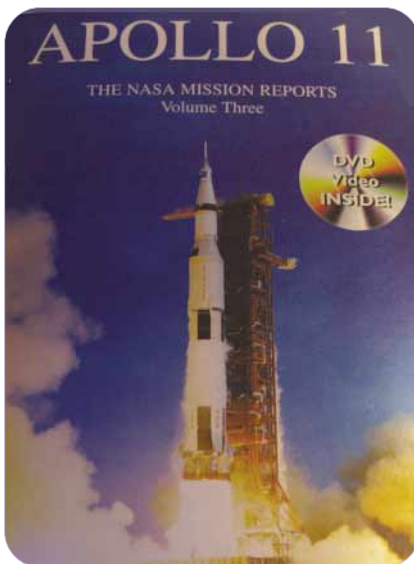




A look at the latest titles

Mark Williamson, independent space technology consultant, reviews books of interest to the space professional. Its policy is one of impartiality and honesty, so if a book has failings we believe should be brought to the attention of potential purchasers, we will do so. On the other hand, if it is useful, informative and entertaining, we will say so. In this way, we hope to provide a useful service to our readers.



Apollo 11: The NASA Mission Reports Volume 3, Robert Godwin (Ed), Apogee Books, Collectors Guide Publishing Inc (<http://www.cgpublishing.com>), 2002, 224pp, US\$24.95; Can\$34.95; £19.95 ISBN 1-896522-85-8 [softback]

As an indication of how much archive information there is on the Apollo missions, the Apogee series of NASA Mission Reports has now published three volumes on Apollo 11 alone. Volumes 1 and 2, which appeared back in 1999, concentrated on pre-flight documentation and post-flight interviews, respectively.

This third volume contains the official Apollo 11 Mission Report, a document originally published by NASA in November 1969, just prior to the launch of Apollo 12. According to the book's publicity, it contains "everything from the crew's observations about the reflection off their faceplates to the interaction between the Lunar Module's footpads and the dusty lunar surface".

As might be expected from a catalogue

of man's first exploration of another world, the level of detail is considerable. The book includes individual sections on each phase of the mission, including "translunar coast", "descent preparation" and "lunar surface operations". Later sections report on the results from the surface experiments, extra-vehicular activities and even the performance of the communications network designed to support all phases of the Apollo missions.

The volume is illustrated by dozens of original photographs, figures and tables providing, in some cases, more detail than even the biggest Apollo buff could assimilate. Pictures, however, tend to speak for themselves and even the more technical ones, showing close-ups of LM footpads sitting hard on the surface, have a story to tell – in this case that those who warned that the lunar module would be swallowed by a sea of dust were just plain wrong!

But learning about space exploration was what the Apollo 11 mission was all about, even the more mundane elements such as drugs packaging. The medications in tablet and capsule form were sealed in individual plastic or foil containers. However, when the medical kit was unpacked in the command module, it was found that the packages had "blown up like balloons", because insufficient air had been evacuated before launch. This increased the volume of the kit so much that it was impossible to repack it without cutting off part of the kit.

The 'bonus DVD' that is now standard with Apogee books in this series contains "an exclusive new movie", a 140-minute real-time composition from two cameras, complete with panoramas and still images. It also includes the landing of the Eagle with stereo audio and subtitles, and other mission phases such as docking, undocking and re-entry. You could easily lose yourself for an evening in this little lot, reliving those halcyon days of 1969 when the Space Age was young. It may not be Technicolor, and it may not be Tom Hanks, but it is an important part of our history. ●



Kids to Space: A Space Traveler's Guide, Lonnie Jones Schorer, Apogee Books, Collectors Guide Publishing Inc (<http://www.cgpublishing.com>), 2006, 304pp, US\$29.95; Can\$33.95; £19.95 ISBN 1-894959-42-6 [softback]

Space proponents are always saying how important it is to educate and excite the younger generation, so that (a) some of them will become engineers and scientists and take up the baton of space exploration and (b) the rest of them will not object to paying for it.

