Space for the 21st Century: Discovery, Innovation, Sustainability (Aerospace Technology Working Group) (Volume 5)

Michael Simpson Ph.D.

Space for the 21st Century: Discovery, Innovation, Sustainability (Aerospace Technology Working Group) (Volume 5)

Michael Simpson Ph.D.

Space for the 21st Century: Discovery, Innovation, Sustainability (Aerospace Technology Working Group) (Volume 5) Michael Simpson Ph.D.
FOREWORD By Bruce McCandless II Former NASA Astronaut This volume is the fifth in the series on contemporary space topics by the Aerospace Technology Working Group with support from Secure World Foundation, the International Space University, and the International Institute of Space Commerce. It deals principally with the topic of sustainability of space operations. In all fields of challenging endeavor actually accomplishing an objective (e.g., putting a satellite into orbit) comes first, followed by exploitation or commercialization, and lastly by a realization that the resource is finite. Such “finite-ness” may come from considerations of pollution (e.g., space debris, propulsion effluent) or of actual limitations on the availability of the resource (e.g., crowding of Geostationary Earth Orbit – GEO). Both of these topics are among those discussed in detail in this volume. Developing countries, in particular, may find such considerations too burdensome, and this begs the need for regulation to avoid the classic “Tragedy of the Commons” situation. In the case of orbital debris we have collectively arrived at a point where tens of millions of tiny pieces of debris are currently in orbit, decaying at diverse rates in a situation where a single flake of paint has been demonstrated to be capable of causing damage when impacting at high relative velocities. At the other end of the spectrum, defunct satellites (e.g., ESA’s Envisat) present discrete problems worthy of individual retrieval/disposal efforts but fraught with complications arising from ownership to potentially still effective ITAR constraints on access to onboard technology. And, of course, the managers of the International Space Station are absolutely paranoid about higher altitude orbital debris eventually decaying to and ultimately impacting their very large orbiting facility. While space may realistically be dubbed “infinite,” very specific orbits, or sets of orbits, have practical capacity limits. In GEO, for example, spacing of satellites along it are subject to constraints arising from use of the same radio frequency spectra and the size of ground based antennas required to spatially discriminate between adjacent satellites. In popular high inclination sun-synchronous Earth imaging orbits, these all converge near the poles, creating a traffic management concern arising from the risk of collision. The subject of “green propellants” is treated from several aspects. The Liquid Oxygen / Liquid Hydrogen system, while yielding only water vapor from combustion, may have a significant carbon footprint associated with the manufacture of the LH2 from methane or methanol. Aluminum oxide, an exhaust product of common solid propellant boosters is generally regarded as inert, but the inhalation of fine particles of it can cause pulmonary fibrosis or other lung damage in humans. Additionally the need for oxidizer depletion shutdown in the family of hydrazine/oxidizer booster stages results in significant quantities of UDMH (for example) being dispersed upon impact of the early stages. No Foreword can do adequate justice to the carefully developed material within the publication itself. For a detailed and thought provoking coverage of the principal topics associated with the sustainability of space operations, this book is highly recommended, authoritative, and “a good read.”

Download and Read Free Online Space for the 21st Century: Discovery, Innovation, Sustainability (Aerospace Technology Working Group) (Volume 5) Michael Simpson Ph.D.

From reader reviews:

Barbara Harp:

The book Space for the 21st Century: Discovery, Innovation, Sustainability (Aerospace Technology Working Group) (Volume 5) gives you the sense of being enjoy for your spare time. You need to use to make your capable considerably more increase. Book can to be your best friend when you getting stress or having big problem together with your subject. If you can make studying a book Space for the 21st Century: Discovery, Innovation, Sustainability (Aerospace Technology Working Group) (Volume 5) for being your habit, you can get much more advantages, like add your capable, increase your knowledge about a number of or all subjects. You could know everything if you like open up and read a publication Space for the 21st Century: Discovery, Innovation, Sustainability (Aerospace Technology Working Group) (Volume 5). Kinds of book are a lot of. It means that, science guide or encyclopedia or some others. So , how do you think about this reserve?

Catherine Walters:

In this 21st century, people become competitive in each and every way. By being competitive at this point, people have do something to make these survives, being in the middle of the actual crowded place and notice by surrounding. One thing that oftentimes many people have underestimated it for a while is reading. Yeah, by reading a e-book your ability to survive enhance then having chance to stand than other is high. In your case who want to start reading a book, we give you this kind of Space for the 21st Century: Discovery, Innovation, Sustainability (Aerospace Technology Working Group) (Volume 5) book as basic and daily reading e-book. Why, because this book is more than just a book.

Darlene Kidd:

You may spend your free time you just read this book this reserve. This Space for the 21st Century: Discovery, Innovation, Sustainability (Aerospace Technology Working Group) (Volume 5) is simple to create you can read it in the area, in the beach, train and also soon. If you did not include much space to bring often the printed book, you can buy the actual e-book. It is make you quicker to read it. You can save the actual book in your smart phone. So there are a lot of benefits that you will get when you buy this book.

Donna Muniz:

Guide is one of source of know-how. We can add our information from it. Not only for students but additionally native or citizen require book to know the revise information of year to year. As we know those guides have many advantages. Beside we add our knowledge, also can bring us to around the world. By the book Space for the 21st Century: Discovery, Innovation, Sustainability (Aerospace Technology Working Group) (Volume 5) we can have more advantage. Don't you to be creative people? To become creative person must love to read a book. Merely choose the best book that suited with your aim. Don't be doubt to change your life at this time book Space for the 21st Century: Discovery, Innovation, Sustainability

(Aerospace Technology Working Group) (Volume 5). You can more appealing than now.

Read Space for the 21st Century: Discovery, Innovation, Sustainability (Aerospace Technology Working Group) (Volume 5) by Michael Simpson Ph.D. for online ebook

Space for the 21st Century: Discovery, Innovation, Sustainability (Aerospace Technology Working Group) (Volume 5) by Michael Simpson Ph.D. Free PDF d0wnl0ad, audio books, books to read, good books to read, cheap books, good books, online books, books online, book reviews epub, read books online, books to read online, online library, greatbooks to read, PDF best books to read, top books to read Space for the 21st Century: Discovery, Innovation, Sustainability (Aerospace Technology Working Group) (Volume 5) by Michael Simpson Ph.D. books to read online.

Online Space for the 21st Century: Discovery, Innovation, Sustainability (Aerospace Technology Working Group) (Volume 5) by Michael Simpson Ph.D. ebook PDF download

Space for the 21st Century: Discovery, Innovation, Sustainability (Aerospace Technology Working Group) (Volume 5) by Michael Simpson Ph.D. Doc

Space for the 21st Century: Discovery, Innovation, Sustainability (Aerospace Technology Working Group) (Volume 5) by Michael Simpson Ph.D. Mobipocket

Space for the 21st Century: Discovery, Innovation, Sustainability (Aerospace Technology Working Group) (Volume 5) by Michael Simpson Ph.D. EPub