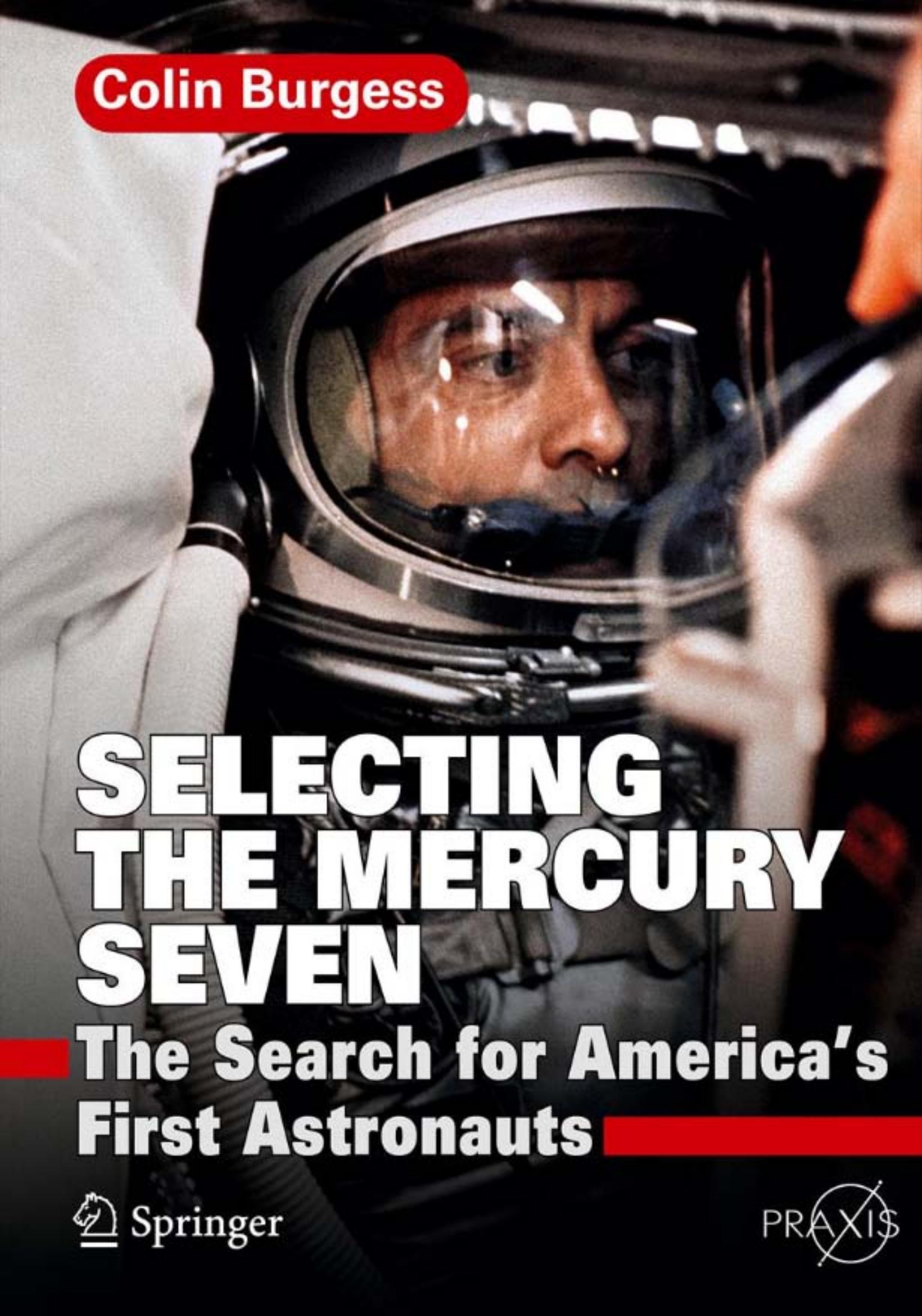


Colin Burgess



# SELECTING THE MERCURY SEVEN

## The Search for America's First Astronauts

 Springer

PRAXIS

# Selecting the Mercury Seven

The Search for America's First Astronauts

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Colin Burgess

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# Selecting the Mercury Seven

The Search for America's First Astronauts



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*This book is dedicated to a humble, generous and inspiring man who became not only the doyen of Soviet/Russian spaceflight historians, but a person of outstanding energy, skills and empathy in the education and betterment of disadvantaged young people, especially the inner city children of London. We have all lost a cherished friend.*

*Vale, Rex D. Hall, M.B.E.  
6 November 1946–31 May 2010*

## Foreword

Fifty years on, only two of the seven remain. They are elderly men still pursued for autographs, asked for their insights, honored for their accomplishments. And while the pictures have faded, the newsreels have begun that annoying color shift to blue, the memories remain.

The press conference in Washington, on 9 April 1959, the scrambling press and barrage of flashbulbs that followed the announcement, "Ladies and gentlemen... the astronaut volunteers!"

There was nothing in American history quite like the Mercury astronauts. They arrived on the public stage at a time when the nation was still reeling from Sputnik Shock. Mighty America, the engine of World War II victory, dominant force in the Cold War, had been beaten into space by Communists who supposedly had difficulty building a refrigerator.

How would we catch up? What warriors would we send into that dark and silent sea of space to do battle?

Carpenter, Cooper, Glenn, Grissom, Schirra, Shepard and Slayton.

These seven *We Seven* was the title of their book were thrust not only into the work of developing the Mercury spacecraft, but also into the undoubtedly more challenging business of helping Americans to appreciate the effort. Their stories were told in *Life* magazine. They were photographed constantly. Their families became fodder for human interest journalism.

And then, of course, they were launched on Redstone and Atlas rockets. "Godspeed, John Glenn." "Oh, the view is tremendous." "We may... have lost an astronaut!" "Things are beginning to stack up a little."

There was tragedy, too. One of the seven died in a fire on the pad. And there was glory beyond Mercury... one of the seven would walk on the Moon.

Tom Wolfe has written eloquently, and mostly accurately, about this time, in *The Right Stuff* (1979), which gave a name to the unique mix of skill and bravado these seven possessed.

Of course, they weren't the only ones. These seven were the ones who made the cut and won the prize, but as Colin Burgess shows in this book, there were twenty-five other men... test pilots from the Air Force, Navy and Marines... who passed

successfully through the initial NASA briefings and interviews... who volunteered to be 'shot into space'... who, like Carpenter and Slayton and the others, went through the challenging battery of medical tests at the Lovelace Clinic in Albuquerque, New Mexico, and the psychological exams at Wright-Patterson Air Force Base in February and March 1959.

What about these other men, the ones who might have been the first into space, first on the Moon? Men who, but for a heartbeat, an interview question or a number on a table would have become names in the history books instead of footnotes?

For the better part of fifty years, no one knew! Yes, researchers and historians knew that other test pilots had gone through the Lovelace and Wright-Patterson tests... several names had emerged. Occasionally you would note a reference in a news article to a military pilot who had been part of the Mercury selection. (There were the two famous "washouts", Pete Conrad and Jim Lovell, who made it into the next astronaut selection in 1962 and went on to notable astronaut careers.)

But for the others? Very little. The NASA History Office couldn't even produce a complete list! (To be fair, the original screening was done at the Pentagon, which controlled the candidates' travel. And NASA had an agreement with Lovelace, but no formal association for sharing records.)

Several of the people involved were also reluctant to speak on the subject: NASA astronaut Ed Givens, selected in 1966, never revealed that he had been one of those who were considered but not selected in 1959.

Here, however, for the first time in print, Colin Burgess gives you the story behind the entire process as seen by those who, for one reason or another, didn't make the final list of seven.

Beyond that, to the extent anyone could, he also follows their subsequent lives and careers. And in those tales you will experience tragic irony, dogged persistence, and in some cases, true heroism. And, to be fair, tinges of bitterness at opportunities lost.

Burgess is not just a space historian, but a tireless and dogged student of military history. He has written about aircraft, about World War II and in particular about the heroic Australian POWs at Colditz.

He has also profiled Australian astronaut Paul Scully-Power and the first teacher selected for a spaceflight, Christa McAuliffe. With David Shayler, he published a comprehensive look at NASA's intriguing scientist-astronaut program. My personal favorite of his works is *Fallen Astronauts* (written with Kate Doolan) an account of American and Soviet space flyers who died in the line of duty.

Fans of space history will remember his two recent works, co-authored with Francis French, *Into that Silent Sea* and *In the Shadow of the Moon*. What characterized those books, aside from the clear prose and skillful interweaving of technical details and human moments, was the authors' willingness to perform original research... not to rely on twice (or a hundred) told tales of the Space Age.

Burgess brings that same energy and rigor to *Selecting the Mercury Seven*. This marvelous book takes you back to the first days of human space flight, to the uncertainty, experimentation, and blind alleys – and then into the crucible of the

American conflict in Vietnam that so shaped the lives of those who were fated not to serve their country as astronauts.

It is a story long in need of telling, and he tells it perfectly.

Michael Cassutt

Los Angeles

March 2011



## **Author's preface**

It was 1959, and space beckoned.

For as long as humans have gazed into the heavens the moon has held a special fascination, arousing our curiosity with its nearness and mysticism. In 1610 astronomer Galileo Galilei turned his "magic tube" on the moon, discovering a surface pock-marked with craters, mountains and dark areas he called "maria" or seas, while at the same time dispelling many fantastic, long-held myths that had entranced watchers of the skies over countless millennia.

Among many others, Cyrano de Bergerac, Jules Verne and H.G. Wells would go on to describe imaginary space voyages to the moon, fueling our dreams of one day conquering space. Then, in the latter part of the twentieth century, those fantasies were replaced by actual vehicles which could venture into space and a daring new breed of hero – the astronaut.

In the fall of 1958, as the Soviet Union jubilantly celebrated its achievement of the first artificial satellite, Sputnik, the orbiting of a small dog named Laika, and the first probes to fly past and impact the moon, the fledgling American space agency NASA was directing its attention to our final frontier: outer space. Within weeks a special committee populated by some of the most influential and respected names in rocketry, spacecraft design and bioastronautics had been formed and tasked with the unparalleled goal of placing a man – an astronaut – into space.

From the outset, Project Mercury was a fascinating, driven programme. However the task of selecting the first cadre of candidates was not simply a matter of drawing up a specification of their essential qualities, it faced the question of where to find these future space pilots. The task was made even more difficult by the fact that no guiding rules or precedents existed for selecting the candidates.

This book explores the motivation behind the need to choose up to twelve men willing to risk their lives in one of the most hazardous scientific undertakings of all time, and how directions governing their selection and training rapidly evolved. When President Dwight Eisenhower gave his approval for the candidates to come from the ranks of serving U.S. military test pilots, a veritable mountain of collated data and medical records was scrutinised. Out of this mammoth undertaking came the names of 110 of the nation's top test pilots. That number had to be winnowed

down to a dozen. Following top-secret mass briefings at the Pentagon, along with initial medical, physical and psychiatric screening for those willing to continue, thirty-two names emerged. These elite, highly competitive pilots would now undergo further and far more intense screening to determine which of them could best confront the dangerous unknowns of space, and carve for themselves a unique place in history as a Mercury astronaut. By the end of the selection process six men were being sought, but when it proved impossible to differentiate between the final two it was decided simply to take them both, and so seven were selected.

In addition to relating the history and difficulties behind the selection process, *Selecting the Mercury Seven* gains personal momentum when the thirty-two finalists have been selected. Leaving until later in the book the stories of the seven successful candidates and the three who were selected as astronauts in later groups, the lives, motivations, military careers and achievements of the other twenty-two finalists are explored in short but fully authorised biographies. Test pilots for the U.S. Navy, Air Force and Marine Corps, each man has a fascinating and decidedly different story that engages the reader in realising what an incredibly difficult task it was to select just seven pilots from such an extraordinary field of dynamic and highly qualified candidates.

All thirty-two men had to undergo one of the most meticulous, demeaning, and even brutal week-long medical examinations at the Lovelace Clinic in New Mexico. This was followed by another torturous week at the Wright Aeromedical Laboratory in Ohio, where they were subjected to extreme fitness and physiological testing, the sole purpose of which was to sort out the supermen from the near-supermen. Or to quote author Tom Wolfe on the subject, they were looking for a group of men with "The Right Stuff".

The latter part of the book examines the lives, accomplishments and space flights of the chosen seven, bringing their amazing stories right up to date.

The selection of America's Mercury Seven came at a crucial time in that nation's history. The fear and uncertainty of the Cold War, when combined with the competitive spirit of the rapidly evolving Space Race, created a fever pitch of international excitement and intrigue in human space exploration. Through the recollections of the surviving members of those thirty-two men finalists, or those who knew them best, we gain an important insight into the lives and legacies of some extraordinarily skilled and fearless men, any one of whom could have ridden NASA's rockets to glory, and achieved a lasting place in the history books as America's pioneering astronauts.

Colin Burgess  
Sydney, Australia

## About the author

Born in Sydney, Australia, in 1947, I spent the first impressionable years of my life in close proximity to Sydney's Kingsford Smith Airport with its entire mystical aura, and the fuss and exciting clamour of air travel. Growing up in a house directly under the flight path, I was fascinated by the prop-jet commercial airliners that used to sweep and scream so majestically over our backyard. Occasionally an unmistakeable howl filled the air as a Qantas Boeing 707 roared over, leaving a slowly dissipating trail of black smoke and kerosene fumes. It seems some of those fumes must have settled and lingered in my sensory glands, because many years later I joined Qantas Airways as a flight steward and flew the world with the airline over the next thirty years before taking an early retirement.

I was fourteen years old when space exploration first captured my youthful attention, inspired by the Mercury flight of astronaut John Glenn. My grandmother Beatrice lived a few doors down. A wonderful, highly intelligent woman with a love of history, she appeared on several Australian television quiz shows. Late in 1961 she was telling me about Glenn's much-delayed orbital flight and suggested I start up a scrapbook on it as a science project for school. I followed her suggestion, locating and cutting out everything I could find as Glenn's flight suffered delay after delay. Finally, there was that momentous day of 20 February 1962, when Glenn and his *Friendship 7* spacecraft were safely recovered from the ocean after a dramatic three-orbit flight around the world. By this time, I had also been investigating the earlier space missions of cosmonauts Yuri Gagarin and Gherman Titov and their astronaut counterparts Alan Shepard and Gus Grissom. I became hooked on the subject. Then, at my grandmother's urging, I wrote to the astronauts in Houston. The signed replies that came in only enhanced the excitement and fascination for me, and the resulting profound interest in the history of space exploration remains with me to this day.

When I first began to write, my books were on another subject that interested me – the Australian prisoner-of-war experience. As a school student, and like most of my fellow male pupils, the books that we mostly sought out in the library were true-life adventures of wartime, such as *Reach for the Sky*, *The Wooden Horse* and *The Colditz Story*. When reading these books I was always disappointed that Australians

received so little coverage or recognition, and I was determined to redress this one day. I ended up writing all of the books I wanted to on the subject, and found some success in having them published. Eventually, I decided it was time to turn to my first love – space exploration.

My principal interest has always been in the men and women who rode those pioneering rockets, and so my books are mostly biographical studies. These include the life of Australian-born payload specialist Paul Scully-Power, Christa McAuliffe – the young teacher who died in the Challenger tragedy in 1986 – and another on the lives of the astronauts and cosmonauts who died before the moon landings. In 2003 the University of Nebraska Press invited me to become their series editor for a set of books (now fixed at twelve) on the complete history of space exploration – a project in which I am still happily engaged.

In 2007, my friend and colleague Rex Hall and I decided to collaborate on a biographical study on the first twenty Soviet cosmonauts, which was released by Springer-Praxis two years later as *The First Soviet Cosmonaut Team: Their Lives, Legacy and Historical Impact*. We thoroughly enjoyed the experience of researching and writing together, especially since Rex was a widely recognised doyen of Soviet space researchers who worked in a home study crammed with unique information and photographs. However, as we worked on the book Rex was unwell, making frequent visits to his doctor and the hospital, and in May 2010 I received the sad news that he had succumbed to his prolonged illness. Our book on the cosmonauts had been well received by the spaceflight community, and I began to prepare a companion volume on the selection of the seven Mercury astronauts in 1959. Although the number of candidates involved was a daunting proposition, I chose to write about the thirty-two finalists for what were eventually seven prized places. The major stumbling block was that no one seemed to have a complete list of the names.

Then, in September 2009, a retired Lt. Colonel in the United States Air Force, Walter B. (“Sully”) Sullivan, Jr. contacted me and said he could not only supply a full list, but was willing to help me write the book – not as a co-author, he stipulated, but merely as someone who has always had the greatest of respect for the men that he met at the Wright Air Development Center in 1959 when they turned up for the stress-test phase of the astronaut screening and selection process. As their liaison officer back then, he has recently enjoyed renewing many fine friendships with these men or their surviving family members after so many years.

Inevitably, many of the thirty-two finalists are no longer with us, a number which also prompts the sad realisation that only two of the original Mercury seven remain with us today. This book is a tribute to them all; not only those who went on to claim fame and fortune as America’s first astronauts, but also those who did not make the cut. As many who were involved in the selection process freely admit, almost all of the candidates could have filled those seven pairs of boots and done an equally outstanding job.

I am proud to present their stories – for the first time in most cases – so that history may finally recognise and respect the many accomplishments and amazing lives of these incredibly talented test pilots.

## Acknowledgements

I always regard this section of any book – the acknowledgements – as one of the most crucial elements of a publication. For this is where, as in previous books, I can name, thank and recognise those kindly contributors, helpers, fact-finders, fact-checkers, readers, friends and family members of the subjects who have assisted me in crafting this book and bringing it to a solid conclusion. It is far from trite to say that without their knowledge and help, this book would probably never have left the metaphoric launch pad.

Principally, my profound thanks and admiration go to a man I am proud to call a friend and colleague; retired U.S. Air Force Lt. Colonel Walter B. (“Sully”) Sullivan, Jr. Throughout all the travails associated with writing this book he was a tremendous source of information, guidance and a can-do spirit I have come to deeply admire. There is something of a Sherlock Holmes in Sully, for he was instrumental in tracking down a group of men with whom, in many cases, he had lost touch during the more than fifty years since the Mercury selection process. He was the candidates’ liaison officer at Wright Air Development Center, and got to know most of the thirty-two finalists so well that he counts a few of them as lifelong friends.

There is more to Sully, however, than just an inquisitive mind and a willingness to lend a much-needed helping hand; he readily acknowledges that the men – test pilots all – who feature in this book were the best of the best, the cream of the crop and the bravest of the brave, at a time when America needed seven Cold War heroes ready to lay their lives on the line in achieving those first pioneering steps into outer space. He came into this book project on one proviso, which is testament to his fine character; he is one of only a handful of people privy to the final results of all the testing these men underwent in their quest to become one of their nation’s first astronauts. He knows the order in which they were ranked, and the identifying code letter associated with each of them in their final evaluation, but he will never reveal these to anyone – not to me, nor even the thirteen surviving finalists. There were four final sub-lists guiding the selection panel in their final choice: Outstanding without Reservations, Outstanding with Reservations, Highly Recommended and Not Recommended. Both Sully and I feel that to reveal the category into which each of the finalists fell

would not honour their lives, their achievements or their families, and should therefore not be for exposure in the public domain. Of course the names of the seven successful candidates are known, and through the official WADC Tech Report 59-505 it was revealed that their relevant code letters were G, K, R, S, U, Z and EE but not which candidate was assigned which letter. It is also known that one candidate (James Lovell) was unable to complete the final screening at Wright for medical reasons. With profound respect, we prefer to regard the remaining twenty-four candidates as extraordinary equals; pilots whose lives were the stuff of superlatives, and as men who proudly flew in combat for their country, taking test aviation, courage and audacity to impressive new levels.

As always with a project of this scale there are numerous people to whom I owe profound thanks for their participation. Without their interest and cooperation it would have been extraordinarily difficult – if not impossible at times – to collect, transcribe, organise or publish the information and anecdotal material contained in this book. Photographs are also crucial in such an undertaking, and I am very grateful to those who ensured I received these, either as scans or through the mail.

Principally, I would like to extend profuse thanks to the surviving members of that 32-strong finalist group for responding so magnificently to my initial contact, for patiently answering my questions, and for checking their biographies and offering corrections to ensure complete accuracy. Your enthusiasm and support for this book turned what was originally a monumentally difficult task into a very pleasant and rewarding experience. My thanks therefore go to VADM Robert B. Baldwin (USN), Cmdr. M. Scott Carpenter (USN), Col. Harold W. Christian, Jr. (USAF), Col. Richard M. Corbett (USAF), Capt. Dale W. Cox, Jr. (USN), Lt. Col. Frank D. Frazier (USAF), Adm. Thomas B. Hayward (USN), Capt. James A. Lovell, Jr. (USN), Capt. John R. C. Mitchell (USN), Lt. Col. Robert M. Solliday (USMC), RADM John Mark Tierney (USN), and B/Gen. Alonzo J. (Lon) Walter, Jr. (USAF). Many thanks as well to supportive family members of those men, who aided in the compilation of this book: Steve Corbett, Patrick Clark, Terri Tierney Clark, Donna Frazier, Robin and Bill Heyne, Kris Stoever and Katherine Nickel.

Sincere thanks also to the family members, friends and former colleagues of those men no longer with us, who responded so magnificently with personal and service information and photographs of their loved one: *Maj. Robert G. Bell (USAF)* – Jackie Bell, Tom Knight, G. Weldon Slaughter, Bill Hosmer, Frank Snay and Gary Meeker; *Lt. Col. Thomas R. Bogan (USAF)* – Lee Higley, Sandi Halterman, Jay and Claire Bogan; *Lt. Cmdr. Hal R. Crandall (USN)* – Kris Freeman, Darcy Kriminger, Tom Walsh, Tom Wimberly, Bob Prince, Jerry Childers, Sam Jewell, Jake Jaccard, Bruce Cobi and Bob Hulse; *Capt. Halvor M. Ekeren, Jr. (USAF)* – David Ekeren and Nancy Ekeren Doubleday; *RADM Lawrence Heyworth, Jr. (USN)* – Lawrence (“Skid”) Heyworth III and Charlotte Heyworth; *Col. Archie T. Iddings, Jr. (USAF)* – Catherine Weaver, Mary Howell, Susan Cobb, Ron Rozelle, Richard Montgomery, Bob Byrd, Don Sharp, George Mushalko and Steve True; *Col. Robert H. Jacobson (USAF)* – Cindy Farrens and Harry Andonian; *VADM William P. Lawrence (USN)* – Diane Lawrence, Wendy Lawrence and James R. Mitchell; *Capt. Jack B. Mayo (USAF)* – Jeanie Mayo Thornton, Richard Mayo, Michael Perry,

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David M. Harland is a name well known to the spaceflight community as the acclaimed author of numerous and authoritative books on the subject of space exploration, and I was more than delighted when the publishers assigned him to the task of editing this book. His practised eye not only helped to smooth out many rough edges, but his background knowledge and enthusiasm for the subject enabled him to zero in on some factual anomalies. I am extremely grateful to him for not only adding a final professional polish to this work, but for the amiable way in which he carried out the assignment. I don't believe that we have ever met, but if that occasion should ever come along, then I do believe I owe him a pint of his favoured brew.

Last – but certainly not least – my continuing, sincere and prodigious thanks to long-time friends Francis and Erin French in California for meticulous proofreading and for pointing out overlooked blemishes in this and other manuscripts. Anything I write is far better for your incisive comments, suggestions and support.



## Illustrations

Front cover: Alan Shepard prepares for his flight aboard *Freedom 7*, 5 May 1961  
Rear (left) cover: Gordon Cooper arrives at the launch pad for his MA-9 mission  
Rear (right) cover: The Mercury astronauts undergoing desert survival training

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# 1

## Sailing in and out of war

It was Monday, 6 August 1945, as an aircraft carrier nicknamed “Tokyo Express” ploughed a steady and majestic path through white-capped waves somewhere east of Okinawa. Ahead of the carrier, the ocean’s curve and the treacherous grey skies blended to form a melancholy azure, warning of a typhoon that the ship’s captain was seeking to avoid. That day, however, the overcast skies and white-caps were of little interest to the vast majority of the 3,500 men aboard the *Essex*-class carrier USS *Shangri-La* (CV-38), who had been busily preparing to launch air strikes against mainland Japan as soon as the weather cleared.

The morning had brought some astonishing news and they were understandably confused, but cautiously excited. The ship’s radio operators had begun to pick up reports of a single, massively destructive bomb that had been dropped on the city of Hiroshima in southwestern Honshu. As well, reports began to circulate the ship of vast numbers of civilian Japanese casualties. An *atom bomb*, they were told, but no one had any idea what an atom bomb was, or its destructive power. In fact most of them had no idea where Hiroshima was located, or why it had been targeted. “We thought we knew the principal cities of Japan,” recalls Dale Cox, then a 24-year-old lieutenant in the U.S. Navy, but he, too, was confused by the reports.

As the flagship of Carrier Task Force 2, under the command of Vice Admiral John S. McCain, the *Shangri-La* had led a series of bombing attacks against the Japanese home islands, beginning in June 1945. “For three days we had launched every plane and dropped every bomb we had on Tokyo,” Cox reflected. “Then we retreated, rearmed and went back to hit other cities for second and third attacks. Everyone expected a major counter-attack, that the Japanese would launch massive strikes against the task force. We were resigned that some of the ships would be sunk.” Now, once again off Okinawa and preparing for action, they pondered the incomprehensible power of the so-called ‘atom bomb’.

Like Cox, his shipmates had become increasingly mystified by the lack of any retaliatory enemy action. They waited, anxiously scanning the leaden skies over a cloud-strewn horizon for the enemy attack they knew must come. Instead, there was just an eerie, disquieting silence broken only by the constant rumble of the carrier’s powerful engines forcing them through the choppy Pacific.

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USS *Shangri-La* in 1945 with the carrier's crew on deck. (Photo: USN)

Unexpectedly, Cox received immediate orders to attend flight training at a new duty station in Texas. "My interest in 'atom bombs' and other new things faded and I dreamed of going home," he recalled. "My three years in the Pacific were over. Two days later I was transferred on a 'high wire' to a destroyer with all my possessions jammed into one dirty canvas sea bag, about three feet long and two feet in diameter, with a strong handle."

According to Cox, the destroyer he boarded in such dramatic fashion, swinging from a wire above rough seas in a boatswain's chair, was headed for Iwo Jima "to deliver classified documents, the U.S. mail, and two passengers." From Iwo Jima he would fly to Texas in stages. But getting onto that States-bound plane would prove to be both vexing and a truly unforgettable experience for the young aviator-to-be.

### AN ENSIGN PUTS TO SEA

The city of Spokane is located close to the eastern border of Washington State, 110 miles south of the Canadian border. It was here, on 17 December 1920, that Dale William Cox, Jr. entered the world. Times were tough and unrelenting back then; although the city had patiently developed into one of the major rail centres in the Western United States, Spokane – still recovering from a devastating fire which destroyed thirty-two blocks of its downtown commercial district in 1889 – was experiencing a major decline, both in population growth and in its economy, which was inexorably grinding to a halt. It was also the year that prohibition – the Noble Experiment – effectively kicked in, and America suddenly went 'dry'.

The son of Elva Pauline (née Bowers) and Dale William Cox, Sr., young Dale would likely have led an entirely different life but for the unsparing influence of the Depression. He did, however, come from hardy pioneering stock. "In 1845 my grandfather, a child at the time, was in the third wagon train to arrive in Oregon. Later he and his father founded the town of Colsax, Washington, in 1871, and homesteaded quite a bit of land around there. My father was born and raised on a cattle and wheat ranch in Washington State."

Both of his parents inherited considerable fortunes at an early age; his mother had received half a million dollars at the tender age of six when her father died of food poisoning, while Dale Sr. inherited a one-thousand-acre property near Hay, Washington, when he was only a teenager.

"After they were married," Cox told the author, "my father mortgaged the ranch and bought another ranch in British Columbia with ten times more acreage, plus two thousand head of cattle." However promising the outlook might have seemed for the young family, financial devastation was only months away. "The following winter was exceptionally severe and most of the cattle froze to death. That wiped him out."

Cox's parents were ill-prepared to cope with such adversity. "They decided to leave Spokane and move to Long Beach, California. Typical of my mother, she went out and bought a new Auburn automobile so we could arrive in style. In Long Beach we moved in with my father's sister in a three-bedroom house. It was quite crowded with four adults, two teenagers and my younger sister and me."

While Elva took on work as a waitress in her sister-in-law's restaurant, Cox's father became a real estate agent, an employment for which he seemed to have a real flair. "He worked for Mortgage Guarantee, a company with many foreclosed properties they were trying to sell. Slowly, my father bought distressed properties for his own account; three duplex apartments and a forty-unit apartment complex in Hollywood." At this time, young Dale was attending Virgil Junior High School, but the change in fortunes meant he would be enrolled in the Hollywood Military Academy on San Vicente Boulevard, then owned by aircraft company magnate Donald Wills Douglas.

"Mortgage Guarantee owned the property in Brentwood where the academy was located," he explained. "Thus, I was offered a scholarship there. I was required to get good grades to bring the school's academic score up. The school had several children of famous parents who were not motivated to study, including Fred Astaire's two boys, Jean Paul Getty's son, and Donald Douglas, Junior."

Cox would play halfback on the academy's football team, becoming a brief hero in one hard-fought game against a rival military college when he caught a winning touchdown pass in the final minute. "This 'moment of success' pushed me towards athletics," he recalled. "I found academics easy and consistently got good grades. My English teacher required us to memorise famous poems and recite them in class. To this day, I can recite certain passages from Shakespeare and Browning from memory."

He happily thrived on his work and education at the academy, but it would all be dramatically curtailed by what he describes as "an altercation" with an instructor over a fellow student. He still does not know or understand why it led to his removal

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from the academy, although he later found out the other boy was homosexual. Confused and desperately unhappy, he transferred to Beverly Hills High School, from which he graduated in 1938.

The Vice President of his father's employer, Mortgage Guarantee, was a retired Navy Commander, and would often talk to young Cox about determining his future, encouraging him to seek a Navy career. Cox decided this was sound advice "because in the Depression my family couldn't afford to send me to college". After attending a Navy Preparatory School, he passed the entrance exams for the United States Naval Academy (USNA) in historic Annapolis, Maryland, and reported in September 1939. Here, in February 1942, he was named National Collegiate Gymnastic Champion. He graduated on 19 June 1942, and was then commissioned an ensign in the U.S. Navy. The following month, aged twenty-one, he began three years' service with the Navy in the Pacific theatre of war.

When asked how supportive his family was to his career in the Navy, Cox said, "My parents were very supportive. My father became successful with his real estate holdings but, unfortunately, became an alcoholic. In the 1950s they moved back to Spokane and I seldom saw them. My sister married one of my classmates at Beverly High, who was also in my class at the Naval Academy. He died very young and my sister inherited half of his family's property on Rodeo Drive, which has turned out to be a 'gold mine'."

On a Sunday evening in 1942, six weeks after the decisive Battle of Midway had been fought and won against Japanese naval forces near the Central Pacific island of Midway, Cox was bound for Kodiak, Alaska. He was on board the destroyer tender USS *Black Hawk*, steaming north from Pearl Harbor. Also aboard were four other recently commissioned ensigns, all with orders to join USS *St. Louis*, the newest cruiser in the fleet.

The *Black Hawk* (AD-9) was a relatively elderly vessel that had been on station on the Yangtze River when the war began. As a result, most of its 400-strong crew were Chinese. Originally launched in 1913 under the name SS *Santa Catalina*, the ship had been acquired by the U.S. Navy in December 1917, and was by now one of the oldest auxiliary ships in the Navy fleet.<sup>1</sup> It would prove a disconcerting journey for the brand-new ensigns, chugging through dangerous waters at the ship's maximum speed of twelve knots, knowing that any Japanese submarine lurking en route could easily outrun and outfight her.

"When we boarded, all of us expressed immediate doubts that we'd ever reach Kodiak in such a rust bucket," Cox reflected. "As one ensign griped, 'This is a hell of an introduction to war. We could be sunk in this old clunker [during] our first week.' Not only were all the ship's characteristics carried over from the prior century, but all routine upkeep apparently had been deferred to the next. The ship still used coal-fired boilers to produce steam for ancient reciprocating engines. Watching young Chinese coalmen, naked to the waist, hurl shovelfuls of black coal into fiery furnaces was a once-in-a-lifetime experience."

Optimistically, the ship's captain tried to confuse any Japanese submarines by zigzagging back and forth on track to Kodiak; he also recruited the young ensigns to help by assigning them to the bridge as the Junior Officer of the Deck – a watch that

changed every four hours. While they now had a duty to perform, Cox felt it was a relatively ineffectual exercise. "This would be the first time any of us had ever stood watch on any bridge. Our usefulness in any tight situation with an enemy submarine seemed questionable."

To further add to the discomfort on their first wartime voyage, whenever the ensigns were off duty the stewards in the wardroom were intentionally insolent to their unexpected passengers, viewing them as extra work and not worthy of a true officer's privileges. "In sharp contrast," Cox recalled with a chuckle, "the few American officers in the ship's company received outstanding service from the Chinese mess attendants. As one old-timer explained to us, our problem was that recently minted officers had insufficient 'face' important to the Chinese."

On 29 July the *Black Hawk* approached Kodiak in overcast conditions. As Cox and his ensign shipmates peered through the near-solid mist, a large green island slowly emerged ahead. The captain carefully manoeuvred through a complicated waterway lined with lethal mines to enter a large, oblong-shaped body of water known as Woman's Bay. They were hoping to see the *St. Louis*, so that they could promptly take their leave of the ancient destroyer tender. Instead, as they prepared to tie up at the innermost pier, which smelled of rotting fish and diesel oil, they were greeted by the sorry sight of a few decrepit cargo ships.

It would be a further eleven seemingly endless days before they spotted *St. Louis* steaming in. "As the ship entered the bay, we took turns with binoculars to examine our future home. She looked sleek and deadly; triple six-inch gun turrets fore and aft and eight five-inch anti-aircraft batteries, their twin guns pointing menacingly skyward." The cruiser eventually moored to the pier closest to the channel and farthest from the *Black Hawk*.

The ensigns could barely wait. "We rushed to the pier, waiting for the *St. Louis* to tie up. All of our worldly possessions were stacked beside us. As soon as the cruiser's boatswain lowered the ship's boarding gangway, we climbed aboard. Each saluted the Officer of the Deck, turned, saluted the American flag on the fantail, turned again and requested, 'Permission to come aboard, sir.' On a misting gray morning, 11 August 1942, we were logged aboard."

USS *St. Louis* (CL-49) was a light cruiser commissioned in 1939, and the fifth U.S. Navy ship to carry that proud name. Just eight months earlier, on the morning of 7 December 1941, the ship had been moored at the Southeast Lock in Pearl Harbor when Japanese airborne forces attacked just before eight o'clock. The ship's gun crews, overcoming complete surprise, managed to man the operable anti-aircraft guns. They shot down an enemy torpedo bomber while the engine crew frantically scrambled to get up steam. The cruiser then rapidly backed away from the pier, heading for South Channel and the relative safety of the open seas. *St. Louis* was the first major combatant ship to get underway that infamous morning. The gunners quickly accounted for another two enemy aircraft as the ship fled from the flaming wreckage in Pearl Harbor. Then, as *St. Louis* moved into the channel entrance, she narrowly avoided falling victim to a Japanese midget submarine whose torpedoes fortunately hit a coral reef just 200 yards from the vessel.<sup>2</sup>

Once the new shipmates were on board in Kodiak they were immediately split up.

## 6 Sailing in and out of war

Dale Cox had just been shown to his new quarters and was beginning to unpack when he was startled to hear his name being broadcast over the ship's public address system. "Ensign Cox, report to the Executive Officer's stateroom immediately." He had to ask where this stateroom was located, and the sailor looked at him piteously before pointing ast, indicating that any fool would know how to find it. After all, the ship was only six hundred feet long, with a beam of sixty-two feet.

"I found the stateroom, knocked, and was told to enter. The commander was tall, weighty, and to me, old. I guessed his age at forty. He didn't waste any time. 'You are today's Shore Patrol,' he informed me without ceremony, handing me an arm badge, a belt with a holster and a .45 calibre pistol. 'Go topside and the Officer of the Deck will give you your orders.'" Such was life as a brand-new ensign in the U.S. Navy.

### TORPEDOES AND DIVE-BOMBERS

The *St Louis* arrived in the South Pacific in December 1942, some four months after U.S. Marines had invaded Guadalcanal. In the ensuing months the ship commenced convoy duties and participated in intercepting enemy shipping in the Kula Gulf, a waterway in the Western Province of the Solomon Islands that opens in the north into New Georgia Sound, also known as 'The Slot', down which the Japanese ran their convoys. One major engagement for the *St. Louis* was the shelling of new Japanese air facilities being built at Munda Point. Then, in early July 1943, her crew took part in the fierce bombardment of Vila and Bairoko Harbor, New Georgia.