This book is intended to provide a step in the right direction. It comprises a large selection of questions and answers on a variety of space-related topics. The questions were asked by some 6000 North American students (aged 3 to 18), between January and June 2005, under the auspices of an organisation suggested by astronaut Buzz Aldrin called Global Space Travelers. They cover anything from "how much does it cost to get water into space?" to "could we play basketball?", while the answers run from a couple of lines to several paragraphs, depending on their complexity.

The answers were provided by more than 80 experts - ranging from astronauts to physics professors - and grouped into three sections: 'planning to go to space', 'visiting and living in space' and 'exploring space'. There are also prologues by Arthur C Clarke and Burt Rutan.

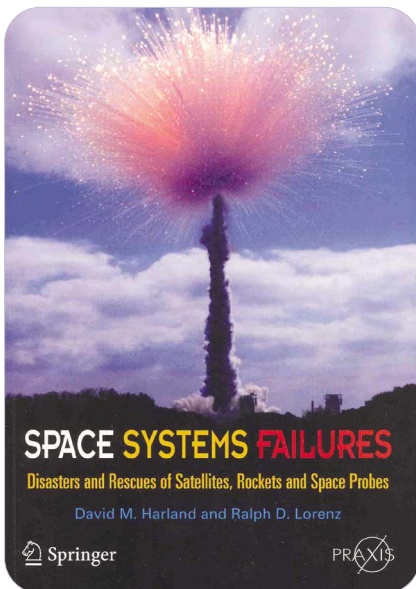
The book is illustrated, as one might expect, by children's drawings and paintings of space subjects; most are in black-and-white, but there is also a 20-page colour insert. As usual with Apogee Books, there is also a CD-



ROM bound into the back cover: it contains several large PowerPoint slide shows of more than 1,000 children's artworks backed by music from Hawkwind. As such, it is probably the largest display of space art one will ever see.

The pictures range from shuttles and spaceships flying to the Moon to space stations and Mars bases. If nothing else, they are an education in the variation of artistic talent among children. The most colourful show variegated spacecraft jetting between a full paint box of planets. One of the more thoughtful, perhaps, shows a pair of children looking through a curtained window towards the Earth. But I particularly liked the picture of the spaceship, plying between worlds, complete with a speech bubble reading "Are we there yet?".

The main question in my mind is "who will read the book?". Although its contributors cover a wide age range, it seems unlikely that the younger half will be sufficiently attracted to the book, and its solid pages of text, to do more than glance at the pictures, while only those older children already interested in space will have the staying power to consider its contents. After all, there is already a well-populated genre of children's books on space, which are large format, colourful, interactive (via tabs and pop-ups) or just plain inspirational. By contrast, this book is like a college text, perhaps more of interest to the children's parents or teachers. ●



Space Systems Failures: Disasters and Rescues of Satellites, Rockets and Space Probes, David M Harland & Ralph D Lorenz, Springer Praxis, 2005, 368pp, EUR24.95; US\$29.95; £18.95 ISBN 0-387-21519-0 [softback]

As a society, we appear to have a morbid

fascination with dysfunction. Visual drama and written fiction invariably focuses on conflict, either physical or emotional, while the very nature of so-called 'reality TV' is based on observing, and revelling in, someone else's misfortune. So why should our view of space exploration be any different?

This book is the literary equivalent of the 'tell-all' TV documentary and should meet most of its readers' vicarious interests in what can go wrong in – or on the way to – space. The authors' intent, however, is not to produce "a catalogue of doom", but to "review the causes of failures and how the engineering knowledge base has been enhanced by the lessons learned".

