

The Big Picture. Really Big.

The price of reaching the final frontier went down by ~75%... with the successful flight of Space Exploration Technologies (SpaceX) Falcon 1 launch vehicle.

Something important happened last month. Sure, there were some financial market dislocations (see related articles elsewhere in this issue), but, taking the long view, something else important happened: The price of reaching the final frontier went down by ~75%. If it seems like I'm being obscure in that statement, it's because I'm talking about a comparatively remote effect rather than its much more heralded proximate cause: The successful flight of Space Exploration Technologies (SpaceX) Falcon 1 launch vehicle.

Following three successive attempts that came heart-wrenchingly close to success, on September 28th SpaceX's Falcon 1 achieved orbit and met all technical objectives for the mission. Rocket science is hard stuff, as the bodies of American Rocket, Rotary Rocket, Kistler, Beal Aerospace and Pioneer Rocketplane and others prove. (Granted, in different hands, the technology from one of these companies may yet put a satellite in orbit...)

In the process, it demonstrated that a privately funded company based more closely on the culture of a Silicon Valley startup than an aerospace contractor can deliver payloads to space. And, that it can do so manufacturing in America (more specifically, in California, which is not noted for its business friendly climate).

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To achieve this success, SpaceX had to develop new components that were not just technically effective (as demonstrated by fact of the flight), but that were *cost effective*, as demonstrated by their rate card for missions (we also note that SpaceX is the only launch vendor that publicly lists their prices on their web site!). This greatly increased the technical challenge of their task – in contrast, most new satellites and launchers draw as much as possible from previously flight proven designs to minimize risk. But, while it did impose greater technical risk, it gave SpaceX the ability to control their production costs throughout the production chain.

When this strategy is combined with a corporate culture that insists "we're going to change the economics of space, and we're going to make ourselves rich doing it," the result is fanatical attention to costs on the part of every employee. In turn, SpaceX's customers enjoy pricing that is a quarter of competing American-built rockets, and way below world market levels. While SpaceX doesn't release



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its financials, its ability to recently attract outside investment capital in the midst of trying economic times indicates that they aren't doing this just for fun, so that low pricing clearly leaves room for profit.

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While the Falcon 1 rocket has modest capabilities for placing small payloads into orbit, most of the technology employed by SpaceX's much larger Falcon 9 vehicle is drawn from its smaller stable mate. Thus, going forward, SpaceX is going to enjoy the same technology heritage advantages it lacked when developing Falcon 1. In other words, and at the risk of minimizing the still considerable work left to do, a lot of the heavy lifting is already done (sorry folks, I couldn't resist that one).

While I don't mean to minimize the technical accomplishment of reaching orbit (and all the smaller developments along the way), changing the economics of space is the real achievement from last month's launch. Because, with cheaper access to space, new business plans that didn't close last month now do. Because, with cheaper launch access and ever increasing satellite capabilities, new plans that have yet to be conceived are now possible. As a consequence, I suspect there was almost as much cheering from SpaceX's customers (they have 10 additional launches already sold) and prospective customers as from its own team.

Last month, thanks to the SpaceX team, the universe just got a little smaller.



Falcon 1 flight 4 liftoff, September 28, 2008.

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