

Conference Roundup: Space Business Forum 2009, New York

If The Space Foundation, along with Toffler Associates, hosted the 2nd annual Space Business Forum in New York City. The single ball room format provided for a more intense and intimate one day experience which encouraged good audience participation and easy networking. The panels and featured speakers were also very engaging and covered well many topics of high current interest (see summary below). Special thanks to my co-master moderator Lon Levin.

Clearly, the speakers and moderators felt the space industry represented attractive investment opportunities both from the stability and recession resistivity offered by the more established aerospace and commercial satellite companies and the high potential growth of certain of the more promising new space entrepreneurial activities. The main challenge of this forum remains the difficulty of presenting “space” in a way that entices greater investment community interest and representation.

All in all, a very good Forum with an important mission: to bring space business leaders and investors together to further mutual understanding; to have entrepreneurs, astronauts and space tourists sit down with aerospace executives, government policy makers, and investors. To borrow a concept from the Obama Administration, to get away from “Old Space” versus “New Space”, and promote “Smart Space”.

- **Space in Today’s Global Economy:** Tom Hendricks, President of Aviation Week, reminded us of how large and global the space industry has become.
 - Revenues for 2008 reached \$257 billion, up from \$251 billion in 2007 a remarkable achievement in a difficult year, but slower growth than the 11% enjoyed in 2007. Continued growth is expected in 2009-2010.
 - Commercial satellite services and infrastructure make up 67% of total revenues with government space budgets representing 32%. Innovation and entrepreneurial activity remain high.
 - Commercial competition will only get more intense as Europe, Russia, China, India, Japan, South Korea and other new space faring nations join the party. For instance, over half of the 636 expendable launch vehicles projected over the next decade will be from Russia, Ukraine and China. On the civil space front, however, greater international collaboration is expected both for ISS and future lunar exploration.



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- The U.S. space industry employs more than 262,000 people and at pay scales roughly twice the national average, yet availability of trained engineers remains a key issue, especially for domestic talent.
- **Sector Performance, Trends, and Expectations:** Anita Antenucci, Managing Director at Houlihan Lokey, moderated this opening panel and was joined by Andy Africk, Senior Partner at Apollo Management, and Heidi Wood, Senior Equity Analyst – Aerospace at Morgan Stanley. Key insights included:
 - Aerospace industry stock and bond performance held up better than the general market during the downturn, but is likewise enjoying less of a pop in the post March recovery.
 - Commercial satellite companies were taken down with the rest of the market, but have actually shown superior revenue and profitability. Those with strong backlog (FSS) and loyal customers (DBS/DTH) are showing good recession resistivity and sound business models. MSS is the next sector to need to prove its business models to investors and will be a focus of 2009/2010 with Iridium, Globstar, ICO, SkyTerra and TerreStar all facing major financing or operational events.
 - The panel shared a feeling that the public equity investor base was still less sophisticated in terms of risk reward analyses for the space industry than debt investors. More education and perhaps more equity successes will be needed to truly open up the public equity markets.
 - Part of the equity problem is that some commercial satellite companies went public too soon, before they really had stable or well understood business plans and sufficiently predictable earnings.
 - Funding “New Space” will remain difficult until revenue generation becomes more clear and predictable. Long negative cash flow periods are a major obstacle to funding in weaker economic cycles like now.
 - Some cautiousness over future prospects for aerospace/defense industry as military budgets may get hit or at least restructured.
- **Space as an Element of Economic Infrastructure:** Steven Kenney, a Partner at Toffler Associates, led this discussion and reminded us the space industry is increasingly part of the larger terrestrial telecom, media, weather and security industries providing critical infrastructure and services as part of often hybrid global networks. Major points included:

- Richard Sanford, Chief Strategist, Global Government Solutions Group – Cisco, discussed the future of satellite telecomm.
 - He believes that with development of new satellite technologies utilization of space by consumers will be just another economic decision versus a last resort. High throughput satellite broadband technologies were mentioned as an example.
 - Mr. Sanford particularly believes the need to eliminate the last mile barrier will provide a large market for space companies as laying fiber to the user will remain too expensive for many markets.
 - In ten years or so, he also sees intra and inter-linked satellite constellations and small satellites operated in networked and reprogrammable fashions to provide more flexible services.

- Edward Morris, Executive Director of Strategic Business Development, ITT Space Systems, focused on the tremendous contribution made to the global economy by GPS.
 - GPS is responsible for billions in productivity gains and the enabling of whole new economic activities like automotive navigation and handheld positioning devices.
 - Mr. Morris also discussed GPS 2.0 with its promised four civil signals and the U.S. Air Force's commitment to continued high quality 24x7 service (despite recent rumors of gaps).
 - Lastly, he reminded us GPS is not just about positioning, but also provides timing signals from atomic clocks which will increasingly enable synchronization of actions in a growing M2M industry.

