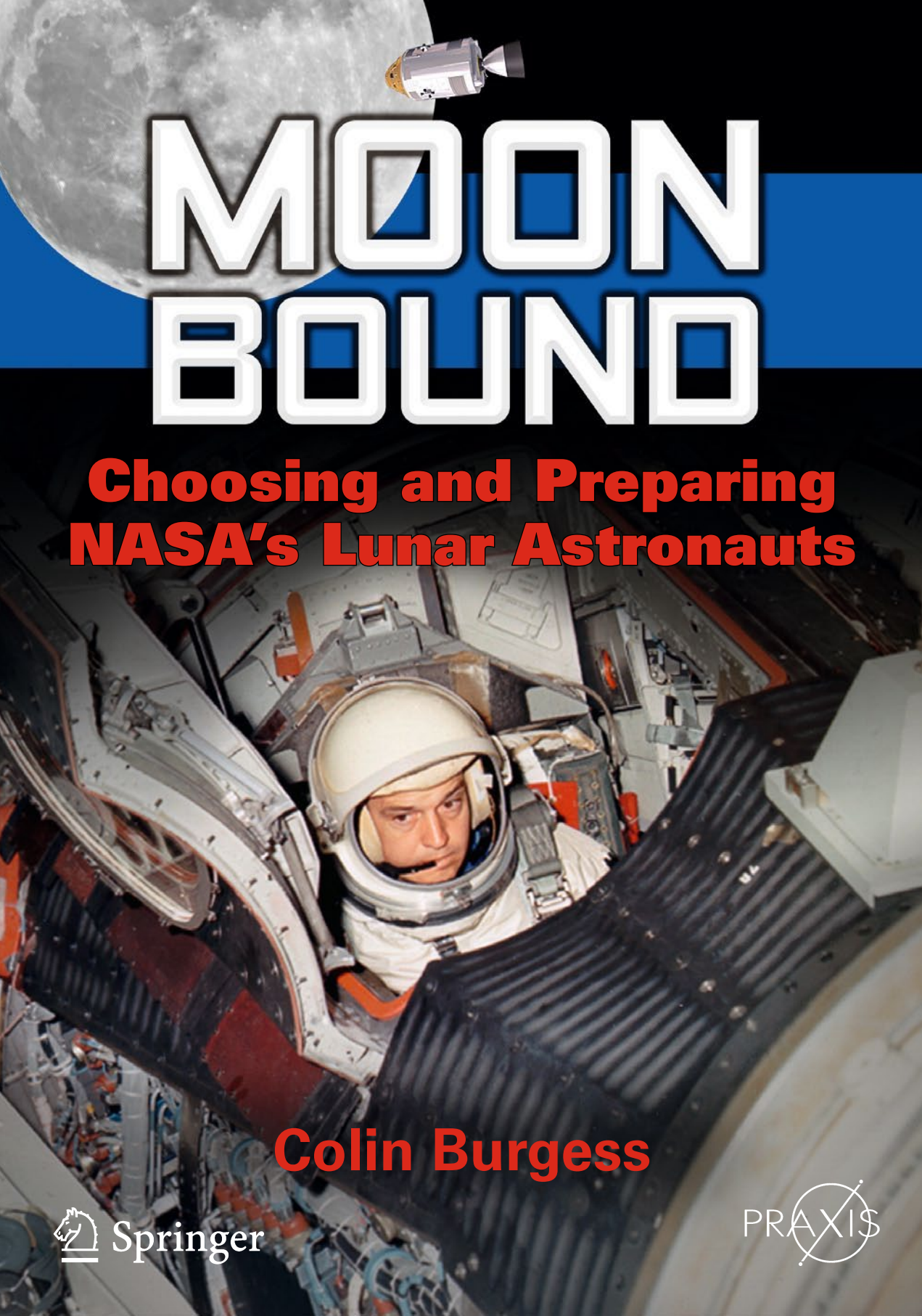
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Contents

This book is respectfully dedicated to the five NASA astronauts from Groups 2 and 3 who lost their lives before they had their chance to realize their dreams of one day gazing down on our blue planet from orbit, or flying to the Moon.