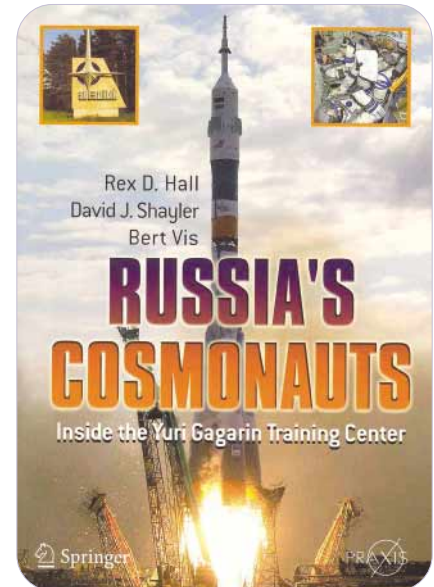
To do this, they split the book into two parts, the first dealing with launch vehicles and the second with spacecraft. Part One, which has eight chapters, is largely historical, covering a variety of systems from the early ICBM-based launchers, via the Space Shuttle and familiar expendable vehicles, to what the authors call "the current crop". Part Two, in nine chapters, is organised on engineering lines, covering failures in various subsystems along with operator and software errors.

The book is pretty well encyclopaedic, without being over detailed. In fact, there are so many cases of failure documented here that one wonders how we have managed to explore and develop the space environment so successfully over the past 50 years. One of the reasons is that many of the errors and anomalies experienced by spacecraft are recoverable, albeit with considerable effort from engineers on the ground. The authors sum it up well in their conclusion: "Failure is the norm: something goes wrong on almost every project. The measure of a spacecraft is perhaps not whether it fails, but rather how well it tolerates the inevitable failures".

The book is illustrated with black-and-white photos and diagrams and, thankfully, does not feature the overused image of the Challenger accident on its cover (instead it shows a spectacular explosion of an unmanned Titan vehicle). In fact, if anything, the book is surprisingly limited concerning manned spaceflight incidents, such as the Apollo 1 fire and the Apollo 13 explosion, perhaps because they have been covered in detail elsewhere (viz. David Shayler's 2000 Springer book 'Disasters and Accidents in Manned Spaceflight').

On balance, this book is well researched and referenced (mostly from published journalistic sources) and includes a 14-page, double-column index. As the authors state, this book's apparent fascination with failure is not designed to point fingers or lay blame: "In space...just as on Earth, if we are to advance the state of the art we must learn from our failures". While the jury may be out on whether or not this actually occurs, the only

way to move forward is to remain optimistic and continue to highlight historical failures. Failure may not have been "an option" as far as Apollo 13's flight director was concerned, but it is an all-too-common fact of life in the space business. Anyone involved in the design, manufacturing and operation of spacecraft and launch vehicles should read this book...and learn. ●



Russia's Cosmonauts: Inside the Yuri Gagarin Training Center, Rex D Hall, David J Shayler & Bert Vis, Springer Praxis, 2005, 386pp, EUR24.95; US\$29.95; £18.95 ISBN 0-387-21894-7 [softback]

Since the end of the Cold War, a number of books on the Soviet, and now Russian, space programme have been published. This latest example opens the doors of the Yuri Gagarin Training Center, better known as Star City, where cosmonauts have trained for their missions since the early days of the space-race.

With the assistance of those who operate the centre and using first-hand interviews as well as historical resources, the authors explore how Russian citizens have been selected for spaceflight and how the process has evolved in the past forty years. They are well-versed in this sub-genre of spaceflight literature, having followed the Soviet space programme for many years, and this book is a valuable addition to the field. Apart from an exposition of the centre's early history, it covers spaceflight simulators (both national and international facilities), survival training and the make up of the various 'cosmonaut groups'. There are also substantial sections on training under Interkosmos and other international programmes, and joint programmes such as Shuttle-Mir and the International Space Station (ISS).



The book is illustrated with black-and-white photographs and line drawings, and is well referenced. Its six appendices include biographies of key personnel, details of the cosmonaut teams and a table of Soviet/Russian international manned spaceflights. The book begins with a Foreword by Alexei Leonov and concludes with a bibliography and a six-page index.