On 13 July, on a black night, the *St. Louis* took a torpedo hit during the Battle of Kolombangara. Fortune was with them that day as the torpedo hit well forward, and even though it shattered the cruiser's bow there were no casualties. In dry dock they learned that a second torpedo had dished in the fantail above the screws and failed to explode. Little wonder the ship had been nicknamed the "Lucky Lou".

As Cox recalls, he was stationed in Sky Forward that July night, situated above the bridge in one of the ship's highest battle stations. His duty was to operate the anti-aircraft fire-control computer. "In 1943, a computer was a series of dials and knobs whose inputs had to be manually matched," he explained. "This generated a solution, directing which target the five-inch guns should fire at." While he was carrying out his duties the Japanese torpedo suddenly exploded near the bow, and the entire ship – all 10,000 tons – shook violently. A wall of water shot upward hundreds of feet then crashed back down on the ship, while 143 feet of the underwater bow separated and dropped to the bottom of the ocean. There were 1,200 men on the *St. Louis* that day, and almost to a man they feared that the ship would sink.

In the inky blackness, panic began to set in, with many of the men fearing they would share a similar fate to the crew of their sister ship, sunk by a Japanese torpedo just a week earlier. That ship, the light cruiser *Helena* (CL-50), had been part of the same task group, charged with protecting troop ships involved in the allied invasion of New Georgia. She had moved into the Kula Gulf just before midnight on 4 July.

Shortly after, her big guns had opened up as part of the shore bombardment, clearing the way for a successful troop landing on the island. An enemy task force was near at hand, and that night a total of ten Japanese ships engaged the task force in the Battle of Kula Gulf. Within minutes the *Helena* had been mortally hit by a torpedo, rapidly breaking up and sinking stern first. Although most of the 900 men on board managed to survive, 168 perished.

Cox was not alone in wondering what would happen after the *St. Louis* had been hit. He thought that perhaps he would be able to simply swim out of his battle station as the ship went down. "There were no answers; everyone checked his emergency life vest."

However, when the wall of water from the explosion crashed back down onto the deck of the cruiser, panic had ensued at certain stations. Most of the water had fallen amidships, on the searchlight platform where the youngest and most inexperienced sailors had been assigned. Driven by fear, around twenty young men immediately began to cut loose the large life rafts, ready to abandon ship. The ensign in charge, a relatively raw newcomer, saw what was going on and pulled out his .45 automatic pistol. He began waving it over his head, yelling "Stop!" Then, as he pointed his gun at the terrified sailors, he shouted. "Only the captain can order abandon ship! Stop – or I'll shoot you down like dirty dogs!" This only added to the terror of the young sailors, as Cox vividly recalled: "Their ship was sinking and the officer in charge, standing in the gloom waving his pistol at them, had to be stark, raving mad." As the next few minutes raced by and it became apparent that the ship was not sinking – at least not immediately – the crew began to calm down. However the dangers of that evening were still not over; there was the unsettling thought that the badly damaged ship might come in for even more deadly enemy attention. "The black night became exceptionally dangerous for a crippled cruiser with enemy warships lurking to the west.

"Over the battle phones, scuttlebutt reported that the USS *Honolulu*, steaming ahead, and the New Zealand cruiser HMNZS *Leander*, had also been hit by torpedoes. The six destroyers escorting the task force were undamaged, the Japanese torpedo spread having been set deep to pick off the cruisers, not the destroyers. The stricken ships slowly turned south toward Tulagi, thirty miles east of Guadalcanal, maintaining a very modest speed, but steaming toward safety. As the ships fled, we could see destroyers to the west engaged in a fire-fight with Japanese ships, high explosives lighting the sky in irregular bursts.

"The night dragged on. The entire crew was kept at battle stations, all water-tight hatches firmly secured. At dawn, friendly aircraft appeared overhead, greeted by many waving arms. They searched the surrounding seas for enemy submarines, and finding none, the ship secured from battle stations, setting Condition Two. Half the crew were then able to crawl into their bunks and grab some sleep. Many hours later, we steamed into Tulagi Harbor, where a thorough damage assessment could be carried out. During the next six weeks, the bow received emergency underwater repairs and, eventually, we departed for San Francisco with one destroyer. Due to the crumpled bow, the ship's speed was reduced to six knots for the entire 4,500 miles. The trip took forever.



A Japanese torpedo caused extensive damage to the bow of *USS St. Louis*. (Photo: USN)

“Arriving at Mare Island, we were dismayed to learn that an entirely new bow had been built while we were steaming back; it was just ‘cut off the old’ and ‘weld on the new’. Consequently, our stateside leave would be quite short.”

In November 1943 the repaired *St. Louis* returned to the Solomons, this time to help to cover the Third Marine Division’s landing on Bougainville Island.

Cox recalls surviving a devastating attack on the ship by two Aichi D3A (“Val”) dive-bombers on Valentine’s Day 1944, during the Green Island landing. On that day the *St. Louis* was carrying two Curtiss SOC folding-wing floatplanes (also known as “Seagulls”) which served as scout planes and could be launched by catapult off either side of the stern. The SOCs could also be lowered onto the water by a crane mounted on the ship’s stern, ready to take off from the ocean. On their return they would be hoisted back on board by the crane, their wings folded, and then secured in small onboard hangars.

As the attack began, the first Japanese dive-bomber dropped a fuselage-mounted 551-pound bomb, as well as its two wing-mounted 132-pound bombs. They missed the ship. But then a second dive bomber howled in and released three more bombs. Two were near misses off the port quarter but the third, larger bomb struck just aft of the superstructure, exploding in the mid-ship living compartment. Twenty-three men died and twenty were wounded, ten of them seriously. A fire which broke out in the clipping room was quickly extinguished, but the cruiser’s two SOCs were rendered inoperable and her ventilation system was damaged, causing the engine room to be temporarily abandoned. The following day the *St. Louis* survived another air attack and then limped south to Tulagi, to undergo repairs alongside a tender.

The *St. Louis* would suffer further damage on 27 November 1944, with sixteen men killed when she was hit in the starboard fantail by one of several Aichi D3A aircraft deliberately flown at the ship by *kanikaze* pilots.

By then, however, Cox had been detached from the *St. Louis*. Immediately after the dive-bomb attack in February he had been assigned to the newly launched *USS Shangri-La*, an aircraft carrier which was commissioned in September. Arriving in the Pacific, *Shangri-La* was based at Pearl Harbor from February to April of 1945, where she qualified land-based Navy pilots in carrier landings in preparation for an all-out assault on Japan.

On 25 April, as part of Task Group 58, the *Shangri-La* and her air group, CVG-85, launched their first strike against the Japanese, targeting Okino Daito Jima, a group of islands several hundred miles southeast of Okinawa. The carrier's aircraft successfully destroyed radar and radio installations on the islands before the task group sailed for Okinawa.

*Shangri-La* became the flagship of Carrier Task Force 2 under Vice Admiral McCain in May 1945. Early the following month the task force launched air strikes on the Japanese home islands, in particular Kyushu, the southernmost of the major islands. Here the carrier's pilots met a resolute airborne defence, suffering many casualties. On returning to the forefront of the action, they pounded Honshu and the northern island of Hokkaido on 14/15 July, and Tokyo three days later. Two weeks after this assault, they hit Tokyo once again.

Other raids on the Japanese mainland targets continued, before news of the atom bomb being dropped on Hiroshima (and three days later, Nagasaki) would reach the *Shangri-La*. Meanwhile, on the evening of 14/15 August, her aircraft struck airfields around Tokyo in what would prove to be her final hostile action of the war.

## STOPOVER IN IWO JIMA

On 15 August, six days after the second horrific detonation over Nagasaki, Japan capitulated. The American fleet was ordered to cease hostilities, and the war in the Pacific was at an end.

Lt. Cox, meanwhile, was on a destroyer bound for Iwo Jima, from where he would fly to his new duty station, NAS Dallas in Texas.

"The destroyer took two days to reach Iwo Jima," he related. "Rough seas from the passing typhoon made the trip rather bumpy. That didn't bother me, but it did upset the other passenger, a twenty-year-old P-51 pilot from Knoxville, Tennessee. After escorting B-29s over Japan, his plane's engine had failed south of Tokyo en route back to Saipan. He had ditched his plane alongside the destroyer while the ship was on radar picket duty 300 miles south of Tokyo."

On their second day aboard the destroyer, the two men saw Iwo Jima take shape on the horizon. The 546-foot Mount Suribachi on the island's south end was the only truly significant feature to be seen. They anchored off the same beach as used by the U.S. Marines during the successful invasion of the island that February. That landing had been a prelude to weeks of savage fighting against entrenched Japanese

defenders who had been ordered to die rather than shamefully surrender. On the fifth day of the bloody 35-day conflict, a photograph of the raising of the Stars and Stripes involving five Marines and one Navy corpsman was taken by cameraman Joe Rosenthal atop Mount Suribachi, and it went on to become one of the best known and most iconic photographs of all time.

Cox and the P-51 pilot then had to make their way to command headquarters on the island. "As soon as we anchored, we were taken ashore in an open boat, spray from a stiff breeze soaking us. We landed on a temporary steel dock built by Navy Seabees. As the two of us walked down the short metal pier to the beach, I was shocked. The entire island looked as if some giant had taken an immense sledge-hammer and smashed every living and inanimate thing, all structures, into small shredded bits. Nothing had escaped the carnage. The island was a black sand blob littered with shell casings and other debris from savage warfare."

"Stunned, I tossed my sea bag in back of the Jeep taxi. My companion, the clothes on his back his only possession, sat in front. A Marine private drove us a dozen blocks to a group of temporary Quonset huts, the Operation Centre for the landing field. It was cold and windy and we shivered in our wet clothes, but the sky was clear. Surprisingly, the landing strip seemed undamaged. Four or five airplanes were lined up at the side of the runway, including one Curtiss C-46 Commando twin-engine transport with 'USMC' on the side."

Inside the hut, sitting behind a scarred desk shuffling papers, was a young Marine sergeant. While Cox's companion disappeared into the Air Force support group at the other end of the hut, he handed over his orders, only to be told that the next airplane to Saipan might not be until the next day, or even the day after that. When he asked what the C-46 was doing out by the runway, the sergeant replied, "It's special. It's reserved for a USO [United Service Organisation] troupe and departs in an hour or so, whenever the pilot decides he's ready."

Disappointed, Cox poured himself a plastic cup full of coffee from a nearby table, but then he decided to confront the sergeant once again. "Look," I said. "I've been out here in the war for three years. I'm more than anxious to get home. What are my chances of getting on that C-46?" The sergeant looked Cox over, and sighed. "Sorry, sir, my orders are to reserve that plane for the USO." Then he paused. "But you could ask the pilot. He's in the next hut."

Entering the adjoining Quonset hut, Cox found himself looking at a beautiful, vaguely familiar red-headed woman talking to the Marine Corps pilot, who had his back to him. Glancing to his right, he saw the plane's crew and ten shapely chorus girls seated around a table eating Oreo cookies and drinking Cokes. He hadn't seen so many women in the past three years, and they were very young, attractive, and dressed in khaki flight suits. All of a sudden it struck him. The red-headed woman was actress Maureen O'Hara. Nervously, he squeezed past her to talk to the pilot. Then he received his second surprise: the pilot was Tyrone Power, another film star.

Captain Power listened to his story and didn't hesitate. "Sure," he said. "We've plenty of room. How much gear do you have?" After explaining he had just one sea bag, Cox gave a snappy salute and said, "Thank you, sir." Needless to say, the flight was filled with excitement for the rumpled, unshaven, Navy lieutenant. From Saipan

it was onto a NATS (Naval Air Transport Service) flight to Honolulu, San Francisco, and finally to Texas and a whole new post-war life as a budding naval aviator.

The encounter with Tyrone Power and Maureen O'Hara on Iwo Jima was not the first brush Dale Cox had enjoyed with Hollywood. In 1943, while the *St. Louis* was undergoing emergency repairs to its torpedoed bow at Tulagi, he happened to bump into an old friend and classmate from the Naval Academy, Lee Scherer. Scherer had been captain of the varsity tennis team at the academy while Cox was on the gym team, so on occasions they shared meals on the table for sports teams in the mess hall and got to know each other. They remain friends to this day. Scherer would enjoy a successful career in the U.S. Navy before being assigned to NASA Headquarters in 1962 as programme manager for the unmanned Lunar Orbiter project. He retired from the Navy in 1964 to remain with NASA, overseeing several space programmes and becoming first Director of the Apollo Lunar Exploration Office in Washington and then Director of the Kennedy Space Center for four years before retiring from that position in 1979, after which he became consultant on U.S. space missions, based in San Diego. In 1943, however, that was all ahead of him.<sup>3</sup>

As they shared a drink at the Iron Bottom Bay Club in Tulagi, Scherer had an idea. Knowing that Cox was headed for Mare Island in San Francisco, he came up with a suggestion, "Why don't you look up the girl who lived next door to me in Kentucky? She's a movie starlet now in Hollywood, appears in Hopalong Cassidy movies and other westerns. Her Hollywood name is Pat Starling. When I knew her she was Pat McCartney, but the studios changed it. Why, I can't fathom." Cox was interested, and wrote down the details.

Following emergency repairs to her bow at Tulagi, *St. Louis* got underway for home and more extensive repairs. The ship was restricted to just six knots all the way to San Francisco. Once back in the States he was given ten day's leave and so, taking up his friend's advice, made contact with Pat Starling. With an invitation to drop by, he drove his father's two-door coupe to Starling's home in the San Fernando Valley. There, they switched to her flashy 'four-holer' Buick convertible and sped in style to the Coconut Grove at the Ambassador Hotel on Wilshire Boulevard – which was a favourite meeting place for the Hollywood set. When famous band leader Freddy Martin came to their table and asked Pat to sing, Cox was knocked out. Pat sang "Deep Purple" to enthusiastic applause. They talked, danced and dined and enjoyed each other's company. Over the next few days they went horseback riding, dancing at expensive night clubs, swimming off the beach at Santa Monica and eating at popular Hollywood restaurants.

The ten days passed "in a flash" and he had to return to Mare Island, broke but happy. With the *St Louis* back in action in the South Pacific, he and Pat wrote to each other. However, "Over time the letters got shorter and less frequent. Her letters took at least a month to get to me. Mine, of course, were censored before leaving the ship, restricting any sentimentality." They would meet again in Dallas after the war, where he was undergoing primary flight training, but despite remaining friends for the rest of her life (she died in January 2006) they went their own separate ways.

Meanwhile, having reported to the Naval Auxiliary Air Field in Grand Prairie,

Texas situated midway between Dallas and Ft. Worth Cox began his primary flight training in open cockpit, fabric-covered Stearman biplane trainers. Here, as he recalled, "The big thrill was doing 'S' turns to a landing – without power. Then, after touchdown, full power, just clearing the trees surrounding the large circular field."

Despite having been temporarily entranced by the actress Pat Starling and her glamorous lifestyle, Cox had a steady girlfriend named Patricia Boadway, who was his sister's roommate at Mills College in Oakland, California. She was, he said, "a beautiful, talented artist" who would graduate from Mills College with her master's degree in art. In January 1946, however, he put her firmly on the spot during a call from a phone booth at his Grand Prairie base to the Boadway home in Pasadena. "I completely surprised her by asking her to marry me. She hemmed and hawed, totally rattled, until I finally told her, 'You have to make up your mind. I only have twenty-five cents left for the pay phone.' It was not very romantic stuff, that's for sure, but surprisingly she gave me a shaky, 'Yes' and I gave her a 'Whoop!'"

They would marry on 19 February 1946. Film star Anne Baxter (*All about Eve*) was one of Patricia's maids of honour, while all six of Cox's male attendants were resplendent in Navy and Air Force uniforms. Soon thereafter, though, it was back to Navy business. "Our honeymoon was a boring drive to NAS Corpus Christi, Texas, where I was in Advanced Flight Training."

The training aircraft he would fly at Corpus Christi was the North American SNJ. A modified Navy version of the redoubtable T-6 Texan, it was an all-aluminium, low-wing aircraft which featured retractable landing gear, increased power with a 450-horsepower engine, and more sophisticated control surfaces. "We all thought we were hot stuff flying that 'almost fighter,'" Cox jokingly related. After carrier qualification at Pensacola in SNJs, he received his coveted Wings of Gold as a naval aviator.

## FLYING FOR THE CIA

With Cox under orders to report to his first squadron, Utility Squadron Ten based at NAS Guantanamo Bay, the newlyweds packed their belongings, arriving in Cuba early in 1947. Their quarters were a two-bedroom apartment that came with a full-time, live-in maid, who had her own apartment situated over the apartment's garage. To their surprise and delight Bill Peach, one of Cox's old USNA classmates, lived across the road with his wife Nancy and their two kids. With their guidance, Dale and Patricia settled in rapidly. One outstanding cultural event on the island for them was seeing an original Paul Gauguin painting in the quarters of the legal officer, whose wife had been born on Norfolk Island and raised in Tahiti. Gauguin had paid his rent to her grandmother with the painting. "Probably only five people on the base knew who Gauguin was," Cox reflected.

Over the next two years at Guantanamo Bay, Cox was able to fly several aircraft types, building up his experience and hours in such varied steeds as the F6F Hellcat, F7F Tigercat, TBM Avenger, JD-1 Invader and the PBY Catalina.

In 1949, now the father of a baby son named Brian, Cox received orders to the



Lt. Dale W. Cox, Jr., USN. (Photo courtesy of Dale Cox)

U.S. Naval Postgraduate School, which at that time was located at Annapolis. After receiving his bachelor of science degree in aeronautics, he attended the California Institute of Technology (Caltech) in Pasadena, where, in partial fulfilment of the requirements for a professional degree in aeronautical engineering, he wrote what he now laughingly refers to as "an incomprehensible thesis" entitled "Stabilization of a Bipropellant Liquid Rocket Motor", later published in the *Journal of the American Rocket Society*. It was evidently satisfactory, because he graduated in 1952.

After the birth of Dale III, and with two small sons now in tow, Cox and Patricia packed their belongings and moved to Barbers Point in Hawaii, the home base for Patrol Squadron VP-22 with its P2V-5 Neptune aircraft. Following a training period, he became the pilot of a photo reconnaissance Neptune aircraft overflying China for the Central Intelligence Agency (CIA).

In October 1950, China had entered the Korean War. At that time United Nations forces under General Douglas MacArthur, which were originally deployed to restore peace, were pushing the invading North Korean forces back into North Korea. The newly established Communist government of China grew increasingly concerned that the Americans might exploit this window of opportunity to push into China in order to overthrow the government in an effort to turn China into a democratic state. They issued a strongly worded communication, warning MacArthur not to allow his forces any closer than twenty miles from the Yalu River, which marked the border between China and North Korea. If he did, they would consider it an act of war and enter the conflict on the side of North Korea. MacArthur's renowned arrogance caused him to ignore this warning – despite specific orders from President Harry S. Truman not to proceed. In a highly

provocative action he ordered his forces beyond the line. At this, almost 300,000 Chinese troops swarmed across the border and drove the Americans back south beyond the 38th Parallel in great disarray, with considerable loss of life. As an immediate consequence, Truman sacked MacArthur.

In a covert off-shoot to those dramatic events, photo reconnaissance ELINT (Electronic Intelligence) missions began to operate over China in 1952. Flying Navy P2V-5 Neptune aircraft, the missions were directed by the CIA. Crewmembers of the photo-planes assigned to this task were based on Okinawa, at Kadena Air Force Base. They flew whenever sections of the Chinese coast were clear, allowing photography.

Thirty-two-year-old Cox's crew consisted of eleven men. Now a Lt. Commander, he was the crew's pilot (otherwise known as the Patrol Plane Commander) along with a co-pilot, navigator, electronics officer, plane captain, long range radio operator, attack radio operator, two gunners and two photographers. Flying down the coast of China, the photographers were kept busy filming and changing film packs on the two K-36 high-definition cameras.

"Typically, our days were tedious. While the crew was on alert in the ready room on Okinawa, we stood by waiting for clear weather. I would periodically check with the squadron meteorologist, who came up with a new forecast every four hours. If his weather 'guessing' showed clear skies along any part of the Chinese coast we would take off. 'Guessing' was the operative word."

Over seven months, weather permitting, one of the two photo-planes would fly over designated areas of China shooting hundreds of feet of film and recording electronic signatures, which would be sent to the CIA's photo interpretation centre in Virginia. There it would be deciphered and formed into intelligence reports. It was a programme sometimes involving extreme danger. On many occasions Cox recalls seeing multiple bright red flashes coming from the ground, followed by black bursts near their Neptune, a definite sign that they were being fired upon by anti-aircraft batteries.

"Our two photo crews had completely different schedules from the ten anti-submarine crews in the squadron. The principal difference was that our photo-orders came from the CIA through a Top Secret channel. Known only to the two Patrol Plane Commanders, our orders were relayed to us by a senior Navy captain on the admiral's staff. He was our direct and only contact – not even our squadron's commanding officer was cleared to know the details of these missions. About every six weeks, we went aboard the flagship and received new orders face-to-face. Most of them were 'continue what you're doing' or 'repeat the Xiamen run'."

On 18 January 1953 their sister photo-plane, carrying a crew of thirteen, was shot down by an anti-aircraft artillery emplacement they had been filming during a photo pass near Swatow on China's southeastern coast. The pilot, Lt. Clement Prouhet, his single sweep done, had turned back to Okinawa and was flying at 1,000 feet when their Neptune was suddenly hit behind the cockpit on the port beam by an anti-aircraft shell. With their starboard engine on fire and losing fuel, the vertical and horizontal stabilisers riddled with large holes and the port flaps and landing wheel gone, Prouhet desperately tried to reach a friendly field on Formosa. As the flames

spread, the radio operator sent out urgent MAYDAY messages. Finally, with no other option available, Prouhet managed to ditch in the South China Sea amid fifteen-foot waves and a 30-knot wind. When the plane stopped in the water, they found they only had one burned and partially inflatable life raft. The wounded men were loaded into the raft while the rest of the crew clung to the sides, buoyed by Mae West life jackets. Help would be many hours away, and two wounded men died as they waited to be rescued.

Eventually a U.S. Coast Guard PBM-SG Mariner search-and-rescue aircraft from Sangley Point in the Philippines responded to the MAYDAY and landed alongside the raft to pick up survivors. This was accomplished, but on take-off, as the PBM reached 50 knots, not quite lift-off speed, the pilot fired the JATO (jet-assisted take-off) rockets for a spurt of rapid acceleration. Unfortunately, at this crucial point the starboard engine failed and the aircraft cartwheeled, exploded, and smashed into the water. Several members of both crews were killed or badly injured. The surviving occupants were ejected from the aircraft into a burning slick.

Following the loss of the PBM, two VP-22 aircraft took off and finally arrived at the scene to drop life rafts. The survivors scrambled aboard the rafts, but were still subjected to enemy fire from shore batteries. Eight hours later the destroyer USS *Halsey Powell* (DD-686) arrived at the scene. Eager lookouts located the survivors. Of the original twenty-one crewmembers from both aircraft, only ten had survived the ordeal – seven Navy men from the P2V and three from the Coast Guard's PBM. Six had been killed in the two crashes and five were missing, presumed dead.

Back on Okinawa, Cox and the other stand-by crewmembers had heard of their sister aircraft's troubles. They rushed to the operations centre where they hovered near the radio speakers listening to detailed action reports directly from the scene. They heard the crew of the stricken P2V report that one of their engines was on fire and, unable to quell the flames, that they were preparing to ditch in the South China Sea.

"That incident affected us all," Cox would reflect on the tragedy. "Several days later, my crew gathered in the mess hall to rehash the fragments of radio conversations that we had overheard. As we talked, heads together, we could envision the scene; the plane on fire as it crossed the coast, heading east toward a turbulent sea."

"Next the weather cleared over Central China and we took off on another mission. We were flying when Prouhet and his gang arrived back in Kadena."

Finally the squadron's seven-month deployment ended and a relieving squadron flew in. After a week of turn-over projects all of the crews departed for Hawaii and home, with one exception. To their annoyance, and the friendly jibes of the departing crews, Cox's crew had to remain on Okinawa for ten additional days to train the new photo-plane crews.

"In retrospect," he concedes, "keeping one crew behind made sense, since our mission was the most challenging and dangerous. First, I had to check out the new crews. That included flying two actual missions in my plane in order to instruct the new pilots and navigators. Then, my navigator and I flew two missions as passengers with the relieving crews in their planes."

Eventually Cox and his crew were released to fly home. They decided to fly straight through to Hawaii with no layovers. It meant twenty continuous flight hours, plus two additional hours for refuelling at Kwajalein in the Marshall Islands. A trip of forty-five hundred miles in a propeller aircraft was a daunting prospect, but with no emergencies along the way and their autopilot operating flawlessly, they “watched with joy as the island of Oahu materialized on the cockpit’s circular green radar display”.

Landing back at Barbers Point, Cox was taxiing under tower control to a parking spot when he saw his wife and two young sons standing in front, waiting. He parked the aircraft, slid open the side window, and waved energetically. “I watched Patricia kneel down and explain to our two-year-old son what was going on. I sent them the universal signal of a kiss and saw my four-year-old respond with both hands and arms. Then I turned back to the cockpit and shut everything down.”

## PATUXENT RIVER

Six months later, in January 1954, Commander Cox reported to the U.S. Navy’s Test Pilot School (USNTPS) at NAS Patuxent River in Maryland.

In 1945 the Navy’s Flight Test Group had transferred to Maryland from NAS Anacostia, in Washington D.C., establishing the Patuxent River Flight Test Center. An unofficial test pilot school soon evolved at the centre, but it was not until 1948 that Commander Frederick Trapnell, the first Navy pilot to fly a jet aircraft and now considered the most experienced naval test aviator of his generation, formally set up an approved test pilot school along with chief project engineer, Commander Sydney Sherby. The two men selected the candidates for the first class, which began on 6 July 1948. This enabled naval aviators to increase their skill levels in the rapidly evolving state of the art in aircraft technology. The selection process for assigning pilots to the school was (and remains) highly competitive, with applicants chosen by a selection board.

In a 2009 address to celebrate the U.S. Navy’s 234th birthday, RADM Lowell F. “Gus” Eggert (USNA Class of 1952), who was Director of the Patuxent River Naval Air Museum Association, spoke about the formative years of the Test Pilot School. “Frederick Trapnell was here, and he really got it going, training pilots to work with engineers to develop a test plan, fly the aircraft and write the reports afterward,” he said. “The engineers needed complete, concise reports. The most important part of Test Pilot School isn’t teaching [students] to fly, because they’re all good pilots. It’s teaching them to write the technical reports about [an aircraft’s] capabilities.” He added that the technology has advanced from the days when “it was a note pad strapped to your thigh, and you wrote with a pencil”.<sup>4</sup>

Cox was assigned to USNTPS Class 12, which was small, but loaded with naval academy graduates and some pilots who already had advanced degrees. Among them were two pilots who would later be in the race for highly coveted spots in the Group 1 astronaut selection process: Navy Lt. Cmdr. Thomas B. Hayward, and a freckle-faced Marine major named John H. Glenn, Jr. Also in the class was a man

with whom Cox would strike up what became a friendship until the man's death in 2005. Shot down over Vietnam in 1965, Jim Stockdale was a prisoner of war for seven ungodly years filled with starvation, deprivation and torture. The most highly decorated officer in the history of the United States Navy, Stockdale later became a candidate for the vice presidency of the United States, on Ross Perot's independent presidential ticket in 1992.

It would prove an exhausting, intense six months at Test Pilot School. The pilots first had to undergo refresher courses in such things as algebra, trigonometry, calculus and mechanics under the friendly but incisive guidance of instructor Walt Hess. As well, they ran a flight schedule, carrying out practice flight tests almost every day in familiar aircraft, then preparing detailed flight reports, linking the classroom theory with actual flight tests.

Finally, in July 1954, the class graduated. There were four test units at that time: Flight Test, Service Test, Armament Test and Electronics Test. Cox was assigned to Service Test. His first project was to check out the new P2V-7, which was the final Neptune variant off the Lockheed production line. This aircraft had the distinction of being the first patrol bomber to have two conventional water-injected Curtiss-Wright R-3350 radial engines and a pair of Westinghouse J-34 turbo-jets. The National Air Show was scheduled for 5 September that year, and Cox was ordered to take delivery of the first production aircraft and fly it to Dayton, Ohio, in order to demonstrate its superior performance at the show.

"My crew and I flew two short test flights from Burbank, then the next day early, took off for the air show. Two hours later, on a bright sunny day, the FAA [Federal Aviation Administration] unexpectedly contacted me on the en-route frequency and directed me to contact Lockheed Operations on UHF Channel 10. I did so. The news was unnerving.

"Operations informed me that the prototype P2V-7, being tested at Edwards Air Force Base, had crashed. The entire crew had been killed. They suggested I fly straight and level, no 'fancy stuff.' I had no intention of trying any 'fancy stuff,' so that wasn't a problem. Hours later we arrived at Dayton and, via phone, received the full story on the crash at Edwards.

"The Lockheed crew was doing a required Bureau of Aeronautics test, mandatory for all new aircraft, proving the plane could fly at maximum speed (four engines wide open) and have adequate stability and control.

"No one at Lockheed realized that at altitude, in a shallow dive with all four engines wide open, the significant higher speed of the -7 would cause complete loss of elevator effectiveness. That was the reason the plane went out of control... and dove straight into the desert.

"The next day at Dayton I demonstrated the P2V-7 to an enthusiastic crowd. The demo flight was greatly curtailed from that originally planned. With all four engines wide open, I took off in about one hundred feet, climbing steeply – not the ordinary take-off for a bomber. Then, over the field, I shut down the two radial engines, feathered both props, and made a pass over the stands on jets only."

After completing the P2V trials at Patuxent, Cox was assigned as Project Officer for the Service Test check-out of the new Douglas A3D. This attack aircraft was

powered by two Pratt and Whitney J-57 jet engines, each delivering ten thousand pounds of thrust, which was "state of the art for that time".

One significant incident took place on 7 December 1955. It was yet another 7 December he would never forget.

"My first adventure in the A3D occurred when I was ordered to take the Chief of the Bureau of Aeronautics [Rear Admiral James S. Russell] on his first flight in a jet plane. The Admiral drove to Patuxent, was outfitted in the proper gear, and was ready for his introduction to jet flying.

"I taxied to the end of the takeoff runway. The Admiral sat next to me in the bombardier's seat and had a clear view of everything. As I went through pre-flight checks, I explained to him what I was doing. Calling the tower, I was cleared to take the duty runway. We were ready for takeoff, and I glanced at the Admiral to see if he was okay. I looked past the Admiral through his window and saw a huge fireball in the air, just south of the field, at about five thousand feet altitude. I was horrified, knowing that a plane had just exploded. Silently, I pointed out the disaster to the Admiral.

"Over the UHF radio, unbelieving comments erupted. One got it right: a jet-engine Martin P6M SeaMaster had blown up, killing all four men on board. Then the tower transmitted, "Navy 431 cleared for take-off." With a definite 'gulp,' very cautiously I pushed the throttles to full power. We took off easily, both of us taking nervous glances at the black ball of smoke out the starboard window. Then, climbing to 30,000 feet, I introduced Admiral Russell to jet flying in an A3D."

Cox would later learn that one of the four men killed in that explosion – the pilot was a fellow Test Pilot School Class 12 graduate, Navy Lt. Commander Victor Utgoff. Victor came from an aviation family; his father was co-pilot of the Russian-designed 'Maxim Gorky', which was the largest plane in the world at one time, and his younger brother, a Navy captain, was also a naval aviator. The cause of the P6M explosion would eventually be traced to a design fault in the horizontal tail that had subjected the "T" tail of the plane to massive over-design loads in a pull-up at high speed. During this manoeuvre the elevator surface flipped from full down to full up in an instant, subjecting the airframe to 9 gs of stress. This caused the wings to buckle and the wing tips to strike each other underneath the fuselage. The aircraft exploded and disintegrated, crashing in pieces into the Potomac River.

In September 1956, while still at Pax River (as NAS Patuxent became commonly known), Cox was assigned to carry yet another VIP, this time the president (later the chairman) of the Chrysler Corporation, Lester ("Tex") Colbert. Dispatch orders were received for him to pick Colbert up from Detroit, Michigan, in a passenger-modified A3D to witness the first launch of a Jupiter-C rocket from Cape Canaveral which was scheduled for 1:45 a.m. EST the following morning, 20 September. On their arrival in Florida they were greeted by an impressive reception and a cocktail party in Colbert's honour, to which Cox was invited. As he sipped on a vodka and tonic, a familiar face came up to him and asked if he was the pilot of the A3D. "Yes, I am. Commander Dale Cox," he responded. "I know who you are, Doctor," he added, shaking hands with Wernher von Braun.

The German-born rocket scientist was required to brief President Eisenhower on

the Jupiter launch, and a jet flight across to nearby Pax River on the A3D seemed an opportune pursuit. They arranged to meet at 9:00 a.m. after the Jupiter launch, which went ahead as planned. It would be, von Braun stated, his first flight in a jet aircraft. There were three seats in the A3D, and the regular plane captain volunteered to take the rear seat.

"When I arrived at my plane the next morning, the plane captain had it fuelled and ready for the trip home," Cox related. "I did my pre-flight check and when von Braun arrived I explained to him his oxygen mask, his position in the bombardier's seat and the emergency escape chute. The plane captain helped von Braun get strapped in, closed the hatch and rigged himself for take-off in the rear jump seat. Having signed out with Operations, I was ready to depart and taxied to the warm-up area."

After checking that von Braun had no problem breathing, Cox pushed the throttles full forward. "In a howl of sound the A3D sped along the runway and lifted off. Climbing effortlessly, we reached 35,000 feet and levelled. With nothing to do for about an hour, I was quite amused when von Braun immediately began pointing out cities and landmarks, easily seen from our altitude. Next he suggested ways to improve the cockpit comfort, enhance the equipment and expand the instrument displays. He was instantly practicing his trade as an eminent design engineer."

As it would take a while for a helicopter to be prepared that would carry von Braun on to Anacostia in Washington, D.C. for his meeting with the president, Cox asked if he would like to join his family at the base for a quick lunch. The answer was in the affirmative. As it was nearing noon, Cox called his unit's in-flight frequency and asked them to phone his wife. "Please tell her I am bringing Wernher von Braun home for lunch," he said.

After landing, the two men drove the short distance to Quarters 'K' where Cox found utter turmoil. "My two young children, who watched 'Disneyland' faithfully, had seen Doctor von Braun repeatedly on that show explaining space travel to young America. Both boys were overawed to see the man on TV in the flesh. My wife, who had about ten minutes to prepare lunch, was in a frenzy of activity when we arrived. She had seized a frozen fruit salad from the freezer and was trying to get it thawed. Next she had thrown 'prepared' biscuits in the oven, hoping they would warm and get brown.

"After our entrance and introductions, she led us to the front porch, where a table was set overlooking the Chesapeake Bay. Fortunately there was a slight breeze, making the porch a more pleasant place on a very warm day. She handed us iced tea, then left for the kitchen to assemble lunch. Wernher and I discussed the future of jet travel. After serving the impromptu lunch, much appreciated by the two space-age travelers, my wife looked a mite frazzled, and politely declined to join us.

"I returned von Braun to the hangar, the helicopter was ready, and I wished him Godspeed. Several weeks later, I received an appreciative letter thanking me for introducing him to jet travel."

**SECRET SUMMONS TO WASHINGTON**

On 21 March 1957, Cmdr. Cox broke two intercontinental speed records in a Douglas A3D-1 Skywarrior twin-engine attack aircraft along with Navy Lt. Russell Baum and Technical Sergeant Robert Butts, USMC. First, he set a record time of 5 hr 24 min 26 sec for a flight from Los Angeles to New York. Although a new record was not set on the return journey, it lowered the figure for the combined round trip by 1 hr 42 min 39 sec, with a total duration of 11 hr 18 min 27 sec. The FAI (Fédération Aéronautique Internationale) used what was called "Lindbergh Rules" in determining these records. All times were taken from the moment the wheels left the ground until touchdown.<sup>5</sup> In congratulating Cox and his crew the Chief of Naval Operations, Admiral Arleigh Burke, wrote that these records "coupled with the known performance of the A3D are indicative of the skilful flight planning and thorough knowledge of high altitude flying which you and your crew so aptly demonstrated. Your performance on these flights was in keeping with the finest traditions of naval aviation."<sup>6</sup>

China Lake is situated about 120 miles north of Los Angeles and about forty miles northeast of Mojave. Commissioned on 18 June 1951 at NAS Moffett Field,



The A3D-1 crewmembers following their record-breaking intercontinental flight. From left: Lt. Russell Baum, USN, Cmdr. Dale Cox, USN, and T/Sgt. Robert Butts, USMC. (Photo courtesy of Dale Cox)



California, Air Development Squadron Five, or VX-5, had relocated in July 1956 to the Naval Air Facility, China Lake, as an independent tenant command so as to be closer to the superior ranges and instrumentation facilities required for its projects. The squadron was under the operational control of Commander, Operational Test and Evaluation Force (COMOPTEVFOR) in Norfolk, Virginia, which issued all projects. It was also Cox's newest assignment.