Charles Arthur Bassett II, USAF
Roger Bruce Chaffee, USN
Theodore Cordy Freeman, USAF
Elliot McKay See, Jr.
Clifton Curtis Williams, Jr., USMC

And to the memory of Neil A. Armstrong,
the first human to set foot on the Moon
(5 August 1930–25 August 2012)

Acknowledgements

The genesis of this book goes back several years to a casual conversation I was enjoying in a London pub with good friend and prolific space flight author David Shayler, in which we were discussing the make-up of the finalist group for NASA's Mercury astronauts. At the time there were still five names missing from David's list. These names later came my way by the kindness of retired USAF Lt. Col. Walter B. ("Sully") Sullivan, Jr. He not only supplied those missing names from nearly five decades back, but proved to be a valued friend and invaluable helper as I put together my book on that story.

When David found out I was investigating this new book on NASA's second and third astronaut groups he once again kindly opened his extensive files, sending me the names of the finalists for those groups, which he had happily unearthed while conducting a random search for other material. Although the Internet and instant communication have proved a boon for writers and other investigators, David is one of those people who strongly believe in good old "digging in the dust", as he so delightfully calls it. During a visit to Houston several years earlier, he was working in the National Archives and Records Administration in Fort Worth, Texas, researching NASA's Gemini program through various documents supplied to Rice University by the Johnson Space Center (JSC). Within the hundreds of General Subject files he was flipping through in one of many archive boxes, in this case No. 382, he came across a 15 December 1966 letter from the School of Aerospace Medicine, Brooks Air Force Base in Texas. It was a detailed costing for aeromedical evaluations held in 1962 and 1963 for prospective Gemini astronauts, showing the average examination cost per candidate to have been $788. More importantly, however, there was an attachment to the letter giving the names and dates of all candidates' medical evaluations between 1960 and 1966. From these lists, David was able to supply me with the names, ranks and examination dates for all 32 Group 2 candidates and all 34 Group 3 candidates. As always, I am truly indebted to David for kindly allowing me access to his records and for his encouragement and support in writing this book.

Mentioned above is "Sully" Sullivan. Back in 1959, then a lieutenant, he was the appointed USAF liaison officer for the 32 Mercury finalists who were ordered to the

Wright Aerospace Development Center in Dayton, Ohio. In addition to working with these men on their day-to-day schedules and other administrative work, he developed long term friendships with many of them. This proved a blessing when – early on – I was attempting to convince the unsuccessful finalists to assist me in putting their biographies in a book. Soon after the book *Selecting the Mercury Seven: The Search for America's First Astronauts* was released by Springer-Praxis, I asked Sully, my own 'liaison officer', if he would help me with this follow-up volume, to which he readily agreed. As we located each of the non-selected test pilots from both groups – or their surviving family members – Sully would make the initial contact and introduce me, which smoothed the way for my later contact with them. Over recent years we have become firm friends, and it is a great pleasure to acknowledge in this book (as in the previous one) the impressive, meticulous, and resolute work he has done for me, and ultimately you, the reader. It is little wonder to me that he was selected to assist as the candidates' liaison officer back in 1959.

Many thanks also go to fellow space historian Michael Cassutt, for once again stepping up to the plate and contributing the Foreword to this book – a task which he achieved with such a wonderfully incisive style for the first book. Being a biographer of astronauts and cosmonauts himself – when he is not busy writing his own books or television scripts – I know how much Michael enjoyed reading the manuscripts for both books. I treasure his friendship and opinions.

