

INTRODUCTION

SPACE COMMERCE, 2010 - 2020

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There are many reasons to go to space, and one of them is surely to make money.

Space commerce is already a major industry today, generating about \$175B in revenue worldwide. This tidy sum comes primarily from communications satellites and the services needed to build them, get them into orbit, and keep them there.

By tomorrow, however, this figure will grow substantially, not only because the satellite market is thriving, but because other forms of space commerce are now maturing at a rapid rate.

In fact, it appears that we are at a transition point. We are shifting from a stage where space commerce is led by governments and a single type of service, satellite communications, to a stage in which entrepreneurs and large companies are taking leadership by finding ways to create and deliver value to many different kinds of customers across a wide spectrum of products and services, from pharmaceuticals and manufacturing to tourism and energy. By 2020 we anticipate that space commerce will be

earning well beyond a trillion dollars each year, and it could easily be generating two or three trillion, or more.

The Space Commerce Pioneers

Who are the people who are building these new industries? Many of them have contributed the chapters in this book.

- They are entrepreneurs who are building new businesses.
- They are engineers who are designing the systems.
- They are managers who are dealing with the unprecedented complexities of space-based *and* Earth-based operations in industry and government.
- They are visionaries and catalysts who see what we *should* be doing in space, and they are prodding and provoking us to make it happen.
- They are, of course, customers who will buy products and services *not* made on Earth.
- They are educators who are helping prepare the next generation of industry leaders.
- They are soldiers, who will provide security to commercial operations located beyond the confines of Earth.
- Lastly, in this book you will find the passionate and perhaps eloquent voices of many of the industry's pioneers, those who have built and launched space vehicles for the last fifty years, and who are now looking into the future to share with us what they have learned about what to do, and what *not* to do.

This book tells the inside story of space commerce from all of these perspectives, in the words people who are fully engaged in making it happen.

Complexity and Risk

Few industries combine as many elements as space commerce. It is a business, surely, where capital is put at risk every day in the hopes and expectations of a healthy return. Today, the entrepreneurs who invest anticipate very high returns because of the very high risks they are taking.

But space commerce also embodies a different type of risk than any Earth-based business. 'Launch,' in space commerce, means something more than just starting a business; it also means getting hardware and perhaps people into space, into orbit 100 miles out and beyond. And of course launch is definitely a risky undertaking, because if your launch fails

then the cost can be very high both in terms of human life and financial capital.

And launch is just the beginning of the complexities. While getting energy, food, and water to an Earth-bound office building is a matter of making a few phone calls, getting them to space, along with your highly trained staff of very motivated people, means bringing along an entire, self-sustaining living environment. We are still learning just how to do that.

In spite of these complexities, though, the thrill, promise and prospect of space commerce have always attracted a few hearty souls. Some are drawn by the wealth that is waiting to be created. Some are drawn by the fascinating nature of the scientific, engineering and management problems to be solved. Some are drawn because they feel that it is humanity's destiny to venture beyond our planet, and they want to be part of that adventure. Many are drawn by the intriguing combination of all three.

And among these many adventurous ones, some wish to share their insights and experiences by writing about it. It is the purpose of this book to bring you their voices, in the hopes that you will come to understand what this human endeavor means not only to those who choose to be directly involved, but to all of us, to humans in every nation who may benefit from the results of these efforts.

We hope you enjoy reading *Space Commerce* as much as we enjoyed preparing it for you.

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