In 1958, as related in a 2006 oral history, Lt. General (then Capt.) William H. Fitch arrived at China Lake, reported to Commander Cox, and quickly realised that "all the flying in VX-5 was connected with nuclear weapons delivery, whether it was low-level navigation, aerial refuelling, mission profiles, loft bombing, or dive bombing. When I joined VX-5 in March 1958 [the squadron] did every kind of nuclear weapons delivery there was."



China Lake, 1958. Standing beneath the nose of an A3D are (from left) future astronaut and moonwalker Edgar Mitchell from Heavy Attack Squadron Two, Dale Cox and Lt. Cmdr. Don Minter. (Photo courtesy of Dale Cox)

"For project flying we had four delivery aircraft in the squadron, and they were the A4D-2 (A4B) Skyhawk, the FJ-4B Fury, the AD-4B and AD-6 Skyraider, and the A3D heavy attack aircraft. Commander Dale Cox was the squadron executive officer the entire time that I was in VX-5, and he supported me in anything that I wanted to do in the weapons delivery world. [He] flew the A3D."<sup>7</sup>

During this time, Cox received a summons to Washington to take part in a bold new venture, entirely beyond anything he had ever contemplated.

It was around 10:00 a.m. on 31 January 1959; a day that Cox will never forget. "I was in my quarters with my family at China Lake enjoying a pleasant Saturday, when the VX-5 Duty Officer called. He reported I had a personal dispatch from Washington that demanded immediate action. In jeans and a sport shirt, I drove the five minutes to the Air Station and climbed the hangar stairs to the squadron's empty offices."

He already had a hopeful inkling as to what the dispatch might tell him, because three days earlier the front pages of both the *Los Angeles Times* and the *Washington Post* had run headlines announcing that one hundred and ten service candidates were listed for the first U.S. flight into space. The successful applicants would be known as the Mercury Astronauts, and competitive speculation as to who might be called for screening was already ripe throughout the test pilot fraternity.

The *Los Angeles Times* article reported that:

One hundred and ten potential candidates have been selected for man's first flight into orbit around the earth.

T. Keith Glennan, U.S. space chief, told the Institute of Aeronautical Sciences today the list will be reduced to 12 by late March. These will be trained.

Glennan said the man finally to be selected would be a university graduate with a degree in the physical sciences or in engineering, a graduate of one of the military test-pilot training schools with at least 1,500 hours of flying time, younger than 40, no taller than 5 ft. 11 in. and in superb condition, mentally and physically.

McDonnell Aircraft Corp., St. Louis, was appointed Jan. 12 to design, develop and build the Project Mercury capsule capable of carrying a man into orbital flight and safely back. Glennan said the project probably will continue for several years.<sup>8</sup>

*Washington Post* staff reporter, Edward Gamarekian, added:

Starting early next month, these candidates will go to Washington in groups of about 30 to be given a full description of Project Mercury by NASA, Army, Navy and Air Force biomedical experts. Only after these briefings will the candidates be asked if they will volunteer.<sup>9</sup>

The dispatch Cox received was a summons from the office of VADM Robert Pirie, Deputy Chief of Naval Operations (Air), directing him to be in a certain room in the Pentagon at 0800 hours on Monday morning, 2 February, which was two days hence. All candidates were instructed to wear civilian clothing while in Washington

to avoid any awkward questions about the purpose of their visit. "I immediately made reservations on American Airlines to fly from Los Angeles to Washington the next day," he reflected, "and then 'talked' a junior lieutenant into flying me to LAX in the squadron AD-6 on the next day, Sunday, departing at 0800."

Curious but a little apprehensive, he began the journey to Washington ready to face whatever lay ahead. And if at some future date it meant flying into space, he thought, well that would certainly be a truly amazing, unbelievably exhilarating adventure. Mercury Astronaut Dale Cox; the name had a nice ring to it.

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All other material in this chapter supplied by Capt. Dale W. Cox, USN (Ret.) in e-mail and postal correspondence, 15 December 2009 to 12 June 2010.

# 2

## The call goes out

On 4 October 1957 the Soviet Union launched into Earth orbit a beach-ball-sized satellite they called *Sputnik*, simultaneously propelling the world into a portentous new era known as the Space Age. Ten days later in America, amid public and military anxiety, President Dwight D. Eisenhower received a carefully constructed briefing on future space exploration, including human spaceflight activities, from the American Rocket Society, an eminent and influential association that was chiefly comprised of aerospace engineers and was then headed by the renowned rocket scientist, Robert Truax. Within its presentation the Society recommended that in view of the Soviet accomplishment – the United States had a pressing need to create a civilian research and development society akin to the National Advisory Committee for Aeronautics (NACA) but not answerable to the military services.

### NACA BECOMES NASA

Since its inception in 1915, NACA had been the aeronautical research agency of the United States. Established as an independent agency, its mandate through ensuing decades was to supervise and direct scientific studies of problems relating to flight. They would offer practical solutions to these problems, as well as conduct ongoing research and experiments in aeronautics. Like those who had preceded them, the seventeen unpaid members of the Advisory Committee at NACA in 1958 had been appointed by the President and reported directly to him. An immediate advancement of NACA, perhaps as a new, integrated space agency, formed part of the recommendations proposed by the American Rocket Society.

Meanwhile the U.S. Army had reacted swiftly to news of the launch of a Soviet satellite, which Lt. General James M. Gavin, the Army's Chief of Research and Development, defiantly described as America's "technological Pearl Harbor". On 8 November, Defense Secretary Neil McElroy ordered the U.S. Army to prepare "for launching a scientific satellite by use of a modified Jupiter-C test vehicle."<sup>1</sup> This order represented a reversal of policy that had earlier assigned to the U.S. Navy the role of developing Earth satellites, while ignoring Army complaints that they could

## 26 The call goes out

have placed a satellite into orbit months or even years earlier. The Jupiter-C launch vehicle was a three-stage test rocket that had already attained a height of around 650 miles and travelled more than 3,300 miles downrange. The first stage of the rocket was a liquid-fuelled Redstone, a modernised version of Nazi Germany's infamous V-2 ballistic missile.

Maj. General John B. Medaris, commander of the Army Ballistic Missile Agency (ABMA) at Huntsville, Alabama, stated in agreement, "that unless we develop an engine with a million-pound thrust by 1961, we will not be in space – we will be out of the race". He further held that "the priority today should be on the attainment of a space capability... at the earliest possible date". Furthermore, he insisted that, "Right now we need a 10- to 12-year program that has as its ultimate goal the manned domination of space".<sup>2</sup>

Dr. Wernher von Braun, the German-born civilian rocket expert who headed the Redstone Arsenal rocket team at the ABMA, backed Medaris' views. He also proposed a national space agency with a \$1.5 billion annual budget that would undertake programmes designed to produce "a man orbiting the earth on a returnable basis" within five years, and a manned space station within a decade.<sup>3</sup> He even suggested a radical, accelerated plan – given Pentagon authorisation – for launching a man inside a space capsule on a suborbital flight aboard one of the Arsenal's Jupiter-C/Redstone rockets. This proactive plan attracted some tacit approval within the Department of Defense, but was quickly rejected as impractical by the White House after taking advice from consultants within the field. The most outspoken of these was NACA's director, Dr. Hugh L. Dryden, who likened the Army proposal to a grossly expensive circus stunt.

Critically, the U.S. Congress was in concordance with calls for an independent space agency. It requested that such an agency be established, and that the space activities of the Department of Defense be reorganised. Following this, President Eisenhower recommended that a civilian space agency be created which would embrace and administer all non-military space activities. This agency would be based on the structure of NACA, which, while carrying out significant aeronautical and space-related research, was regarded by Eisenhower and his science advisor James R. Killian as being too small a facility to take on this additional responsibility.

On 2 April 1958, the President sent to Congress a bill calling for the immediate establishment of a civilian aeronautics and space agency. Congress duly passed the Space Act on 29 July, resulting in the creation of NASA, the National Aeronautics and Space Administration. The NACA membership would now find itself absorbed into this new agency. On 8 August, Dr. T. Keith Glennan, President of the Case Institute of Technology and one-time Atomic Energy Commissioner, was appointed NASA's Administrator, with Dr. Hugh L. Dryden providing continuity by serving as Deputy Administrator.

NASA officially came into existence on 1 October 1958, despite the protestations of the Army and Air Force, who felt that they should be in sole charge of any space programme. Dr. Glennan, together with Roy W. Johnson of the Advanced Research Projects Agency (ARPA) of the Department of Defense at Huntsville, Alabama, immediately set to work implementing a manned spacecraft programme.



President Dwight D. Eisenhower presents NASA commissions to Dr. T. Keith Glennan, right, as the first administrator for NASA, and Dr. Hugh L. Dryden, left, as deputy administrator. (Photo: NASA)

At President Eisenhower's direction, NASA could also draw on the experience of the Jet Propulsion Laboratory (JPL) of the California Institute of Technology in Pasadena, California, and assumed control over the 150 engineers, technicians and scientists then operating the U.S. Navy's Vanguard satellite programme. Glennan declared the Vanguard programme would continue, "at least temporarily", under the supervision of Dr. John P. Hagen and would use Navy facilities "for the time being".<sup>4</sup> The President permitted the Army, through Wernher von Braun, to retain the ABMA and its scientists then based at Huntsville, but gave NASA the right to use its capabilities "on a fully cooperative basis". In effect, von Braun now found himself working for a civilian space agency, but one which mirrored his ambitious personal drive for human space exploration.

## FORMING THE SPACE TASK GROUP

On 5 November, a Space Task Group (STG) was formed at the Air Force's Langley Research Center at Langley AFB, Virginia, with Robert R. Gilruth appointed as its Director. Once the organisational core had been established, the experience and resources of universities, industry and the U.S. armed services were called upon in determining certain objectives. The Department of Defense would contribute in the area of human factors, drawing upon its facilities and crucial experience garnered over many years in the field of aeronautics, in addition to preliminary research that it had conducted into space flight and known aspects of space medicine. This included tentative Air Force plans for selecting service pilots dedicated to its proposed Project 7969 or MISS (Man In Space Soonest) programme.

At this time the Navy, Army and Air Force all had plans for sending men into space, and their aims were very much the same: to develop a suitable man-rated capsule, to observe a pilot's capacity to live and function in space, and to recover the pilot and his craft safely. The Army concept was known as Project Adam, which would involve firing a manned nose cone on a ballistic trajectory.<sup>5</sup> The Navy meanwhile was working on Project MER (Manned Earth Reconnaissance), which would use a rocket-launched collapsible pneumatic glider to shoot a volunteer into orbit aboard a cylindrical craft with hemispherical ends.<sup>6</sup> But the Air Force was well in advance of these proposals, and had already proceeded to the selection and training of space volunteers.

The STG was tasked with four major goals: to select and train potential space pilots; to prepare specifications for a manned spacecraft, submit them to industry, and evaluate the proposals; to select and develop a suitable launch vehicle; and to plan and build a worldwide tracking network.

In accordance with these objectives, an astronaut selection committee was set up by Charles J. Donlan, a senior management engineer and Assistant Director for Project Mercury, who served as chairman. Its members were Chief of Space Flight Programs and NACA test pilot engineer Warren J. North, a former assistant chief at the Lewis Flight Dynamics Laboratory; two flight surgeons, Dr. Stanley C. White, MD, Major, U.S. Air Force, and Dr. William S. Augerson, MD, Capt., U.S. Army; Dr. Allen O. Gamble, an industrial psychologist on leave from the National Science Foundation and Manpower Evaluation Development Officer at NASA Headquarters, and U.S. Navy psychologist Dr. Robert B. Voas; and two psychiatrists, Dr. George E. Ruff, MD, Capt. (USAF) then 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). It meant that all branches of the military would have an involvement in the selection process. These eight men would undertake the initial screening of records and go on to carry out interviews and testing of the selected candidates.

Prior to this time Dr. Ruff had been working with the Air Force on the MISS project for orbital flight, which required the selection of pilots. "As I remember, at some time late in 1958, the responsibility was taken away from the Air Force and given to the newly formed NASA. But the aeronautical research nucleus from which it was developed had no human factors capability, and selection responsibility was given to our lab, with the understanding that we would coordinate with the School of Aviation Medicine at Brooks AFB in San Antonio and the equivalent naval unit at NAS Pensacola, Florida."<sup>7</sup>

Ruff's team of staff psychologists and psychiatrists comprised of Captain Levy, with whom he shared leadership of the group; Captains Victor Thaler and John Jackson, Lt. Gilbert Johnson and Dr. Mildred Mitchell. They would discuss and develop a basic philosophy to guide Ruff and Levy in the psychiatric screening of the candidates.

The objective of the selection process was later outlined in the 1959 paper "Psychiatric Evaluation of Candidates for Space Flight" prepared by Drs. Ruff and Levy. It was a process to choose pilots for a two-year training programme, followed

by a series of ballistic and orbital flights. The pilot's duties would "consist largely of reading instruments and recording observations. However, he will retain certain decision-making functions, and will be required to adapt to changing conditions as circumstances may demand."

By combining data on the known expectations and goals of the programme with information on behaviour during other highly stressful operations, the following general guidelines for psychiatric evaluation by Ruff and Levy were established:

1. Candidates should have a high level of general intelligence, with abilities to interpret instruments, perceive mathematical relationships and maintain spatial orientation.
2. There should be evidence of sufficient drive and creativity to insure positive contributions to the development of the vehicle and other aspects of the project as a whole.
3. Relative freedom from conflict and anxiety is desirable. Exaggerated and stereotyped defenses should be avoided.
4. Candidates should not be overly dependent on others for the satisfaction of their needs. At the same time, they must be able to accept dependence on others when required for the success of the mission. They must be able to tolerate either close associations or extreme isolation.
5. The pilot should be able to function when out of familiar surroundings and when usual patterns of behavior are impossible.
6. Candidates must show evidence of ability to respond predictably to foreseeable situations, without losing the capacity to adapt flexibly to circumstances which cannot be foreseen.
7. Motivation should depend primarily on interest in the mission rather than on exaggerated needs for personal accomplishment. Self-destructive wishes and attempts to compensate for identity problems or feelings of inadequacy are undesirable.
8. There should be no evidence of impulsiveness. The pilot must act when action is appropriate, but refrain from action when inactivity is appropriate. He must be able to tolerate stress situations passively, without requiring motor activity to dissipate anxiety.<sup>8</sup>

## PROJECT MERCURY IS BORN

The name for the manned space project was suggested by Abe Silverstein, the STG's Director of Space Flight Development, who proposed that it be called Mercury, after the swift-footed messenger of the Roman gods and patron of travellers. Hugh Dryden agreed. On 26 November 1958 the programme name Project Mercury was adopted, although it would not be publicly launched under that title until 17 December – the fifty-fifth anniversary of the Wright brothers' first flight.

"Oddly enough, one of the first hot issues was the names or terms," wrote Dr. Allen Gamble in his personal recollections of the selection process. "What should we

call the men who would one day fly into space? At Langley Research Center on December 1, 1958, we brainstormed, and every name mentioned went up on the blackboard. Of course, somebody said 'spaceman' and someone else said 'superman' and still another said 'space pilot'. But perhaps he would be a passenger instead of a pilot, so some wise guy proposed 'man-in-a-can'. Other suggestions were made, some kidding and some serious. Then one of us came up with a solid suggestion, 'Mercury', which made sense. It referred not to the planet Mercury and not to the quicksilver metal mercury, but to the messenger of the Roman gods, who had wings on his heels and legendary speed of flight. But someone had heard the word mentioned before, so he called Washington. Sure enough, only five days earlier, on November 26, NASA Headquarters had officially adopted Project Mercury as the name of the first American manned spaceflight effort, but not yet used the term publicly or told us."

Eventually, someone in the study group found the word 'aeronaut' and they built on this to create the word 'astronaut', meaning 'star voyager', which met with the group's approval. "We thought we had actually invented a new word," Gamble added, "but it later turned up as having been used earlier, in 1929, probably in science fiction. In any event, the term 'astronaut' rang true and was adopted."<sup>9</sup>

British Honduras-born Maxime Faget was one of thirty-five men who originally served as a nucleus for the Space Task Group of Project Mercury. Trained in mechanical engineering at San Francisco Junior College and Louisiana State College, he quickly advanced to become head of NACA's performance aerodynamics branch. For this new programme his principal task was to find the best re-entry shape for the Mercury spacecraft, crucially one that would dissipate the excessive heat of re-entry through Earth's atmosphere. He and his eight associates finally came up with what they felt was the answer to this problem; a configuration with a blunt face, truncated cone, and a cylinder mounted atop the cone. The curved face of the spacecraft, which would be facing into the heat, was protected by an ablative heat shield. Mounted on the heat shield and held there by metal straps would be three posigrade rocket motors and three retrograde rocket motors. The pilot, securely seated within a moulded couch, would face the small end of the spacecraft.

On 12 January 1959, the McDonnell Aircraft Corporation was informed that it had been awarded a contract for the formidable task of fabricating and equipping NASA's Mercury "capsule", as it was then called.

Various options for a launch vehicle were reviewed by the STG, and they finally settled on the reliable Redstone rocket to place the first manned spacecraft into a suborbital flight path to an altitude close to that planned for later orbital missions. The 83-foot tall Redstone had a proven record, having been in military service since 1953. The rocket's A-7 engine could generate 78,000 pounds of thrust and would easily lift the 66,000-pound spacecraft-Redstone combination. For the later orbital missions the more powerful Atlas rocket was the booster of choice.

The STG now had to address the issue of what duties or responsibilities would fall on the astronaut during his mission, demonstrating that humans could contribute more than machines in exploring space. One document issued by the STG at that time was very cautious in explaining the role of the astronaut:



From left, Charles Donlan (deputy head), Robert R. Gilruth (head Space Task Group) and Maxime Faget (spacecraft designer) with a technician holding a scale model of the proposed Mercury spacecraft. (Photo: NASA)

Although the entire satellite operation will be possible in the early phases without the presence of man, the astronaut will play an important role during the flight. He will contribute by monitoring the cabin environment and by making necessary adjustments. He will have continuous displays of his position and attitude and other instrument readings, and will have the capability of operating the reaction controls, and of initiating the descent from orbit. He will contribute to the operation of the communications system. In addition, the astronaut will make research observations that cannot be made by instruments; these include physiological, astronomical and meteorological observations.<sup>10</sup>

With these elements in place, the human factor side of the programme could now be fully explored and a pilot selection process undertaken. NASA would need some volunteers to fly aboard their spacecraft. They needed to choose astronauts. But the big, unresolved question was precisely who, and with what qualifications, were they looking for in setting out their parameters? Much frenzied activity had followed the

establishment of Project Mercury, particularly in regard to the selection of astronauts and defining what qualifications were required or desirable. With no precedents or government procedures to follow, NASA had to decide where the best candidates could be found, how many were needed, how they should be tested, and then who would be involved in the final selection process. What they *did* know was that the selection process would hinge on three crucial factors: physical, psychological and technical.

### **EISENHOWER ENDORSES TEST PILOTS**

In the last week of December 1958, after several meetings between Keith Glennan, his deputy Hugh Dryden, the hard-driving STG Director Robert Gilruth, and other upper-level representatives of NASA and the STG astronaut selection committee, a consensus was reached. For speed and facility in arriving at the selections, it was decided to restrict the search for suitable candidates to the ranks of military test pilots. There were several advantages; test pilots were already inured to the rigors of military life, they were available at very short notice, and their full records were readily accessible. First, however, the decision had to be formally raised with President Eisenhower for his approval – or rejection – of the group's recommendation.

During a 1982 interview, Glennan revealed that he and Dryden, both having service backgrounds to assist them in their decision-making, told the President that there were substantial problems associated with finding enough civilians with the requisite number of hours in high performance jets. To them, it clearly demonstrated that they should be looking at service test pilots, "because we wanted to be sure that Ike would have no objection to the use of military test pilots as astronauts in a civilian agency, and that we were not, in any way, compromising his thinking about a civilian agency which he very often spoke of as being the space program developers in the U.S. Eisenhower, apparently convinced of the merits of restricting the selection to test pilots, said 'Of course you should use service test pilots. They are in the service to do as the service requires of them at various times. They ought to have a chance to volunteer if they wish.' We got it cleared in five minutes."<sup>11</sup>

This was a relief to Gilruth. Ultimately, it was up to Eisenhower to make the final decision on who should be considered for space flight, and his approval would now set the wheels in motion. "It was one of the best decisions [the President] ever made," Gilruth stated later. "The test pilots were stable guys who had already been screened for security."<sup>12</sup> All U.S. military test pilots at that time were men, so without exception, this decision likewise meant that all the candidates would be male.

Shortly after the establishment of the organisational core of the STG, NASA's Special Committee on Life Sciences had been formed, with W. Randolph ("Randy") Lovelace II as chairman. Dr. Lovelace, who founded and operated a remote, private diagnostic clinic in Albuquerque, New Mexico, was a pilot and parachutist in his own right and therefore well suited to the pioneering medical aspects of launching men into space and their survivability in that hostile environment. He had conducted



Dr. W. Randolph Lovelace II. (Photo courtesy of New Mexico Museum of Space History)

high-altitude and pressure-suit testing at Wright-Patterson AFB, and his clinic had already performed extensive biomedical space studies, including tests on U-2 pilots.

Lovelace's committee was charged with making recommendations concerning biomedical aspects of the space activities of the United States, and in particular with defining who would make the most suitable candidates for space flight. Assisting on this committee was Brig. Gen. Donald D. Flickinger, USAF, MC, a flight surgeon (with a law degree from George Washington University) as well as assistant deputy commander for research of the Aerospace Research and Development Command (ARDC), who had also been involved as a director of "human factors" in biomedical aspects of the Air Force's man-in-space programme. Flickinger understood what he was seeking when it came to candidates, and he knew that it was to be found in test pilots. "There is the aggressive response to stress, as we find in the tiger, and the docile response, as exhibited by the rabbit," he commented in a 1958 newspaper interview. "We're looking for tigers."<sup>13</sup>

Another member of the committee was Lt. Colonel Stanley C. White, a key Air Force consultant to General Flickinger on Project MISS and who had already been assigned to the STG as Chief, Life Sciences Division.

"Our group met with the realization that we had to use everything learned from flight within the atmosphere," recalled Dr. Lovelace, "but we recognized we had many additional problems involved. Though this country had not organized any previous study regarding man in space on an official level, the individuals on this working group, especially General Flickinger, had thought a great deal about it. So when we met, we could move very fast and come up with definite recommendations. We met at several places – Washington, D.C., Boston, Wright-Patterson Air Force



Brig. Gen. Donald D. Flickinger, USAF (Photo: USAF)

Base – and approached the problem scientifically. Our final recommendations were unanimous; there was no minority report.”<sup>14</sup>

With deliberate analysis, the specialist team approached the matter of candidate selection. In his capacity as an aeromedical consultant, White had deemed the use of test pilots a logical decision. “They are doing engineering tests every day, taking risks beyond that which is normally expected of a man. They also give both objective data as gathered by the performance of their vehicle, and subjective data as far as their impressions of both the engineering and themselves under test conditions are concerned.”<sup>15</sup>

Navy psychologist Dr. Robert Voas agreed. “We were looking for a professional group that already fulfilled many of the requirements necessary to enable us to achieve space flight *at the earliest time*. This brought us inevitably to test pilots. Others could undoubtedly have been trained, but these men had a tremendous head start in the most important factor of all – technical skill.”<sup>16</sup>

## ASTRONAUT SELECTION A PRIORITY

According to Charles Donlan, one of the more interesting aspects of the process of selecting astronauts was that STG Director Robert Gilruth handed his subordinates complete responsibility for making decisions. “Now that’s known as really delegating authority... It didn’t have to pass through a bunch of committees [and]

that was very instrumental in being able to decide something and go ahead with it.” As he recalled, Gilruth merely said that the selection was a top priority and directed, “Pick whoever you want; I’m putting you in charge of the selection program... I don’t want to hear anything about it until you’re ready to tell me who the final candidates are.”<sup>17</sup>

As Colonel White explained, “We began to pound out the exact criteria. We wanted to have individuals who were not only in top physical condition, but had demonstrated that they had the capability to stay alive under tough and dangerous assignments. Also, stamina was important; these men had to have good response to the onset of stress, and moreover be able to withstand it over a period of time.”<sup>18</sup>

Some specific limitations were then set; candidates had to possess a university degree; be a graduate of a test pilot school; be in superb condition, mentally and physically; have around 1,500 jet hours, be no taller than 5 foot 11 inches and be under forty years of age. Initially, the age limit had been set at thirty-five, but the rigorous qualifications caused it to be raised to thirty-nine.

“There were some arbitrary criteria in this initial screening that had to do with educational background, height, previously administered intelligence tests, and medical history background,” General Flickinger stated. “The height limit of 5 feet 11 inches, for example, was irrevocable because it was governed by the dimensions within the space capsule.”<sup>19</sup>

One important consideration was the selection of an appropriate facility for conducting medical examinations of the candidates, and the Special Committee on Life Sciences was kept fully informed as several institutions were discussed. Initially, three federal facilities in Washington, D.C. were favoured: the National Institutes of Health, the U.S. Army’s Walter Reed Medical Center, and the Bethesda Naval Medical Center. The decision makers in this process were Charles Donlan, George Low, Warren North, Robert Voas, William Augerson and Stan White, and the more that they weighed the options, the more they favoured choosing a non-government civilian facility. Flickinger was the one who pressed hard for the Lovelace Clinic in Albuquerque, New Mexico, to be selected – it was a private, civilian clinic where Brig. General Albert H. Schwichtenberg, a retired Air Force medical liaison officer, was head of the Department of Aviation and Space Medicine. “Send them to Lovelace,” Flickinger suggested, adding with emphasis, “They’re used to keeping secrets.”<sup>20</sup>

During World War II, Schwichtenberg had served in the Air Surgeon’s Office in U.S. Army Air Corps, and post-war became Chief of Operations in the Air Corps Medical Service. He then served in the Office of the Secretary of Defense for almost three years before being assigned to Ent AFB in Colorado Springs, Colorado, which was the headquarters of the Air Defense Command. He spent a number of years there before retiring from the Air Force in 1958. “Randy [Lovelace], of course, knew me well and he had also put in his three years in the Office of the Secretary of Defense,” Schwichtenberg observed in a 1985 interview, “so he was free, and he practically insisted that I come down here [Albuquerque] to be his head of the Department of Aerospace Medicine and Bioastronautics. Since I was retiring, that seemed just the thing.”<sup>21</sup>

A meeting convened at NASA Headquarters in Washington in the first week of January 1959 brought together Lovelace, Flickinger, Low, North, Gilruth and other key members of the STG, at which it was decided after much investigation to take Flickinger's advice and use the Lovelace Clinic. The clinic had already undertaken (and impressed with) important biomedical work for the Aerospace Research and Development Command of the Air Force, including the discarded MISS project. It being a non-government facility, as Flickinger had stressed, the results of the medical examinations would become the property of NASA and not the military. This would also help assuage any fears the pilot candidates might harbour that any poor results could potentially jeopardise their service careers. It was also agreed that the ensuing stress and related tests would be conducted by the Aero Medical Laboratory of the Wright Air Development Center (WADC) in Dayton, Ohio.

With these decisions made, the records of individuals who met the broad criteria had to be retrieved and reviewed. As recalled by Dr. Voas, "We went to the Pentagon and were able to get the Air Force and the Navy to pull the records... the personnel records of everyone who had graduated from the test pilot schools for the last ten years, I think, something like that. So our first operation was for myself and Allen Gamble – and Stan White was involved in some of this, too – to go through these personnel records and examine them for a certain set of basic requirements and the minimum set of flight hours."

Having ended up with 508 potential candidates, the next step was to check the pilots' medical records. "So they went through the medical records to make sure that each of them was in good physical health... then you went through the flight records to select them based on the reports of their superiors through their military records, make sure that they had the minimum flight time, and look at the type of flying that they had been doing."<sup>22</sup> This procedure would become known as Phase One of an eventual five-phase operation to select the future astronauts.

## MOVING BEYOND PHASE ONE

The records of 110 men were set aside as meeting the minimum qualifications. This list comprised 58 Air Force pilots, 47 Navy officers, and five from the Marine Corps. The records of several Army candidates had been examined, but as none of the men were graduates of a test pilot school their files were set aside by the committee as not meeting this crucial qualification.

Personnel Records Screened	Met Minimum Standards	%
USAF	225	58
USN	225	47
USMC	23	5
US ARMY	35	0
<b>TOTAL</b>	<b>508</b>	<b>110</b>
		22



U.S. Marine Corps Maj. John H. Glenn, Jr. (Photo: NASA)

But the initial selection process was not without its faults, and one particular oversight almost cost the United States one of its all-time heroes, as Dr. Voas later admitted. “I was the Navy representative on the selection group and I made the error of assuming that the records of the Marine Corps pilots would be in the same files as the Navy pilots, since they went to the same Patuxent River training center. It wasn’t until we had selected almost all the 110 candidates that it was called to my attention that we didn’t have any Marines. So we had to make a quick contact with the Marine Corps and they found two pilots who fit the requirements. One was John Glenn.”<sup>23</sup>

There was one major problem with Glenn’s selection: he lacked a college degree. “Frankly,” Glenn told biographer Frank Van Riper, “I had more than enough credits for a college degree. In fact, I probably had enough for a masters, based on all the academic work at Patuxent, as well as college-level course work I had done right after World War II through the Armed Forces Institute. Around that time, I had also gone to the University of Maryland extension division two or three nights a week at the Pentagon.

“I had transferred all this back to Muskingum [College], but they still wouldn’t give me a degree. They held it up on a residency requirement, of all things! I’d only spent the first twenty years of my life there, and they stymied it on that.”

Dr. Voas recalls that the selection committee decided to be flexible. “From the beginning, it was felt that while John didn’t have a formal degree, he had the outside course work, and that was the equivalent. We didn’t take these requirements that rigidly. What was important was the nature of the flight record, and John’s was outstanding.”<sup>24</sup>

Glenn commented further on this in his 1999 autobiography, *John Glenn: A*

*Memoir*, stating that his remaining in the candidate field was entirely due to Colonel Jake Dill, his one-time commanding officer at the Marine detachment at Pax River and, at that time, second-in-command of personnel at Marine headquarters in Washington, D.C. "As the field narrowed, my lack of a degree loomed larger. Jake Dill, unbeknownst to me, learned that I had been deselected on the basis of the degree requirement, since the astronauts were all to be assigned specific, and highly technical, tasks within the program in addition to riding rockets into space. Jake knew my background and thought this was unfair. He went to NASA with all my combat and academic records, and my technical flight reports from Patuxent. I later learned he had met with the selection board and convinced them that I had more than the equivalent of a degree."<sup>25</sup>

Each of the 110 candidates was then ranked in terms of his overall qualifications, taking into account factors such as total flying time, total testing experience, ratings of senior instructors from the test pilot schools... and even the age and number of their children.

The committee's final task was to place the reviews in ranking order – running from best to least qualified – and then split up the files into three working groups of around thirty-five pilots each, with the most promising candidates placed in the first group. Charles Donlan then notified NASA of the results. Literally within days of the initial screening, invitations were prepared and issued to the top thirty-five candidates to attend a briefing and interviews in Room 4-E-1085 at the Pentagon in Washington, D.C., on Monday, 2 February, on what became Phase Two of the selection process. They were instructed to leave their uniforms behind and report in civilian clothing. The second group would present itself a week later and the third group a week after that.

Lt. Hal Crandall was serving at the Naval Air Test Center when he got a letter signed by RADM Clifford S. Cooper, Acting Deputy Chief of Naval Operations (Air). The letter read:

Dear Lieutenant Crandall,

You already have or shortly will receive orders to report to BUPERS [Bureau of Naval Personnel] for temporary additional duty on matters concerning a special project. My purpose in writing to you at this time is to advise you of the special nature and sensitiveness surrounding the purpose for which you have been ordered to Washington. I would like to impress upon you the importance of your not speculating or discussing the reason of this visit with anyone at this time. Premature identification of yourself in this matter could prejudice the project.

You will be furnished information for your guidance upon arrival in Washington so, in the meantime, I suggest you consider the communication and purpose as a confidential matter between yourself and this office.<sup>26</sup>

The men would be travelling under what were known as blind orders – meaning that no reason was given.

Robert Voas' memory of this phase of the operation was clear. "We had invited

the first thirty-five... and then we had two more groups to come, and we were going to do one each week for three weeks. So when I say 'invited,' we didn't make any communication. They were ordered in by the Chief of Naval Operations or the Air Force Chief of Staff. They were just told to report to the Pentagon and they were not supposed to be told why they were doing it and so on. This was all being done in a top-secret form.<sup>27</sup>

On 27 January 1959, NASA had issued the following statement bearing the name of Administrator T. Keith Glennan.

The process has begun to select the U.S. citizen who will become our 20th Century Mercury orbiting the Earth in space.

He will be a university graduate, with a degree in the physical sciences or in engineering. In addition, he will have graduated from one of the military test pilot training schools, and will have a minimum of 1500 hours of flight time in his log book. He will be younger than 40, and not taller than 5'11". In superb condition, he will possess the physical and psychological attributes suited for space flight, as determined by top aero-medical scientists who are participating in the National Aeronautics and Space Administration's Project Mercury.

Selection of the pilot-astronaut has already begun. He will be one of a dozen volunteers chosen with greatest care. The group will be totally involved in a program of rigorous training for the first orbital space flight, the climax of the Project Mercury program.

Although the first orbital flight by our modern Mercury will surely be a pioneering venture, we are determined that the risks to the pilot will be no greater than those experienced during the first flights of a new, high performance airplane. As in such airplane flights, the Astronaut will play a vital role in the Mercury project. Repeated flights of the same space capsule, first carrying only instruments, and later animals, will have tested and proven the practicability of the final phase of Project Mercury – manned satellite flight – before it is undertaken.

The first step in the selection process already completed was screening of the records of Air Force, Navy, and Marine officers who have been graduated from their service test-pilot schools. On the basis of criteria established with assistance of the NASA's Acromedical Committee, headed by Dr. W. Randolph Lovelace, 110 potential candidates have been chosen.

Beginning early in February, the pilot-astronaut candidates will come to Washington in groups of about 30 to be given a full description of NASA's Project Mercury. NASA, Army, Navy, and Air Force bio-medical experts will participate in these meetings.

Only after these briefings will the candidates be asked if they will volunteer. From those who answer affirmatively, 36 will be chosen for the next step in the selection process. This smaller group will be given a series of intensive physical and psychological tests, which include studies of the candidates' ability to cope with the stresses of space flight and with the environmental and other bio-medical aspects of flight performed under confined conditions over a long period.

By late March, it is expected selection of 12 volunteers for the Project Mercury team will have been made. This team will then begin the training program that will include both simulated and actual flight conditions that progressively come closer to those of orbital space flight.

The volunteers will be assigned to the NASA Space Task Group, located at Langley Research Center and under the project direction of Robert R. Gilruth. The Mercury Astronauts will be given additional training at the Johnsville Naval Air Development Center, Pennsylvania; the Atlantic Missile Range, Florida; the Air Force Wright Air Development Center, Ohio, and other biomedical centers in the U.S.

At Johnsville, the Astronauts will undergo training in a centrifuge that very nearly simulates conditions in a capsule during takeoff and re-entry. The early testing period will involve balloon flights in Mercury capsules to familiarise the Astronauts with some of the environmental conditions with which they will have to cope.

While the volunteer team is undergoing this training, technical teams will be testing Project Mercury capsule mock-ups in gradually increasing degrees of range and complexity. Short range, solid fuel boosters will be used initially to launch these mock-ups in sub-orbital trajectories, followed by longer range flights, using more powerful boosters. At a later period in the program, animals will be launched in the capsule in order to determine more completely the environment man will experience in space flight.

All 12 volunteers of the Mercury team will be given the same preflight and flight training. Only immediately before the first manned orbital flight will the first Mercury Astronaut be selected.