My principal thanks must, of course, go to the surviving members of both NASA finalist groups who not only responded to my initial enquiries, but went on to provide information and photographs with the utmost enthusiasm for what I was doing. They made it an interesting and pleasurable experience, and I am immensely grateful and appreciative. Profound thanks therefore go to: *Col. Reginald R. Davis (USAF); Col. Roy S. Dickey (USAF); Thomas E. Edmonds; John M. Fritz; Capt. William J. Geiger (USMC); Orville C. Johnson; RADM George M. Furlong, Jr. (USN); Lt. Col. Samuel M. Guild, Jr. (USAF); VADM William E. Ramsey (USN); RADM Robert H. Shumaker (USN); RADM L. Robert Smith (USNR); Lt. Col. Robert E. Solliday (USMC); Col. Alfred H. Uhalt, Jr. (USAF); Lt. Col. Robert J. Vanden-Heuvel (USAF); M/Gen. Kenneth W. Weir (USMC); and Cmdr. Richard L. Wright (USN)*. Special posthumous thanks also go to Capt. John R. C. Mitchell, a Group 2 finalist who assisted me with *Selecting the Mercury Seven*, but sadly passed away shortly before it was published.

The years have taken their toll, and not all of the finalists are with us today, so I turned instead to family members – their widows, sons, daughters, nieces, nephews, and those who knew them best in either their service or private lives. Sincere thanks to all of you for helping me to write about those magnificent men who are no longer in our midst. They were: *Maj. Michael J. Adams (USAF)* – Michelle Evans; *Capt. Roland E. Aslund (USN)* – Diana Aslund and Joan Cudeback; *Capt. Tommy I. Bell, Jr.* – Carolyn Bell Phillips; *Capt. Carl Birdwell, Jr. (USN)* – Bob Birdwell; *Capt. John K. Cochran (USMC)* – Ken Cochran and Kathleen Cochran Clayton; *Donald G. Ebbert* – Greg Ebbert; *Capt. David L. Glunt, Jr. (USN)* – Ann Glunt; *Cmdr. William P. Kelly, Jr. (USN)* – Barbara Kelly; *Capt. Marvin G. McCanna, Jr. (USN)* – Trey and Mary McCanna; *Capt. John R. C. Mitchell (USN)* – Katherine Nickel;

Capt. Alexander K. Rupp (USAF) – Karen Rupp Deming and Bill McWilliams; *Capt. John D. Yamnicky (USN)* – Jann Yamnicky, Jennifer Yamnicky, Lorraine Yamnicky Dixon, Mark Yamnicky, Judy and Lee Bausch, L/Gen. George D. Miller (USAF, Ret.), Garnett Bailey, Craig Rutter, Dolores Sebastian, Carmine Sebastian, Dick Liljestrand, Elizabeth Carroll Foster, Dennis Plautz, Joe Sutliff and Harry Errington.

Invaluable help in researching and compiling biographical information also came from family members of other non-selected finalists, and I am immensely grateful to Terry Vanden-Heuvel Jones, Jim Fritz and Terry Kirkpatrick Loewen.

Some years back I co-authored a book with Kate Doolan for the University of Nebraska Press called *Fallen Astronauts: Heroes Who Died Reaching for the Moon*, in which we gave comprehensive biographies of several of the astronauts who were selected in NASA's Group 2 and 3, so I would like to thank those family members once again for their generosity, hospitality and memories. My extended thanks go to: *Maj. Charles A. Bassett II (USAF)* – Jeannie Bassett-Robinson, Karen (Bassett) Stevenson, Peter Bassett and Bill Bassett; *Lt. Cmdr. Roger B. Chaffee (USN)* – Martha Chaffee and Sheryl Chaffee Marshall; *Capt. Theodore C. Freeman (USAF)* – Faith Freeman Herschap, Anna Mae Freeman Thompson and Perry McGinnis; *Maj. Edward G. Givens, Jr. (USAF)* – Morgan and Cathrine Doyle, and Ed Givens III; *Lt. Col. Virgil I. Grissom (USAF)* – Betty Grissom and Scott Grissom; *Elliot M. See, Jr.* – Marilyn See, Sally See Kneuven, Sally See Llewellyn and the late Neil Armstrong; *Lt. Col. Edward H. White II (USAF)* – Jeanne Whatley, Bonnie Baer and Ed White III; *Maj. Clifton C. Williams, Jr. (USAF)* – Beth Williams, Gertrude Williams, Catherine Williams and Jane Dee Williams.