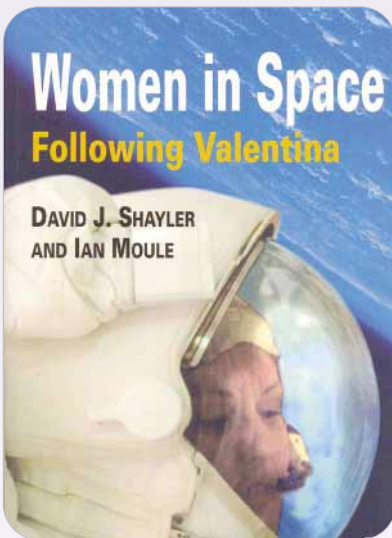
The military town of Zvyozdnyy Gorodok (Star City) is surrounded by a perimeter fence with guarded gates. For many years it was neither shown on any maps nor signposted on the road system. Even today, official passes are required to visit the town and

security is tight, but international collaboration has brought changes over the years and the City continues to develop. A new hotel, complete with café and hairdressing salon, was built in 1990 and a number of detached houses have been built for visiting American astronauts.

One of them even has a bar in the basement, established by ISS mission 1 commander Bill Shepherd (and called 'Shep's Bar' in his honour). This would have been hard to predict in Cold War days, but it remains a testament to how manned spaceflight has evolved since Yuri Gagarin made that first historic flight in 1961.

Cataloguing the history of manned spaceflight has now entered an era of increasing specialisation, in that authors are obliged – in order to be different – to focus on narrower and narrower aspects of the subject. While training programmes may not evoke the feelings of excitement stimulated by actual missions, there is a place for books like this if the subject is to be fully documented.

Certainly, it is necessary to do so before those who were personally involved either die or forget. This book represents an important addition to the 'ongoing documentary' of manned spaceflight.



Women in Space – Following Valentina, David J Shayler & Ian Moule, Springer Praxis, 2005, 410pp, EUR32.95; US\$39.95; £22.50 ISBN 1-85233-744-3 [softback]

Anousheh Ansari, whose family bankrolled the Ansari X-Prize, became the 44th woman to venture into space in September 2006. At the time, 446 individuals had crossed that final frontier, which means that women represent just a tenth of all space travellers. Nevertheless, that so many women have been in space will come as a surprise to many who perceive it as an exclusively male-dominated profession. For that reason alone, in highlighting the role of the female astronaut and cosmonaut, this book does woman-kind a significant service.

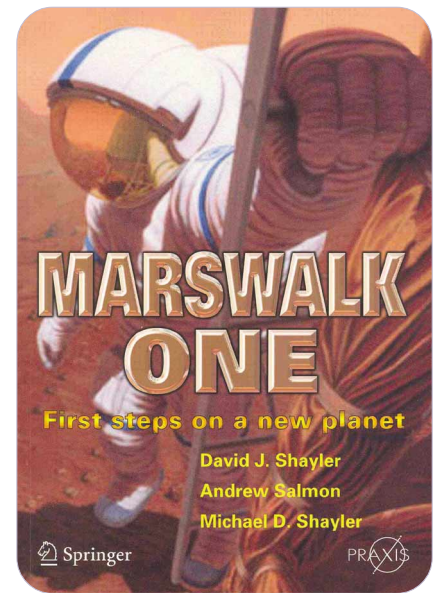
In fact, delving back to the beginnings of the Space Age, the tenth person to orbit

the Earth was a woman, Valentina Tereshkova, who is referred to in the subtitle of this book. However, her groundbreaking flight was an overtly political manoeuvre on behalf of the Soviet Union, and another ten years would pass before a second woman achieved orbit. As the authors say, "The road to space for women has been long and difficult but their commitment and contribution has been as dedicated as that of their male colleagues". This book is their story.

One of the authors, David Shayler, has been interested in the subject since the late 1960s, when he read about the support given to the early astronauts by their wives and families. The aim of this book is "to record the long history of women's quest for space, and their competitive nature in matching and at times surpassing male achievements in astronomy, aeronautics, aerial combat, and space programme support roles". As such, it is much more than a biographical account of the female astronauts.

Coverage is divided into nine main sections, with such engaging titles as "A Seagull in Orbit" (a reference to Tereshkova's call sign) and "The Right Stuff, The Wrong Sex", along with section titles such as "Brassieres, capstans and rocket-plane pilots" and "Pancho Barnes and the Happy Bottom Riding Club". It doesn't go quite as far as 'from g-strings to g-suits', but it's close! The book is illustrated with historical black-and-white photos and has four appendices (of spaceflight and crew details), a glossary, a bibliography and an index – in other words, the complete package.