- Richard Buenneke, Deputy Director for Space Policy, U.S. Department of State, was the last speaker on this panel.
 - He stated that the new Administration had started policy reviews in several areas involving space, but clearly understands the vital nature of space infrastructure to our economy and security. Our embassies, for instance, rely on commercial satellites for much of their communications. DHS is tasked with protecting our domestic satellite infrastructure in a partnership with DOD. Protection of space infrastructure is an agenda item for bilateral talks with our

allies and using satellites to expand prosperity to the “global village” is also part of our future diplomatic efforts.

- Mr. Buenneke also discussed the growing importance of space situational awareness given increased crowding and the space debris problem. The U.S. Air Force has recently expanded the number of objects they track and intends to notify commercial and non-U.S. satellite operators of potential collisions.
 - Lastly, he discussed ongoing efforts by ISO working groups to develop global standards for space communications and operations which should benefit everyone.
- **Featured Speaker - Thomas Pickens III, CEO, Astrotech Corporation:**

Mr. Pickens gave a brief summary of the newly restructured and renamed SpaceHAB, now doing business as Astrotech and trading under the ticker ASTC. However, the focus of the talk was on their Astrogenetix subsidiary.

 - Mr. Pickens and his team at Astrogenetix have studied over 2,000 space manufacturing experiments to determine what works and does not work and what activities have the greatest chance of profitability.
 - NASA has been focused on completing ISS before retiring shuttle fleet and has therefore pushed micro-gravity research to the side. Astrogenetix had special access and knowledge given SpaceHAB’s heritage and was named an ISS National Lab Pathfinder business.
 - Decision was to focus on things like discovering biomarkers for vaccine development which rely on microbe growth. Apparently, microbes grow virulently in space due to better cell diffusion. Mr. Pickens stated that a vaccine that might cost \$100 million to develop on Earth could cost only \$30 million if developed on ISS and perhaps even less on another platform with less red tape and astronaut handling requirements. The salmonella vaccine was chosen as the first target. Some vaccines could have billion dollar markets. Protein crystal growth is another promising market.
 - Barriers to entry include fact that bureaucracy involved in getting experiments flown is daunting (e.g. 7,000 pages just to stay on the shuttle) and the general reluctance of pharmaceutical companies to engage in new and riskier drug development technologies.
 - Mr. Pickens believes ability to utilize sub-orbital systems for R&D mostly limited to shorter term experiments like metallurgy.
 - **New Space Comes of Age:** Joseph Fuller, CEO of Futron Corporation, moderated a panel on “new space” including representatives from

SpaceX, XCOR and Virgin Galactic, all of whom brought entertaining video clips and slides. He reminded us that new space is not just space tourism, but includes activities that both NASA and DOD are supporting. The general consensus was that entrepreneurs were doing things the existing aerospace community was not well equipped to lead, but that the best outcome would be one of collaboration versus hostility. There was also consensus that space tourism was not new space's only "trick pony". Expanding sub-orbital space tourism flights to handle other missions and eventually orbital services was an ambition of all three panelists in addition to potential terrestrial point-to-point flight services.

- Gwynne Shotwell, CEO of SpaceX, brought the audience up to speed on the Falcon I success to date and the status of the Falcon 9 development. She hopes to get two Falcon 9 launches done this year and highlighted a 29 mission, \$2 billion backlog, mostly COTS use of Dragonlab for ISS supply missions. Clearly COTS is doing what it was intended to do and I hope NASA uses this success to create additional COTS style programs for other commercial space activities (Hint to NASA: lunar cargo supply missions). Ms. Shotwell also offered to give tours to anyone visiting the Los Angeles region. Gwynne, I may take you up on that one.
- Andrew Nelson, COO of XCOR, gave a very persuasive talk centered on debunking many cherished "myths" about space development. For instance, XCOR's development and flight testing of its piston-pumped "green thrusters" Lynx vehicle, with as many as seven take-offs and landings in one day, has proven that not all rocket-based vehicles require government funding. XCOR is focused on jet like operations for space tourism and other sub-orbital applications with a projected 2014 market size of \$7.5 billion.
- Patricia Grace Smith, Former FAA Associate Administrator for Commercial Space Transportation and Virgin Galactic Consultant (and longstanding industry champion), reminded us that it was Burt Rutan and the original X-prize winners that truly launched space tourism into the realm of plausibility and the support of Virgin Galactic that added much needed respectability and capital. Ms. Smith stated that SpaceShip 2 was 75% complete and was expected to roll-out this Fall and it has one mother of a mother ship.
- **The Business of Space Tourism:** Richard Garriott, famed video game developer and private space explorer, interviewed by Tom Shelley, VP Marketing of Space Adventures Ltd. Mr. Garriott gave a very engaging travel log of his recent Soyuz trip to ISS. Three major lessons learned: (1) going to space is way cool and addicting (best experience of his life, he wants to go back, but not at \$30 million a pop), (2) the Russians are now

better capitalists than Americans and (3) if you spend some time you can find companies willing to pay you to conduct experiments in space, although for millions versus tens of millions of dollars. Mr. Garriott is convinced companies like SpaceX, XCOR, Virgin Galactic, Armadillo and Blue Origins will be wildly successful and substantially lower the cost per pound of access to low Earth orbit in his life time. He thus believes strongly that the amount of money you can generate by working in space will in the near future exceed to cost of getting to space. In his mind, “new space” can not be stopped. It will happen. Many in the audience were still skeptical of the time frame for these cost improvements in launch given the slow pace of chemical rocket-based propulsion advancements historically. In short, Mr. Garriott is the epitome of the space enthusiast having spent much of his video game fortune on a series of space ventures and now personal space flight and his enthusiasm and optimism are quite contagious, other than perhaps to those immunized in the school of hard knocks.