Individually, and collectively, I acknowledge all those who assisted so readily in the compilation of this book, supplying the gems of information and photographs so vital in turning a few scattered pages into the book that you now have before you. In no particular order, my sincere appreciation goes to Jerry Zacharias, RADM John R. ("Smoke") Wilson, Jr., Tracy Kornfeld, David Shugarts, Kate Doolan, Morris J. Herbert (West Point Association of Graduates), Clayton Adams, Neal Thompson, Joachim Becker at SPACEFACTS, Jere Allen, Neil Corbett (the "Tartan Terror"), David Mazurek, Gary Verver, Al Hallonquist, Will ("Tiny") Tomsen, Steve Townes, Walter Price, Dr. Robert Voas, Nadine Wisely (Blue Angels Association), Colin Babb (Naval Aviation News), Jennifer Bryan (U.S. Naval Academy, Nimitz Library archivist), the entirely wonderful Brigitte Tamashiro at the U.S. Air Force Test Pilot School, and Paula Smith, Jan Schell and Becki Hoffman at the Society of Experimental Test Pilots (SETP).

Several pioneering Gemini and Apollo astronauts readily lent their support to this book through personal and telephone interviews, as well as providing much helpful information at Novaspace's Spacefest IV in Tucson, Arizona in 2012. Firstly, many thanks go to Bill Anders. At Spacefest, Alan Bean, Gene Cernan, Walt Cunningham, Ed Mitchell, Dick Gordon, Dave Scott and Al Worden kindly assisted with answers to my questions and offered stories of their own. For allowing me to attend the event, my gratitude is extended to the amazing Spacefest organizers Kim and Sally Poor.

In January 2012 contact was established with a principal player in the selection of the Group 2 and 3 astronauts, panel member Warren J. North, and I was eager for his insights into the process. It was therefore with great sadness that I discovered he had passed away just weeks later. His input would have been extremely helpful, and he is saluted in this book.

As always, long-time friend and co-author on other books, Francis French, looked through the manuscript and not only reported errors and typos but also made certain recommendations that improved the text.

My final thanks go to those who were responsible for the publication of this book, and their ongoing support of the author. To Maury Solomon, Editor of Physics and Astronomy at Springer Books (New York) for her friendship and belief in the merits of this book, and her assistant Megan Ernst for sorting out the many difficulties that arose with patience and a reassuring professionalism; to Clive Horwood and Romy Blott of Praxis in the U.K.; to my astute copyeditor David M. Harland; and to Jim Wilkie for his superb cover artwork. As previously, this great team has transformed my stories into a superbly crafted book.

Illustrations

Front cover: Group 3 astronaut C.C. Williams in backup training for the Gemini X mission.

Back cover (left to right): Neil Armstrong with the Lunar Landing Training Vehicle; Elliot See during a water egress exercise; Gene Cernan, Roger Chaffee and Charlie Bassett on a geological field trip.

Chapter 1

Chapter 2

Chapter 3

Prologue

At 2:00 p.m. on the afternoon of 9 April 1959, seven apprehensive test pilots – now chosen as Mercury astronauts – were introduced to the press amid unexpected hype and adulation at NASA's temporary headquarters in the Dolley Madison House, Washington, D.C. From outset to announcement, the selection of America's first cadre of astronauts had been conducted in strict secrecy.

A year earlier, in April 1958, and in the light of recent achievements in space by the Soviet Union, U.S. President Dwight D. Eisenhower sent to Congress a bill calling for the immediate establishment of a civilian aeronautics and space agency. The bill was presented and supported, resulting in the passage of the Space Act of 1958, which in turn led to the creation of NASA, the National Aeronautics and Space Administration, on 1 October that year.