It would be excellent if this book was widely read by girls still at school, since it might influence their choice of subjects and ultimate career. Not that all girls should aspire to be astronauts, but they should realise that science, engineering and technology are as open to them as they are to their male counterparts. Indeed, the book should not be confined to the women's section, because even those men already involved in the space industry would benefit from knowing more about women's achievements.



Marswalk One: First Steps on a New Planet, David J Shayler, Andrew Salmon & Michael D Shayler, Springer Praxis, 2005, 244pp, EUR24.95; US\$29.95; £18.95 ISBN 1-85233-792-3 [softback]

When US President Bush made his so-called 'Vision Speech' in January 2004, announcing "a new plan to explore space and extend a human presence across the solar system", it was inevitable that space book authors would start tapping at their keyboards. This book is one of the results.

Its title - Marswalk One – is fairly self-descriptive, evoking images of suited astronauts exploring the surface of the red planet, as their forebears did on the Moon in the 1960s and 70s. Although astronaut Dick Gordon went to the Moon, as command module pilot of Apollo 12, he sees the perspective of Earth gained from Mars as more important. "I believe the final perspective will be from Mars," he writes in his Foreword, "when the Earth...will be that blue dot in the vast void of space".

This book aims to answer questions



about what the first manned missions to Mars will do, both on the surface and from orbit, and what they can achieve that unmanned missions cannot. Not surprisingly, perhaps, it begins with an overview of the Martian system and a short history of Mars exploration, but it soon gets down to the nitty-gritty with sections on the voyage to Mars, which could take the best part of a year, the design of spacesuits, and plans for surface science and exploration. It is illustrated, though not copiously, with black-and-white photos and has a brief chronology as an appendix and a four-page index.

The authors recognise the difficulties in writing a book like this, considering that no firm plans have been made and no funded programme exists, and have confined their remit to what might be expected from the very first mission, because "in many ways the challenge of landing this first crew on Mars will set the stage for the events that follow". It is, as a result, a highly speculative volume which aims to "open a discussion" on what to expect from that first mission.

In a sense, therefore, it follows in the foot-

steps of many other publications, dating back at least to Wernher von Braun's writings of the 1970s, and risks suffering from the same optimism: "By the year 2000", wrote von Braun, "we will undoubtedly have a sizeable operation on the Moon, we will have achieved a manned Mars landing, and it's entirely possible we will have flown with men to the outer planets." It must be hard for those who did not live through this period, and experience the optimism first hand, to understand how such predictions could have turned out so wrong.

Nevertheless, there is a need for books like this. They provide food for thought and should be studied by future Mars exploration planners, if only to reject ideas for better ones.

Quite rightly, this book makes mention of the contamination and planetary protection issues that will hopefully feature in actual project planning, although it could usefully have included a dedicated section on the subject. As the authors realise, false positives in the search for life (because contamination has been introduced from Earth)

will be extremely damaging for Martian life science.

Bush's speech placed the first Mars mission in the indeterminate period beyond 2020, while ESA's Aurora programme looks to around 2030.

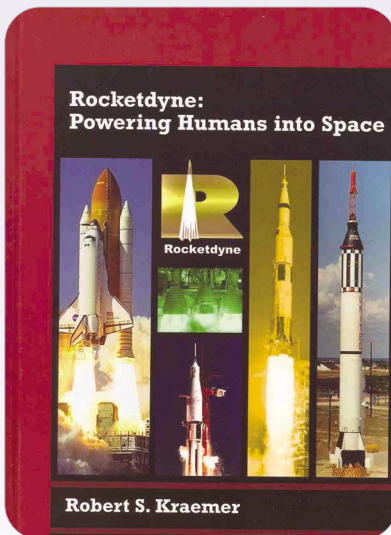
It remains to be seen when 'Marswalk One' will become reality. ●

GET YOUR BOOK REVIEWED

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If you wish us to review your book please contact Mark Williamson.