On January 12, we announced the selection of McDonnell Air Craft Corporation as the source for the design, development, and construction of the Project Mercury capsule capable of carrying a man into orbital flight around the Earth. The space capsule, serving as the payload of a powerful booster, will be designed to carry a human passenger through the atmosphere, into orbital flights, and safely back to Earth again. The satellite system will provide a means of studying the psychological and physiological effects of space flight on man. The research will include man's reaction to weightlessness during orbital flight, high acceleration during launch, and high deceleration during re-entry into the atmosphere.

Dr. Abe Silverstein, NASA Director of Space Flight Development, is responsible for the over-all technical direction of Project Mercury. The Space Task Group, under Mr. Gilruth, while physically located at the Langley Research Center, reports to Dr. Silverstein in NASA Headquarters, Washington, D.C.

Project Mercury, a program being conducted with the advice and assistance of the Advanced Research Projects Agency of the Department of Defense, is expected to continue for several years.<sup>28</sup>

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# 3

## Narrowing the field

At precisely 8:27 a.m. on Monday, 2 February 1959, a skittish groundhog known as Punxsutawney Phil emerged from his burrow on Gobbler's Knob and cautiously sniffed the chill morning air. He paused momentarily, blinked, and gazed around at the huddled crowd of beaming spectators surrounding his burrow, annoyed by a sudden burst of flashbulbs and excited cries of humans. He was the centre of attention that day, with a ridiculously simple task to perform, but one richly steeped in tradition and folklore. All that was required of him was an appearance at a time of his own choosing, which he had now performed. As expected, the gunmetal morning skies over Pennsylvania ensured that the little creature did not cast a shadow on the ground. His annual duty over and recorded for posterity on film, the celebrity groundhog snorted and beat a hasty retreat into the warmth of his burrow as the spectators erupted into more cheers and applause. Punxsutawney Phil had just made it official – he had not seen his shadow, so spring was just around the corner.

That same morning, four states away to the west, twenty-two-year-old Charles Hardin Holley was decidedly fed up, tired and frustrated as he gazed in annoyance through a frosted bus window at the passing snow-covered Iowa countryside. Better known to his legion of fans as Buddy Holly, his support acts and backing group *The Crickets* had joined him in criss-crossing the Midwest at a frantic pace in miserable conditions for a rock-and-roll tour known as the "Winter Dance Party". Some party, he mused: twenty-four Midwestern cities in three weeks, with long overnight travel in freezing conditions riding a tour bus that not only continually broke down, but also had a defective heating system. It was causing them massive problems. His regular drummer had already been in hospital with a severe case of frostbitten feet, and Holly knew that he had to do something. That evening they had a gig at the Surf Ballroom in Clear Lake, Iowa, and he was going to suggest that they charter a small aircraft to transport at least some of them to their next venue in Moorhead, Minnesota. It had to be far safer and more comfortable, he decided, than riding in a crowded, unheated and unreliable tour bus.

## A MEETING WITH DESTINY

The weather over Washington, D.C., on that morning of 2 February was also cool and overcast, with snow piled up on the ground. Many of the Project Mercury candidates were staying in a tiny Marriott Hotel on 14th Street near the Pentagon. It was so cold that a small feature pond outside the hotel had frozen over.

However the inclement weather was one of the last things on their minds as thirty-five men dressed in warm civilian clothing but with an unmistakably military bearing pursued their individual paths to the Pentagon for an eight o'clock appointment with destiny. They had still not been given any official explanation for their summons, but most had a reasonably good idea – hence the anonymity of wearing civilian clothing in case any nosy reporters had been snooping around any new arrivals in uniform. They were confident their presence had a lot to do with the recent call for astronauts to ride NASA's rockets into space.

Those who suspected this was the purpose of the call to Washington knew that if they performed well they stood a very good chance of one day – perhaps – riding a rocket into space. Not as a “spaceman” – a name that evoked childhood fantasies of swashbuckling heroes such as Buck Rogers and Flash Gordon – but as what the new civilian space agency NASA had decided to call an “astronaut”. It was all still very conjectural, so most were eager to hear what this mystery prospect might mean for them and, perhaps more importantly, their service careers.

It was certainly an intriguing time for USAF Major Chris Christian. “I do recall the excitement from receiving messages requesting – no, demanding – that I report to Washington, D.C. on a given date, and that I was to talk to no one concerning my reason for going, including my boss. There were others within my unit who were also summoned, but I did not know it until arriving at the Pentagon.”<sup>1</sup>

Scott Carpenter recalls that there was one legendary name missing from the test pilots who would be summoned to Washington. “Unfortunately, Chuck Yeager was not one of those... he is the doyen of all test pilots. But he didn’t have a degree.” The lack of a degree probably wouldn’t have bothered Yeager – “he was above all that”, Carpenter commented – but not even being considered did not sit well with the great man. “He didn’t like that.”<sup>2</sup>

## CANDIDATES REVEALED

Two of the men selected for briefing and interviews were Tom Bogan and William Bradbury, both Air Force captains. Amazingly, despite the top secret nature of their summons, the two men’s names seem to have been mysteriously revealed to the print media by Keith Glennan. The following article from the *Newton County Enterprise* newspaper of 30 January 1959 was found among Bogan’s effects by his family after his death in 1980.



Captain Tom Bogan at the USAF Cold Weather Test Station at Eielson AFB, Alaska, preparing to test-fly an ice-covered F-16 Delta Dart. (Photo courtesy of Bogan family)

#### GOODLAND CAPTAIN MAY BE FIRST INTO SPACE

An Air Force captain from Goodland, Ind., was revealed as one of the 110 men being considered for man's first venture to outer space.

"It was pretty hard to believe," said Tom Bogan, who is stationed at the U.S. cold weather test station near Fairbanks, Alaska. His name and that of Capt. William Bradbury of Houston, Tex., were the first of the candidates to be announced by Keith Glenman [sic], head of the National Aeronautics and Space Agency [sic].

Both Bogan and Bradbury said they had no special training for the space venture, but both have more than twice the required 1,500 flying hours and are

within the maximum height of 5 feet, 11 inches. Both pilots are married. Bogan said he has been trying to reach his wife, who is visiting in London, Ontario. Both wives now live in Dayton, Ohio.

Capt. Bogan, who said he did not volunteer for the space flight and was bewildered by his nomination, is married and has an 18-month-old son and a 3-year-old daughter. He has an electrical engineering degree from Purdue University.

Bogan's mother, Mrs. Bethel Bogan, lives in Goodland, where he was born and grew up. He has two brothers, Maj. David Bogan of the chemical warfare branch of the Army, and Robert Bogan of Mill Valley, Calif. Capt. Bogan was a fighter pilot in World War II.

Both men said they soon would return to Wright-Patterson Air Force Base in Dayton, where they are regularly assigned, and were eager to learn more about Project Mercury.

Space Chief Gilman [sic] said the 12 final space candidates are expected to be selected by late March.

The announcement of the selection of Bogan and Bradbury came ahead of [the] announcement of the 108 other candidates because of a Fairbanks radio station interview yesterday with the two men.<sup>3</sup>

It is not known why these two names were initially made public, but in view of the time frame it would seem that permission was granted from someone in authority to reveal those first two names to the media. It almost goes without saying that if two Air Force officers were given top secret orders they would *never* have responded to any questions from the press. Conversely, even if they had innocently discussed their candidature, it is quite certain that their names would have been quietly removed from the list. Tom Bogan definitely went through every phase of the screening process, so no censure seems to have been involved. The press report remains a curious anomaly.

## PENTAGON BRIEFINGS

As the thirty-five men reported for their Phase One briefing at the Pentagon, the Navy and Marine candidates were directed to one room and the Air Force pilots to another. While they would shortly be addressed by representatives from NASA, it was felt that the pilots would be more comfortable if the initial welcome and briefing came from a senior officer within their own service. Thus the Navy and Marine candidates would be briefed by the Chief of Naval Operations and the Air Force pilots by the Chief of Staff of the Air Force.

Dale Cox was in the Navy contingent. "Monday morning I was seated in the correct room in the Pentagon with about twenty other naval aviators, a few of them marines. Precisely at 0800 Admiral Arleigh Burke, USN, Chief of Naval Operations, entered the room. He told us that his friend, Dr. Hugh Dryden, the newly appointed Deputy Director of NASA, had called him at home asking if there weren't any Navy

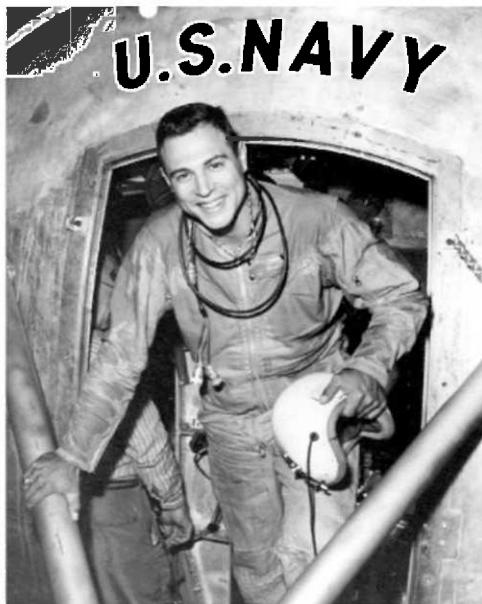
and Marine volunteers interested in exploring space. Up to that point, the Air Force had assumed that all potential Project Mercury candidates would be selected exclusively from the U.S. Air Force and had already assembled a team. That's how close it was that all astronauts would have been Air Force.<sup>4</sup> While Admiral Burke's recalled statement does not entirely comply with the chronology of the formal selection process, he may simply have been using this as a means of inciting the Navy and Marine candidates to a greater awareness in terms of inter-service rivalry with the Air Force.

While Admiral Burke welcomed the Navy and Marine contingent to the NASA briefing, General Thomas D. White was similarly outlining the Air Force's position on the men volunteering for a civilian space programme. In his opening statement, General White announced that he wanted to shake hands with the first American to fly into outer space. Both senior officers gave an assurance that their branches of the service unequivocally backed the NASA programme, and would fully support any of the candidates should they decide to volunteer. Their status would be protected, they were told, while normal professional progress and promotions would continue. These statements answered important questions many of the candidates had wanted to ask. Further reassurance was given when they were told that their branch of the service would cooperate fully with the space agency in providing adequate opportunities for them to continue their flight proficiency.

An hour later all thirty-five candidates were assembled in an auditorium for their NASA briefing, looking distinctly uncomfortable in civilian clothing. Naval aviator Wally Schirra had been hesitant – even reluctant – to attend. He had been test-flying the Mach-2 F4H Phantom II at Edwards and envisaged himself as possibly the first commander of an F4H squadron; he was therefore reluctant to leave the security and potential of the Navy. Because the space programme would be a civilian endeavour, anyone who volunteered would be “on loan” from their military service – at least temporarily – and Schirra feared that the space programme would provide a massive interruption to his career. Like many other Navy candidates in the auditorium he felt he was on a steady, set path to eventual flag rank, and did not want to upset that goal with something as wildly unpredictable as a space programme. Nevertheless, like many of his Pax River buddies, including Pete Conrad and Jim Lovell, Schirra was interested in hearing what NASA had to say and, as he revealed in his memoirs, kept an open mind.

“The three selection committee members who addressed us from the stage of the Pentagon hall were Charles J. Donlan, a senior engineer and Gilruth’s assistant; Warren J. North, a NASA test pilot and engineer; and Lieutenant Robert B. Voas of the Navy, a psychologist. They must have looked into a sea of blank expressions. We were a very confused group of guys.”<sup>5</sup>

Certainly one of the least confused guys at the series of briefings was John Glenn, at that time a senior major in the U.S. Marine Corps. He had earlier volunteered for an assignment to NASA’s facility at Langley Air Force Base in Virginia, where, over a period of several days, he made runs on a spaceflight simulator as part of a study of various spacecraft re-entry shapes. To fully explore and write up some comparative data for this investigation, he had then volunteered to spend a week at the Naval Air



The centrifuge at the Navy's Aviation Medical Acceleration Laboratory in Johnsville, Pennsylvania, would be used to train America's astronauts. Marine Corps Mercury candidate Capt. Robert Solliday is shown exiting the gondola. (Photo courtesy of Robin Solliday Heyne)

Development Center in Johnsville, Pennsylvania, to be subjected to high-G runs in a large simulator.

As Glenn later recalled in the book *We Seven*, "Since I had been to Johnsville and knew something about the ride the capsule would have to take, and had also been involved on a number of mockup boards in the Navy and was familiar with the procedures, my boss in BuAer [Bureau of Aeronautics], Captain Tony Benjes, arranged for me to go to the McDonnell plant in St. Louis where the capsule mockup was being discussed and act as one of the Service advisors to the mockup board." He knew that space was going to be the new frontier, and very much wanted to be a part of it. "I felt that many of my experiences had added up to prepare me for the kind of challenge that Project Mercury presented and that I would be remiss if I did not volunteer to put some of this background to good use."<sup>6</sup>

Leroy Gordon ("Gordo") Cooper, Jr. was also there that day. As a thirty-two-year-old Air Force captain, he was a test pilot in the engineering branch at Edwards AFB flying high performance jets when he received his summons to Washington. Cooper recalled that the commanding officer, just as much in the dark, only asked that the three test pilots involved keep their eyes open and not become involved in some kind of foolish, fly-by-night programme. As he listened to the NASA officials, however, Cooper became increasingly intrigued as they spoke of Project Mercury involving newly developed techniques in aerodynamics, rocket propulsion, celestial mechanics, aerospace medicine and electronics.

"When I was given the presentation on what the program would be, I had to think: I've got the best job in the world already, which I loved. I'm giving this up to go into this new program? I hope that this new program is all that I think it will be. And, of course, as it turned out, it certainly was. It was a big decision to make... and by the end of that day you had to make your decision.

"My dad always said, even when I was a kid, someday we'll be traveling in space, traveling in rocket ships. That was many years before, of course. I really didn't think I would be one of the first, though. I suppose it didn't really dawn on me that we'd even get into space in my lifetime. I figured we would get into space, but I think I figured it would be quite a number of years off.

"I felt that this was the way that I was going to get higher and faster and further to get into space. I certainly realized that I was in competition with a lot of very qualified guys, and I knew it was going to be a very tough competition. At that point in time, I decided that the only way I was going to do it was just decide, I'm going to make it, and whatever happens I'm going to be one of the ones selected."<sup>7</sup>

## AN OVERVIEW OF PROJECT MERCURY

In the first of the three briefings, Charles Donlan outlined the organisation known as NASA and presented an overview of Project Mercury. Warren North then explained the need for a pilot in the spacecraft. And finally Robert Voas gave a comprehensive run-down of the selection process and how it had brought them all to Washington that day, what would occur should they agree to continue in the screening process, and the training programme that would prepare the successful candidates for space flight. It was announced that after a break for lunch there would be short, personal interviews with the selection committee, at which time each man would be asked if he had any questions and, more importantly, if he wished to proceed as a candidate or withdraw without prejudice.

There were also some rules to be observed, as related by Chris Christian. "During our stay in D.C. we were asked to not collect with others being evaluated, to stay in civilian clothing and keep a low profile. At the completion, we were told to return to our daily activity, to discuss the D.C. events with no one other than our wives, and to caution them as to the secrecy of the activity. We were told that we would have the opportunity to opt out of further consideration and otherwise we would be given further information or instructions in due time.

"Although I saw Deke Slayton, Gus Grissom, Frank Frazier, Jim Wood and Tom Sumner in D.C., I do not recall any discussions among us concerning the program."<sup>8</sup>

For some, however, once the day's briefings were at an end and they had made their way out of the Pentagon into the chill evening air, deep in thought, the need for a group discussion was a given. Four of the Pax River pilots gravitated together and fell into conversation as they made their way back through the snow to the Marriott Hotel. Despite the restriction, they agreed they would like to discuss the prospects over a drink or three. According to Jim Lovell, he, Charles (Pete) Conrad, Jr. and Alan Shepard went to Wally Schirra's room, where they carefully slipped the chain

on the door once they were inside and broke the seals on some bottles of liquor. It was the first instance of what the Mercury astronauts would later call a “seance”.

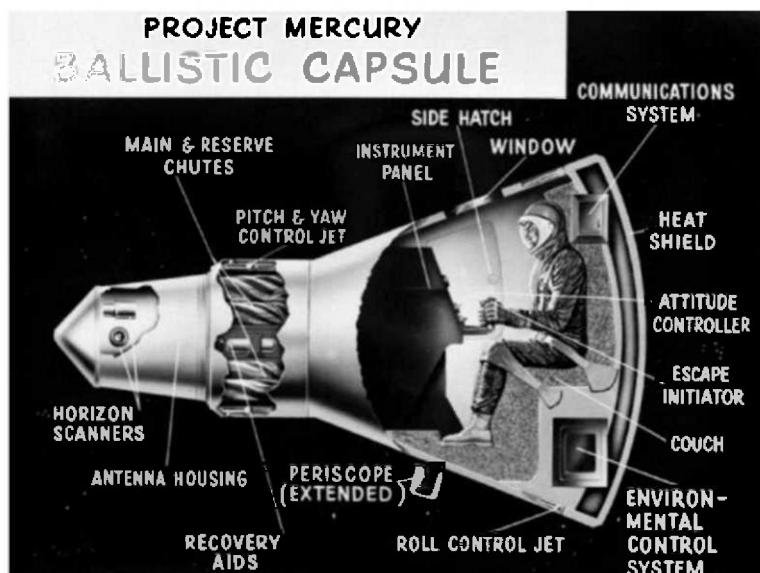
Schirra’s lingering concern was the interruption to his career and what might become of his future prospects. The others agreed. Shepard, for example, was on a fast track to one day earning the stripes of an admiral.

“The key,” Lovell later wrote, “was not to get sidetracked. Spend a few years doing some loony, at-the-fringes work – volunteering for some half-baked space task group, for instance – and you might never get back on course.”<sup>9</sup>

Gilruth had told the candidates the man-rated capsule was only at the blueprint stage. He also admitted that he had no real idea how the pilot would control his craft in flight, or indeed how much control that would entail. There was understandable concern amongst the aviators over the use of the word “monitoring” in discussions about operating the manned capsule; specifically in *monitoring* critical phases of the mission such as the booster staging, separation of an escape tower, the firing of the retrorockets and deployment of the parachutes. Eyebrows also shot up when Gilruth told the candidates that there would be no landing as such; it would be a splashdown into the ocean, after which they would be retrieved by a waiting helicopter.

Nevertheless, Gilruth had stressed that each and every man there was a test pilot and NASA was not seeking a passenger for the capsule – the space agency wanted competent pilots with solid engineering backgrounds who could not only operate this unique craft, but report any difficulties in a calm, logical manner, and work with the best aerospace engineers and manufacturers in the country to fix any shortcomings. They had also been reminded that while the programme would be

An early schematic of the Mercury capsule. (Photo: NASA)



administered as a civilian enterprise, the successful volunteers would retain their

military status and rank. The only real difference was that they would report to NASA rather than the Department of Defense.

Sure, the four men seated around the hotel room knew that from time to time the rockets blew up, but new, innovative aircraft could have some pretty deadly nuances as well, so the risk factor was not seen as a big deal. They understood, and had been told, that the job was dangerous, and it would not be held against any man if he opted not to continue beyond that day. What really got their attention was when they were told that Project Mercury was not only a "hazardous undertaking", but a programme of the "highest national priority". The challenge had been clearly laid down.

"Within half an hour of arriving at the Marriott, every pilot in Wally's room had accepted that Project Mercury might well spell the death of his naval career," Lovell recalled in his memoirs. "And every one had decided he'd do whatever he had to do to be a part of it."<sup>10</sup>

They finally adjourned to their own rooms around 2:00 a.m.

## **DECLINING THE INVITATION TO SPACE**

Air Force Captain (later Colonel) Thomas Sumner from Louisville, Kentucky had been working at Wright-Patterson AFB when he received his summons. He listened intently as Air Force Chief of Staff General Thomas White carefully outlined the service's position should any of them wish to volunteer later that day for possible astronaut selection. Next they were joined by the Navy and Marine candidates for a group briefing by representatives from NASA. At the end of this discussion, Tom Sumner had made his decision – he was going to decline.

"I had several reasons," he told the author. "However the main reason I said no was when we were told that the capsule would have no windows. Maybe I could have lived with that, but then we found out that there was no clear indication about how much control the pilot would have over the capsule. That reinforced my decision not to carry on."

"I thought the whole thing was really ridiculous, and the people who had come up with this had no really clear policy or anything that would attract me into wanting to sign up." Following the briefings he was asked at an individual interview if he wished to continue. He declined. "Maybe one of my worst decisions," he revealed with a chuckle. "I already knew Deke Slayton, Gordon Cooper and especially Gus Grissom from Wright-Patterson and I often wondered how it might have ended up if I'd said yes that day."

Although he turned down the chance to become an astronaut (altogether eight men declined the invitation) Sumner would subsequently enjoy an interesting career in the Air Force. In 1962 he was assigned to Hickam AFB, Honolulu as commander and one of about fifty pilots in an elite task group involved in the airborne recovery of photo-reconnaissance film capsules for the highly classified USAF Corona project. Ejected from spy satellites, these capsules would parachute down to the Pacific. Before splashdown, however, C-130 aircraft specially equipped with a

dangling rig of ropes and hooks would skilfully snare the parachute and pluck the capsule from the air. "It was like catching a big powerful fish that's on the run," he stated. Post-recovery, the polymer film was removed, processed, and the images carefully examined by CIA photo-interpreters. Colonel Sumner was later based in Los Angeles and, ironically, became the Air Force's space programme director for NASA's Space Shuttle. He now lives in retirement in Hawaii.<sup>11</sup>

## **PHASE TWO BEGINS**

On the second day the men who had not opted out were summoned to the temporary headquarters of NASA on H Street, in the elegant Dolley Madison House which was once the home of the widow of President James Madison. They began by completing a far more extensive personal history to supplement the information in their service records. Dr. Voas then asked each candidate to compete a series of short written tests which were "designed to measure their general intelligence and their engineering and mathematical aptitude".<sup>12</sup> Altogether they would participate in four searching interviews, one of which meant sitting in a hard chair facing a barrage of technical questions from a panel comprising Donlan, North and Gamble.

According to a report prepared by the Aerospace Medical Association (ASMA):

Engineer Charles Donlan had on the table the thick specifications book from McDonnell Aircraft Corporation for the proposed Mercury capsule, another thick book about the launch vehicle, a world map of the planned orbital trajectories, and various charts and tables. Each man was shown these items, key features were pointed out, and all his questions were answered as well as we were able. Next, Warren North, then Chief of the Manned Space Flight Program at NASA Headquarters, quizzed the candidate in detail about his flight training and experience. An Industrial and Organizational Psychologist (Dr. Gamble) asked a variety of motivational questions.

One of the big questions the men had to answer was how they would feel if they were selected as one of the twelve astronauts, but did not then get to fly into space.

The second stage was a psychiatric evaluation. Two psychiatrists, Dr. George Ruff and Dr. Edwin Levy, who were Air Force officers, conducted this. Each recorded his independent conclusions, and then they compared notes and reported to the committee.<sup>13</sup>

"A psychiatrist probed as to why we'd want to do something so crazy and dangerous and so forth," Dale Cox recollects.

Although an oversimplification, this was indeed what George Ruff and Ed Levy wanted to discern in the responses of the subjects, as they later wrote in their paper, "Evaluation of Candidates for Space Flight".

The psychological evaluation included 30 hours of psychiatric interviews,

psychological tests and observations of stress experiments. The information obtained was used to rate the candidates on a 10-point scale for each of 17 categories. Ratings were made on the basis of specific features of behavior – both as indicated by their past history and as observed during the interviews. Even though the general population was used as a reference group, the scales are normative only in an arbitrary sense. The 10 levels represent subjective decisions on which characteristics are ideal, which are average and which are undesirable. Although the reliability among raters is excellent, validation studies have not yet been done. The categories are:

1. *Drive* – An estimate of the total quantity of instinctual energy.
2. *Freedom from conflict and anxiety* – A clinical evaluation of the number and severity of unresolved problem areas and of the extent to which they interfere with the candidate's functioning.
3. *Effectiveness of defenses* How efficient are the ego defenses? Are they flexible and adaptive or rigid and inappropriate? Will the mission deprive the candidate of elements necessary for the integrity of his defensive system?
4. *Free energy* What is the quantity of neutral energy? Are defenses so expensive to maintain that nothing is left for creative activity? How large is the "conflict-free sphere of the ego"?
5. *Identity* – How well has the candidate established a concept of himself and his relationship to the rest of the world?
6. *Object relationships* Does he have the capacity to form genuine object relationships? Can he withdraw object cathexes when necessary? To what extent is he involved in his relationships with others?
7. *Reality testing* – Does the subject have a relatively undistorted view of his environment? Have his life experiences been broad enough to allow a sophisticated appraisal of the world? Does his view of the mission represent fantasy or reality?
8. *Dependency* – How much must the candidate rely on others? How well does he accept dependency needs? Is separation anxiety likely to interfere with his conduct of the mission?
9. *Adaptability* How well does he adapt to changing circumstances? What is the range of conditions under which he can function? What are the adjustments he can make? Can he compromise flexibly?
10. *Freedom from impulsivity* – How well can the candidate delay gratification of his needs? Has his behavior in the past been consistent and predictable?
11. *Need for activity* What is the minimum degree of motor activity required? Can he tolerate enforced passivity?
12. *Somatization* – Can the candidate be expected to develop physical symptoms while under stress? How aware is he of his own body?
13. *Quantity of motivation* – How strongly does he want to participate in the mission? Are there conflicts between motives – whether conscious or unconscious? Will his motivation remain at a high level?
14. *Quality of motivation* – Is the subject motivated by a desire for narcissistic

- gratification? Does he show evidence of self-destructive wishes? Is he attempting to test adolescent fantasies of invulnerability?
15. *Frustration tolerance* – What will be the result of failure to reach established goals? What behavior can be expected in the face of annoyances, delays or disappointments?
  16. *Social relationships* How well does the subject work with a group? Does he have significant authority problems? Will he contribute to the success of missions for which he is not chosen as pilot? How well do other candidates like him?
  17. *Overall rating* – An estimate of the subject's suitability for the mission. This is based on interviews, test results and other information considered relevant.<sup>14</sup>

The candidates were also asked if they had a wife who was completely opposed to him taking part in the space programme. If he did, then he could not do his best work and would be rejected.

An initial evaluation of each man was made by Ruff and Levy through separate interviews during the preliminary screening period. Asked whether they had any specific roles to play or observations to make during the earlier Pentagon briefings, Ruff responded, "Ed and I had no role at the Pentagon, but were there so we knew what the candidates had heard and what questions were asked. We had no contact with any of the individuals. We lived in Washington during that period and interviewed candidates all day, then met with NASA staff engineers all evening. We each interviewed all candidates."<sup>15</sup>

One psychiatric interview of the candidates was devoted primarily to a review of their history and current life adjustments, but the other was completely unstructured. The author asked Dr. Ruff about certain statements made in Scott Carpenter's book, *For Spacious Skies*, in which the Mercury astronaut said he was "fascinated" by the psychiatric interviews and particularly by Ruff. To quote the book: "All the other interviewers were people he could understand, or at least relate to. They asked straightforward questions. Scott provided straightforward answers. But Ruff asked questions that simply had nothing to do with airplanes, physics or science. Worse, he was completely unreactive to each of the pilot's answers."<sup>16</sup>

According to Dr. Ruff, "Ed and I conducted unstructured interviews. We used a hurriedly assembled, unvalidated rating scale and collaborated to present a joint rating to management. We had agreed ahead of time, more or less, on what topics we would cover.

"Among other things, we asked each man to describe how he got interested in aviation and about his career. Airplanes, physics, or science may or may not have come up in this context. But Charlie Donlan and the others from NASA covered airplanes and science in their interview – that was their primary objective. I still remember Scott's comment about being unreactive. In an initial interview, a psychiatrist typically listens to what is said, without a lot of moment-to-moment reaction. It's sort of 'Um, hmm, tell me more' or 'What did you feel about that?' The attitude is sympathetic, and we usually sum up issues at the end. But we were not to

give feedback to the candidates about what we thought about them. We were to report our findings to management. As I remember it, Scott was looking for feedback about my impressions of him – which I didn't give. He thought I was sort of inscrutable. Many of the candidates told us that they hadn't looked forward to talking to a 'shrink' but found that they had enjoyed the interview, and Scott and I later became good friends. When Ed and I compared notes, we found that we both had liked him, and rated him highly, but never told him that, at the time."<sup>17</sup>

## RATING THE CANDIDATES

The cumulative purpose of these and other interviews was to assess through each candidate's own words their relevance to the Mercury programme, their technical reasoning and capabilities, communication skills, associated interests, and their motivation for wanting to be involved in the fledgling space programme.

Altogether, Drs. Ruff and Levy were evaluating some thirteen traits in each of the candidates, which they would then rate on a scale of 1 to 9. In the final stage of the screening process these rated points were promulgated by the two psychiatrists, the information pooled, and a combined rating made. Any lingering areas of doubt and disagreement were recorded by Ruff and Levy for subsequent investigation.

According to psychologist Allen Gamble, "A few were frank enough to say they weren't interested if there was no assurance they would fly. These were of doubtful motivation – indications were they sought glory."<sup>18</sup> Those candidates were quietly removed from the winnowing list.

The third stage of the interviews was a medical evaluation based on a meticulous review of each candidate's medical records, which they had been requested to supply. This stage was conducted by Dr. William Augerson, the army flight surgeon who had recently been involved in looking through and dramatically culling the records of the initial 508 candidates. His task was to probe further into each pilot's medical history and clarify some details, as well as to compare the candidate's physical appearance with the information in his file. It soon became apparent that several of the men had been fairly cavalier in offering service physicians details such as their true height, although in some cases they had actually gained a little height in maturing from their late-teen enlistments to their full adult height. No one had really been concerned about a pilot's true height, but to Augerson it was a critical factor, as size would definitely matter in the cramped confines of the Mercury capsule.

"The main physical requirement, actually, was that they had to be under six feet," noted Dr. Voas. "That turned out to be probably too simple a definition, because we really weren't taking into account anthropometrics. People who are six feet can be six feet because they have long legs and stubby bodies, or they can be six feet because they have stubby legs and long bodies. It made a difference in the Mercury capsule because you wear molding, you know; they're sitting in the seats. It was more important, really, what the body length was than what the leg length was."<sup>19</sup>

Those men who exceeded the 5' 11" height limit were therefore eliminated from further screening at this stage, and several contenders were lost who were otherwise

highly qualified.

"My height had been a problem when trying to play football at the Naval Academy," candidate John Tierney revealed, "but a decade or so later it proved advantageous. I topped out at five-eight at this point, and the height maximum for NASA was set at five-eleven. I easily met the weight limit of 180 pounds as well, and felt pleased to have made the first cut using only my natural gift of shortness."<sup>20</sup>

The fourth stage of the interviews on day two involved a set of three written tests selected and administered by Dr. Voas, assisted by other psychologists. These were the Minnesota Engineering Analogies test, the Doppelt Mathematical Reasoning test and the Miller Analogies test—the last being a difficult test of logical reasoning ability that had been developed for university graduate students.

Chris Christian says there was a lot going on at that time, and his recollection of the interviews has blurred considerably over the years. "I do recall remarking that from what I gathered in the briefings, they were looking for too many pilots for the scope of the program. The medical screening was straightforward, with the screener having my medical records and questioning me about anything that caught his attention. The engineering types were obviously trying to determine my knowledge in an engineering sense and I could hold my own with them.

"I frankly do not remember many of the questions asked nor the narratives between me and the scientists, psychiatrists and psychologists except their interests in delving into my background and my thoughts concerning the briefings, but I have often wondered what they kept writing in their notes and what little games they were playing."<sup>21</sup>

On the third day, each of the candidates was given a final or "exit" interview, at which they learned their fate. It was all done with proper military decorum. "On Wednesday," Dale Cox recalled, "the Assistant Project Manager of the Space Task Group (later Assistant Director of Project Mercury), Charles J. Donlan, took us to supper at a nice restaurant in groups of two to get to know us better."

Those who would definitely progress to further screening at the Lovelace Clinic and the Wright Aero Medical Laboratory were advised to return to their base and await further instructions. The same advice was given to those who were borderline candidates. Those found to be unsuitable for further screening were thanked for their time but told they were no longer eligible.

"Upon returning to China Lake," Cox added, "I found a very unenthusiastic wife. She didn't want to become a widow at thirty-seven."<sup>22</sup>

## CUTTING THE NUMBERS

It soon became apparent to Donlan that screening all 110 candidates would place an unnecessary strain on the resources of his selection team. Following the second round of briefings and interviews a total of sixty-nine men had been processed. With only a nominal twelve astronaut positions on offer, and due to the high volunteer rate from within the first two groups, a decision was made that it would not be

necessary to call the remaining group of forty-one candidates to Washington.

According to Dr. Allen Gamble, "Bob Voas and I worked late one night to tally up the results. We found that we had 32 well-qualified candidates who had passed every test, so far, with flying colors. Of the 69 who had reported, 16 had declined, 6 were found to be too tall, and another 15 had been eliminated by one or more of the tests. So we stopped right there and did not call in the third group, who had not [been] ranked quite as high on their records anyway. We figured that with 32 men like this we could hardly go wrong. All we had to do now was pick the very best from among these excellent candidates."<sup>23</sup>

The decision was upheld. With thirty-two excellent finalists already selected for further screening, the final group of prospective candidates would not be called to Washington. Those still in the running received letters confirming their eligibility, together with the date on which they were to report to the Lovelace Clinic (officially the Lovelace Foundation for Medical Education and Research) in New Mexico.

"You and your record made a very favourable impression on our selection committee," the letters read. "As a result, you are invited to continue on to the [next] phase of this competitive selection program." This would involve "a series of intensive physical and psychological tests, which include studies of the candidate's ability to cope with the stresses of spaceflight, and other biomedical and environmental aspects of flight, under confined conditions, for a long period." The men were ordered to report to the Lovelace Clinic in civilian clothing. "During this period of temporary duty, only key personnel at the Lovelace Foundation and in Washington will know the reason you are being tested. Please do not discuss Project Mercury unless authorized to do so. You will be informed of the final decision of the selection committee during the first week in April."<sup>24</sup>

These letters of confirmation were sent to the following fifteen aviators from the United States Navy:

- Lt. Cmdr. Robert B. Baldwin
- Lt. Malcolm S. Carpenter
- Lt. Charles Conrad, Jr.
- Cmdr. Dale W. Cox, Jr.
- Lt. Hal R. Crandall
- Lt. Cmdr. Thomas B. Hayward
- Cmdr. Lawrence Heyworth, Jr.
- Lt. Cmdr. William P. Lawrence
- Lt. James A. Lovell, Jr.
- Lt. Cmdr. Paul Miller, Jr.
- Lt. John R. C. Mitchell
- Lt. John R. Ralston, Jr.
- Lt. Cmdr. Walter M. Schirra, Jr.
- Lt. Cmdr. Alan B. Shepard, Jr.
- Lt. Cmdr. John M. Tierney



An aerial view of the Lovelace Clinic (centre of photo) in 1959. (Photo courtesy of Susan Wilson, Director of Public Relations for Lovelace Health System)

Fifteen pilots attached to the United States Air Force also received notification that they had been accepted for further screening:

Capt. Robert G. Bell  
Capt. Thomas R. Bogan  
**Maj. Harold W. Christian, Jr.**  
Capt. Leroy G. Cooper, Jr.  
Capt. Richard M. Corbett  
Capt. Halvor M. Ekeren, Jr.  
Capt. Frank D. Frazier  
Capt. Edward G. Givens, Jr.  
Capt. Virgil I. Grissom  
Capt. Archie T. Iddings, Jr.  
Capt. Robert H. Jacobson  
Capt. Jack B. Mayo  
Capt. Donald K. Slayton  
Capt. Alonzo J. Walter, Jr.  
**Maj. James W. Wood**

The United States Marine Corps would be represented by two finalists:

**Maj. John H. Glenn, Jr.**  
Capt. Robert E. Solliday

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# 4

## The finalists

Of the thirty-two finalists, only ten would one day realise their dream of becoming a NASA astronaut – seven in the (Mercury) Group One, two in Group Two, and one in Group Five. With the exception of Dale Cox, who has already been introduced, this and the next chapter will outline the biographies of the other finalists from the Mercury selection process.

### **ROBERT B. BALDWIN, USN**

Precision has always been an integral part of the world of retired Vice Admiral Robert Bemus Baldwin, so when he was asked by the author for his date of birth he not only identified this as 24 April 1923, but more specifically, “at 0345”.

The future admiral’s parents were Nellie (née Pickard) and William Prendergast Baldwin, and he was given the middle name of Bemus as a nod towards his father’s heritage. “His family roots were in upstate New York,” Baldwin explained. “There’s a point of land on the eastern shore of Lake Chautauqua in New York named Bemus Point.”

