

History of Rocketry and Astronautics

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Front Cover Illustration:

Charles Lundquist (right) gives a presentation on orbital trajectories at the Army Ballistic Missile Agency in Huntsville, Alabama, to Hermann Oberth (left) and Wernher von Braun (center) on June 28, 1958. Credit: NASA and UAH Library.

History of Rocketry and Astronautics

**Proceedings of the Fifty-First History Symposium of
the International Academy of Astronautics**

Adelaide, South Australia, 2017

Michael L. Ciancone, Volume Editor

Kerrie Dougherty, Part III Editor

Rick W. Sturdevant, Series Editor

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Foreword

As series editor for the International Academy of Astronautics (IAA) history symposia volumes, the authors of the scholarly papers that become chapters in these volumes always surprise me. I am amazed at how they present new details about familiar projects or events, and I am stunned by how they introduce previously forgotten or unappreciated aspects of rocket and space history. This latest, long-awaited volume is no exception.

As I reflected on its nineteen chapters, it occurred to me that I have lived through and, in some instances, personally experienced bits and pieces of the stories these authors so captivatingly tell. Practically every one of them, in their own way, delivers memorable space- or rocket-related history from my lifetime. Looking backward in quinquennial fashion, I found mention of the last Apollo flight to the Moon in 1972—forty-five years prior to this IAA symposium. Before that, in 1967—fifty years before the symposium—the *Apollo 1* tragedy that cost the lives of three brave American astronauts came to mind, as did the happier memory of *WRESAT*, the first Australian satellite, being launched. Five years before that—as a high school student, in 1962—I was glued to the television screen, watching John Glenn’s Mercury-Atlas 6 send the first American into Earth orbit. And, five years even earlier—as a ten-year-old boy, in the autumn of 1957—I gazed upward to watch *Sputnik*’s rocket body pass swiftly across the nighttime sky. Then, when Charles Lundquist’s obituary informed me that he first became acquainted with Wernher von Braun’s work seventy years earlier, in 1947, it took me back to my birth.

Looking backward, as this historical volume prompted me to do, left me mindful of the rich complexity of the space-related activities that constitute the foundation upon which today’s rocket scientists, satellite engineers, and other spaceflight professionals continue building. Most often, today’s work is evolutionary, but that is not to say revolutionary ideas spark unforeseen twists and turns, just as they did in the past. The chapters in this volume tell tales of both these progressive avenues.

Indeed, after a thorough reading, they prompted me to sit back in my chair and contemplate the quinquennial pattern of the future. Looking forward, I see billionaires building space rockets and their corporate enterprises operating dozens, even hundreds of privately funded satellites. Will private human spaceflight occur in 2022? Will a privately financed presence be established on the Moon in 2027? Will a government-sponsored space organization manage to send humans to Mars in 2032? Where will rocketry and spaceflight take us in 2037? The history that appears in this volume leaves me extremely excited about the future and unbelievably curious about how it will unfold.

Dr. Rick W. Sturdevant
Series Editor
United States Space Force
Office of History

Preface

The Fifty-First History Symposium of the International Academy of Astronautics took place during the Sixty-Eighth International Astronautical Congress in September 2017. The picturesque city of Adelaide, capital of South Australia, was the venue for the congress, only the second time the event had been held in the Land Down Under (the first was held in Melbourne, Victoria, in 1998).

The year 2017 was special for space in Australia, marking fifty years since the launch of the country's first satellite, *WRESAT (Weapons Research Establishment Satellite)*. This fiftieth anniversary formed a major theme of the education and outreach programs associated with the congress. Highlights included an extensive exhibition on the history of the Woomera Rocket Range, held at the State Library of South Australia, and the release of a special WRESAT anniversary stamp and first day cover by *Australia Post*.

History was also made during the congress, with the announcement at the opening ceremony that the Australian government would form the nation's first space agency, a goal long pursued by the Australian space community. The jubilation with which the Australian delegates greeted this announcement will be long remembered by everyone present.

The Fifty-First History Symposium was composed of four sessions: Memoirs and Organizational Histories; Science and Technology Reviews; a session on the History of Australian Contributions to Astronautics, in recognition of the host country; and a special session as part of the lead-up to the fiftieth anniversary of the *Apollo 11* Moon landing in 2019, under the title "Can You Believe They Put a Man on the Moon?" This special session was the first in a series that will continue until 2019, focusing on all aspects of the development and preparation for the first human landing on the Moon in 1969. Its four papers encompassed an eclectic range of topics: from the cultural impact of the Apollo program and the larger lessons to be learned from the space race to the contribution of Spain's

Fresnedillas space tracking station and the experience of watching the *Apollo 11* landing in Ireland.

This volume is divided into four parts, reflecting the four sessions of the symposium outlined above. The papers presented in 2017 covered a wide spectrum of space history topics, but—in addition to the special focus on the Apollo program—a few themes emerged. As 2017 was also the sixtieth anniversary of the launch of the world’s first satellite, several papers addressed the legacy of *Sputnik 1*, while the achievements of little-known rocketeers of the 1930s and less-well known figures in the US space program were also presented. Regrettably, the lead author of a fascinating presentation on the work of Robert Farquhar, the “father of halo orbits,” failed to provide a written paper. In its stead, an extended abstract is included to acknowledge Farquhar’s significant work. A particularly important contribution in this volume is Frank Winter’s chapter, reassessing the significance of the Viking sounding rocket and demonstrating that it must be considered the first rocket specifically designed for flight into space.

Sadly, space historian and long-time participant in the history symposia, Dr. Charles Lundquist passed away in 2017. A memorial celebrating his life and contributions to space history research is included in this volume as a mark of respect to a valued colleague.

Kerrie Dougherty
Part III Editor

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