One of the first tasks of the new space agency was to implement the selection and training of a small group of outstanding pilots willing to fly into space aboard a capsule that was being designed for the American manned space program, known as Project Mercury. The job of defining and then undertaking a program to select these potential space pilots fell to NASA's Space Task Group, then located at the agency's Langley Research Center in Hampton, Virginia. Accordingly, an astronaut selection committee was assembled.

This eclectic committee consisted of Charles J. Donlan, who was Assistant Director for Project Mercury and headed the candidate screening committee; Warren J. North, formerly a test pilot and engineer with the National Advisory Committee for Aeronautics (NACA) and now NASA's Chief of Space Flight Programs; and flight surgeons, Dr. Stanley C. White, MD, Maj., U.S. Air Force, and Dr. William S. Augerson, MD, Capt., U.S. Army. Additionally, there were two psychologists, Dr. Allen O. Gamble of the National Science Foundation and the Manpower Evaluation Development Office at NASA Headquarters, and Dr. Robert B. Voas, USN, and two psychiatrists, Dr. George E. Ruff, MD, Capt., USAF, at that time Chief of the Stress and Fatigue Section of the Aero Medical Laboratory (AML) at Wright-Patterson AFB, and Dr. Edwin Z. Levy, MD, Capt., USAF. Thus all branches of the military had an active involvement in the selection process. These eight men set in motion an initial screening of military records and later carried out

interviews and testing of the selected candidates. In setting out their parameters the question became a matter of precisely who, and with what qualifications, ought they to seek.

One major problem for the committee was satisfactorily resolved in December 1958 when President Eisenhower decreed that the nation's first astronauts had to be drawn from the ranks of military test pilots. The advantages were obvious; test pilots were already familiar with the rigors of military life, they were available at very short notice; and their full flight and medical records were readily accessible.

Initially, the committee was contemplating a selection pool of around 150 pilots, from which a nominal group of 36 finalists would be chosen to undertake physical, psychological and stress testing. It was originally planned that twelve would then be selected to undertake a nine-month training and qualification program, at the end of which the top six candidates would be selected as the nation's first astronauts. As Dr. White from the committee explained, as they began to pound out the exact criteria, they required individuals who were not only in top physical condition but had also demonstrated the capability to remain calm and work through tough and dangerous assignments. And stamina was an important factor, because the men had to have a good response to stressful situations and be able to withstand it over a period of time.

Specific limitations were then defined; the candidates had to possess a university degree; be a graduate of a test pilot school; be in superb condition both mentally and physically; have around 1,500 hours in high performance jets; be no taller than 5 foot 11 inches (as governed by the dimensions within a Mercury capsule); and be under forty years of age. Initially, the age limit had been set at 35 years, but the rigorous qualifications caused it to be raised to 39.

In the first week of January 1959 a meeting was convened at NASA Headquarters in Washington, at which it was decided to use the Lovelace Clinic in Albuquerque, New Mexico for comprehensive medical testing of the chosen candidates. The clinic was a non-government facility and the results of the examinations would become the property of NASA – not the military. It was felt this would offer reassurance to the pilot candidates that any poor results, which could potentially jeopardize their ability to continue in that service, would not go on their service records. It was also agreed that the ensuing stress and related tests would be at the Aero Medical Laboratory of the Wright Air Development Center (WADC) in Dayton, Ohio.

With these decisions in hand, the selection committee arranged with the Pentagon to retrieve and review the personal records of those who had graduated from test pilot schools in the previous ten years, examining them for basic requirements and a minimum number of flight hours. At the end of this process, they had the names of 508 potential candidates. Next it was necessary to cross-check these records against medical files in order to substantially narrow the field. Eventually, in what became known as Phase One of the operation, the names and records of 110 men were set aside as meeting the minimum qualifications: 58 Air Force pilots, 47 Navy officers, and five from the Marine Corps. Each of the 110 candidates was ranked in terms of his overall qualifications. Several factors were taken into account, such as total flying time, total testing experience, ratings of senior instructors at the test pilot schools – even the age and number of their children.