By the time Bob Baldwin entered the world he had two brothers and a sister, and was his parents’ youngest child by almost ten years. His father, a physician who had served in that capacity during World War I, was already 46 years old and his mother was 41. Sadly, his father would die soon after Bob was born. “My father died later in 1923 – I wish I had gotten to know him – and my mother in 1930,” he reflected. “My mother was such a sweet lady; she suffered from cancer for weeks preceding her death, but you would never have guessed from her manner.

“I then became the ward of Dr. William H. Long, a close friend and associate of my father. My brothers and sister were just in their early twenties/late teens and in no position to take me on in those Depression years after my mother died. I went to live with the Longs right from my mother’s bedside at her death. However I maintained close contact with my siblings, especially Lenore, my sister, through the years.”

The Longs lived in Fargo, North Dakota, so as he grew up young Bob attended

Agassiz, Roosevelt and Clara Barton elementary schools, Agassiz Junior High and Fargo Central High School.

The crippling years of the Depression and a touch of youthful hero-worship would combine to set Bob Baldwin on his career course. "Mrs. Long had a brother, Mahlon S. Tisdale, who had attended the Naval Academy and would serve in the Navy through both world wars." In fact Tisdale not only became a vice admiral in the U.S. Navy, but would have a guided-missile frigate (FFG-27) named in his honour. "I'd never heard of Annapolis until I went to live with the Longs," Baldwin continued. "As a teenager I was fascinated by airplanes and especially taking off and landing on a carrier, and that made me interested in the Naval Academy. Also I did not want to burden the Longs with the expense of sending me to college – although they never intimated that that was a worry to them – so the Naval Academy was a prime choice from all my points of view."

He entered the academy in 1941 as one of the wartime accelerated class of 1945. While there, he befriended a midshipman by the name of Wally Schirra. "He was a class behind me, but we both were on the soccer team, so I saw a lot of him and we became good friends," Baldwin recalled. They would later serve together in the same squadron at NAS Moffett Field and decades later would become neighbours as well as good friends in Rancho Santa Fe, California.

Graduating on 7 June 1944, Baldwin now held a commission as ensign in the U.S. Navy. His first post-academy assignment was service aboard the light cruiser, USS *Birmingham* (CL-62). After completing repairs, the ship rejoined the Pacific fleet in January 1945 to support the assault on Iwo Jima in March. This action was closely followed by Okinawa, during which the young ensign was engaged in battle for the first time. On 4 May the *Birmingham* was severely damaged when struck in the bow area by a kamikaze aircraft, necessitating a return to Pearl Harbor for repairs. For his actions following the suicide attack, Lt. Baldwin was awarded the Purple Heart and Bronze Star.

At the end of hostilities, Baldwin entered flight training and received his naval aviator's wings on 23 September 1947. His first fleet assignment was in VA-44 ("Scarlet Knights") flying Douglas AD-1 Skyraiders from the aircraft carrier USS *Franklin D. Roosevelt* (CV-42). Then, in 1949, he was assigned as a bombardier/navigator to VC-5, the first of three squadrons that would be established to give the U.S. Navy a nuclear weapons delivery capability. Personnel for this new squadron, both officer and enlisted, were selected on the basis of record reviews and interviews. Initially the squadron flew modified P2V Neptunes, but in September 1949 began converting to the North American AJ-1 Savage, a carrier-based bomber specifically designed to deliver nuclear ordnance and perform photo reconnaissance duties.

In 1950 Bob Baldwin married his first wife June, and they would eventually have three children: Scott, Jared and Sylvia. The following year, he reported to the Naval Test Pilot School at Patuxent River to undertake advanced flight and academic studies in Class 8. After graduating in 1952 he remained at Pax River, serving in the Tactical Test Division and as an instructor at the Test Pilot School.

A PacFleet assignment to VC-3 in 1954 took Baldwin to NAS Moffett Field in California to head up the squadron's Jet Transitional Training Unit (JTTU). To turn



Lt. Robert Baldwin's official U.S. Navy Test Pilot School photograph, 1954 (Photo: USN courtesy of Nancy Posch)

prospective squadron leaders into competent swept-wing jet pilots in preparation for deployment to their various squadrons, VC-3 was assigned six of each new type of swept-wing jet carrier-type airplane. Each aircraft type had a team leader who was a Test Pilot School graduate, and ground instructors who taught swept-wing aerodynamics and jet engines. Baldwin became team leader for the North American FJ-3 Fury, the navalised version of the F-86, and the following year, in the course of his duties, was promoted to the rank of lieutenant commander.

Following his work with VC-3, Baldwin would stay on at NAS Moffett Field as executive officer and acting commanding officer for VF-154 ("Black Knights"), the first PacFleet squadron to fly the F8U-1 Crusader. He served with this squadron on the carrier USS *Hancock* (CV-19) from June to October 1958, during which time the ship became part of a carrier task force which was stationed off Taiwan to deter the Communist Chinese from invading the Nationalist Chinese islands of Quemoy and Matsu. When the *Hancock* returned to San Diego to undergo an overhaul, Baldwin took a shore tour with the Bureau of Naval Personnel (BuPers) to gain experience of administrative leadership, policy planning and general oversight of the service. It was while serving there that he was involved in testing for possible selection as a Mercury astronaut.

Between November 1961 and October 1962, Lt. Cmdr. Baldwin was in command of VF-51 ("Screaming Eagles"), which was attached to the carrier USS *Ticonderoga* (CV-14). By the time Baldwin took command, one of the squadron's pilots destined for greater things had already departed: a mild mannered young aviator by the name



A group photo from Vice Admiral Baldwin's F-8 Crusader days, circa 1956. He is second from the right, standing, capless. Others in this photograph include Jim Stockdale, far left kneeling, and fellow Mercury candidate Tom Hayward, second from left kneeling.  
(Photo courtesy of Robert Baldwin)

of Neil Armstrong. In November 1962, Baldwin was assigned to command Carrier Air Wing 16 (CVW-16) aboard USS *Oriskany* (CV-34). The Air Wing comprised of VF-161, flying F-3B Demons; VF-162 in F-8A Crusaders; VA-163 and VA-164 in A-4B Skyhawks; VA-165 in A-1H Skyraiders; VAH-4 in the A-3B Skywarriors; VAW-11 flying E-1B Tracers; and VFP-63 Det GOLF in RF-8A Photo Crusaders.

Next, Baldwin spent two years in Washington D.C., as administrative aide to the Chief of Naval Personnel, VADM Benedict J. Semmes, "the finest officer I ever had the pleasure of working for". After that tour he was assigned as commanding officer of USS *Chipola* (AO-63), a fleet oiler that had been acquired by the U.S. Navy during World War II. During the war the *Chipola* had been regularly engaged in the dangerous task of providing petroleum products to combat ships wherever required. Recommissioned in December 1960, she would serve once again as a fleet oiler with the Pacific Fleet and saw further action during the Vietnam War.

In 1967, Baldwin was given command of the attack carrier USS *Forrestal* (CVA-59). He was about to leave the United States to take up his command when a terrible tragedy occurred on the ship on 29 July. This involved Lt. Cmdr. John McCain, a later POW of the North Vietnamese and Republican nominee for President of the United States in the 2008 election. As Baldwin put it, "McCain was nearly the first casualty of that catastrophe. He was in the cockpit of his [A-4E Skyhawk] aircraft waiting to be catapulted on a bombing mission. A rocket was inadvertently launched from another aircraft in the pack and struck McCain's plane, igniting a fierce fire which ultimately spread to other aircraft and set off several bombs. McCain managed to scramble from his burning aircraft and joined his shipmates in combating the blaze."

As McCain tried to extricate another pilot from an aircraft a bomb exploded and he was hit in the chest and legs by shrapnel. Even so, as Baldwin explained, McCain was able to return to his squadron's ready room when the situation was under control, "much to the amazement of his squadron mates who were convinced that he could not have survived the rocket impact on his plane". The ensuing fire killed 134 sailors and took 24 hours to control. The damage was extensive. "Since the ship was [ordered] to Norfolk for repairs, I waited there," Baldwin concluded the story.

By 8 April 1968, the *Forrestal* had undergone 207 days of extensive repairs and refits, and was once again ready to take her place in the Fleet. Captain Baldwin then took her down the Elizabeth River and out into the waters off the Virginia Capes for post-repair trials. He would remain in command of the *Forrestal* until 11 December 1968, when he handed over command to Captain James ("Bud") Nance. In that same year, Baldwin was selected for flag rank. Following a tour of duty at the Pentagon he was given command of Carrier Division 6 in the Atlantic Fleet from January 1971 to April 1972, directing an operational feasibility evaluation of the CV concept, which involved combining the capabilities of the attack and anti-submarine carriers (CVA and CVS) into a single ship.

After another Washington tour as Deputy Chief of Navy Personnel, Baldwin was promoted to Vice Admiral, in which grade he served as Commander Naval Air Force, Pacific Fleet, and from 24 July 1976 to 31 May 1978 as Commander of the Seventh Fleet, which he took over from another former Mercury candidate,



Captain Robert B. Baldwin. (Photo: USN)



Observing an obscure Navy tradition near the end of his tour of duty as Commander of the Seventh Fleet, Admiral Baldwin threw a set of his dress blues, attached to a representative anchor, over the side of USS *Oklahoma City*. (Photo: USN)

VADM Thomas B. Hayward, a lifelong friend. He then became Chief of Navy Personnel.

Retiring from the Navy on 31 July 1980, VADM Baldwin moved to Rancho Santa Fe in California, where he was involved in consultancy work and the management of investment properties, and then moved to Carlsbad, California. A life member of the USNA Alumni Association, he served as its President from 1989 to 1991. His first marriage ended in divorce in 1996. Two years later he moved north to Gig Harbor in Washington State. There he married Sally, whom he had known since his school days in Fargo. But in what he described as "a stunning loss", she passed away suddenly in 2000. "I had the good fortune to meet another very special lady here named Corinne, and we've been happily married since 2002."

Since moving to Gig Harbor he has remained in good physical condition, leading an active life and enjoying a fair amount of travel, "mostly to the Scottsdale area and Palm Desert, with a month in Hawaii every other year".<sup>1</sup>

## **ROBERT G. BELL, USAF**

Robert Graham Bell was born in Cisco, Texas, on 23 May 1930. Two years later his father Frank, a sergeant in the U.S. Marine Corps, was killed in Indochina. When his mother eventually remarried, he grew up with his stepfather's name of Edwards.

As a pre-teen, Bell attended the Peacock Military Academy in San Antonio where he was registered – and known – as Bobby Bell Edwards. There he became part (and later captain) of the crack Zouave drill team, whose teenage cadets did precision drills in their immaculate uniforms.<sup>2</sup> He would also become president of the senior class. He began flying at the age of fifteen, and received his pilot's licence at the age of sixteen. He left the academy after six years with the rank of Battalion Commander, which was the highest attainable by a cadet.

After his graduation he attended a single semester at Rice University and was able to attend another the following year, while at the U.S. Naval Academy. On becoming a midshipman at the naval academy in Annapolis in 1948, he legally reverted to using his birth name of Bell.

In the early 1950s the U.S. Air Force was actively recruiting Navy personnel in order to fill its technology and piloting ranks. Bell was one of those who decided to make the change, entering with the rank of 2nd Lieutenant and a service number of 23271A. Another defining change in his life occurred in 1952, when he married his sweetheart, Jackie (Jacquelyn) Rogers of Houston, Texas.

The next phase in Bell's Air Force career was pilot training, which he undertook from 3 June 1952 at Hondo AFB, followed the next year by jet training at Connelly AFB, both located in Texas. Promoted to 1st Lieutenant, Bell then took advanced jet training and attended fighter gunnery school before being assigned to the 1st Fighter Squadron at Hamilton AFB, California, in 1954. That same year Jackie gave birth to their first child, a daughter, Cherlyn Cathleen. They rounded out their family in 1955 with a son, Wesley Curtis.<sup>3</sup>

Bell was next assigned to overseas duties with the 35th Fighter Interceptor Wing,

flying F-86D Sabres out of Yokota Air Base, some thirty-five miles west of Tokyo, Japan. When hostilities ceased in Korea in 1953, Yokota Air Base had returned to a Cold War status and the 35th FIS was mostly engaged in aerial reconnaissance until being inactivated. In 1956, Bell spent a year with a second F-86D squadron, the 41st Fighter Interceptor Squadron based at Andersen AFB in Guam. While serving there he was promoted to the rank of captain.

In 1958, Bell entered USAF Test Pilot School at Edwards AFB in California and subsequently flew such aircraft as the C-130, B-57, F-100 and F-101 while based at Robins AFB in Georgia. At the time that he received summons to attend a mystery briefing in the nation's capital, he was also involved in studies at Squadron Officer School at Maxwell AFB, Alabama. Although Bell was ultimately unsuccessful in his bid to become an astronaut, two of his friends from the Peacock Military Academy, G. Weldon Slaughter and Tom Knight, have revealed that Bell told them that he had come 12th in the final candidate rankings.

Moving on from Robins AFB, Bell next became a member of the U.S. Air Force's 4520th (Thunderbirds) Air Demonstration Squadron in 1961.<sup>4</sup> As an officer pilot, he would serve a two-year assignment with the team. Based at Nellis AFB in Nevada, the Thunderbirds would tour the United States and selected international venues, performing aerobatic formation and solo flying in four customised F-100C Super Sabres. The 1961 team comprised Major Ralph ("Hoot") Gibson – who was America's third jet combat 'ace' – as squadron commander and team leader. Gibson had Captain William Hosmer on his left wing and Captain Robert Cass on his right. Bell took up the "slot" position in the squadron's signature diamond formation. As the slot pilot's role was to move into position directly astern of the lead aircraft, this meant that the vertical stabiliser on this aircraft was permanently blackened from the exhaust of his leader. Five years earlier, future astronaut Bill Pogue had also flown this same slot position with the Thunderbirds.



Robert G. Bell. (Photo: USAF)

Bill Hosmer (left wing) recently recalled two incidents which he says indicated Bell's abilities and stability under tense situations.

"We were doing air shows at the Daytona 500 races in early 1962. On take-off from McDill AFB, Florida, the right wing man Bob Cass lost his radio, which makes it difficult to fly formation aerobatics with no cues hearable on each maneuver. On the cross-over from the bomb-burst maneuver he pulled up early, before he and I met and passed under the lead, "Hoot" Gibson, and Bob Bell, the slot. I told lead [that] I couldn't see where Cass was. He was really on his way back to McDill without a radio because he had struck a flag pole with his left wing. It cut into the wing and a lot of fuel and hydraulic fluid was being vented overboard. At the same time, Bob Bell said that he was stuck in afterburner and would not have enough fuel to make McDill if he could not find a way – and fast – to keep from losing a lot of fuel. I followed his F-100 toward McDill, but it flamed out about halfway. Fortunately, Naval Air Station Stanford was in sight. Bob entered a low key, but could not get to high key. These are checkpoints in three-dimensional space, associated with flameout patterns, and are based on altitude, airspeed and aircraft position from the approach end of the runway. They are meant to help a pilot determine if he has enough energy to be able to land on the runway without propulsion [power]. Bob executed a perfect dead-stick landing and was even able to turn off onto a taxiway so as not to close the runway. He was perfectly cool under much pressure.

"The other occasion that year was at the Air Force Academy graduation site. We were doing the diamond formation inverted pass. It was a long pass, which was difficult to do over that terrain, and on the rather fast roll out to upright flight from the left wing position, I noticed something unusual out of the corner of my eye. As we pulled up to do our wiffridill, a basic turning maneuver which gets us into position for the next display, Bob Bell said to the right wingman, Ralph Brooks, 'Ralph, did you hit me?' Ralph answered, 'Negative.' So we did the next maneuver and in the wiffridill at the other end of the show site, Bob Bell said, 'Ralph, you did too!' Three feet of red, white and blue stripes on Bob's wing tip was missing, and Ralph's wing was also damaged. We finished the show and landed at Peterson Field, Colorado, after those two did some stalls to see if they'd need to hold a little higher airspeed on final approach. Bob stayed cool, continued to maintain his proper position, and considered it another day's work."<sup>5</sup>

The 1961-62 Thunderbirds team would travel 652 days in their two-year tenure, visiting forty U.S. states and fourteen Central and South American countries while flying a total of 180 spectacular demonstrations, each of around twenty-three minutes duration. During that time Bell made two appearances on the Johnny Carson Show to discuss his role as a Thunderbird pilot, and even carried the amiable but nervous TV host on one of his demonstration flights.<sup>6</sup>

Bell had been keen to reapply for the astronaut corps, but when applications were invited for the second intake in April 1962 he had already become an integral part of the Thunderbirds team.

Promoted to major in 1963, Bell attended Naval War College in Newport, Rhode Island, and in 1964 gained his master's degree in international affairs from George Washington University in Washington, D.C. From 1964-65, Bell was on temporary



Maj. Bell (second from left) with a group of fellow Peacock Military Academy Class of '47 cadets at a gathering in the early 1960s to honour the Thunderbird pilots visiting Houston for an air show. (Photo courtesy of G. Weldon Slaughter)

assignment to the Navy, first at NAS Miramar in California, and then deployment to Vietnam as an F-8E Crusader pilot on the carrier USS *Oriskany*.

In his book *Captain Hook: A Pilot's Tragedy and Triumph in the Vietnam War*, fellow aviator on the *Oriskany*, Wynn F. Foster, described Bell as “a popular Air Force exchange pilot who had been serving with *Oriskany*'s VF-162 squadron.” By this time Bell had been awarded the National Defense and Vietnam Service Medals, as well as an Air Medal.<sup>7</sup>

Frank Snay has two particular memories of Bell's flying skill. He was in the Replacement Air Group (RAG) – a Navy training unit – at the same time Bell was transitioning to the F-8. Snay said that all of the instructors wanted to fly ACM (Air Combat Manoeuvring) against Bell, but none of them could beat him in the air. He further recalls that when Bell came to the squadron he was assigned as the Tactics Training Officer, taking junior officers up for one-on-one training hops. Snay says that in those hops he learned to do things with the F-8 that he hadn't known were possible.<sup>8</sup>

In the early morning hours of Sunday, 16 May 1965, 34-year-old Major Bell set off from the *Oriskany* on an air-support mission in the vicinity of Saigon, but his F-8 was apparently hit by enemy ground fire, damaging the bomb release mechanism and causing a fuel leak. He aborted the mission, but under Navy regulations knew that he would not be permitted to return to the carrier until the hung bomb had been removed. Low on fuel, Bell opted instead to divert to the military airstrip at Bien

Hoa, fifteen miles north of Saigon, where maintenance technicians could investigate the problem. After landing, he clambered out of his cockpit and was making his way to the base operations centre when it seems he returned to the aircraft, possibly for his maps. At around 9:30 a.m., while standing on the wing of his Crusader, he was killed when a sudden, catastrophic accident took place.

The devastation began when a 500-pound bomb loaded onto a B-57B Canberra Night Intruder exploded while the pilot was in the flight line, ready to take off. The deadly detonation of napalm set off a tragic chain of explosions that engulfed other aircraft and fuel dumps. Another ten bomb-laden B-57s parked wingtip-to-wingtip nearby were destroyed, along with fifteen A-1E Skyraiders and Bell's F-8. In total, twenty-seven men died in the massive blasts and firestorm, while nearly a hundred personnel were injured. The explosions were so violent that debris would be found nearly a mile from the base.

It was determined that the catastrophe resulted from a known fault. B-57 engines were started by the pilot pressing an ignition switch which detonated a black powder cartridge which in turn spun up a small starter turbine. According to USAF Vietnam veteran Capt. Shelley Hilliard, the turbines "had a nasty habit of spinning loose and coming out of the starter housing like a buzz saw". This time, Hilliard reported, the turbine "hit the fuse of one of the 500-pounders, starting a chain reaction". He was involved in recovering the bodies, among them that of Robert Bell. "We found his name tag, but it took about three days to figure out who he was."<sup>9</sup>

Robert Graham Bell was laid to rest alongside his Marine sergeant father, Frank T. Bell, at the Oakwood cemetery in his hometown of Cisco, Texas. The military rites were conducted by a group from Dyess AFB. In according tribute to one of their own, a memorial service was held at NAS Miramar during which the Thunderbirds team performed a fly-over of the station.



The Bien Hoa flight line following the tragic explosion on 16 May 1965. (Photo: USAF)

In order to pay homage to those who fell in America's longest war, the names of all service personnel listed on the Vietnam Veterans Memorial in Washington, D.C. were included in a fingernail-sized microchip loaded aboard NASA's Stardust probe that was launched in February 1999 on a round-trip journey to sample comet Wild 2. One of the names included was that of Robert G. Bell, USAF.<sup>10</sup>

### **THOMAS R. BOGAN, USAF**

When Captain Tom Bogan found out that he was a candidate for selection in Project Mercury he was bewildered, but also intensely proud. It was not something he had applied for, and he admitted to reporters he knew very little about space travel – but he would quickly learn.

Thomas Rex Bogan was born in Goodland, Indiana, on 4 October 1923. His parents Charles and Bethel Isabelle (née Banes) Bogan both came from families with strong links to the small town, where his father operated a produce store, and which even today boasts a population of only just over 1,000 residents. His mother was the youngest of four children, and it was from her older brother Rexford that Tom gained his middle name. He and his older brothers, David and Robert, attended both grade and high school in Goodland. During his high school days Tom not only worked to help to support his family, but found enjoyment by singing in the church choir. He graduated from Goodland High School in 1941.

On 15 December 1942 Bogan joined the U.S. Army's Enlisted Reserve Corps at Lafayette, Indiana, serving until 14 April 1944, when he was honourably discharged after accepting a commission as a 2nd Lieutenant with the U.S. Army Air Force. He undertook basic and advanced flight training at Spence Field, Georgia, which was completed on 31 July 1944. Then followed additional training as a co-pilot on B-24 Liberator bombers, attending gunnery school and receiving instrument training. He was later transferred to FRTU (Fighter Replacement Training Unit) in which new fighter pilots polished their skills for two months. Assigned to temporary overseas duty with Transport Command, he was attached to APO 627 (China Theater).

The China-Burma-India (CBI) theatre of war is very much a forgotten conflict, taking something of a back seat to the European and Pacific theatres in terms of manpower, resources and press coverage. Pilots and their crews who served in the CBI, flying hazardous bombing and transport missions during the latter stages of World War Two, faced treacherous obstacles while flying from India to Burma or China. Bogan was one of those resourceful pilots engaged in ferrying Chinese troops and supplies – gas, ammunition, bombs and other essentials to support the troops – by cargo aircraft to China from India. This involved what was euphemistically known to them as "Flying the Hump" over the southeastern range of the Himalayas from India through Myitkyina in Burma to Kunming in China, with pilots guiding their heavily-laden aircraft at around 15,000 feet for nearly four hours over 500 miles of some of the roughest country on Earth. Fortunately the weather conditions were so bad and visibility so poor that Japanese fighters didn't bother them too much. In addition to flying P-40 Tomahawk and P-51 Mustang fighters in the CBI theatre, he

also flew two P-51s over the Hump. He was in India on V.J. Day (15 August) on a mission to ferry a plane back to China. His promotion to 1st Lieutenant came on 18 September 1945 in Lo Ping, China.<sup>11</sup>

On his return to the United States, Bogan applied to the Civil Aeronautics Administration of the Department of Commerce for a commercial pilot's licence. When this was awarded on 28 March 1946, it allowed him to operate single-engine and multi-engine aircraft. On 1 July he became a 1st Lieutenant in the USAF Reserve as a step towards being demobbed on 20 August.

As he had been involved in test-flying and conducting acceptance checks on different aircraft during his CBI tour, Bogan wanted to pursue this avenue further, taking on an aeronautical engineering degree at Purdue University, Indiana. On 8 May 1949 he signed on as a 1st Lieutenant with the Indiana National Guard. Upon graduating from Purdue, he rejoined the regular Air Force on 1 February 1951 and, following requalification, transitioned from P-51s to the Lockheed T-33 Shooting Star jet fighter. After completing the fighter interceptor course, he was transferred to the U.S. Air Defense Command at Youngstown Air Base in northeastern Ohio.

His next assignment was to the 319th Fighter Interceptor Squadron at McChord AFB in Tacoma, Washington. After a short tenure at McChord, the squadron was transferred to Larson AFB in Moses Lake, Washington, and gained the F-94 Starfire, which was a derivative of the F-80 Shooting Star. In February 1952, within three weeks of their Warning Order for deployment, the squadron and its aircraft were aboard the carrier USS *Sitkoh Bay* (CVE-86) heading west across the Pacific.



Audrey and Tom Bogan (Photo courtesy of Bogan family)

On 23 March the 319th became operational at Suwon Air Base (K-13), Korea, attached to the Far East Air Forces Fifth Air Force, and its F-94Bs operated during the hours of darkness or in adverse weather to help to maintain fighter screens between the Yalu and Chongchon rivers in North Korea, thereby assisting in protecting B-29 Superfortress bombers from enemy interceptors. For most of the following year of operations the F-94Bs were not permitted to operate anywhere near enemy ground force positions because of their highly-secret AN/APG-33 radar, which the Air Force did not want to fall into enemy hands.

Bogan returned home after his tour of duty in December, and on Christmas Day 1952 married Canadian-born Audrey Bernice Angles, daughter of the late Gordon Angles and his wife May from London, Ontario. They had met at a dance in Grand Bend, Ontario, earlier that year while he was serving on temporary duty at Selfridge Field. There had been an instant attraction, and they swapped letters for ten months while he was in Korea before deciding to get married. Following the wedding in San Francisco, they drove from California to Goodland and stayed with Bogan's parents, then visited the bride's mother in Canada. They then resided at Youngstown, where Lt. Bogan was stationed with the 86th Fighter Interceptor Squadron, flying F-84Cs over Lake Erie.<sup>12</sup>

Promoted to the rank of captain on 1 April 1953, Bogan was recommended for assignment to the USAF Experimental Flight Test Pilot School, joining Class 53D. All twelve pilots in that class graduated on 2 April 1954. He then served at Wright Air Development Center from 18 April 1954 to 1 October 1959, test-flying cargo aircraft for eighteen months, followed by four years in fighters. He was awarded the Air Force Commendation Medal for meritorious service. He and Audrey were living in Dayton during this period, and would celebrate the birth of their daughter Sandra (Sandi) in 1954, and their son Jay in 1956.

During his tenure at Wright-Patterson, Captain Bogan qualified as a Delta Pilot on 4 June 1956, flying the F-102 Delta Dagger supersonic interceptor. He also joined the North American Aviation Mach Buster's Club, flying an F-100 Super Sabre beyond Mach 1, and on 29 May 1958 he further qualified as a Delta Pilot by flying an F-106 Delta Dart.<sup>13</sup>

On 21 December 1958, aged thirty-five, Bogan was at the controls of a supersonic F-106A when it departed Wright-Patterson AFB on a temporary assignment with the U.S. Cold Weather Test Center at Eielson AFB, near Fairbanks in Alaska. During this remote and wintry duty, his wife and children temporarily relocated to live with her mother in London, Ontario.

Bogan arrived at Eielson the following morning for Phase V in a series of cold weather tests of aircraft being developed and flight-tested by the Air Force Systems Command (AFSC). Over a planned two-month period the aircraft and ground support equipment would be put through a test programme of severe weather conditions – at night the temperatures at the base could plunge as low as 40 degrees below zero. The Wright Air Development Center's task force under Major J.C. Gordon was present on temporary assignment to 'arctic test' the Convair F-106, the McDonnell F-101B, Boeing B-52G and Republic F-105. Bogan was responsible for flying the F-106 Delta Dart in sub-zero tests, and 33-year-old Captain William



Capt. Bogan (mid-front with helmet) at Eielson AFB, Alaska (Photo: USAF)

Bradbury flew the F-101B Voodoo interceptor, which was capable of supersonic speeds while carrying a pilot and observer.<sup>14</sup> It was during this posting that unexpected orders came for the two men to report to Washington, D.C. It seems that unlike the other 108 candidates, they were told from the outset that it was in regard to the possibility of becoming a NASA astronaut.

While Bogan had majored in aeronautical engineering at Purdue, Bradbury had gained a bachelor of science degree in mechanical engineering at the University of Houston in 1949, and then a master's in aeronautical engineering from the U.S. Air Force Institute of Technology at Wright-Patterson AFB. "About our only common background is that we have both had engineering," said Bradbury when news of their Mercury candidature was revealed, "and we're both practicing test pilots." They said the first that they knew of this exciting prospect was when they were informed that other pilots would replace them at Eielson while they went to Washington for their interviews. "It was pretty hard to believe," was Bogan's comment.<sup>15</sup>

As the exciting news broke in syndicated reports across the country, Bogan's mother Bethel was understandably overwhelmed. "Of course it came as a complete surprise," she told inquisitive reporters. "He doesn't discuss these things with me or anyone else because of security, and I didn't learn until very recently that he was in Alaska testing the new Convair jet F-106. I'm naturally proud if he has been selected with so few others, but at the same time the idea does worry a mother."<sup>16</sup>

One of Bogan's closest (but unidentified) hometown friends was interviewed in a local newspaper article. They often hunted together and enjoyed discussing their gun collections, and he was not surprised to hear the news because Bogan was "just the kind of typical American boy who would want to do something like this for his country."<sup>17</sup>

The two pilots were interviewed by news director Ken Conner of radio station KFRB, who had learned of the men's candidacy from an "undisclosed" news source. However Air Force officials reportedly confirmed the rumours for Conner.<sup>18</sup>

On 9 July 1959, three months after being informed that he had *not* been selected by NASA, Captain Bogan flew at twice the speed of sound and thereby became the 122nd member of the then-select group of airmen to have exceeded Mach Two.

Promoted to major on 1 September 1961, he remained with Air Force Systems Command (AFSC) and conducted weapons tests in Range Scheduling at Holloman AFB, New Mexico. Part of this task involved flying modified F-106A interceptors and shooting down full-sized drones with Hughes AIM-4 missiles and MB-1s. The MB-1, also known as the *Genie*, was a small, nuclear-armed air-to-air missile being considered for possible use against Soviet bombers. Almost ten feet in length, with a solid-fuelled rocket and flip-out fins for stability in flight, the MB-1 could be armed with a 1.5-kiloton W25 nuclear warhead. In training, an inert version designated the MB-1-T "Ting-a-ling" was used that emitted a cloud of white smoke on detonation.<sup>19</sup> During his three years at Holloman, Bogan also tested fire control systems on such aircraft as the F-102, F-106, F-100 and T-33.

Between 1964 and 1966 Bogan served as a Missile Flight Range Safety Officer at Vandenberg AFB in California, testing re-entry vehicles on the Western Test Range. He was then assigned to an AFSC analysis group that was charged with investigating problems suffered by the geodetic control system used to align the navigation systems of LGM-30B Minuteman I intercontinental range ballistic missiles test-



Lt. Col. Thomas R. Bogan, USAF. (Photo: USAF courtesy of Bogan family)

launched from Vandenberg AFB. The silo-based missiles were test-flown down Western Test Range, which included Eniwetok and Kwajalein Atolls in the Marshall Islands. Bogan was one of two officers stationed on Eniwetok, initially as deputy commander and for the last six weeks as commander.

In September 1967 he returned to Wright-Patterson as Chief of the Flight Test Engineering Division, where he would serve until August 1971. On 16 July 1969 – the day that Apollo 11 launched for the moon – Bogan was further promoted to the rank of lieutenant colonel.

Beginning in August 1971, Bogan spent the last four years of his military service as Research and Development Director with AFSC Headquarters, which was located at Andrews AFB in Maryland.

When he retired on 31 July 1975, his medals and decorations included the China Service Medal, World War Two Victory Medal, American Campaign Medal, Asian-Pacific Campaign Medal, United Nations Service Medal (Korean Conflict), Korean Service Medal, U.S. Army Distinguished Unit Citation, Good Conduct Medal, Air Force Longevity Service Award Ribbon with Silver Oak Leaf Cluster, National Defense Service Medal, Armed Forces Expeditionary Medal, Meritorious Service Medal (1971). Air Force Commendation Medal (1959), Distinguished Flying Cross (1952), and Air Medal (1952).

In retirement, Tom and Audrey Bogan lived in Albuquerque, New Mexico. Then on 5 December 1980, he died of pneumonia at the Veterans Administration Hospital in Albuquerque, and was honoured with a final resting place at Arlington National Cemetery in Virginia. His beloved wife Audrey passed away in Rio Rancho twenty years later on 9 October 2000, leaving behind a son Jay Bogan, also of Rio Rancho, daughter Sandra (Sandi) Halterman of Croom, Maryland, and three grandchildren: Billy, Dawn and Jessica Halterman.

Sandi Halterman recalls her father having a wonderful sense of humour, and Jay agrees. "Dad was loved by many in the military, even though they fondly referred to him as the 'Old Grouch,'" he observed. "He had a lot of dedicated, intelligent men and women that helped him throughout the years."

## **HAROLD W. CHRISTIAN, JR., USAF**

The mining town of Silver City is nestled in the foothills of the spectacular Pinos Altos mountain ranges, in a New Mexico valley that once served as an Apache campsite. A one-time home to notorious outlaw Billy the Kid, Silver City is where Harrison (Jack) Schmitt, one of only twelve men to walk on the moon, grew up. Just a few miles to the east on State Highway 152 there once existed a township known as Santa Rita, the home of Mercury astronaut aspirant Harold Christian, Jr. Santa Rita fell victim to the need for further expanding strip mining in the area. It was simply abandoned and today is the site of a giant open pit copper mine.

Christian's father, known to one and all as Harry, was of Danish descent. He married Jennie Frantom from Pinos Altos, and they first lived in Buckhorn, some twenty miles from Silver City. Their home adjoined the local post office, where he

was employed as postmaster while also running a small grocery store. Ernest, their first child, was born in 1920. Following the birth of a second son, Harold Winsfield Christian, Jr. on 4 March 1923, the family moved to Silver City, and later to Santa Rita, where Harry worked in the general store of the Kennecott Copper Company. In 1936 the family moved a final time to nearby Bayard, where, for a few years before retiring, Harry worked in facility engineering.

The two boys took their early education in Santa Rita and at Hurley High School. Harold Jr. (initially as Little Harry, then Harold, and finally Hal in high school) was very active in his youth; as well as attending church with his family he participated in a number of sports, joined the Boy Scouts, played the violin, and was drum major in the high school band. "To help out, I worked at various jobs during summer months. From gasoline station attendant to carpenter's helper, a railroad brakeman, to helping in my Dad's store and in other grocery stores... and always delivering newspapers." He loved nothing better than hiking in the hills and wilderness, camping, hunting and fishing.

Christian then took on studies at New Mexico State Teacher's College. He recalls only a moderate interest in airplanes, having watched a few fly overhead, but while in college his roommate's brother paid a visit. "He'd recently graduated from the Army flying schools as a second lieutenant. His experience so intrigued me that I wanted to follow suit, and in October 1942 I volunteered to do so." He reported for active duty at Santa Fe, New Mexico, and in January 1943 was sent to Sheppard Field, Wichita Falls, Texas, for army basic training as a private. After screening and testing in San Antonio he was designated an aviation cadet and assigned to that base for pre-flight training. The next step was Wichita State University for additional college training. This was a new programme intended to last a year, but as he already had a college background and the army was setting up a rotation, he only studied for one semester. Next he was sent to Sikeston, Missouri, for primary pilot training. After flying the Fairchild PT-19s under civilian pilot instruction, he proceeded to Winfield Army Air Field in Kansas for basic flight training on the Vultee BT-13 Valiant trainer. Trouble loomed just prior to graduation when he was caught flying an unauthorised formation with another cadet. Fortunately, after an enquiry-delayed graduation he only received a penalty fine. He was then sent to Blackland Army Air Field in Waco, Texas, for the third phase of advanced flight training. "While there in Class 44C, I flew Beechcraft AT-7s and Curtiss AT-9s, both twin-engine airplanes," he commented. "I graduated, won my wings and a commission as a second lieutenant in the U.S. Army Reserves in March of 1944, very soon after becoming twenty-one years old."

After flying ferry missions out of Salt Lake City for a short time, Christian (now known as Chris – the name he still prefers) was assigned to Biggs Field in Texas for training in the Consolidated B-24 Liberator bomber. A full crew of ten was assigned and trained in bombing, gunnery, formation and navigation. He was the co-pilot. In May of 1944, while preparing for overseas duty, he married Kathryn Louise Harvey, whom he had begun dating in high school back in Hurley.

