react and adapt quickly to changes and events as they occur in the market will be a determinant of a company's future success.

The difference between established and emerging space is similar to discussions regarding "land lines" and "cellular" networks in the 1980s. It was difficult for established firms to see the importance of the network itself, rather than the devices that relied on the network. Those firms that successfully evolved to focus on the network itself, recognizing that the device was a very different market, tended to be those that captured the value of agility. For example, the market made it clear to AT&T that being big was, in itself, no longer an advantage. By divesting in certain legacy areas and taking investment risk in others, the company was able to increase its market share and avoid a plunge into irrelevance. Over the years other firms followed suit and that brought increased competition and innovation. AT&T is not necessarily a "small" company, but the idea of shedding legacy capability and focusing on streamlining operations and creating a smaller, faster, more adaptive organization is a model for Emerging space.

Change like this takes courageous decision makers and companies willing to accept the risk of failure. For decades, established space has relied on governments to accept much of the financial (and in many ways reputational) risk associated with space – governments made the bold proclamations; governments absorbed the costs of research and development; governments accepted the risk of failure. Established space grew up to be an environment that worked to avoid risk and government established regulations and procurement processes that emphasized the reduction of risk, while accepting increasing costs and squeezing out many opportunities for competition and innovation. For the space industry to take advantage of change and succeed in the future, it will require not only agility, but the leadership willing to accept risk and make rational decisions about "what stays and what goes." It will also need government to not penalize when there is a failure.

Emotional vs. Rational – Balancing for Talent and Leadership

The structure of the space industry and the identity struggle between established and emerging space has much to do with the emotion surrounding the domain itself. On one hand, the emotional pull of space exploration and rocket science has attracted talent and capital to the industry, and it was this emotion that sustained public support despite setbacks. At the same time, that very emotionality may be constraining the

industry's ability to change. Companies that have traditionally relied on the government procurement model must make hard decisions and organizational changes to meet emerging market needs, and it is in their interest to find ways to shut out smaller competitors while they adjust. Shedding legacy missions, technologies, and even people, is difficult in any industry, but it becomes even more difficult given the emotions surrounding the space industry.

Emerging space is able to leverage new technologies so quickly because it does not have to shed any legacy systems. Just as many countries in Africa and Southeast Asia have moved quickly to cellular networks because there was little legacy infrastructure to hold it back, and there were few in those areas who were attached to the previous communications methods. The move to a "true commercial" model for emerging space industry will require just as much business and financial acumen and innovation as it does technical. Emerging space has not yet found its "Silicon Valley" but we expect that in the next 5-10 years, such an area (literally or figuratively) will emerge, joining innovative technical minds with the business, legal, and financial support they will need to shape new markets. The future of the space industry is not a question of emotional vs. rational; rather, it is finding a way to harness the emotion – the desire to tackle global challenges – and channel that energy into rational investment and business decisions.

Market Driven vs. Government Driven

The group discussed the challenges of current government regulations and procurement processes, but agreed that government was not to blame. This is a market and there are technology risks that plague the industry – it takes strong investment to build technologies that will change the industry. The group agreed that, if there were a big enough demand from the markets, technologies would be funded and developed. For example, when the satellite communications industry began, the endeavor was too much for one company and proved to be too much for even one government; therefore, it was an international endeavor with the world essentially sharing in the costs and risks. Today, there are more than 250 communications satellites, because market demand grew, the investment community stepped in, and the investment moved from government organizations to the private market.

In many ways, the "market" for space, might have very little to do with space itself. The space industry must start treating space as a means to an end, not the end itself. In the 15th and 16th centuries, the ocean was a new frontier, a space for explorers to make their names. Over the years, however, it quickly emerged as a means to an end: building wealth, wielding power, and exchanging ideas. As the space industry evolves, it is entirely possible that it will be less an "industry" and more a domain occupied and leveraged by other industries to serve their purposes – research, information

transmission, national security, etc. Much of the business related to space is about leveraging space to provide earth-based services at this point. As the markets emerge and we identify new ways to use space, the industry will move to capitalize.

As the market drives demand, other countries will present both challenges and opportunities. The group discussed the difficulty in competing for talent, both domestically and globally, but the emerging markets for space will not necessarily be on U.S. soil. Furthermore, the protection provided to “national” space industries could be similar to those that exist in the aerospace or defense markets. Emerging space must be agile enough to leverage new and emerging partners as they build their own capacity and capability, both domestically and internationally. These new partners will be able to share some of the costs and absorb some of the risks as the market changes.

As technology improves and price points come down, the industry will start to see more business plans close, but the industry is still feeling that out. At the same time, while we do want money to flow into the market—and the industry has to be better about not only anticipating new markets, but helping to shape them—it is important to recognize that there are some advantages to operating in a resource constrained environment. Emerging economies coming out of communism in Eastern Europe have actually led the way in many technologies, based on the fact that their environments forced them to do more with less. Industry should look for the Goldilocks solution – not too much investment, not too little investment. The Russian Federation has done a good job in creating a robust and resilient system with a small amount of money; this could be a relevant example of the near-term future of the industry.

As we concluded the evening’s discussion, we agreed that the space industry will face a variety of challenges in the future, but there were specific areas on which it should focus today:

- The idea of space and space travel conjures many images for people around the world; **organizations must find ways to encourage and leverage passion, while making rational, and informed, decisions about accepting risk, making investments, and shaping the market.**
- To remain relevant and prosperous, **organizations should focus on improving their agility, allowing them to anticipate risk and make adjustments very rapidly to capture markets and technologies.**
- Government has played a significant role in space over the past six decades, but the time has come to let markets drive the utilization of the domain; **governments should remain focused on “grand challenges” but leave other endeavors to the private sector.**



Conclusion

Space is not a monolithic, singularly-focused industry; rather it is a diverse set of organizations seeking to generate ideas and profits from different aspects of the domain. The industry is changing, and both emerging and established space players have equities to protect and risks to understand, but the industry, as a whole, is poised for major shifts – in the markets it serves, the way its customers buy, and the value it creates. These shifts will provide challenges, in some ways serving as selective pressures that will thin the competitive environment and force consolidation. However, with these challenges will come significant opportunities for those with the required agility to react quickly and lead the industry into the future. **The success of organizations in the space industry will depend, in many ways, on their ability to increase their agility, quickly identify opportunities and challenges, and make rational and informed decisions to capitalize on them and drive value.**



TOFFLER ASSOCIATES

Toffler Associates is a strategy consultancy, helping leaders build the extraordinary organizations of tomorrow. We serve as a catalyst for change for clients with tough problems to solve, creating impact through knowledge of the forces of change that will shape the future.

To accomplish this, we employ a collaborative approach to guide clients in the development of Knowledge Age business strategies. Our **Future ProofSM** business consulting service provides clarity by identifying the risks and opportunities that may lie ahead, enabling leaders to implement the changes necessary to create value, to sustain growth and to succeed in future operating environments.

We work with public-sector clients, such as federal agencies, the intelligence community, associations and educational institutions, to develop and implement ways to use resources more effectively and to build lasting public trust. We work with private-sector clients, like those in the transportation, aerospace, chemical, advanced materials, information technology and defense markets, to create and execute strategies that drive top-line growth.

We find daily inspiration in working with commercial enterprises and government agencies that are creating something that really matters to people, clients who are trying to make a difference in all of our lives. Our purpose is to help them achieve that. It is the passion that unites our firm as one community.



For more information, please contact:

Beau Oliver

boliver@toffler.com

202.507.0646

Or

Hans Davies

hdavies@toffler.com

571.289.1628