- **View from the Publicly Traded:** John Higginbotham, CEO of Integral Systems, Inc. Mr. Higginbotham shared with the audience his impressions to date of running a public space company after having managed SpaceVest, a leading venture capital / private equity firm.
 - He thought Sarbanes-Oxley and normal regulatory compliance were a piece of cake (just be honest). What gets you, he said, are the unseen regulatory requirements. He was also critical of accounting rules for employee option expensing, which hurts innovative growth companies. The short-term public investor focus on earnings was another known if unfortunate issue, but more worrisome was an unfair litigation environment that favors the plaintiff, frequently costing public companies hundreds of thousands of dollars to fight frivolous lawsuits. In short, he has made the transition from private to public, and while bemoaning the extra cost, work and risk inherent in being public is focused on growing Integral Systems and creating shareholder value.
 - As for the general public equity market for space companies, he believes that aerospace/defense is well accepted, the commercial space industry is now viewed as real and that there are in fact a growing number of sophisticated long-term public investors. Mr. Higginbotham also believes we are moving into a third wave of globalization. As for the “new space” versus “old space” debate, he doesn’t buy it. In his view, there are real companies like SpaceX that happen to be at an earlier stage and more mature companies like Integral Systems that are ready to be public. It’s a case of development stage, not a new versus old mind set.

- **Government Acquisition – Where Are Dollars Flowing for Space?:**
Kenneth Gordon, CEO of Antelum Capital Partners moderated this panel on expectations in space acquisition from the new Obama Administration. The panel included representatives from the major players and space budget entities, including the Air Force, NASA, NOAA and FAA. In order of decreasing budget:
 - Gary Payton, Deputy Under Secretary of the Air Force for Space Programs confirmed that DOD's acquisition policies were under review. We may see an increase in fixed price contracting, but he does not see a near term decrease in the overall space budget despite the cancellation of TSat. GPS 2.0 will be funded as will increased space situational awareness. He also confirmed an increased interest in small satellite applications and said the first Operationally Responsive Space mission got funded to support a request from a regional commander. More to follow.
 - Alan Ladwig, Senior Advisor, NASA, said that many key decisions would be under review for awhile as the new Administrator went through confirmation and the new team came on board. NASA's budget has a one time boost from the Stimulus package and then flattens out, so difficult choices will have to be made. He suspects NASA will have a continued interest in supporting commercial participation in civil space activities as with the COTS program. International cooperation will also increase.
 - Maureen Wylie, CFO of NOAA, discussed her agencies focus on getting GOES-R up and the difficulties with the NPOESS program. Perhaps luckily for the commercial sector, the cost challenges with these main NOAA programs has created a need and willingness to work with commercial suppliers of atmospheric, oceanic and weather data. She summarized a long list of data NOAA needed following their decadal review, such as GPS radio occultation measurements for more accurate weather prediction.
 - Ken Davidian, EFP Program Lead, FAA Office of Commercial Space Transportation, has a much smaller space budget than his peers on the panel, but certainly the FAA is a key player. Mr Davidian seems to be following in the same tradition of Ms. Smith and should be a supporter and asset to the industry. He focused much of his remarks on the FAA's new drive to create more accurate predictions of the launch service market, which given its increasing complexity, we wish him luck.

In conclusion, unlike Mr. Garriot, I do not believe the brilliant space future that is often envisioned is unstoppable and inevitable, and certainly not so in our life



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times. Space is expensive and difficult and involves an allocation of resources away from other pressing needs with benefits often intangible or distant in their realization. The future of space will instead depend on the hard work, dedication and financial resources of a vast number of people and entities, many of whom are not yet even engaged. A small number of wealthy enthusiasts can be applauded for jump starting our imaginations again and pointing us along the next leg of our journey into space, but if we are going to accomplish everything we can and should do in space, we are going to need numerous and deep new pockets of financing. Government funding alone has proven fickle and insufficient, even if it does continue to provide the backbone for our national security requirements and most civil space exploration. New technologies and business models need to be privately financed to make space activity more cost effective and bring us more powerful space infrastructure and services and more affordable access. Innovative new ways also need to be explored to leverage the support of governments to unleash the creative energies of an enthusiastic even passionate private sector. I hope these issues are the focus of future Space Business Forums.

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