The committee's final task in this phase of the operation was to place the reviews in ranking order – best through least qualified – then split the files into three working groups of around 35 men, with the most promising in the first group. Charles Donlan then notified NASA of the results.

Literally within days of the initial screening, invitations were sent out to the top 35 candidates, requesting their presence at a briefing session and interviews in the Pentagon on Monday, 2 February, for what would begin Phase Two of the selection process. The orders were issued by the Chief of Naval Operations or the Air Force Chief of Staff, as appropriate. The candidates were instructed to leave their uniforms at home, and not to discuss their top-secret orders or the nature of the briefing with anyone. The second group would be called a week later, and the third group a week after that.

After informative briefings by service heads and NASA representatives on Project Mercury and the opportunity to apply to become astronauts, each candidate was told he could decline without prejudice to his military career. Those that opted to proceed would spend the rest of the week undergoing interviews and preliminary suitability tests. It was soon realized that to screen all 110 candidates would put an unnecessary strain on the resources of the selection team. After the second round of briefings and interviews, a total of 69 men had been processed. Of that number, 16 had declined, 6 were found to be too tall, and another 15 had been eliminated by one or more of the tests. According to Dr. Allen Gamble, he and Bob Voas found that they had 32 well-qualified candidates who had passed every test with flying colors. With a nominal 12 astronaut positions on offer, and a surprisingly high volunteer rate from the first two groups, it was decided not to summon the remaining group of 41 candidates, as they had not ranked quite as high on their records.

After batteries of tests had been carried out at the Lovelace Clinic and the Wright Air Development Center – as described in full in the author's earlier book, *Selecting the Mercury Seven: The Search for America's First Astronauts* – all of the medical, physical, psychological and stress test results were given to the selection committee. With the number of positions on offer reduced to 6, but with 7 firm candidates, the committee faced the near-impossible task of finding a reason to exclude one man. To remedy this dilemma, Dr. Robert R. Gilruth, head of the Space Task Group, elected to accept them all, and these were the men proudly presented to the assembled press in Washington, and through them the world, in April 1959.

Three years later, on 18 April 1962, NASA announced that it would be selecting a second cadre of astronauts following the tremendous successes and acceleration of the manned program. More pilots were now needed as Mercury transitioned into the two-man Gemini program.

This time, there was some policy reorientation. Mercury astronauts Alan Shepard and Donald ("Deke") Slayton were appointed to the selection panel, which also contained Warren J. North, a member of the Mercury selection panel. Slayton had recently been named coordinator of astronaut activities (i.e. chief astronaut) after his disqualification from flight assignment owing to a minor heart irregularity. As he so rightly pointed out in his later memoir, the panel could probably have simply gone back to the group of finalists from the Lovelace and Wright-Patterson exams in 1959

and hired another group right there from the 25 who did not make the final cut, but in the end it was decided not to do this.

According to Slayton, the panel devised a set of criteria for the second astronaut group that would enable the selections to be made with far less fuss. First of all, the invitation was opened to include civilians with experience as a jet test pilot, and to those with scientific as well as engineering backgrounds. The physical requirements would also be revised, as the planned Gemini and Apollo spacecraft were intended to be slightly larger than the Mercury craft. It was therefore decided to raise the height limit by an inch to 6 feet. Additionally, as these new programs would extend beyond the planned 3 years of Project Mercury, the age limit was reduced from 40 to 35.

When the deadline of 1 June 1962 rolled around there were 252 applications on Slayton's desk. Another one arrived a little late, but the panel wisely decided that the applicant was too well qualified to be refused for tardiness. He was a well-respected civilian X-15 pilot named Neil Armstrong.

The experiences of the Mercury Seven had demonstrated what was required of the nation's astronauts. Given the incredible appeal and outstanding challenge of the job, once again the nation's finest test pilots lined up hoping to become one of NASA's renowned "star voyagers". This is their story.

