

FOREWORD

Some of my colleagues at Martin Marietta (now Lockheed Martin) once told me that they had hoped someday to work on the moon or Mars, but that politicians had stolen that opportunity from them. They said they wouldn't let it happen to their kids. I realized at that point that we had to stop talking to each other about space and seek a wider audience. I embarked on what turned out to be a 25-year study of the frontier theory of history as it applies to space colonization. One result is this book. It is not a book about how to get into space. There are plenty of those. This is a book about why we must.

There are no frontiers left on Earth. Virtually every spot on Earth is owned or claimed by a nation willing and able to defend it for economic or military reasons. Every point on Earth is within 20 minutes flight time by ballistic missile. Every point on Earth is connected to the same stressed ecosystem. Nowhere on Earth welcomes refugees anymore. There are no frontiers left on Earth.

Can we substitute other kinds of frontiers? No. Metaphysical realms are a poor bet. "God helps those who help themselves," said Benjamin Franklin. In a similar statement of faith, Heinrichson Faust, the scientist hero of Goethe's play *Faust*, frees himself from a pact with the Devil through practical, dirty-handed struggle. (At the end of Act V: "He who strives on and lives to strive/ Can earn redemption still".) Intelligent design is efficient design. We can expect no future miracle of salvation because that miracle has already occurred.

God has given us the tools to save ourselves: a mind and a spirit capable of conceiving the technologies to enter space.

Princeton physics professor Gerard K. O'Neill called space "The High Frontier" in his 1976 book by the same name. In it, he gave what he called an "existence proof" that humans could build and live comfortably on colonies in space, independently of the earth, but benefiting the home planet in many ways: clean solar power delivered to the earth in virtually unlimited quantities, new hope for an exciting and affluent future, new markets, inventions stemming from the needs of the new environment, and openings for technologies and political systems that would not be permitted to challenge the status quo on Earth.

The nation that does this gets far more, but, perhaps most significantly, it gets the military high ground, justifying the expense of it all (about \$200 billion a year over 15 years). It's a pittance, really. The United States can find it by the simple expedient of diverting funds from its conventional and failing military efforts to space colonization and industrialization, with all that it implies. So what does it imply? See above.

For our trouble, we also get truly isolated facilities to handle any strains of microbial life we may find in space, high vacuum, low temperature, and zero gravity (all valuable industrial resources expensive or impossible to obtain on Earth, but free in space), plentiful energy and materials, exciting and profitable work, a reduction in social pressure for crime and terrorism on Earth, and, like Atlantis, Camelot, and America in their time, the next "Land of Wonders".

The obstacles:

Cost, but not so much. We could more than do this work for a fraction of the money squandered on the military and social futilities of the United States Government alone.

Technological barriers, but not so much. No breakthroughs in physics, materials science, propulsion, or structures are required. At least one (carbon nanotube wire for the cables of space elevators) would be useful. Closed-cycle life support might be a particularly instructive challenge. We will need solid engineering.

Cowardice. We will need to take some risks, including the risk of using nuclear propulsion. A sufficient number must understand and be willing to take these risks.

Communication/Education. This is the most difficult work of all, and the work left to what are typically the weakest minds. About 4% of the U.S. population already gets it, according to an admittedly old copy of the *Space Activist's Handbook*. We can start with that.

Legal/Political Barriers. The Outer Space Treaty, the Moon Agreement, and the Nuclear Test Ban Treaty are examples. Like the treaties themselves, this speed bump is worth mentioning only in a historical context.

Those contributions are most welcome that enable us best. Nothing is more enabling than an idea that provides a litany against fear. That is what *Survivors from Earth* seeks to do, because, for the first time in their history, Americans are afraid. They are the worst kind of afraid, with a cold, hopeless, debilitating fear rather than the hot sense of urgency which has driven them to vigorous action in the past. It is clear that we cannot continue as we have been. The situation has changed. Alternatively, our leaders ask for sacrifice and permanently reduced expectations. Too many of us believe we must not see what is forbidden by the gospel of sustainable development: that there is a third path that avoids both environmental mayhem and dreadful losses of sovereignty and prosperity. What we do not yet see in America is that the world needs an exit, and that the only way out is up. When we do, we will

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begin to end the dark age that began when frontiers disappeared from Earth a hundred years ago and we embarked upon a desperate and futile attempt to address that loss with a specious philosophy of big government, counterfeit altruism, and all manner of the wrong stuff.

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