He can be contact at
mark@williamsonspace.co.uk



Rocketdyne: Powering Humans into Space, Robert S Kraemer, AIAA, 2006, 274pp, US\$39.95 ISBN 1-56347-754-8 [hardback]

Seasoned space watchers will know the name of Rocketdyne, as the company responsible for rocket engines such as the legendary Saturn V F-1 and the Space Shuttle Main Engine (SSME). Rocketdyne was absorbed by Boeing in 1996 and then sold to Pratt & Whitney in 2005. Surprisingly, given its evident importance in space exploration, "No one had written an overall history of Rocketdyne", according to author Robert Kraemer, because "the professional historians said there was not enough preserved documentation for them to write a proper history book". Luckily, Kraemer ignored the opinions of the so-called professionals and went out to interview survivors of the Rocketdyne days, added his "own insight as a member of the team" and produced this book.

As its subtitle suggests, this book is about the role of Rocketdyne engines in delivering several generations of astronauts to space. In the author's own words, it is "a story of heroes and even a few villains, but mostly it is a story of triumphant success in the human venture into space". He recalls talking to some of the key Rocketdyne managers who he interviewed for the book: "Without exception their eyes would light up when they recalled their experience with the design and development of large powerful rocket engines. Their enthusiasm was so infectious that I decided to make an effort to...preserve their vital roles in opening...the Space Age".

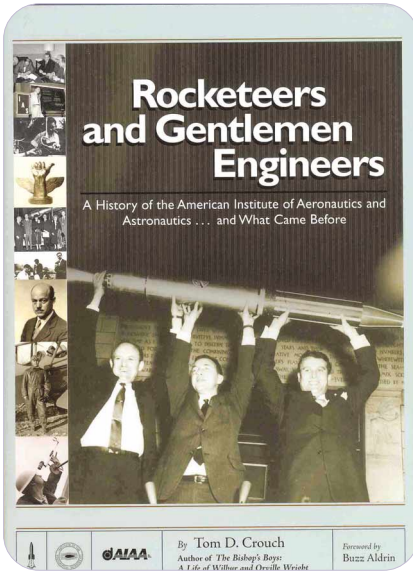
His book does this in nine chapters, covering the early development of rocketry "from theory to the V-2" and then dedicating chapters to the major engine developments pur-

sued by Rocketdyne over the years. There are also appendices on engines and people, chapter notes and references and a substantial 16-page, double-column index. The book is illustrated with black-and-white photos and diagrams.

The 1960s are seen as the golden years by many in the space profession, with good reason as this was the decade that saw the first astronauts on the Moon. To achieve this goal, the thrust of American rocket engines increased by a factor of 1000 in just a decade and a half, culminating in the Saturn V F-1 engine, which - at 1.5 million pounds of thrust - remains the most powerful individual rocket engine ever built.

This is an interesting story, made substantial by its reliance on the people who actually made the dream come true for Rocketdyne. All space companies should be lucky enough to have their own stories told this way. The only criticism of this book is the poor reproduction quality of many of its images, which appear to have been scanned at far too low a resolution; one hopes that the publisher will put this right for any second edition.

There's a well known phrase describing things that aren't that difficult: "it's not rocket science". This book isn't rocket science either: it's about rocket engineering - a far more difficult challenge, as the engineers who made Rocketdyne a household name in the space business would probably testify.



Rocketeers and Gentlemen Engineers, Tom D Crouch, AIAA, 2006, 292pp, US\$49.95 ISBN 1-56347-668-1 [hardback]

Rocketeer is a word you don't come across very often – probably because it's made up – but it helps to draw the eye to this book on the history of its publisher, the American Institute of Aeronautics and Astronautics. Commissioned to commemorate its 75th anniversary, it tells the story of the AIAA and its predecessor organisations, the American Rocket Society (ARS) and the Institute of the Aeronautical Sciences (IAS) and, by its nature, includes a significant amount of pre-Space Age development.