Foreword

On Monday afternoon, 17 September 1962, Tom Stafford, a captain in the U.S. Air Force, was celebrating his 32nd birthday in unusual circumstances. He was sitting on stage in an auditorium at the University of Houston, Texas, being introduced as one of a group of nine new astronauts selected by the National Aeronautics and Space Administration.

Alongside him were three other Air Force test pilots, Major Frank Borman and Captains Jim McDivitt and Ed White, as well as three naval aviators, Lieutenant Commander Jim Lovell and Lieutenants Pete Conrad and John Young. There were also two civilian test pilots, Neil Armstrong from NASA and Elliot See from General Electric.

Stafford knew some of these men; Borman, McDivitt and White had been his students at the Air Force Test Pilot School within the past two years. He had met Conrad and Armstrong, too, prior to arriving in Houston the day before.

But personal relationships were not on his mind that day. What Stafford thought as he looked to his left and right was: "One of us is going to be the first man to walk on the Moon."

It was an insight that no human could have had prior to that September day – or since.

That group of nine men, all test pilots between the ages of 31 and 36, had been deliberately selected by NASA to serve as the primary pilots for the Apollo program.

They hadn't been selected just for their flying skills, though that was an important factor. They were selected for their intelligence, for their ability to serve as project engineers for the command module and lunar module of the Apollo spacecraft that would hopefully take them to the Moon before the decade was out, and then return them safely to Earth.

NASA already had seven astronauts in the Mercury program. But those men were approaching the end of their original tours of duty; the space agency expected some or even most of them to return to their military careers ... certainly it did not plan for them to remain in the program for another seven years.

It was this new group – the Nine – that was tasked with developing and flying Apollo.

Within a year, the Nine would be joined by the Fourteen, a mixed group of test pilots, operational pilots and research pilots whose role would be to support the Nine in development work and serve as additional crew members.

However, it was this Nine – Armstrong, Borman, Conrad, Lovell, McDivitt, See, Stafford, White and Young – who would be the superstars of the Race to the Moon, experiencing both its high points (spacewalks, rendezvous, lunar orbit, lunar landing) and its low points (accidental death).

Colin Burgess' *Moon Bound* explores their story, and those of the Fourteen, in a new and exciting fashion. He also gives us a new perspective on the Nine and the Fourteen by presenting the stories of the men who, for one reason or another, did not make the cut – the men who were, in Tom Wolfe's cruel-but-accurate phrase, "left behind". Some of these pilots went on to highly successful careers in the military, becoming generals and admirals. Others died in combat or aircraft-related accidents. Some simply continued their careers and eventually made the transition to a well-earned retirement … and likely wondered, "What if …?"

Chapter Six, 'The Boy From Barren Run', tells the fascinating and tragic tale of naval aviator John Yamnicky. His story alone is worth whatever you paid for this book.

The strength of *Moon Bound* is no surprise to readers of the history of human space flight, because Colin has established himself as one of our best writers on the subject. In addition to the valuable overviews of Mercury, Vostok, Gemini, Soyuz and Apollo (*Into That Silent Sea* and *In the Shadow of the Moon*, both co-authored with Francis French), he has written about Australia's astronauts, NASA's scientist-astronauts, Russia's cosmonauts, Teacher-in-Space Christa McAuliffe, and – in my personal favorite, *Fallen Astronauts* – those men who were selected but didn't live to see the lunar landing.

I must also mention his *Selecting the Mercury Seven: The Search for America's First Astronauts*, which is a vital precursor to *Moon Bound.*

His other work, notably on the triumphs and tragedies of the Australian military in World War II, and his professional knowledge of the world of aviation, give him a unique perspective on the lives and careers of these men.

Colin has also been dogged and energetic in pursuing new information, not just on the non-selected men, few of whom have ever been profiled, but also on the selection process, medical tests and training of the Nine and the Fourteen, and those who came after them.

Open the pages. Prepare for launch. Take the *Moon Bound* voyage.

Michael Cassutt
August 2012
Los Angeles

Part One