In June the crew left by ship from New Jersey bound for Naples, Italy, and were then transported to an air base near Cerignola in the province of Foggia, where they

became a replacement crew for the 15th Air Force's 484th Bomb Group, 825th Bomb Squadron. They were housed in tents and flew their B-24 off runways constructed of pierced steel planking (PSP). Bombing sorties took them over Northern Italy, France, Germany, Austria, Poland and the Balkans, and could last up to eight hours. At that time, the required number of missions was fifty but, as he explained, "on some very tough targets we were given double credit so, in actuality, I flew less than 50 sorties; somewhere between 35 and 40. We were hit by anti-aircraft fire on practically every mission. If we dropped out of formation as a result of ground fire the German fighters would attempt to shoot at us. It was then that we relied on our P-58s and P-51s to chase them away. Our sorties were all in daylight and in formation, except that during the winter of 1944 our unit was one of the very few that was assigned [several] new radar-equipped B-24s. With those airplanes we went on single-plane sorties at night. Due to the very high accuracy of German searchlights and guns in combination we did not dare fly over the target unless it was covered by clouds. If the primary target was clear we would go to a secondary target."

Christian was promoted to first lieutenant, and then in the fall of 1944 became an aircraft commander. That October the crew ran into serious trouble on a mission over the oil processing facilities at Ploesti, Romania. With an engine shot out and on fire over the target, German fighters closed in for the kill. With the aft end of their plane well alight, the rear four crew members were forced to bail out. Christian managed to coax the blazing B-24 to the Yugoslavian island of Vis and belly-land on a dirt strip. Partisans rescued the six remaining crewmembers, then stripped the shattered aircraft and bulldozed it into the Adriatic. After their return to Italy, the six airmen spent ten days recuperating on the Isle of Capri before rejoining their unit. "The crewmembers that bailed out were not released until the Germans were forced out of the Balkans," he recalls with bitterness. "They were treated badly, became seriously ill, and were in terrible shape when retrieved."

At the end of his combat tour in April 1945, Christian was shipped home aboard a cruise liner and reunited with his wife in El Paso. After B-25 instructor pilot training, his next assignment was as an advanced flight instructor at Enid Air Field, Oklahoma. While there, he attended Squadron Officer's School at Tyndall Field in Florida.

In late 1947 the War Department became the Defense Department and the U.S. Air Force was established as a separate service. Prior to this, a general reduction in force was initiated because there were many more military personnel and facilities than were needed during peace time. A vast number of Reserve Army officers were released, and the rest could apply for a commission in the Regular Army. Christian was one of those accepted. "Many others elected to remain on active duty as Reserve officers, and some were even granted Enlisted status (as Master Sergeant) rather than leave the service altogether." With the formation of the USAF, those in the Regular Army could request Regular Air Force commissions. He applied, was accepted, and given the rank of first lieutenant in the Air Force. "We were left with both Regular and Reserve Air Force officers, but the Reserve officers were not promised the same longevity as the Regulars."

That same year, 1947, the Enid base was closed and pilot training was moved to Barksdale AFB in Shreveport, Louisiana. While instructing at Barksdale, Christian attended Instrument Flight Instructor School. In 1949 his training unit was relocated en masse to Oklahoma, where the Enid base had reopened as Vance AFB. "My jobs there became Operations Officer of the Advanced Instructor School and an office for Training Analysis & Development to bring updated training techniques and teaching equipment into being." He became jet qualified, starting with the P-80 Shooting Star and later the F-80 and T-33. Applying that year for additional college training he was sent to the University of Illinois, but the programme was cancelled with the onset of the Korean War. Instead, he attended the Air Force Institute of Technology (AFIT) at Wright-Patterson AFB, Ohio, and went on to receive the equivalent of a master's in aeronautical engineering – "equivalent" as the school had not received accreditation by the time he graduated in 1952. He was then assigned to Bomber Test Operations at Wright-Patterson. After qualifying in several airplanes he attended the Experimental Test Pilot School at Edwards AFB as a member of Class 52C. "While there, I met some of the people that are so well known in the business. Most notable were Chuck Yeager, Bob Hoover and Pancho Barnes. I was not really close to any of them at the time, but we did our share of enjoying Friday evening happy hours and a few other social occasions together. As a student, I was probably a sort of wannabe in their eyes. Bob Hoover and I became closer later on, but I didn't see Pancho again until I returned to Edwards in 1968 as Commander of the Test Pilot School. I guess I didn't make much of an impression on Chuck because he practically ignored me in later associations."

Back at Wright-Patterson, Christian was involved in research and development test flights in support of the Laboratories and Program Offices. This often involved flying heavily modified airplanes and researching such topics as communications, navigation, air-to-air refuelling, armaments, pressure suits, engines, anti-missile systems, nuclear weapons, radiation and all-weather flying, including cold-weather tests on the B-52 bomber in wintertime Alaska.

At Wright-Patterson, Christian had close associations with many well-known test pilots and aviation greats. Fellow Mercury candidates Jim Wood, Frank Frazier and Tom Sumner were particularly good friends. "Of course, Deke Slayton and Gus Grissom were good buddies even before the Mercury program," he reflected. "It was also during this time period that the Society of Experimental Test Pilots (SETP) was formed. Although not a founding member, in 1953 I was one of the first members of the society that has gained international recognition and acclaim since."

On 20 December 1954 in Wichita, Kansas, the family celebrated the birth of twin boys Gary and Kirkly. At that time Christian was on a three-year detached duty at Boeing in Wichita, working on classified armament development testing of the B-47. One of the better-known results of this work was the LABS (Low Altitude Bombing System) manoeuvre, which provided crews with a safer means of bomb delivery and evasion from devastating effects of the ordnance. He found working with Boeing to be a highly satisfying experience. "As a result of this association, I was privileged to fly and provide subjective evaluations of most Boeing jetliners through the 747 while in pre-production testing."



Chris Christian at Boeing-Wichita in 1953, conducting classified armament tests on the B-47. (Photo: USAF courtesy of Chris Christian)



Christian with his co-pilot and good friend Jesse Jacobs in front of an XB-52 at Wright-Patterson AFB, circa 1957. Note that the two J-57 engines on each side have been removed and replaced by a single J-75. (Photo: USAF courtesy of Chris Christian).

In 1959, Christian was invited to participate in the astronaut selection programme for Project Mercury. Following the screening tests he returned to Wright-Patterson and continued regular flight test duties until January 1960, when he was informed of a transfer to the Office of Scientific and Technical Liaison in New York City. Christian argued that he was a trained test pilot, not a desk pilot, but was told that it was time "to put my education to work. I went there leaving black heel marks all the way," he observed with a chuckle. "But, as it turned out, it wasn't all that bad." In fact, it was very interesting work. "The office was made up of people with various scientific and engineering disciplines, and it was the duty of each to establish contacts with commercial, industrial and academic entities in the New England territory that had the expertise and facilities and were conducting basic and development research in areas of interest to the Air Force. Each office representative had to recognize the state of the art within his discipline, to establish rapport with those doing the research, and provide liaison among those individuals and [their] counterparts with the Air Force laboratories when we found common interests or could move the research towards our interests. I learned a lot and made some wonderful associations." One connection he made while working in New York City was with a small facility in Massachusetts. There, three or four scientists were working on thermodynamic research that led to the design and patents of materials and techniques which later became the basis for heat shielding of spacecraft, such as nose cones and tiles.

When he went to New York, Christian had already been told that he was to attend the Armed Forces Staff College in Norfolk, Virginia, in a class that would start in the summer of 1962. This proved interesting. "It was a six month course to teach officers of all the services how to operate in joint endeavors." His next assignment was to the Plans Division of Air Force System Command Headquarters at Andrews AFB, near Washington, D.C. As a planning officer it was his job to contribute to plans and also to the management of research, development, construction and testing of prospective aeronautical systems. Among other projects, he was responsible for authoring what was then known as a White Paper for the highly classified AeroSpace Plane. As he explained to the author, "Despite the NASA decision to go into orbit and beyond by the use of vertical rocket launch and horizontal recovery such as the now-known Shuttles, it was the desire of the Air Force to do so [using] Horizontal Take-Off and Landing technology. The White Paper was to look into all aspects of research and technology in order to direct resources where necessary to attain such capability. The project required the input from scientists, engineers and managers of all Command Units and required about six months of intensive evaluation of the state of the art in many areas. The project details and results, of course, were highly classified. The final potential to provide the original goal became a delivery plane and in-transit refuelling plane... and to do so by air refuelling of liquid hydrogen and liquid oxygen while flying hypersonically. One can imagine the stretch, but it was far from being inane... think 'supersonic combustion ramjet power'. I am not at liberty to reveal the results of the White Paper, but there were real challenges."

In 1963, after two years at Systems Command Headquarters, Christian attended

the Air War College at Maxwell AFB in Montgomery, Alabama, to study aspects of air warfare and its association with U.S. policy and international relations, and he left as a Distinguished Graduate. In his spare time he also obtained a master's in politics (international affairs) with the extension campus of George Washington University. Following the year-long War College course, he was assigned to the Directorate of Research and Development, Aeronautical Division, USAF Headquarters, Pentagon, where he worked on such programmes as the OV-10 and C-5, as well as once again being assigned responsibility for the AeroSpace Plane.

The Christians divorced in 1966 and Chris was given custody of their twin sons. He later married Ruby Louise Marker, who lived in Dayton, Ohio, and worked as a Civil Service office manager at Wright-Patterson AFB. "I hadn't known her when I was stationed there in the '50s, but met her while performing my work at Andrews. She was a classy lady and we had a wonderful marriage."

In 1968, Christian was made Commandant and Commander of the Aerospace Research Pilot School (ARPS) at Edwards AFB, which was dedicated to preparing future astronauts, as well as test and research pilots. "This was the elite job that any real test pilot longed for, and I felt extremely proud to accept it," he stated. "It was challenging and rewarding in many aspects. All [of the] staff and students had been meticulously picked for this assignment. Each class was made up of approximately thirty-five students, and for each that was selected there were usually fifteen others that had applied who met the basic criteria for entrance. There was a special Air Force board, chaired by the Commandant, which met to screen the applicants. Since in each class there were some representatives of the Navy, Marine Corps and a



In 1968 with F-104. Christian was then Commandant of the Aerospace Research Pilot School at Edwards AFB. (Photo: USAF courtesy of Chris Christian)

foreign student or two and, on occasion, a civilian, the competition was stiff for Air Force pilots. Then as instructor and teacher positions came open, the Commandant was generally given free hand to fill the vacancies. Nearly all had master's degrees in the sciences and there were always some PhD holders... all were exceptional pilots."

Two years on, Christian was reassigned to Systems Command Headquarters as Deputy Director of Operations, with responsibility for the Command's aeronautical operations. Later, following a specific request by the commander of AFSC, George Brown, he became the general's executive officer, charged with managing his office and maintaining a close relationship with his staff. "We travelled extensively to many parts of the world including the war zones; wherever research, development and test activities were conducted or needed in support of the Air Force mission."

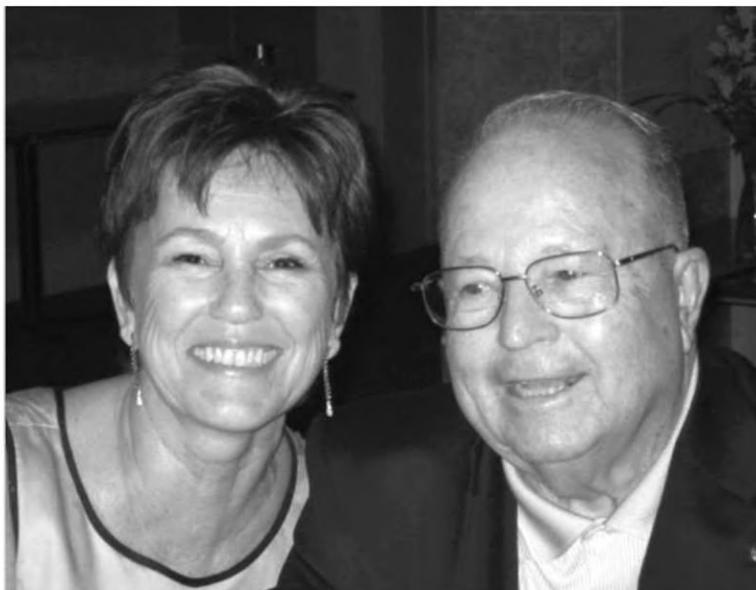
It was during this period that Christian received what he describes as the second great disappointment in his Air Force career. "The first was when I was not selected as an astronaut on the Mercury program." On this occasion, he had been nominated for promotion to General Officer's rank and both the Board Chairman and General Brown were so sure that he would receive the promotion that he and his family were moved into General Officer quarters at Andrews. Then, just before the promotion list was sent to Congress for ratification, the Chief of Staff of the Air Force decided to cut many of the 'older' men, "in order to make room for some of the younger colonels of his previous command". Bitterly disappointed, 49-year-old Christian decided it was time to retire from the service. General Brown, who would become the next Chief of Staff, tried to keep him on duty, but in the end he remained only long enough to help Brown's replacement, General Samuel C. Phillips – an old friend of his – complete the transition. "I was given some nice medals and a memorable ceremony, and said goodbye to active duty after some 31-plus years. And I would do it all over again – hoping only not to repeat those two disappointments."

Chris and Ruby settled into a new house in Pensacola, Florida. He dabbled in real estate until 1979, when he became general manager of the Perdido Bay Resort which was then under development on the shores of the Gulf of Mexico. He remained in this position until retiring in 1989, and thereafter continued as a consultant for some time afterward.

Sadly, Ruby suffered a stroke while undergoing hip replacement surgery in 2001. "She never walked again and finally died in 2006 after an agonizing and continuing degrading quality of life." She was buried at Arlington National Cemetery.

Chris Christian remarried in 2008 to Jana Dale Barmakian (née Lunn), a long-time resident of Southern California with two daughters and a son of her own, plus five grandchildren. These days he and Jana spend approximately six months of the year at their home in Florida, and the remainder in a condominium that he bought in 2007 at PGA West near Palm Springs, California – except of course when they are travelling elsewhere.

Chris Christian was asked whether he missed flying. "I certainly do," he replied, "but have no joy just looking at the ground from the air. I'd want to *do* something while flying – hopefully supersonically. I do fly with my son Gary in his nineteen-seventy-something Cherokee 235." With a smile on his face, he continued, "When he



A recent photo of Jana and Chris Christian. (Photo courtesy of Chris Christian)

makes facetious remarks about just who *he* has for a co-pilot I take over [to] give him what I refer to as ‘a couple of unusual positions’.”

In a final reflection, he offered the following. “After over 10,000 hours in the air in over 80 different aircraft types, I think it is time to hand the stick over to the next generation, and *at the same time*, I challenge the next generation to contribute more to aerospace activity than did mine... from the Wright brothers, to supersonic cruise, to men on the moon and a manned International Space Station. GO TEAM GO!”<sup>20</sup>

### RICHARD M. CORBETT, USAF

Had he been successful in his bid to become a Mercury astronaut, obvious but probably tiresome comparisons would doubtless have been drawn between Captain Dick Corbett and the fictional, 1950s space-faring character who shared his surname – Tom Corbett, the heroic 24th Century spaceman of American television, radio, novels and comic books, whose creation was inspired by the 1948 Robert Heinlein juvenile science-fiction book, *Space Cadet*.

Space flight was no more than a fantasy for Richard Marvin Corbett as he grew up in the rural farming community of Vinton, Iowa, which was a one-time trading outpost located some twenty-two miles northwest of Cedar Rapids. His father, John LuVern Corbett, the patriarch of the family farm, had served in World War I and also worked for the Agricultural Conservation Association, while his mother, Wilhelmina (née McMillan) had started teaching straight out of high school in 1918.

They were married the following year. Richard known as Dick was born on 29 April 1926 and grew up on the farm with his older siblings, Evelyn and Ben. A younger brother named Oran would complete the family.

As well as the lessons that the children often received at home from their mother, Corbett can recall that he and other farm kids "spent eight hours each school day in a little one-room country school for our first eight years, with about fifteen or sixteen total students in any one year". Attending Lincoln High School in Vinton, he became vice president of the freshman class and president of his junior class, then graduated in 1944 as a member of a class of around seventy-four students; he is not certain of the exact number, because three or four students dropped out to join the Army and some others returned after the war to graduate. "I was selected to attend Boys State leadership and citizenship programme, and played football for four years where I lettered as a tackle," he adds. "I would have been an end, but I couldn't hang onto a pass." Meanwhile, because of the war, his mother had returned to the classroom to teach music and art to primary education children.

With the war dominating most things in those days, Dick could hardly wait to join the service. "My older brother [Ben] had joined in 1941 and made landings in Africa, Sicily and Normandy, so things were very personal." His preference was to join the Air Corps, but the flight training pipelines were full, so in April 1944 he signed up with the U.S. Navy. Three days after graduating he was on his way to boot camp. "I had always wanted to be a pilot, but if that was not possible I would take anything to get into the big war. I was very naive and adventurous."

Corbett wanted to volunteer for submarines, but was informed that he would first have to attend skills training in the Navy's 'A' School. "Not being very astute I chose torpedo school, since that would get me to submarines." After completing the school, he was advised that he would be going on to advanced torpedo school. There, he was asked to attend a Naval Academy prep school (short course). The object of this was to select 100 fleet appointments from around 1,200 candidates, most of whom had some level of college education. "One of the biggest hurdles I faced was that I hadn't taken chemistry, but I think I could have made it if I had really worked at it. Anyway, I did not pass chemistry which took me out of contention, but at least I was on my way to submarines. However, first I had to go to electric torpedo school. I finally made it to submarine school and graduated just about on V.J. day."<sup>21</sup>

Once the war was over, Corbett was assigned to the submarine USS *Tigrone* (SS-419), taking part in training cruises in the Mediterranean. He was then reassigned to the Philadelphia Navy Yard and spent the rest of his Navy career putting the diesel-electric submarine USS *Tench* (SS-417) out of commission.

In September 1946, Corbett joined his brother Ben at Coe College in Cedar Rapids, Iowa, on the GI Bill, intending to spend two years at Coe and then transfer to Iowa State University to study engineering. However those plans went astray in May 1947 when he met student nurse Darlene Farnham in an emergency room where he was being treated. There was an instant and mutual attraction, and they were married that November when she graduated as a registered nurse. He then decided to stay on at Coe and major in chemistry. "I was also taking advanced

USAF ROTC [Reserve Officers Training Corps] because they paid me \$31 a month," he pointed out. "I was commissioned in the Air Force reserve in June 1948." Towards the end of his time at Coe, Corbett's mother joined the two boys in taking on summer studies at the college. Then, in July 1949 he and Darlene celebrated the birth of a baby daughter they named Gayle. By August 1950 he had completed forty semester-hours of chemistry and had a fellowship to attend Iowa University to study for his doctorate in chemistry. Then, on 11 August, he received a telegram that would change his life forever. It instructed him to report for duty at Chanute AFB in Illinois on 18 August, where he would be sworn into the active United States Air Force.

"It was a shock," he has admitted, "but it resulted in a great career change for me. When I arrived at Chanute I immediately applied for pilot training, but I failed to pass the eye exam for pilots. I have left hyperphoria, a condition defined as 'the tendency for the line of sight of the left eye to deviate upward relative to that of the right eye.' I was born with it, and there was nothing that could be done to correct the condition. My depth perception and vision are fine, but I cannot pass that part of the test."<sup>22</sup>

Instead, Corbett was assigned to an automotive maintenance school for four months, following which he was transferred to Otis AFB on Cape Cod as the Wing Auto Maintenance Officer. After five months at Otis he was reassigned to Nome in Alaska on a one-year tour as adjutant assisting the commanding officer. While there, he was frequently given temporary duty at unit headquarters at Fairbanks, where he continued to take the pilot physical every month for over a year, and failed the eye exam every time. But then, after the eye specialist described how the optical refractor device worked, he came up with a fix. "After much research, I realized there was no way I could legally pass that test, so I looked at the testing machine. Lo and behold, I could pass the test by moving the controls to where I could guess the image should be. From then on until I retired, that was how I passed the flight physical. However I could not defeat the four-hour eye exam that I participated in at the Lovelace Clinic during the Mercury astronaut selection process."

With his service commitment about to expire, Corbett was taking his separation physical in May 1952 when a sergeant walked in and advised him that confirmation had just arrived that he had passed the flight physical. "I had a choice. I could get out, or they had an immediate slot for pilot training. I terminated the exam and headed for the motel where my wife was waiting for a civilian to return." When he told Darlene that they were leaving immediately for Bainbridge, Georgia, she joined in his excitement. "My wife was always supportive," he reflected, "and didn't even blink an eye."<sup>23</sup>

He underwent training at Bainbridge for six months, flying the T-6 Texan low-wing monoplane. He then spent a further three months at San Marcos, Texas, flying the T-6, but this time primarily involved in instrument and formation flying. Then it was on to Waco, Texas, for another three months training in the T-33 Shooting Star. After receiving his wings on 1 July 1953, he spent three months at instrument school in Perrin AFB, also in Texas, checking out in the F-86D Sabre jet. With around 300 hours total flying time to his credit, including close to twenty-five hours in the F-86,



Dick Corbett at Edwards AFB. (Photo: USAF courtesy of Richard Corbett)

he was next assigned to the 2nd FIS (Fighter Interceptor Squadron) as part of the 26th Air Division, 4709th Air Defense Wing at McGuire AFB in New Jersey. Three weeks after arriving there, a son, Stephen, became the newest addition to the family. In just under three years at McGuire he would serve as a pilot, assistant operations officer, and a flight commander. He was promoted to captain in late 1955.<sup>24</sup>

In September 1956, Corbett was reassigned to the 26th Air Defense Division on Long Island, as the flight safety officer for the division. While there, he heard of the Air Force's Test Pilot School and was eager to apply. One of the prerequisites was a bachelor's degree, which he already possessed, and he set about achieving the other requirement of 1,500 hours of flight time. To his delight he was accepted, and from January to July 1958 attended TPS Class 58A along with future Mercury astronaut candidates Hal Ekeren, Arch Iddings and Bob Bell. Their performance instructor was another future Mercury candidate, Captain Robert Jacobson.

"The curriculum consisted of three months of performance and three months of stability and control," Corbett related. "We flew the F-86E/F, the T-33, and B-57s. You really felt like a select group because the staff treated you that way. Many of us had only flown F-86Ds, but instead of an extensive briefing and ground school you just filled out a simple questionnaire about the aircraft systems and went out and flew it. We flew a limited number of 'buddy' flights with another student because there was no instrumentation in the airplanes, and all the data had to be recorded by hand. Also, spins were prohibited in jets in the combat squadrons, but we did spins in the 86 and 33 with only warnings about what altitude to get rid of the canopy and what altitude to eject if it hadn't recovered. This was followed by a stern admonition

to strictly adhere to these altitudes because they could always replace an airplane, but it took twenty-some years to grow and train a test pilot."

While at Edwards, the class members were able to submit requests for assignment beyond TPS. At that time, Edwards, Eglin, Wright-Patterson and Holloman were the centres for test flight. Corbett and Hal Ekeren were the only members of their class to receive assignments directly to test pilot positions in AFSC. "Hal stayed at Edwards and I went to Holloman. The others received assignment to combat squadrons or to logistics centers that were inspecting and repairing aircraft that then had to be flown to see how well they were put back together. Unfortunately, Hal was killed during a test flight in an F-106 less than a year later.

"I can't say exactly what the TPS provided other than an attitude and approach to flight test. Most people don't realize what flight test encompasses. Very few military pilots ever get to make a first flight on a new aircraft. That is done by the civilian company pilots. What we did was expand the envelope and test numerous systems and weapons. Most of my testing was done on radar, infrared and related systems."

Corbett's next posting was to the fighter missile test branch at Holloman AFB in New Mexico. He served as a test pilot with the additional duty as an armament and electronics officer, mainly involved in testing radar and missile systems used by the F-102, F-101B and F-106. This involved some airframe testing for compatibility and determining the envelope for launching weapons. In October 1961, trouble struck:

"I was doing a maintenance test hop on a 102 that had just been equipped with about a million dollars worth of special test equipment for a program which I was scheduled to fly. I had completed the flight and was on my way back to the field when the engine quit. Everything I tried failed to start the engine so I was trying to dead stick it. Unfortunately, the field was about a mile too far away. I ejected at [an altitude of] about 800 feet. I had hooked up my D ring to the seat belt – a normal procedure at low altitude and low speed. When I pulled the handles everything worked perfectly; the seat belt blew immediately after clearing the cockpit and it pulled the D ring. I was reaching for the belt and it blew before I reached it; then I went for the D ring and the chute was already opening. I swung a couple of times and hit the ground without injury. The cause of the engine failure was [...] shearing of the accessory drive shaft which provided power to the hydraulic and fuel pumps and the generator."

In late 1962, Corbett was selected along with future astronaut Jim McDivitt and Jess Green, a test pilot from Eglin AFB, to go to France and evaluate the Mirage IIIC which was just entering that country's squadrons. While there, he also had the chance to fly another nine French airplanes, including the Super Mystère and the new Navy Étandard IVM.

A Navy exchange assignment took Corbett to Navy Test Squadron VX-4 at Point Mugu, California, in July 1962. Here he flew F-4s, F-8s, A-4s, the Beech SNB and the T-33. The primary mission was operational testing of air-to-air missiles, but there were several ancillary missions and the exchange also gave him the chance to practice carrier landings. "I qualified on the *Constellation*, then made traps on the *Midway* and *Ranger*, and my last four traps were made on the *Constellation* just a few days



Corbett's Test Pilot School Class 58A. Front row (left to right): Henry Chouteau (Northrop), Lt. Ralph Rich, Capt. Ken Grubaugh, Capt. Jimmie Pierce, Capt. Herman Knapp, Capt. Don Stewart, Jr., Capt. William Wronski, Capt. Robert Bell. Back row: Jack Stephenson (Grumman), Capt. Roland Brunelle, Capt. Halvor Ekeren, Jr., Capt. Jesse Locke, Capt. Archie Ildings, Jr., Capt. Gerald Hattendorf, Capt. Richard Corbett, Bell, Ekeren, Ildings and Corbett were all Mercury finalists. (Photo: USAF Test Pilot School, Edwards AFB)

before I went back into the Air Force." In mid-1963, whilst on exchange with the Navy, the Air Force promoted him to the rank of major. He returned to Holloman AFB in July 1964 as test director of the CAT II sensor test programme. This involved testing new sensors such as cameras, infra-red cameras, side-looking radar and a forward-looking radar (used primarily for navigation) developed for the RF-4 reconnaissance version of the Phantom.

Early in 1966, as the RF programme was winding down, Corbett volunteered for service in Vietnam, flying the A-1 Skyraider, and after training at Hulbert in Florida (Eglin AFB Aux. 9) in May, he headed off to war.

"Fortunately I had maintained currency in the F-4 and F-100. When I arrived in Vietnam they had lots of A-1 pilots and few airplanes, and were going to send me to Cessna O-1 Bird Dogs. When I stated I was also current in the F-4, I was immediately assigned to the 480th Fighter Squadron at Da Nang. On the day I arrived, I was also informed by virtue of date of rank that I was operations officer.

"It was a typical combat tour. Some exciting times dodging surface-to-air missiles (SAMs) and flying through anti-aircraft fire (AA) such that you wondered how that sheet of rounds could possibly miss. I was hit only once when a round went through the motor of one of my wing-mounted Sidewinder missiles and into the aircraft wing. It happened over North Vietnam, but I had no problem making it back to Da Nang. However the airplane had to be sent by barge to a depot [on the island of] Taiwan for a wing replacement." He was promoted to lieutenant colonel in November 1966. "I flew 102 'north' missions and a few down south. By virtue of 100 'north' I was sent home on 2 January 1967, after seven months in country."

Corbett was assigned to the Pentagon as a programme element monitor (PEM) in the reconnaissance and electronics warfare division (AFRDR). Although he went to the Pentagon with reluctance (and even volunteered for a return to Vietnam, which was denied) he would soon discover that he enjoyed the role of staff officer, which involved monitoring advanced tactical reconnaissance equipment, and obtaining money for classified development projects. He did well at his job and was promoted to colonel in November 1970.

From 1971-73 Corbett was based at El Centro NAF in California as Commander, 6511th Test Group (Parachute). He would meet fellow Mercury candidate Jim Wood at a number of staff meetings at Edwards AFB because they both worked for the very popular Major General Robert M. White. "Jim was a great guy," Corbett stated, "and I believe an outstanding officer and test pilot. I was surprised he wasn't selected for general. Buzz Aldrin was also at those meetings. He returned to the Air Force after his moonwalk and was assigned as commandant of the TPS." Bob White was greatly admired by Corbett. "He was a true gentleman and a great test pilot, particularly on the X-15 program. He was also a great fighter pilot who was awarded several medals for his valor and leadership. I thoroughly enjoyed working for him."

In October 1972, however, Lt. General Howard M. Lane took over as commander of the Flight Test Center at Edwards. "Not my favorite person," Corbett confessed. "I requested a change of assignment within a month. I was assigned to a military commission in Brazil and was sent to the language school at Monterey, California, to learn Portuguese."



Lt. Col. Corbett with his family in 1967. Recently returned from Vietnam, he was presented at the Pentagon with the Bronze Star, Oak Leaf Cluster for the DFC, and Oak Leaf for the Air Medal. (Photo courtesy of Richard Corbett)

The Corbetts arrived in Brazil in the first week of January 1974. His assignment was to an organization known as the Brazil/U.S. Military Commission that had been formed during World War II. Here he held the imposing title of Chief of the Military Advisory Assistance Group (MAAG), which had oversight of the USAF assistance to Brazil, including such aircraft as the F-5. The following year, tragedy would strike the happy family.

“During the summer of 1975 my wife Darlene was diagnosed with colon cancer. I chose to retire and take her to the Navy Hospital (Balboa) in San Diego. My beloved wife of over twenty-eight years died 13 March 1976.”

Colonel Richard Corbett retired from the Air Force following twenty-eight years of active service and a further two years of reserve service. His major decorations are the Legion of Merit, Distinguished Flying Cross with Oak Leaf Cluster, Bronze Star, Meritorious Service Medal with cluster, Air Medal with ten clusters, Commendation Medal, Presidential Unit Citation and Outstanding Unit Award. He married again in February 1978 to “another wonderful wife”, Patricia J. Penick, and today, more than thirty years on, they continue to share a happy, contented life in retirement.

#### **HAL R. CRANDALL, USN**

Hal Russell Crandall was born on 15 January 1929 in Pocatello, Idaho, and was the only child of Eliza (née Hyde) – who preferred to be known as Lyle – and Edward

Russell Crandall. His parents were originally from Salt Lake City, Utah, where they had married on 25 September 1922. According to the 1930 census, the year after his birth the family was living in Idaho Falls, Idaho, a community whose economy was primarily based on agriculture, situated by the turbulent waters of the South Fork of the Snake River.

After graduating from Great Falls High School in 1946, and as a proud new Eagle Scout, Crandall took up a midshipman appointment at the U.S. Naval Academy, as a member of the Class of 1951. "I don't know this as fact," his oldest daughter Kris told the author, "but I was told my father was the only Mercury candidate to go directly from high school to the naval academy."<sup>25</sup> In the class's senior year, future vice admiral and Mercury astronaut candidate William Lawrence became their class president.

On graduating from Annapolis in June 1951, Crandall received his commission as ensign and was required to serve a mandatory tour of duty aboard a warship. The ship to which he was assigned as a communications officer was USS *Erben* (DD-631), a *Fletcher*-class destroyer that had been decommissioned and placed in reserve at the end of World War II. With the Korean War requiring the expansion of the American fleet, the *Erben* was recommissioned on 19 May 1951 and sailed from her home port of Long Beach, California, on 27 August bound for Yokosuka, Japan. Once there, the ship joined the destroyer screen which was protecting carriers of Task Force 77 from submarine attacks. Over the ensuing seven months the *Erben* bombarded shore targets on Korea's west and east coasts to provide close fire support for the troops ashore, as well as participating in antisubmarine warfare exercises off Okinawa. Then the *Erben* returned to San Diego for overhaul, arriving back at base on 21 March 1952. A month later, Crandall married Nancy Graham in Great Falls, Montana.

With his "black shoe" days as part of the ship's crew at an end, Crandall was keen to become a naval aviator. The Navy trained its fledgling pilots at Pensacola, Florida, known as the "home of naval aviation". Crandall was assigned there in May of 1952 for basic flight training in the single-engine T-6 Texan, referred to by the U.S. Navy as the SNJ and as the J-Bird by the men who flew it. He proudly received his Wings of Gold as a naval aviator on 15 September 1953. The next month Crandall was sent to NAS Corpus Christi, Texas, for advanced and instrument flight training using the SNJ. These workhorse aircraft were occasionally assigned to carrier units, and were equipped for arrested landings. They not only met all of the requirements of a basic trainer, but also facilitated the transition from basic training to flying jet aircraft by requiring a pilot to develop the reflexes necessary to overcome emergencies such as those that could occur when flying jets. At Corpus Christi, Crandall and the other trainees worked all summer on "field carrier" landings with the SNJs at Barin Field, an outlying Pensacola facility where the runways had been painted to resemble the deck of a medium-sized aircraft carrier. Here, the pilots were judged on their ability to fly in, cut power, and crunch down solidly in the right place in order to catch the arresting wires of the "carrier".

Around this time Hal and Nancy celebrated the birth of their first child – a baby daughter named Kristen. The next month, November 1953, Crandall was assigned to



Hal Crandall, USN. (Photo courtesy of Kristen Crandall Freeman)

Kingsville, Texas, for additional jet training. On completing this flight training, the lieutenant (junior grade) stood ready for assignment to his first fighter squadron. In December he received orders to report to the recently redesignated VF-151 based at NAS Alameda, California. The squadron, which was known as the "Black Knights" or the "Fighting 151", was at that time under the command of Bill Makan and flew the Grumman F9F-2 Panther. After the Korean truce of 27 July 1953, the squadron was operating from USS *Boxer* (CVA-21) with Air Task Group One (ATG-1).

On 1 September 1954, VF-151 was once again deployed to the Western Pacific, this time operating from USS *Wasp* (CVA-18). In February 1955, the squadron was tasked with providing air support during the evacuation of Chinese Nationalists from the Tachen Islands after their bombardment by Communist Chinese forces. In May it transitioned to the Vought F7U-3M, which was known unflatteringly as the "Gutless Cutlass" and even the "Ensign Eliminator" due to a severe lack of engine thrust in addition to numerous technical and handling problems suffered throughout its short Navy career. Twenty-five test and Navy pilots died flying the Cutlass, and over a quarter of those built were destroyed in accidents. The Project Cutlass pilot and instructor on the F7U-3 at NAS Miramar during that period (1954–55) was the future Mercury astronaut Wally Schirra. Although his project team recommended to the Naval Air Forces that the aircraft's deployment to the Pacific fleet be cancelled, their recommendation was overturned by the Navy. "Decision-making at the upper levels of government is beyond me," Schirra wrote in his autobiography. "I never



Two Black Knight F7U-3 Cutlass aircraft from VF-151 pass by Japan's spectacular Mount Fuji at 28,000 feet on 28 November 1956. Lt. Hal Crandall is flying aircraft U-308 closest to camera. (Photo: USN supplied by Charles Swinford, courtesy of Kristen Crandall Freeman)

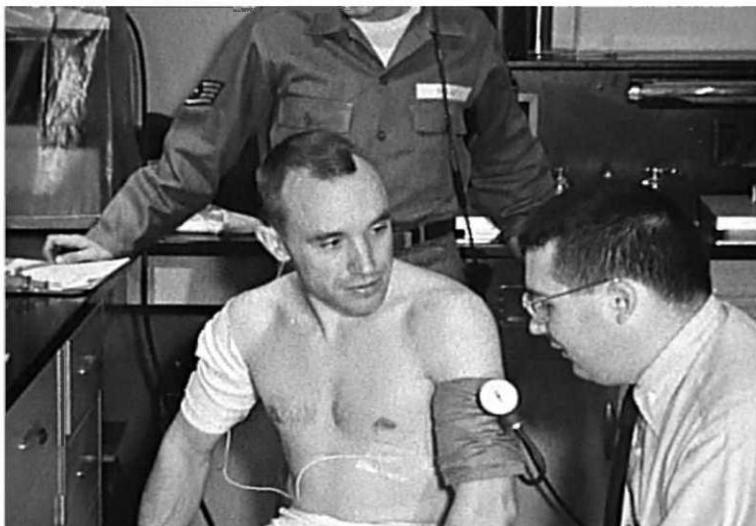
understood why the Navy insisted on going ahead with the F7U Cutlass, although I assume it had to do with Chance Vought being in Dallas.”<sup>26</sup>

On 7 February 1956 the Black Knights were redesignated as Attack Squadron 151 (VA-151). On 25 May, now fully proficient on the Cutlass despite the aircraft’s poor carrier landing and take-off performance and abysmal safety record, the squadron was deployed to the Western Pacific, this time operating off USS *Lexington* (CVA-16) with ATG-1. By the time the squadron returned to NAS Alameda, the Crandall family had gained another baby daughter, Kimberly Ann.

