# Preface

The papers contained in this volume were presented at 47th History Symposium of the International Academy of Astronautics (IAA) at the 64th International Astronautical Congress (IAC), held in Beijing, China, September 23–27, 2013. This event represented a historic opportunity for the first developing nation to have achieved comprehensive space capabilities to share its progress with the world space community. As part of the congress, I was privileged to join other participants in technical visits to the China Centre for Resources Satellite Data and Application (CRESDA) and the Shanghai Academy of Spaceflight Technology (SAST).

IAC offers the premier international presentation of technical space research and development. No other event in the world offers this scope, depth of knowledge, or access to experts in the field. The fact that this event was hosted in China ensured strong representation by a wide range of Chinese specialists from top governmental and commercial organizations. While only one Chinese group presented on an IAA panel, this volume—in a final section devoted to history of Chinese contribution to astronautics—contains four chapters relating to challenges and opportunities (including one not taken) in Chinese space development. Clearly, there will be plenty to write about in the future on this important subject.

This volume also contains a wide range of chapters documenting contributions to international spaceflight in the traditional areas of memoirs and organizational histories, and scientific and technical histories. Together, these three categories form the organizing principles for this volume.

Back in 1967, when the first IAA *Proceedings* was being edited, China was in the throes of the Cultural Revolution and had yet to launch its first satellite. The founding father of China's space development, Qian Xuesen (to whom this volume is dedicated), found himself in a difficult political position, even as his vital importance to the nation was recognized. Nearly half a century later, the IAC conference location itself—the China National Convention Center—symbolized a new era for China and its interaction with the world. IAC was just one of a half dozen major national and international conferences being held simultaneously on topics ranging from blood platelets to aviation. Were Qian Xuesen to have had the opportunity to attend, he would have found his vision for China well on the way to being fulfilled.

**Dr. Andrew S. Erickson**
**Volume Editor**
**United States Naval War College**
**Newport, Rhode Island**

# Foreword

The 47th History Symposium of the International Academy of Astronautics (IAA) occurred in conjunction with the 64th International Astronautical Congress (IAC) in Beijing, China, during September 2013. As in previous volumes, the papers presented at the symposium are published here as individual chapters. Although some papers required more editing than others, the editing team has endeavored to remain faithful to each author's original intent. Based on the publisher's longstanding practice, our "guiding light" is to avoid overly correcting symposium papers already accepted for publication. Rather than striving for stylistic consistency across all chapters, the editors endeavor to leave chapters mostly as the individual authors originally wrote them, striving only to prevent anything embarrassing or obviously incorrect. We deem it acceptable for an author's idiosyncrasies to come through in the final work, thereby reflecting worldwide differences in language and style.

The thirteen chapters in this volume literally take readers around the world, across a remarkable expanse of time. Altogether, they remind us of how people on nearly every continent have sought to become involved with rocketry and astronautics. We see how gifted visionaries, dedicated scientists, skillful engineers, and supportive political leaders, sometimes working alone but more often participating in creative organizations, have made space history.

As is customary in this series, the last part of the volume provides glimpses of space history in the country that hosted that year's IAC—in this case, China. Only the third country that has developed a human-rated spacecraft to carry its citizens into Earth orbit, China stands today in the first rank of the world's space powers. Building on a heritage of Long March space launch vehicles, the Chinese have near-term plans for their own space station, flights to the Moon, and onward to Mars. The volume you are holding furnishes excellent historical insights to how China's space program evolved. Furthermore, it highlights how Chinese launch vehicles have sent innovative Chinese satellites into outer space.

After reading this volume from cover to cover, one cannot help but admire the inspiration and the determination that have characterized rocketry and astronautics, regardless of nationality, over so many years. Whether from China, Israel, Australia, Japan, Germany, Russia, Great Britain, or somewhere not represented herein, every citizen of the world ought to be proud of what humanity has achieved with regard to spaceflight. Together, all of us ought to shout in unison our advocacy for humankind's continued progress upward and outward into the cosmos.

**Dr. Rick W. Sturdevant**
**Series Editor**
**Air Force Space Command**
**Office of History**

# History of Rocketry and Astronautics

**Proceedings of the Forty-Seventh History Symposium of the International Academy of Astronautics**

**Beijing, China, 2013**

**Andrew S. Erickson, Volume Editor**

**Rick W. Sturdevant, Series Editor**

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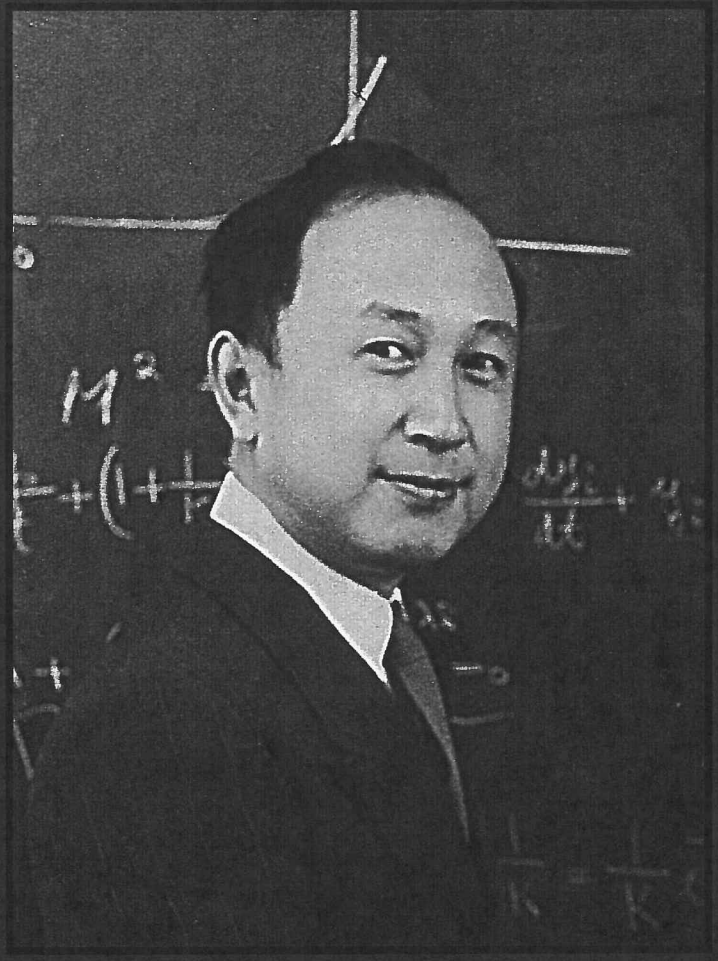

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**Front Cover Illustration:**

The cover photograph is of Dr. Qian Xuesen (Tsien Hsue-shen/钱学森) (1911–2009), to whom this volume is dedicated. It shows him in a classroom at the California Institute of Technology (Caltech), before he returned to China in 1955 to become the undisputed founding father of the nation's space development (中国航天之父). All relevant publication permissions obtained from the Caltech Institute Image Archives.

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