The book's nine chapters cover distinct historical periods, beginning with 1881-1928 (the "prehistory" of the IAS), via various phases in the development of the ARS and IAS, to a final chapter called simply "AIAA, 1980-2003". It also includes a bibliography and an eight-page three-column index. In addition, some 50 pages of this 300-page book are dedicated to appendices that list past presidents, award recipients and ARS rocket designs (seven pages of line drawings). The rest of the book is illustrated with monochrome photographs, mostly of the people involved in the organisations' development.

One of those people, pictured on page 64 in flight suit and goggles standing next to a biplane, is Edwin Eugene Aldrin, the father of one Edwin 'Buzz' Aldrin (second man on the Moon). A student and correspondent of rocket pioneer Robert Goddard, Aldrin senior was recruited by Jerome Hunsaker and Lester Gardner in 1932, when they set out to create the IAS, and was a member of its first governing council. In his foreword, Aldrin junior expands upon his "personal connection to the history of the Institute" and expresses pride in playing his own part in

carrying the tradition "forward into the space age".

The fact that this book exists at all is testament to the growing interest in the history of science and engineering – at least among the cognoscenti. In 1981, on the occasion of the AIAA's 50th anniversary, the possibility of a history was suggested. However, writes author Tom Crouch, "for a variety of reasons, that did not happen". Twenty-five years later, those arguing for a history to be written were more successful and this book is the result.

What is particularly nice about this book is its contextual element. Not content with stating that such-and-such a development was the brainchild of so-and-so and this is how he did it, Crouch paints the characters onto a canvas of contemporary history. He writes that Gawain Edward Pendray, ARS founder, rented a second-floor apartment which he and his wife "furnished with tables

and chairs constructed ("in the cubist manner") from shipping crates". Attracted by "the excitement and sense of possibility in Jazz Age Manhattan", Pendray struggled with a series of part-time jobs to make ends meet, got in with science fiction publisher Hugo Gernsback and helped formulate the idea of a rocket society in a speakeasy, called Nino and Nella's, on New York's West 22nd Street. Perhaps one suffers a rose-tinted view of history, but why don't things happen like that any more?

You don't have to be particularly interested in the AIAA as an organisation to appreciate this book – indeed you could even miss out the IAS chapters if your interests are confined to space – because its subject is more than the AIAA. In the same way that such organisations bind a profession together, this book provides the ties that link individuals, technology developments in America and other aspects of the Space Age.

Recent Advances in Gossamer Spacecraft, Christopher H M Jenkins (Ed), AIAA, 2006, 341pp, US\$94.95 ISBN 1-56347-777-7 [hardback]

It could be said that if you have to ask what "Gossamer Spacecraft" are, this book might not be for you, but that would assume that you were unwilling to learn. As the editor explains, "A hallmark of gossamer technology is its ultra-low mass", and includes the technology of solar sails used for propulsion and membrane mirrors used in space telescopes.

The book begins with a quote from Louis Freedman, the project director of Cosmos 1, a solar sail experiment sponsored by The Planetary Society. The project might have boosted gossamer spacecraft higher in the public consciousness had it succeeded, but, unfortunately, as a result of a launch vehicle anomaly in June 2005, it failed to make it into orbit. Nevertheless, says the editor, "the project captured the hearts and minds of millions around the globe [because] the thought of 'sailing' the vastness of space, charting new frontiers in a way so analogous to the early exploration of our own realm, is both exciting and infectious".

Despite the apparent excitement, this is undoubtedly a technical book, complete with graphs, equations and complex descriptions. Its contributors, mainly from universities, NASA centres and research laboratories, present the latest technology in the field in seven chapters: 'Booms and Trusses', 'Membrane Mirrors in Space Telescopes', 'Membrane Wrinkling', 'Functional Materials for Smart Gossamer Spacecraft', 'Solar Sail Propulsion Technology Development', 'Thermal Measurement Techniques' and 'Photogrammetric Measurement Methods'. Each follows a standard format, with introduction, conclusion, acknowledgments and references, and the volume is complemented by a six-page, double-column subject index and an author index. It is illustrated with monochrome photographs and diagrams.

This book will mainly interest workers already in the field or students interested in studying what appears to be a growing research topic