In early February 1957, Lt. Crandall attended Naval Test Pilot School (TPS) at Patuxent River as part of Class 18, who nicknamed themselves the “Barn Boomers.” The class of twenty-four included five industry or civil service pilots and four from the U.S. Marine Corps. One member was future astronaut Richard Gordon, Jr. Their test instructor was Alan Shepard, Jr., who would be selected as one of the Mercury astronauts. After he graduated from TPS on 26 July 1957, Crandall stayed on at Pax River, assigned to the Electronic Test Division of the Naval Air Test Center. In the process, he flew a wide variety of naval propeller-driven and jet aircraft. Future astronaut Jim Lovell and his family were the Crandall’s next-door neighbours in the cinder block housing at Pax River.

While working at the NATC, Crandall received orders to report in civilian attire to Washington, for what proved to be an opportunity to assess his interest in becoming an astronaut for the newly formed NASA space agency. Having completed all the required tests he returned to Pax River, and in early April 1959 was informed that he had been unsuccessful.

Lt. Crandall joined the Pacific Division of Operations Test and Evaluation (OPTEVFOR) in February 1960 as Assistant for Operations, Communications and



Crandall in 1959 undergoing stress testing as part of the Mercury astronaut selection process. (Photo taken from USAF film footage).

Security, and as a Project Pilot. He was based at NAS North Island, located at the north end of the Coronado peninsula on San Diego Bay. That November, while the family was living in Coronado, Nancy gave birth to twin daughters Dale Margaret and Darcy Jean Crandall.

On 1 May 1961, Crandall was promoted to lieutenant commander. The following June he reported to NAS Miramar, California, for training on the F-8A Crusader with fleet replacement squadron VF-124 ("Gunfighters"). In January 1963 he was attached to VF-211 ("Fighting Checkmates") in the Western Pacific. Soon thereafter, he joined his squadron aboard USS *Hancock* (CV-19), a twenty-year-old *Essex*-class carrier with wooden decks and steel plates. The Crusaders were painted with a red-and-white checkerboard pattern on their tail rudders, and so the squadron pilots were known as "Checkertails". Having joined in combined Seventh Fleet defence exercises along the coast of South Korea in June, the *Hancock* was operating in the South China Sea and routinely sent aircraft for maintenance at NAS Cubi Point in Subic Bay, Philippines. Pilots would also fly training missions from Cubi Point, which was the 'air side' of a large complex adjacent to Naval Station Subic Bay, at that time a major shipyard and gathering place for Navy surface ships.

Aviation Machinist Mate 2nd Class (ADJ-2) Bob Prince was attached to VF-211 in 1963, and on 24 July was involved in what was called a "beach detachment". This detail, he explained, gave mechanics the opportunity to carry out maintenance that was otherwise difficult to conduct on a rolling ship. On that day he was watching as Hal Crandall took off over Subic Bay from runway 25.

Prince recalled, "I don't know what the final determination was concerning the crash, but it appeared [that] he was doing a four-point roll on take-off, so there were obviously no post-maintenance issues with his aircraft [that required] a check flight.



An F-8J Crusader from USS *Hancock*, displaying the distinctive VF-211 checkmate pattern. (Photo: USN)

I recall someone on the flight line asking him where he was going, at which he pointed to a hole in the clouds and said, ‘Right through there’. After take-off, his F-8 rolled sharply 90 degrees, paused briefly, rolled 90 degrees again, paused, and went into Subic Bay inverted with [its] afterburner roaring. We spent days placing pieces of the aircraft in the hangar at Cubi [just] as they would have been on the whole aircraft. It was a very bad time for our squadron. I do not recall ever being given any reason for the crash, other than pilot error. As enlisted men, I’m not sure we always got the complete story on things of that nature. However we all doubted [it was pilot error] because Lt. Cmdr. Crandall was such a fine, truly professional naval officer and a very able pilot who earned the total respect of everyone in VF-211.”<sup>27</sup>

Kris Crandall (now Freeman) was only nine years old when her father died. “My mother never talked about him much in detail,” she recalls. “It was interesting what Bob Prince said about being told it was pilot error. I was standing next to my mother when they informed her that my dad had died. I remember distinctly them telling her it was a windshear microburst.”<sup>28</sup>

Jerry Childers was also at Cubi Point that day. “I do remember having to stand watch over the shredded F-8 parts one evening in the hangar. A very sad night,” he recalls. “From an enlisted person’s point of view, Hal Crandall was well respected and liked. On the lighter side, some of us referred to him as ‘high waters’ because of the length of his khaki pant legs.”<sup>29</sup>

Fellow VF-211 pilot Bob Hulse did not get to know Hal Crandall very well, but recalls him as being an excellent pilot “who did a very good job around the ship, and his personal appearance was always impeccable”. He also remembers Crandall as “a very religious man, devout in his faith”.<sup>30</sup>

On 1 August 1963, a week after the incident, the VF-211 newsletter *Checkmates* issued a special dedication to Lt. Commander Crandall, which reads:

Lt. Cmdr. Crandall was an excellent pilot with the integrity, courage and fortitude that national heroes of the past were made of. He was a symbol of valor which every American youth would follow as an example in years to come.

We, the crew and officers at FITRON [Fighter Squadron] 211 are saddened by the void that is left among our ranks by the passing of Lt. Cmdr. Crandall. He was well known and respected by every man in our squadron, as well as other Crusader squadrons throughout WESTPAC. He was a devoted husband and a loyal father.<sup>31</sup>

Hal Crandall had also been a proud member of both the Alumni Club of the U.S. Naval Academy and the National Society of Experimental Test Pilots. Following a funeral service conducted by his maternal grandfather, Bishop J. William Hyde, Hal Crandall was buried in Logan City Cemetery, Utah, on 5 August 1963. He now rests alongside his father (died 16 February 1981, aged 91) and mother (died 9 September 1993, aged 97), and is survived by his four daughters, five grandchildren and three great-grandchildren. His wife Nancy passed away in 2005.<sup>32</sup>

#### **HALVOR M. EKEREN, JR., USAF**

Halvor Ekeren, Jr. was born on 23 May 1929 in Thief River Falls, Minnesota, at the confluence of the Red Lake River and Thief River in Pennington County. His grandfather Oluf Olson had emigrated from Norway and is said to have changed his surname because there were so many Olsons already living in Minnesota. The name Ekeren (or Ekern) means “small farm” in Norwegian, so he may have chosen the name of a farm or town in his native Norway. He married Gertrude (née Langeland), a second generation Norwegian from nearby Rothesay, who gave birth to three sons; Halvor Martin, Olaf (Ole) Adolph and Walter. Their father established a pharmacy in Thief River Falls, and all three sons would become pharmacists in the family business. In due course Halvor married Verona Nixon, and they had a son, Halvor Martin, Jr.

In his youth, Halvor, Jr. attended Lincoln High School in Thief River Falls. In addition to excelling in academics, arts and athletics, he participated in a variety of activities in the school, church and community. He was also an honour student and a member of the National Honor Society. When his parents divorced in 1940 and both left the area, he asked to be allowed to finish his schooling with his friends, so it was arranged that he would live in Thief River Falls with his grandparents and spend the holidays and summer break with his mother and her parents on their modest farm in Southam, North Dakota.

Prior to his graduation from high school in 1947, Ekeren's uncles Ole and Walter encouraged him to apply for enrollment at the U.S. Naval Academy and then ensured that the boy received a fair hearing from the appropriate people. Ekeren

distinguished himself scholastically at Annapolis. It was during those four years that he met Nancy Helen Huston from the small town of Dansville in upstate New York, whom he later married. They met on a blind date while she was attending Edgewood Park Junior College, a women's college just north of New York City.

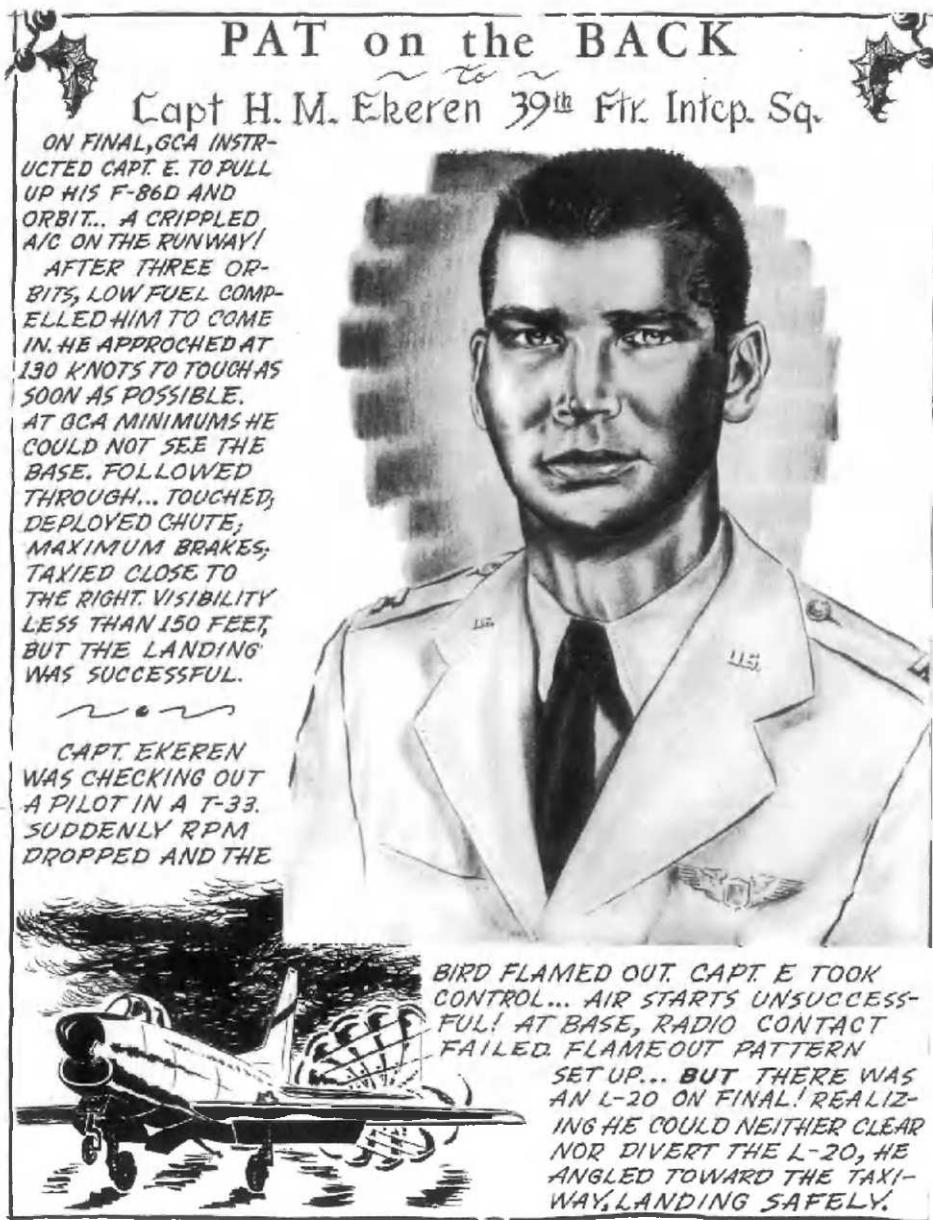
In 1951 Ekeren graduated 48th in a class of 818 and, given his choice of service, opted to join the U.S. Air Force. He gained his pilot's wings as a second lieutenant on 22 March 1952. By this time Nancy had given birth to their first child – a girl named Kathleen Gail. During the next several years he would be stationed at five air bases, including Langley Field in Virginia, and while there Halvor Martin Ekeren III was born in February 1954. The arrival of David Andrew exactly one year and one day later completed the family.

After Langley, Ekeren would serve more than two years with the 39th Fighter Interceptor Squadron at Komaki Air Base in Nagoya, Japan, where he was involved in formation test flights involving night and day intercepts, weather formation, rocket firing and navigation training, in addition to serving as the operations officer of the squadron's rocket team. As a fully-qualified all-weather F-86D Sabre fighter pilot, he was rewarded after a year with a promotion to flight commander over several senior lieutenants because of what his operations officer, Major Edward Smith, described as "his eagerness, aggressiveness and demonstrated flying ability".<sup>33</sup> As well as training new pilots, one of his principal tasks in this role was to carry out initial test flights on aircraft just out of maintenance.

On 5 September 1956, Ekeren had a close shave while testing an F-86D. Ninety minutes into the flight he began his descent into Komaki, having completed all the tests apart from a radar check. To try to get a pickup on his radar he flew around for another fifteen minutes, but when his fuel level reached 1,500 pounds he decided to make a spiralling descent over the north central part of Nagoya and then enter on the initial approach for landing. During these manoeuvres, Ekeren had noticed another aircraft. "He was below and appeared to be turning inside the radius of my turn," he noted in his later statement. He kept a check on the position of the aircraft behind him, and when he could no longer see it he assumed that the pilot had broken off. "I extended my dive brakes, retarded my throttle to idle, and commenced a spiralling left turn descending at the rate of approximately 400 feet per minute."

As he was passing through a heading of around 180 degrees, at around 10,000 feet, Ekeren noticed a C-47 below his aircraft. "I momentarily lost sight of him so I levelled my wings, picked him up again, and then went into a left bank." It was some thirty seconds since he had last sighted the aircraft behind him. "Within five seconds after I re-entered the turn I felt a violent explosion. The canopy of my aircraft was torn off, my helmet came off, and the aircraft was spinning violently. The centrifugal force was so great that I could not reach the ejection handles. I managed to release the seat belt and was thrown completely clear of the aircraft. I opened my chute and floated to the ground, landing approximately three miles west of Komaki Air Base."<sup>34</sup>

In May 1957, recommending Ekeren for the USAF Test Pilots School at Edwards AFB, Major Smith wrote, "Captain Ekeren was on two occasions awarded the Far East Air Force Able Aeronaut Award. This award is given in recognition for some



This "Ripley-style" tribute to the courage and daring of Hal Ekeren appeared on the back cover of the December 1956 Far East Air Forces' *Flyer* magazine. (Photo courtesy of David Ekeren)

feat of superior flying ability. The first award was given for dead-sticking a T-33. On this occasion Captain Ekeren was giving a local area/instrument indoctrination ride to a new flight member. While at 15,000 feet, approximately 50 miles from the nearest suitable airfield, he experienced complete engine failure. He glided back to his home base and set up a landing pattern. While on final approach an L-20 cut him out of the pattern, forcing him to fly through telephone lines in order to land on a taxi strip. The second award was given while flying an F-86D. Captain Ekeren and his wing man were scrambled at night to identify an unknown aircraft. While accomplishing the mission the weather deteriorated to zero-zero conditions. His wing man landed first but blew a tyre and blocked the runway. Since an alternate airfield was not available he flew a holding pattern until [he was] down to approximately 800 pounds fuel at which time he flew a short field ground-controlled approach and landed.<sup>35</sup>

Ekeren's commanding officer, Lt. Colonel DeLain Clark, would also recommend him highly, saying, "Captain Ekeren generally leads the squadron each month in jet flying time. His determination to do an outstanding job is paramount in his mind at all times... Based on Capt. Ekeren's formal education, flying ability and his experience in the administrative field I would consider him as being very highly recommended for the USAF Test Pilot School."<sup>36</sup>

That year Ekeren was accepted at the Test Pilot School at Edwards AFB, where he undertook six months of high performance jet training as well as academic tuition and evaluation of aircraft performance. Four of the fifteen pilots in Class 58A would be in the thirty-two finalists for Mercury astronaut selection: the others being Robert Bell, Richard Corbett, and Archie Iddings, all of whom, like him, were captains in the USAF. Graduating top in his class on 2 July 1958, Ekeren would remain at Edwards to test state-of-the-art military aircraft.

It was while at Edwards that Ekeren's coolness under pressure, thoroughness, judgement and ability brought him to the attention of NASA, and he was asked to undergo testing as a Mercury astronaut candidate. He remained in contention when the field was narrowed to just 32 candidates, and is believed to have been one of the 18 finalists. But then he withdrew from the selection process in order to continue his test pilot work, leaving open the possibility of pursuing the astronaut opportunity at a later time. This was an option available to all the candidates throughout the selection process; they could opt out without any recrimination due to the unique nature of the programme for which they had been asked to apply.

In a case of tragic irony, Hal Ekeren died in an aircraft accident on 8 April 1959 (described later in this book) the day before NASA officially announced the names of the successful seven Mercury astronaut candidates at a Washington press conference.<sup>37</sup>

Halvor M. Ekeren was buried with high honours at Arlington National Cemetery, near the Tomb of the Unknown Soldier. He is survived by his wife Nancy, their three children, and three grandchildren Timothy David, Anna Louise and Patrick David Ekeren.<sup>38</sup>

In 1959 the USAF Test Pilot School introduced an award to memorialise the life of Halvor Ekeren. It was presented to an outstanding pilot in each class. The award



Hal Ekeren and Test Pilot School Class 58A. From left: Capt. Richard Corbett, Jack Stephenson (Grumman), Capt. Archie Iddings, Capt. Roland Brunelle, 1st Lt. Ralph Rich, Capt. William Wronski, Henry Chouteau (Northrop), Capt. Halvor Ekeren, Capt. Kenneth Grubaugh, Capt. Robert Bell, Capt. Donald Stewart, Capt. Jesse Locke, Capt. Herman Knapp, Capt. Jimmie Pierce, and Capt. Gerald Hattendorf. Corbett, Iddings, Ekeren and Bell were all Mercury finalists. (Photo: Edwards Flight Test Center)



Captain Halvor M. Ekeren, Jr., USAF (Photo courtesy of David Ekeren)

was discontinued after Class 62C in March 1963. One proud recipient of the Ekeren Award as the top flier in the Aerospace Research Pilot School of 1963 was Captain David R. Scott, who would walk on the moon eight years later as the commander of the Apollo 15 mission.<sup>39</sup>

### **FRANK D. FRAZIER, USAF**

Nine years before then-Colonel David Scott walked on the moon, he had attended the fourth Aerospace Research Pilot School at Edwards AFB, where he trained alongside an enthusiastic young Air Force captain named Frank Frazier. As Scott told the author, he remembers his flying colleague well. "He was a good pilot; a quiet, friendly guy who smiled a lot."<sup>40</sup>

Frank Daniel Frazier was born in San Antonio, Texas, on 17 November 1929 and was raised on a farm just south of the city. He had a brother and three sisters and was the youngest member of the family. His parents were Texas-born Louise Wilhelmina and William Boatner Frazier, a U.S. Navy shipwright from Louisiana who had served during World War I and left the Navy in Kingsville, Texas, just prior to his marriage to Louise.

The nearest town to where they lived, Dobrowolski, consisted of a gas station, a blacksmith, a saloon and a cotton gin. It also had an open-air dance hall, where on a Saturday night folks would gather from miles around and relax after a week of hard work, while their children waited for a break in the dancing to entertain themselves by running and sliding across the waxed dance floor.

When he was about seven years old, Frank would walk in the woods designing in his head an airplane that he wanted to build and fly. "Never mind," he reflected, "that it was to be of wood and canvas and powered by rubber bands cut from tractor tire inner tubes." When he was ten, the family moved back to San Antonio. His mother once disclosed that he had "a great driving interest in airplanes. We had a house full of model airplanes he built as a hobby."<sup>41</sup> Sadly, in June 1941 his father, the man he credits as the inspiration of his life, died from a burst appendix in a veterans' hospital in Kerrville, Texas.

After graduating from the Central Catholic High School, which was an all-boys military academy, in 1947, Frazier went to Texas A&M, an all-male military college in order to study for a bachelor of science degree in aeronautical engineering. In his sophomore year at college a classmate set him up on a blind date, and it was on this that he met his "soul mate" Barbara Harwell, daughter of Robert and Edna Harwell from San Antonio. Meanwhile, he became a member of A&M's wrestling team and worked in the oil fields during summer vacations. He and Barbara were married two weeks before his graduation in 1951.

With an ROTC commission from the college, Frazier entered the U.S. Air Force as a second lieutenant. After basic flying school he was assigned to flight training at Williams AFB in Arizona, which was "a dream come true". Just before he completed flight training, he and Barbara shared the joy of the birth of a daughter named Donna Marie – the first of their seven eventual children.



1st Lt. Frank D. Frazier, USAF (Photo: USAF courtesy of Frank Frazier)

The next step in his service career, involving a move for the young family, was advanced flight and gunnery training at Nellis AFB, Las Vegas. Here he had his first taste of flying the F-86 Sabre jet, which he would soon fly in combat. On completing his training he received orders for Korea. He readily admits that leaving his wife and baby daughter was the single most difficult thing he had ever encountered, and that it was equally difficult for Barbara, not knowing if he would return home. He arrived at Kimpo (K-14) Air Base in Seoul with the rank of 2nd Lieutenant, assigned to the 4th Fighter Interceptor Wing's 336th Fighter Interceptor Squadron ("Rocketeers"), then under the group command of Colonel Royal Baker. The squadron was tasked mostly with conducting daily patrols across MiG Alley – a narrow triangle of land south of the Yalu River in the northwestern corner of the Korean Peninsula – protecting the Fifth Air Force fighter-bombers from MiG-15 attacks.

While operating over MiG Alley on 31 March 1953, Frazier's F-86E suffered engine failure. He bailed out over the Yellow Sea in the vicinity of Cho-do and was rescued from the water seven minutes later by a helicopter from the U.S. Air-Sea Rescue Service.

On 5 June 1953 the Soviet Union lost four MiGs, three of them while taking off from Dapu airfield in Manchuria. Sharing the credit for shooting down one of these fighters, flown by Soviet Snr. Lt. Vladimir Tsarenko of 781 IAP, were Lt. Colonel Julian Harvey and (by now) 1st Lt. Frank Frazier. Several weeks after sharing in the

destruction of the MiG, Frazier was cited by the Fourth Fighter Interceptor Wing at Fifth Air Force headquarters for "having displayed outstanding courage against enemy aircraft in aerial action over North Korea". The citation which accompanied the award stated that Frazier, "while flying the number two position, sighted seven enemy aircraft. Frazier maintained a protective position for his lead man until his ammunition was exhausted." It went on to say that he crippled the MiG-15 until his stricken quarry crashed in a ball of flame. "By his skill, courage and judgment, he shared in the destruction of an enemy aircraft." The citation was accompanied by an award of the second Oak Leaf Cluster to his Air Medal.

Then, on 19 July, just eight days before the cease-fire came into effect, Frazier shot down a MiG flown by Soviet Air Force pilot Nikolay Gerasimchuk of 913 IAP. On that day, as later recalled by Soviet ace Semyon Fedorets, six MiGs had been scrambled to intercept a formation of F-86 aircraft attacking Supun airfield. "When we approached the airfield, a flight of Sabres from the top cover dove on us. I made a left turn and the fight was on. An enemy plane opened fire on 1st Lt. Gerasimchuk's MiG; he pulled up instead of making a hard turn. While climbing, another burst found his plane and set it on fire. Gerasimchuk ejected. Unfortunately, Gerasimchuk's parachute didn't open properly and he died on his 20th combat sortie."<sup>42</sup>

After the war ended in June 1953, Frazier enjoyed flying his Sabre in the 'slot' of a precision flying team. Returning home to San Antonio on 29 November that year, he would add the Distinguished Flying Cross to his tally for aerial combat in Korea. While in Korea with the 336th FIS he flew a total of sixty-three missions in various F-86 aircraft, serving in the latter part as a squadron flight commander.

With his degree in aeronautical engineering, Frazier was reassigned to the Air Force Flight Test Center, Edwards AFB, as a Flight Test engineer. His task was to determine performance data as well as stability and control characteristics on new aircraft bought by the USAF. He was the test engineer for numerous types, such as the Bell-47 helicopter, the trainer version of the F-100 fighter jet, the Douglas B-66 and Martin B-57 Canberra medium-range bomber and the Boeing B-52 long-range bomber, which was just coming into service with the Strategic Air Command. He chose these aircraft so that he could fly as co-pilot as well as test engineer and thus build up his flying hours to be eligible to attend the centre's Flight Test Pilot School.

In early 1955 he was sent to Seattle, Washington, to conduct the Phase 3 tests on the B-52. During a mission to determine if the aircraft could fly high enough to avoid missiles carried by the Air Defense Command interceptors, he was climbing through 58,000 feet when a large chunk of the Number 5 engine's turbine rotor broke loose and slammed into the side of the fuselage, narrowly missing the main structural spar but puncturing a fuel tank. Fortunately the tank did not explode and the aircraft commander, Lt. Colonel Guy Townsend, made an emergency descent and landed at Boeing field in Seattle.

After completing the B-52 tests he returned to Edwards and in June of 1957 was accepted into the sixteen-strong Class 57C of the Test Pilot School. On graduating on 3 January 1958 he was assigned to Wright-Patterson AFB near Dayton, Ohio, which had just received the XB-52 bomber, the second one made by Boeing. This



Frank Frazier at the Flight Test Center, Edwards AFB, 1957. (Photo: USAF courtesy of Frank Frazier)

was to be used for equipment testing as well as developmental testing of a new engine built for the F-105 fighter, namely the J-75, manufactured by Pratt and Whitney. Four engines were removed from the B-52 and were replaced by two J-75s fitted with afterburners. In addition to testing this aircraft, he also flew B-57s, B-47s and KC-135s. While at Wright-Patterson he helped develop the procedures for flying zero gravity parabolic arcs in a reconfigured Boeing KC-135, during which experiments and/or personnel could remain in a weightless state for around thirty seconds. By means of a small television screen in the instrument panel, he could monitor the people in the padded cargo compartment during zero gravity. Some of the equipment built for astronauts was tested in this way.

On 17 November 1958, Frazier (by now a captain) was one of a three-man crew who set an aviation endurance record by remaining continually airborne for 80 hours and 36 minutes in a B-47 that had taken off from Wright-Patterson AFB. Making the flight with him were Captains Shelton Anthony, Jr. and Click Smith. According



Deplaning after their marathon flight aboard a B-47, (from left) Captains Frank Frazier, Click Smith and Shelton Anthony receive congratulations from group commander, Colonel Davis. (Photo: USAF courtesy of Frank Frazier)

to the WADC, the primary objective of this exercise was to test the effectiveness of an experimental tilting ejection seat equipped with a pulsating cushion and pneumatic backrest. Also studied on the flight were long-range habitability problems, minimum space requirements for pilots and techniques by which to sustain their efficiency and comfort. As Frazier states, "One man [Anthony] stayed in the front seat for the entire flight, apart from brief rest periods, and two of us rotated in the rear seat. We flew a four-leaf clover pattern over the continental United States, and did this four times, refueling in-flight by means of a KC-135 jet tanker each time we got near our Dayton, Ohio, base."

In 1959, while still at Wright-Patterson, Frazier received orders to report to the Pentagon in civilian clothes. After the briefings, those who volunteered remained for further briefings and interviews. Two weeks later, he and thirty-one other candidates received letters inviting them to take extensive physical and psychological testing at both the Lovelace Clinic in New Mexico and the Wright Air Development Center at Wright-Patterson AFB, Ohio. After completion of these tests, they all went home



Newly arrived in Vietnam, Frazier would fly the F-4 Phantom on 115 missions during his year-long tour. (Photo courtesy of Frank Frazier)

and waited anxiously. Much to his disappointment, he was not among the final seven chosen for the Mercury programme. Frazier continued at Wright-Patterson and in 1962 returned to Edwards AFB, where he became an instructor at the Test Pilot School.

Earlier, in 1961, the Air Force had received permission to develop a mission in space. The Test Pilot School added a seven-month astronaut training course to the

basic test pilot curriculum, and was renamed the Aerospace Research Pilot School (ARPS). On 17 June 1962 Frazier attended the fourth class, which he successfully completed. He achieved another milestone on 6 September 1963 when he exceeded Mach 2 for the first time while flying an F-106A.

Assigned to Vietnam in December 1966, Frazier flew from the Ubon air base in Thailand. He was operations officer for the 497th ("Night Owls") Tactical Fighter Squadron, part of the 8th Tactical Fighter Wing. Most of his one hundred and fifteen missions were flown at night in black-bottomed F-4Ds tasked to intercept and strike trucks bringing supplies from the north into South Vietnam. Dive-bombing from low altitudes at night was a very dangerous thing and required intense concentration.

His most memorable mission was flying into the Hanoi area of North Vietnam at night, at an extremely low level to avoid being picked up by radar, and penetrating a barrage of anti-aircraft fire before arriving on target. The pilots were so low that they had to pull up to drop their bombs if they wanted to avoid blowing themselves out of the sky. When Frazier pulled up he was caught in a searchlight beam, which blinded him. Nevertheless, he had to drop back to low level in order to prevent missiles from being launched at his aircraft. Somehow he made it and returned to base along with his buddy aircraft.

Frazier returned to Edwards AFB in January 1968 as a lieutenant colonel and was assigned as the Deputy Commandant of the Aerospace Research Pilot School, where he remained until he retired in 1972. Now with seven children, he and Barbara moved to Grants Pass, Oregon, to live in a beautiful house in the country, set on seven acres of land bordering the Applegate River. In 1975 they moved to New York City, where Frank was hired by the Island Helicopter Company which operated a small airline out of Long Island and shuttled passengers between Kennedy, La Guardia and Teterboro airports. They also flew people into New York City from these airports because it was quicker and more interesting than sitting in traffic for hours, and operated sightseeing flights around the city complex and the Statue of Liberty.

In 1986, now in Loveland, Colorado, Frazier was hired to fly a corporate Cessna Citation jet for a non-profit organisation near Denver. Barbara was flight attendant. Frank likes to refer to this experience as the best retirement job they ever had. They lived north of Denver until 1993 when they fully retired and moved to San Antonio, Texas, for three years and then to the island of Kauai, Hawaii, where they spent the next twelve years. To be nearer to their children and grandchildren, he and Barbara now reside in San Antonio.<sup>43</sup>

### **THOMAS B. HAYWARD, USN**

Thomas Bibb Hayward was born in Glendale, California, on 3 May 1924 to E. Payson and Martha Eudora (née Bibb) Hayward. After elementary schooling in Glendale he attended Glendale High School. He then spent a year at Occidental College, a small, co-educational liberal arts college in Los Angeles, followed by a

year's primary flight training with the Navy's V-5 programme, established in 1942.

In 1943 he was appointed a Naval Aviation Cadet in the U.S. Naval Reserve. The following year he entered the U.S. Naval Academy as an appointee from the State of California in the Class of 1948 – a class that actually graduated in 1947 as the final one of the academy's wartime-accelerated programme. In his final year at Annapolis, he met Margaret (Peggy) Keating of Medford, Massachusetts, on a blind date. They married on 29 February 1948.

Commissioned as an ensign, Hayward then served aboard the Essex-class carrier USS *Antietam* (CV-36) until being sent to Pensacola, Florida, for flight training. He received his Wings of Gold as a naval aviator on 26 July 1950 and then reported for duty as a lieutenant (junior grade) with Fighter Squadron 51 (VF-51), which was at that time under the command of Lt. Cmdr. Ernest "Skipper" Beauchamp. One of his squadron mates was a young, blond Midshipman/Ensign by the name of Neil Armstrong, with whom he has maintained a close relationship to this day. In fact, Hayward has several mentions in James R. Hansen's best-selling 2005 book *First Man: The Life of Neil A. Armstrong*, the only biography to have been authorised by the first person to set foot on the moon.<sup>44</sup>

Over the next three years Hayward participated in Korean operations aboard USS *Essex* (CV-9) and USS *Valley Forge* (CV-45) with VF-51, accumulating a total of 146 combat sorties while flying F9F Panther single-engine jet fighters during two years of war service. On one sortie from the *Valley Forge*, a 57-mm shell blew what Hayward would describe as "a significant hole" in his left wing, almost three feet in diameter. In addition, shrapnel had cut the hydraulics and entered the engine, which began to make ominous growling noises, accompanied by a fire warning indicator. Knowing that he could not land back on the carrier without hydraulics to lower the wheels and flaps, Hayward diverted to a friendly air base where he crash-landed. He managed to escape without injury, but his F9F was so badly damaged that it could only be cannibalised for spare airplane parts.

For his actions in Korea over two eleven-month tours, Hayward was awarded ten Air Medals and three Navy Commendations with Combat V, as well as the Distinguished Flying Cross. The citation for his DFC reads:

Lieutenant, Junior Grade, Thomas B. Hayward is awarded the Distinguished Flying Cross for heroism and extraordinary achievement in aerial flight as Pilot of a Jet Fighter Plane attached to Fighter Squadron Fifty One, based on board the USS *Valley Forge*, during operations against enemy aggressor forces in Korea on 8 April 1953. Leading a four-plane flight in a strike against a camouflaged and heavily defended enemy troop billeting and supply area, Lieutenant, Junior Grade, Hayward skillfully directed a series of well-coordinated attacks in the face of intense and accurate hostile anti-aircraft fire, personally destroying eight buildings and damaging five others. Subsequently, when the division proceeded on an armed reconnaissance of the Majon-ni-Wonsan supply route, expending their remaining ordnance on camouflaged trucking shelters, he personally destroyed two additional buildings and damaged three others. By his superb airmanship, courage and



Lt. Thomas Hayward at the U.S. Navy Test Pilot School, 1954 (Photo: USN courtesy of Nancy Posch)

steadfast devotion to duty, Lieutenant, Junior Grade, Hayward contributed materially to the reduction of the enemy's war-making potential and upheld the highest traditions of the United States Naval Service.

At the conclusion of hostilities in Korea, Hayward reported to the Naval Test Pilot School in Patuxent River, Maryland, as a member of Class 12. Among his classmates were Jim Stockdale and a Marine Corps major named John Glenn. Another member was future fellow Mercury finalist, Dale Cox. While there he also got to meet Wally Schirra and Alan Shepard, each of whom would later be in the first astronaut group.

One of the first courses the men received as part of the school was a refresher in calculus, which some found very difficult to assimilate. Other mathematics lessons followed, and the pilots would be up at all hours of the night with their noses buried in their books, studying. They also began performing some test flying by day, which then required a report on the performance of the aircraft to be written that night. On his graduation in August 1954, Hayward remained at Patuxent River as a test pilot and project coordinator. He then attended the Aviation Safety Officers School at the University of Southern California in Los Angeles. His next assignment was with All-Weather Fighter Squadron Three until August 1958, when he reported for instruction at the Naval War College in Newport, Rhode Island. It was while Hayward was there that he was called to a briefing in Washington, D.C., and later informed that he was one of the thirty-two finalists for further intensive testing in the selection of NASA's first astronauts. He was one of the fifteen Navy finalists still



Test pilot Thomas B. Hayward. (Photo courtesy of Robert Baldwin)



As Chief of Naval Operations in 1979, Admiral Hayward meets with the 4th Master Chief Petty Officer of the Navy (MCPON) Thomas Crow and his wife Carol. (Photo: USN)

under consideration for the space programme, but eventually only three naval aviators were selected – Scott Carpenter, Wally Schirra and Alan Shepard.

On finishing at the Naval War College, Lt. Cmdr. Hayward was assigned to VF-211 ("Fighting Checkmates"). He served as the squadron's executive officer until 1961, and was then appointed to the Pentagon as the Administrative Aide to the Secretary of the Navy. In 1964, now with the rank of captain, he received orders for VF-103, serving both as the squadron's executive officer and commanding officer. Later, he led and trained Attack Carrier Air Wing Ten for combat operations in the Vietnam War. In this command he was first deployed to the Mediterranean with USS *Shangri-La*, and then to Southeast Asia with the carrier USS *Intrepid* (CV-11). He flew thirty-six missions from the *Intrepid*, receiving the Legion of Merit and an additional three Air Medals.

Between tours of duty in the mid-1960s Hayward simultaneously attended the National War College and studied for his master's degree in international affairs at George Washington University. Having graduated from the War College with his degree, he was assigned as commanding officer aboard the *Hyades*-class stores ship USS *Graffias* (AF-29), a command which included a combat support deployment in the Gulf of Tonkin. He would return to duties in Washington in 1968, as Executive Assistant and Aide to the Undersecretary of the Navy. In December 1969, he was assigned command of aircraft carrier USS *America* (CV-66), then deploying to the Seventh Fleet as the Flagship of Commander Task Force 77. The following year he was promoted in rank to rear admiral, leaving for Hawaii to report as Commander



Prior to his retirement as Chief of Naval Operations, Admiral Hayward discusses final flight plans before take-off in an A6 Intruder that will take him to USS *Midway* (CVA-41) for a visit. (Photo courtesy of *Aviation Spectator*)

Hawaiian Sea Frontier and Commandant of the 14th Naval District. He would have additional duties as Commander, Fleet Air Hawaii and also Commander, Manned Spacecraft Recovery Forces, Pacific. From 1971-73 he served again in Washington, this time as Director, Office of Program Appraisal, U.S. Navy, and for the next two years was Director of Navy Program Planning, Office of Chief of Naval Operations (CNO), after which he was promoted to the rank of vice admiral.

On 14 June 1975, Hayward's leadership skills earned him command of the U.S. Seventh Fleet in the Western Pacific, embarking on the *Cleveland*-class light cruiser USS *Oklahoma City* (CLG-5) until 1976, at which time he was promoted to four-star admiral. Serving as Commander in Chief of the U.S. Pacific Fleet from 12 August 1976 to 9 May 1978, he called for the development of a global naval strategy to face the threat of growing Soviet military power. In order to counter the Soviet presence, Hayward increasingly deployed fleet units into the Indian Ocean, while fostering the design and production of advanced warships, aircraft, and missile systems. On 1 July 1978, Hayward became the twenty-first Chief of Naval Operations, the most senior officer in the U.S. Navy. He brought to the role a broad experience in command of major fleet units, an extensive background in programme planning and manage-



Admiral Thomas B. Hayward (Photo courtesy of Thomas Hayward)

ment, and a long and distinguished career in naval aviation. As the naval member of the Joint Chiefs of Staff, Hayward built on his predecessor's work to prepare the service for future challenges by emphasising pride and professionalism, strengthening fleet readiness and mine warfare capabilities, and instituting a forward leaning maritime strategy.

In 1981, Hayward was awarded the James H. Doolittle Award of the Society of Experimental Test Pilots (SETP). After retiring as CNO on 30 June 1982, he also retired from military service. He and his wife Peggy moved to Honolulu, where he set up a consulting company specialising in matters of business development and other areas of importance to Pacific Rim nations. They later moved to Seattle to be nearer their children.

In retirement, Admiral Hayward took on a challenging role as chairman of the Ethics Resources Center of America, working hard to promote business ethics. He also assisted in the establishment of a number of Navy-related museums, including USS *Missouri* and Pacific Aviation Museum. To address the mounting issue of illiteracy facing his country, Hayward co-founded Voyager Expanded Learning in 1994, an educational company that assists more than a million at-risk public school children. "I will expend the remainder of my effective years to helping America's public education [system] turn out students ready for success in school and life," he said of his involvement, "with even finer youngsters seeking careers in the Navy and the rewards of attending the Academy."

Admiral Hayward's military decorations include, among many, the Distinguished Service Medal with a Gold Star in lieu of second award; the Legion of Merit with two Gold Stars; the Distinguished Flying Cross; the Air Medal with ten Gold Stars and Bronze Numeral 3; the Navy Commendation Medal; the Vietnamese Cross of Gallantry Army Level with Bronze Palm; the Republic of Vietnam Presidential Citation; the Vietnam Campai; the Republic of China Order of Cloud and Banner Second Class with Grand Cordon; and the Japan Second Class Order of the Rising Sun. In 2007 the U.S. Naval Academy's Alumni Association announced Admiral Hayward as one of four recipients of its 2007 Distinguished Graduate Award.

Today Thomas and Peggy Hayward live in Seattle, where he remains a lifelong supporter and contributor to the U.S. Naval Academy, and is a Trustee Emeritus of the Naval Academy Foundation.<sup>45</sup>

### LAWRENCE HEYWORTH, JR., USN

A future rear admiral in the U.S. Navy, Lawrence Heyworth, Jr. was born on 10 February 1921 in Chicago, Illinois, to Lawrence Heyworth, the second son of the prosperous real estate developer, James O. Heyworth, who came to Chicago from England in the 1860s, and his second wife Marguerite Kallscheuer Heyworth.<sup>46</sup> After initial home-schooling, he attended the Harvard School for Boys in the South Side's Kenwood neighbourhood from 1926 to 1938. Another notable, earlier graduate from this school was Edgar Rice Burroughs, the science fiction writer and creator of *Tarzan*. While his father went on to become president of a construction company and supervised construction of the landmark Heyworth Building at the junction of Madison Street and Wabash Avenue in Chicago – Lawrence spent a year at the University of Chicago and then decided to attend the U.S. Naval Academy in June 1939.

In order to meet the needs of the Second World War, the members of Heyworth's Class of '43 would actually graduate in 1942. Also in that class was future U.S. Navy Chief of Naval Operations, James L. Holloway III.

From December 1942 to January 1945, Heyworth was assigned to the *Gato*-class submarine USS *Finback* (SS-230) under Captain Jesse Hull, participating in nine war patrols in the Pacific Ocean over a nineteen month period. After refitting at Majuro in the Marshall Islands, the *Finback* set out once again on 16 August 1944 for her tenth war patrol, this time under Captain Robert Williams, Jr., for lifeguard duties near the Bonin Islands, where it would go on to rescue a total of five downed pilots from the sea. One of the pilots plucked from the combat-littered ocean on 2 September was a Navy aviator whose TBM-1C Avenger torpedo bomber had been shot down during a mission to bomb a Japanese radio station on the island of Chichi Jima. After dropping its payload of bombs on the target the TBM was hit by anti-aircraft fire, and the pilot was obliged to bail out over the ocean. Fortunately the *Finback* was patrolling fifteen to twenty miles off Chichi Jima. After racing to the scene the submarine surfaced and made the rescue. The pilot was more fortunate than he realised, since other downed airmen captured on Chichi Jima were



Taken aboard USS *Finback*. Lawrence Heyworth is third from the right (standing); future U.S. President George H. W. Bush is in the front row (kneeling), second from the left. (Photo courtesy of Lawrence Heyworth III)

summarily executed by the Japanese. The pilot in this case was Lieutenant (junior grade) George Herbert Walker Bush, who would become the 41st President of the United States and the father of the 43rd. While the *Finback* completed its patrol, he remained aboard for a month and assisted the crew in retrieving other airmen. During this time, the submarine torpedoed and sank two enemy ships and was itself subjected to bombing by depth charges. "That experience was far scarier than an airplane bombing run," Bush recalled. "At least in the plane, you controlled your destiny to some extent. But there, under the water, all you could do was hope like hell that an enemy ship wouldn't put an explosive on top of you."<sup>47</sup>

On the *Finback*'s eleventh war patrol the crew was again assigned to lifeguard duties in the Bonin Islands, sinking a freighter and returning to the Midway base on Christmas Eve, 1944, where Heyworth disembarked for the final time.

Following the end of hostilities, Heyworth requested flight training in Pensacola, Florida, where he earned his designation as a naval aviator in 1947, making him one of very few servicemen to wear both an aviator's gold wings and a submariner's gold dolphins.

In 1946 Heyworth married Jean Gordon Holloway, sister of his USNA classmate, James L. Holloway III and the daughter of Rear Admiral James L. Holloway, Jr. The admiral's wife (also named Jean) died of cancer in October 1956, and two years later he married Josephine Cook Kenny, the mother of Jo Schirra, wife of future Mercury astronaut Wally Schirra.



Test Pilot School at Patuxent River, 1950. Lawrence Heyworth is second from the left, front row, while future Mercury astronaut Alan Shepard is second from the left, back row. (Photo courtesy of Lawrence Heyworth III)



Heyworth (left) at the Naval Air Test Center, March 1952. The aircraft in the background is an F3D Skyknight. (Photo courtesy of Lawrence Heyworth III)

In July 1950, Heyworth reported to the Naval Air Test Center at Patuxent River, Maryland, where for the next six months he was under instruction as a member of its fifth class, undertaking test pilot training. Another member of that class was future Mercury astronaut Alan Shepard. An outstanding pilot, Heyworth graduated first in his class, ahead of Shepard, who came in second. He remained at the Naval Air Test Center until November 1952. Among his many other distinctions, he was one of the first aviators to land the Navy's Douglas F3D Skyknight jet fighter aboard an aircraft carrier.

After serving as executive officer of Fighter Squadron 61 ("Jolly Rogers") based at NAS Oceana, Virginia, Heyworth returned to Patuxent River in October 1955 for a second tour as a test pilot. During this time he became the first naval aviator to fly an Air Force F-104A, entering the "Double Supersonic Club" by flying twice the speed of sound. Upon graduating from the Naval War College in Newport, Rhode Island, in 1958, he briefly attended a Replacement Air Group (RAG) for training in preparation for being given command of VF-81 ("Crusaders") which was flying Grumman F9F-8 Cougars off the carrier USS *Forrestal* (CVA-59). It was while on the *Forrestal* with fellow Navy test pilots Alan Shepard and Wally Schirra, that Heyworth was called to Washington in February 1959 to undergo interviews and testing for selection to the Mercury programme.



Captain Heyworth with astronaut Wally Schirra and two unidentified dignitaries in 1967. (Photo: NASA courtesy of Lawrence Heyworth III)

On 4 March 1959, the squadron transitioned to Douglas A-4 Skyhawks, and four months later VF-81 was redesignated Attack Squadron VA-81, with a homeport of NAS Oceana, Virginia. On 4 November 1959, Heyworth relinquished command of VA-81 after receiving orders as Commander, Carrier Air Group Eight, also aboard the *Forrestal*. By having commanded two air units aboard the ship, he earned the right to wear the Navy's Command-at-Sea insignia. In December 1960 he became Operations Officer for three months on the *Forrestal*, and was later appointed to a one-year term as Executive Officer. Following his tour of duty aboard the *Forrestal*, he completed a further year of shore duty on the Washington staff of the Deputy Chief of Naval Operations (Air). He would remain at the headquarters of the Navy Department until April 1963.<sup>48</sup>

Lawrence was next given command of the fleet oiler USS *Pawcatuck* (AO-108), as part of the Sixth Fleet in the Mediterranean. In May 1964 he was made the first commanding officer of the newest attack aircraft carrier, USS *America* (CVA-66), which had been launched on 1 February that year. He went on to regard his years of command on the *America* as the most satisfying of his Navy career.

In his commissioning speech at the Norfolk Naval Shipyard on 23 January 1965, Captain Heyworth said in part: "The act of committing a ship and her crew to life on the sea has always had a deep emotional and religious significance. The custom of appealing to one's God on occasions such as this is older than history for a seafaring man; the feeling of the power of God is never stronger than when he is faced with the hazards of the sea... The ship is ours at last, and we can now apply ourselves



A proud Navy family at the Induction Day for Midshipman Lawrence Heyworth IV at the U.S. Naval Academy, Annapolis, 2001. From left: Rear Admiral Thomas Heyworth, Jr., USN (retired), Mariella Oliver, Capt. James D. Oliver, Jr., USN (retired), Marijo Oliver Heyworth, Charlotte Cordes Heyworth, Midshipman Lawrence Heyworth IV, USN, Cmdr. Lawrence Heyworth III, USN (retired), Admiral James L. Holloway, III, USN (retired), and Jean Holloway Heyworth. (Photo courtesy of Cmdr. Lawrence Heyworth III)

vigorously to developing the teamwork and operating procedures for which we have prepared so long. It is a great challenge and much hard work is ahead – but we welcome this challenge, and take pride in being chosen to come to grips with it – in the development of a great ship proudly bearing the name of her great country.”<sup>49</sup>

After completing outfitting at the Norfolk shipyard, the *America* got underway on 25 March for local operations off the Virginia Capes, and she made her first catapult launch and landing on 5 April with a Douglas A-4C Skyhawk from Attack Squadron VA-76. Proceeding to the Caribbean, the carrier conducted a two-month shakedown training cruise with her assigned carrier attack air wing (CVW-6). This concluded at Guantanamo Bay on 23 June. The carrier then returned to the Norfolk shipyard on post-shakedown availability and further training cruises off the Virginia Capes and Bermuda. At the end of November 1965 she set off on an uneventful seven-month deployment with the Sixth Fleet which involved participating in the

Franco-American exercise Fairgame IV to simulate conventional warfare against an aggressor that had invaded a NATO (North Atlantic Treaty Organization) ally.

On the *America*'s return to Norfolk in July 1966, Captain Heyworth handed over command to Captain Donald D. Engen and subsequently served at the U.S. Naval Academy, assuming Commandant of Midshipmen duties in 1968. That year he briefly became the academy's 45th superintendent, between the departure of RADM Draper Kauffman in June and the arrival the following month of new superintendent RADM James F. Calvert – a fellow graduate of the USNA Class of '43.

Prior to retiring, Rear Admiral Heyworth was Commander Fleet Air Jacksonville, Florida, and deputy Chief of Staff for Logistics, Commander in Chief, Pacific, based in Honolulu, Hawaii.

Heyworth greatly enjoyed sports, in particular tennis, ice skating, squash and golf. He was keen on the history of golf and studied its evolution and the development of the golf swing. He kept himself in excellent physical condition, and as a result was a tough competitor in any endeavour in which he engaged.<sup>50</sup>

After his retirement in the summer of 1973, Lawrence and his wife Jean travelled the world, playing golf and tennis and visiting family and friends. Along the way they had produced three children; Lawrence Heyworth III, who would in turn retire from the U.S. Navy with the rank of commander, Gordon and Marguerite. One of their six grandchildren, Lawrence Heyworth IV, continued the family tradition by entering the U.S. Naval Academy as a midshipman in the Class of 2005, thus becoming the fifth continuous generation of his family to graduate from a U.S. Service academy dating back to his great-great-grandfather, Lt. General Johnson Hagood of the U.S. Military Academy Class of 1896.<sup>51</sup>

Rear Admiral Lawrence Heyworth, Jr. died at his Virginia Beach, Virginia, home on Sunday, 4 May 2003. He was privately buried at the USNA Cemetery, Annapolis.

## ARCHIE T. IDDINGS, JR., USAF

Gary High School, located in Gary Hollow amid the once heavily populated coalfields of West Virginia's McDowell County, was established around 1913 and educated the offspring of a steady influx of miners and their families from all around the United States and Europe. With a rapidly increasing demand for coal in the ensuing decades, the mines of McDowell County underwent boom times and the schools flourished. The area would come to latter-day prominence with the autobiographical book and movie *October Sky* by Homer Hickam, who was raised in McDowell's Coaltown, later becoming a senior NASA engineer and award-winning author.

One former student from Gary High School was Archie Tibbs Iddings, Jr., who would daily traverse the seven miles to and from Elkhorn, a small town to the east of the Hollow. The son of Archibald Tibbs and Margaret Goode Iddings, and a brother to Dorothy, he was born in Elkhorn on 20 June 1928. After high school, he opted to further his studies at the Virginia Polytechnic Institute in Blacksburg, situated in the Appalachian region. While attending Virginia Tech as a member of its graduating

Class of 1950 he joined the institute's Corps of Cadets, and during those three years of study and military training also competed as a varsity swimmer. His graduation in June 1950 with a bachelor's degree in mining engineering was held at the historic Wright-Patterson Air Force Base in Ohio, and he was simultaneously commissioned as a second lieutenant in the U.S. Air Force. On 30 December 1977, this base would also witness his retirement from the service as a full colonel, following a long and distinguished career in his nation's Air Force.<sup>52</sup>

Deciding to make the Air Force his career, Archie Iddings undertook basic flight training, principally on the AT-6 Texan, at Goodfellow Field at San Angelo, Texas. He was then assigned to Vance AFB at Enid, Oklahoma, where he flew increasingly advanced aircraft such as the piston-engine T-28 Trojan, and the B-25 Mitchell twin-engine medium bomber, earning his much-coveted Air Force wings. From there he advanced to jet aircraft training at Moody AFB in Georgia. Shortly after the Korean War began on 25 June 1950, the Air Training Command took over most combat crew training, so the trainees at Moody received quality instruction on advanced jets such as the Lockheed F-80 and its derivative, the T-33 Shooting Star. He was then sent to the 83rd Fighter Interceptor Squadron at Hamilton AFB in California, where he flew F-89 Scorpions and F-84 Thunderjets.

By October 1952 the 'hot war' in Korea was winding down and the 'Cold War' was warming up. The occupation of Japan had ended in April, leaving the Far East Air Force responsible for the air defence of that island nation. For this reason, Captain Iddings was next assigned to overseas duties in Japan with Flight E (Provisional), also known as the 40th Fighter Interceptor Wing, 35th Fighter Group, or more commonly, the Fighting 40th. They were based at Johnson Air Base in Iruma, Japan, flying F-86F Sabre jets, and their main role was to discourage Russian MiGs from harassing U.S. aircraft and intruding into Japanese air space over the northern island of Hokkaido. Two months after the cessation of hostilities, Iddings survived a harrowing accident. On 5 September 1953, he was flying an F-86F Sabre during a tow-target mission near Obihiro city in southern Hokkaido when he suddenly ran low on fuel due to an engine malfunction and was forced to crash-land.

While in Japan, Iddings applied for and was granted a regular commission in the USAF. Upon his return to the United States he reported to the 723rd Fighter-Bomber squadron, attached to the 450th Fighter Day Group and equipped with F-86F Sabres, at Foster AFB in Victoria County, Texas. There in September 1955 he transitioned to the supersonic F-100C Super Sabre jet fighter. It was during this tour of duty that he met his future wife, Bonnie Ann Nixon, and they would marry at the Central Baptist Church in her hometown of Livingston, Texas. A nephew of Ann (as she preferred to be known) was Ron Rozelle, who acted as the ring-bearer at their wedding. He says his aunt was "a real beauty. Being the baby of that family – three girls and three boys – her romance with a dashing young Air Force pilot was the stuff of storybook high drama."<sup>53</sup>

At dawn on 31 August 1956, six F-100 Super Sabres took off from George AFB, California. All of the pilots were experienced Air Force fighter pilots competing for that year's Bendix Trophy, which meant flying non-stop from Los Angeles to Tinker AFB in Oklahoma City; 1,118 miles start to finish. Aerial refuelling was allowed but



Captain Archie Iddings, representing the 450th Fighter Day Group, was one of six contestants flying North American F-100C Super Sabres in the 1956 Bendix Trophy.  
(Photo: North American Aviation Incorporated courtesy of Mary Iddings Howell)



Captain Iddings at the USAF Test Pilot School, 1958. (Photo: USAF courtesy of Mary Iddings Howell).

none of the pilots, including Captain Iddings, was interested. Instead, they preferred to wring out every last drop of fuel by meticulously plotting their flight path the night before. There was precious little margin for error. Two hours after taking off, Korean air ace Captain Manuel "Pete" Fernandez, Jr. touched down at Tinker AFB in first place. Iddings would cross the finish line in third place, with just twenty gallons of fuel remaining in his tank enough to stay airborne for another minute.<sup>54</sup>

That same year, Captain Iddings was one of fifteen pilots specially selected to undertake advanced aeronautical studies and test flight training at Edwards AFB as part of ETPS Class 58A, which graduated on 2 July 1958. Owing to his outstanding qualifications, and now a full-blown test pilot, he became a candidate, then a finalist, in the Project Mercury astronaut selection process, but did not make the final seven.

Later, in his role as a test pilot, he would fly many different types in evaluating new aircraft and armaments. A pilot and family friend from that time was Richard Montgomery unsurprisingly known as "Monty". In 1959 60 they were serving as F-104 Starfighter pilots with the 56th Fighter Interceptor Squadron based at Wright-Patterson AFB, Ohio. As Montgomery has told the author, "The F-104 was a high performance fighter and it was an honour to be flying 'the missile with a man in it'. Arch was an experienced, above average fighter pilot and just a great, good guy in the squadron. The mission of the Air Defense Command, at that time, needed an aircraft with a different type of all-weather capability so, much to our dismay, the Command closed a number of the F-104 squadrons in 1960 and retained just two [...] located in Texas and Florida. Our squadron was closed and the pilots were transferred to different assignments around the United States."<sup>55</sup>

Iddings and Montgomery were transferred to the 94th FIS at Selfridge AFB in Michigan, where they flew the F-106 Delta Dart. As the first American squadron to enter service in France in World War I, the 94th was allowed to choose an insignia, and it selected a "Hat and Ring", the motif being derived from boxing in which one signifies one's willingness to become a challenger in a fight. This insignia had been retained. It was in the 94th that Iddings officially joined the elite M-2 Club by flying an F-106B beyond Mach 2 on 25 May 1960, although he had actually accomplished this feat several times previously in an F-104. The two friends would often go to pro hockey games in Detroit in Iddings' beat-up jalopy which Montgomery says he had painted "a horrible green color". All too soon, however, their career paths diverged. "Sometime around 1962, Arch left the squadron to return to college for an advanced degree."<sup>56</sup>

After gaining his master's at the University of Chicago, Iddings was stationed at Eglin AFB in Florida. Later, around 1968 70, he would serve as a military attaché to the American Embassy in London, stationed in the Air Force European Research and Development cooperative/coordinating office. Following his fine work there he was promoted to the rank of colonel.

Iddings' final Air Force assignment involved Pentagon duties at Wright-Patterson AFB in Ohio, where he was the Director of Program Control (Business Manager) for air-launched nuclear cruise missiles, which included the long range cruise missile and short range attack missile both launched from the B-52 and B-1 bombers with him later becoming programme director for the short range attack missile.



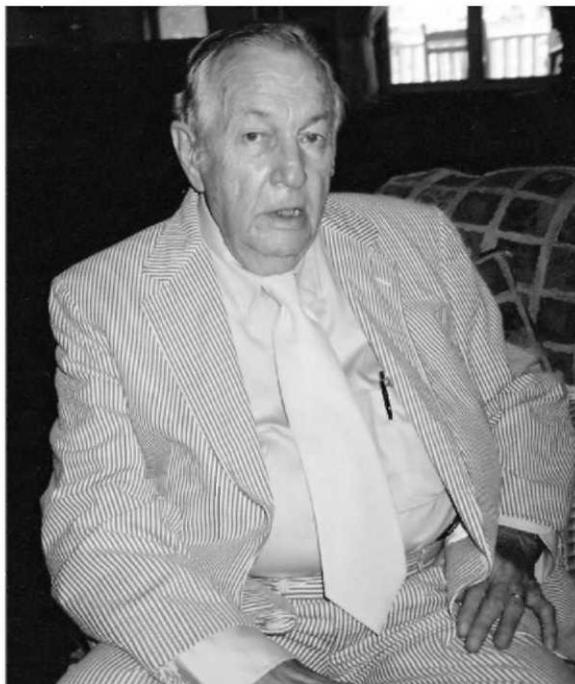
Iddings in front of a North American F-100C. (Photo: North American Aviation Incorporated courtesy of Mary Iddings Howell)

One of the friends Iddings made while stationed in Ohio was George Mushalko (now Colonel, USAF, Ret.) who says, "I got to know him late in his career, in fact in his last assignment at Wright-Patterson AFB, where he was my boss for three of the four years of my assignment." Mushalko recalls Iddings as "a very calm, unexcitable person who was quietly very intelligent." He says it was "no surprise" that Iddings "made the final thirty-two cut" in NASA's quest for Mercury astronauts.<sup>57</sup>

After retiring from the Air Force in 1977, Colonel Iddings and his family moved to San Jose, California, where he took on employment with the United Technologies Corporation as a project manager in their chemical systems division. But because his wife Ann longed to be with her family and friends back in Livingston, in June 1982 he granted her dearest wish; they purchased a house in her old hometown and made the move. "I am glad he brought her home," their daughter Catherine reflected. "We lived next door to her sister Mary, and my mother was able to enjoy a year and some months surrounded by all the people who adored her."<sup>58</sup> Sadly, in the fall of 1982, Ann developed Hodgkin's Disease, a form of lymphoma, and the loving family lost her on 5 September 1983.

It took quite some time for Iddings to get over this loss, but in February 1987 he married long-time family friend Nell Arnold.

Richard Montgomery recalled a 94th Squadron reunion held in Ohio "where he showed up in a wheelchair with his daughter Catherine pushing him. He had been



In his later years, Archie Iddings at a "Fighting 40th" reunion. (Photo courtesy of Donald Sharp)

painting a bedroom wall for one of his children, fell off the ladder and broke a leg. This didn't prevent him from flying from Texas to Ohio to attend the reunion.

"The last time I saw Arch was, I believe, in 2006. He was attending another squadron reunion at Eglin AFB. We live in the area, so met him at his hotel and relived some of the memories of the past. Arch had a wonderful sense of humour, and enjoyed a good joke even at his own expense. Knowing Arch, I'm not surprised that he became a finalist in the astronaut program. He was an excellent pilot, a leader of men and a true friend."<sup>59</sup>

Colonel Archie T. Iddings died peacefully at the age of 79 in Lufkin's Memorial Health System of East Texas on 20 August 2007. Some four years earlier Lufkin had been stricken with despair, having been made the regional centre for search-related operations and debris recovery following the disintegration of shuttle *Columbia* in February 2003. Among his many honours, Colonel Iddings was a member of the Society of Experimental Test Pilots, the Air Force Association, the Virginia Tech Monogram Club and the Virginia Tech Corps of Cadets Alumni Association, as well as an avid reader and a devoted fan of the Virginia Tech Hokies athletics teams. He was survived by his second wife Nell and son Philip, daughters Mary, Catherine and Susan and their families.

The life of Archie Iddings and his near-selection as a Mercury astronaut is best illustrated by his family motto, *Si sit prudential* – "if there be prudence". Prudence has everything to do with good judgement, common sense and even caution; all of which were essential qualities in a person who might once have become one of his nation's very first astronauts.

## **ROBERT H. JACOBSON, USAF**

Robert Herbert ("Bob") Jacobson was born on 26 December 1924 in Milwaukee, Wisconsin, the eldest son of Edna (née Rudolph) and Herbert Jacobson, and brother to Donald and Richard. His paternal grandparents, Niels and Netta Marie Jacobson, had arrived in the United States in 1854 as settlers from Kasa in Telemark, Norway. He grew up in Northfield, southern Minnesota, and graduated from Northfield High School in 1942. He was reported to have been something of a whiz at mathematics, and it is said that he also rode a motorcycle everywhere in his late teens.

He attended St. Olaf College in Northfield, founded in 1874 by a group of Norwegian-American immigrant pastors, but after one semester he enlisted in the U.S. Army Air Corps. Jacobson then studied meteorology at Vanderbilt University in Nashville, Tennessee, and pursuing his dream he became an aviation cadet and was sent to an induction centre where candidates were classified by aptitude tests for training as pilots, bombardiers or navigators. Between November 1943 and January 1944 he had nine weeks of gruelling pre-flight training at Maxwell Field, Alabama. This was followed by AACPS (Army Air Force Contract Pilot School) instruction at Carlstrom Field in Alabama from January to March 1944, where a candidate's ability to continue flying was assessed during dual flight with a civilian flight



Bob Jacobson, posing beside a Lockheed F-104 Starfighter, was a graduate member of the Test Pilot School's Class 54C. (Photo: Edwards Flight Test Center)



U.S. Air Force Test Pilot School Class 55C, which graduated on 6 January 1956. Flight instructor Bob Jacobson is second from the left, front row. Behind his right shoulder and second from the left in the back row, is future Mercury astronaut, Captain Donald Slayton.  
(Photo: Edwards Flight Test Center)

instructor. After a solo flight, Jacobson completed his basic flight instruction on more powerful aircraft at Gunter Field, Alabama, where he applied the navigation skills learned in the classroom. Following his advanced training at Marianna Army Air Field, Florida, he graduated as a 2nd lieutenant on 4 August 1944.

Upon leaving the USAAF at the end of the war, he resumed his studies at the University of Minnesota. He graduated in March 1948 with a bachelor's degree in aeronautical engineering, and worked as an engineer with North American Aviation in Los Angeles, California. As a member of the Air Force Reserves, in March 1951 he was recalled to active duty and after five months in England served another two years in Japan. In September 1952, he married Virginia ("Ginny") Emily Peterson. Before returning to the United States, he served at Johnson Air Base in Iruma, Japan.

As a 1st lieutenant, Jacobson attended the Experimental Flight Test Pilot School at Edwards AFB as a member of the eleven-strong Class 54C, which graduated on 17 January 1955. Others in his class included Mustang fighter ace James W. Empey and helicopter test pilot Robert G. Ferry, but one of the more outstanding members was Captain Robert M. White, who would become the first pilot to fly the X-15 into space (314,740 feet) and set numerous speed and altitude records. White was also the first man to fly a winged aircraft six times faster than the speed of sound. Jacobson and White became friends at TPS, and it would become a friendship of lifelong tenure.

Jacobson stayed on at Edwards to complete a tour as a performance instructor and test pilot, flying supersonic aircraft such as the F-104 Starfighter. While there, he was assigned as a test pilot to the highly-classified Lockheed U-2 programme. Designed and manufactured for minimum airframe weight and nicknamed "Dragon Lady", the U-2 (which is still operational) was a single-engine, very high altitude reconnaissance spy plane. Jacobson made test flights of the U-2 to Puerto Rico, Hawaii and Alaska, and was the first pilot to fly above a hurricane and take photographs of its eye. In late 1958, he became involved in the covert U-2D "Low Card/Smokey Joe" programme in support of the Air Force's then-secret WS-117L MIDAS (Missile Defense Alarm System) satellite programme, intended to provide extended warning from space of a Soviet ICBM attack. Three Lockheed U-2Ds were modified to support MIDAS in Project Low Card (later renamed Smokey Joe). The aircraft had an airborne optical spectrometer in a rotating "pickle-barrel" housing on top of the fuselage, aft of the cockpit. This cylindrical installation contained a forward-facing lens that could scan for missile exhaust plumes. An observer would be carried in the specially modified two-man cabin to monitor incoming data and aim the sensor.<sup>60</sup>

Among his many other accomplishments, highly honoured Vietnam fighter and test pilot Harry Andonian served at the Air Force Flight Test Center at Edwards AFB as Chief of the Special Operations Branch, U-2 Test. As Project Pilot, he conducted 340 flights on the U-2A/B/D for classified development testing, and was also Project Pilot on the U-2C, conducting flight test evaluations. He was transferred to Edwards at around the same time that Jacobson was being screened for selection as a Mercury astronaut.



The Lockheed U-2 spy plane. (Photo: USAF)

"I met Bob shortly after my assignment to Edwards AFB in January 1959," Andonian told the author. "I was assigned to the Special Operations Branch which primarily oversaw the U-2 test operations. Bob, along with several of our test pilot force, was later assigned to the unit. I commanded the unit until my reassignment in June of 1966. Bob came to the organization from an assignment at the AF Test Pilot School.

"Our U-2 tests consisted of investigating many applications... as well as aerodynamics and engine development. A considerable amount of flying was accomplished in support of high altitude weather investigation on a global basis. Some of the flights were in support of DoD satellite test and recovery. We supported many of the early manned spacecraft launches from Cape Canaveral with high altitude photographic coverage.

"Bob was with me very early in the program and helped to qualify incoming test pilots on U-2 operation. This aircraft is – even today – considered to be the most demanding plane to land in the Air Force inventory. It would take several flights and many landings before the pilots were considered qualified for flight test missions. In fact, the first ten hours were spent at altitudes below 50,000 feet, using regular flying suits before proceeding above, wearing a partial pressure suit. We, later, tested the use of full pressure suits that are now used regularly on today's U-2 operations.

"It was a pleasure to work with such a highly qualified team of pilots and navigators... At the peak of my tenure at Edwards we had eleven pilots and five navigators in the unit. Bob was a very sharp engineering test pilot... I considered him to be one of the most reliable pilots in my unit. When it came to coordinating some of our test missions with the engineering department, I had Bob help to resolve some of the test plans. He worked well with all members of the test team. Many of our missions were conducted at off-site locations and the U-2 pilots performed as detachment commanders. I considered Bob to be one of the best for these operations. Some of these off-site exercises involved daily flights and we utilised up

to three pilots to support the effort. The reason for this was because after a 5- to 7-hour mission the pilot was given two or three days off to recuperate before his turn came up again.

"In addition to his qualifications, Bob was friendly, helpful, eager to assist in planning for all of our missions and especially when it came time to prepare our annual budget requirements... never a cross word and certainly well liked by the whole unit."<sup>61</sup>

Jacobson later gained his master's degree in mechanical engineering from the University of Southern California and worked for the Office of Aerospace Research in Washington, D.C. He was then stationed at George AFB in California for training in the F-4 Phantom before completing a tour as a fighter pilot, flying F-4s during the Vietnam War.

In 1972 he was assigned to HQ USAF with duties at the RAND Corporation in Santa Monica where he worked on RPV (Remote Piloted Vehicles), Loran (Long Range Navigation), conventional weapons, and other tactical operations. His next assignment was with the Aeronautical Systems Division, AFSC, Wright-Patterson, where he achieved his final rank of lieutenant colonel.

Bob Jacobson retired from the U.S. Air Force in 1974. Following his retirement he worked for Rockwell International on the B-1 Lancer bomber, and for Boeing on the B-2 Spirit stealth bomber. At the time, as well as being an avid photographer, he owned two aircraft: a Beechcraft Bonanza and Comanche. He was also a member of the Confederate Air Force and the Civil Air Patrol. On leaving the aviation industry, he moved to Casper, Wyoming, and married for a second time, to Bonnie Nelson.

He died at the Veterans Administration Nursing Home in Sheridan, Wyoming, on 15 March 2003, aged 78, and was buried in the Oregon Trail State Veterans Cemetery in Evansville, Wyoming. He was survived by his two brothers and his two wives, and by three children: Linda Redmond of Lemore, California, Cynthia Farrens of Homer, Alaska, and Dean Jacobson of the Marshall Islands; who between them provided four stepchildren and thirteen grandchildren.<sup>62</sup>

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# 5

## Tennessee patriot, pilot and poet

One of the more outstanding candidates was a man who later endured six years in a hellish POW camp in Vietnam and then rose to the rank of vice admiral in the U.S. Navy. Illness resulting from his years as a prisoner forced his premature retirement, and precluded him from achieving four-star ranking, and perhaps the job of Chief of Naval Operations. While held in captivity, Bill Lawrence composed a poem about his beloved home state in order to occupy his mind, and in 1973 this became the official state poem of Tennessee.

### WILLIAM P. LAWRENCE, USN

At the time that he was undergoing tests as a Mercury candidate, Bill Lawrence was considered by many of his peers to be the best test pilot at Patuxent River. As noted author James A. Michener observed in his book *Space*, Lawrence was “perhaps the ablest flier, all things considered, that Pax River was to produce.”<sup>1</sup> The 29-year-old fighter pilot must have felt that he had a better than good chance of being selected for the space programme. But in the final round of screening, when he was sweating it out in a heat chamber, attending physicians noticed that he had a slight heart murmur, and that was sufficient to eliminate him from the running.

William Porter Lawrence was born in Nashville, Tennessee, on 13 January 1930 as the third son of Robert and Tennessee (née Brewer) Lawrence. Despite the Great Depression they were relatively well off, as his father was the director of water and sewerage services for the city of Nashville. He would also describe his mother, who was known as Tennie, as “the embodiment of southern gentility”. Bill and his elder brothers Bobby and Eddie would play sport all year round – football, basketball and baseball. He remained the youngest member of the family until Tommy was born in 1943, completing the family.

A high achiever academically, Bill graduated first in his Nashville West High School class and became president of the student body. He was also a ranking cadet officer in the school’s ROTC, becoming the unit’s commanding officer in his senior year. He was also highly regarded as a general sportsman, receiving the prestigious



Midshipman 1st Class William P. Lawrence, 1951. (Photo courtesy of Diane Lawrence)

William Hume award for high school football's "most outstanding in scholarship, leadership, sportsmanship and value to his team".

In 1947 he turned down an academic scholarship at Yale for an appointment to the U.S. Naval Academy at Annapolis. While there he played three varsity sports, served as Class President, Commander of the Brigade of Midshipmen, and led the establishment of the present-day Brigade Honor Concept. He and classmate Ross Perot, concerned about midshipmen cheating on tests, had teamed up to write the concept: "Mids do not lie, cheat or steal." It became the school's moral code and a key element in midshipmen behavioural development.

He was introduced to nineteen-year-old Anne Williams in February 1951 and they began dating in his senior year. He graduated "with distinction" in June, having been ranked eighth in his class of 725 academically, and set off for flight school. His basic instruction in the SNJ (the navalised version of the T-6 Texan) was at Whiting Field in Milton, Florida. Three days after Christmas 1951 Bill married Anne, the daughter of World War II flying ace Macpherson Williams. When she was only ten years old her father had been shot down over the Philippines. With the help of local Filipino guerrillas he managed to evade capture before being rescued and returned home. It had been several months before Anne's family knew whether he was dead or alive, and this sense of anxiety would return to haunt her when her husband went missing over Vietnam some fifteen years later.

After completing his advanced training at NAS Kingsville, Texas, Lawrence was presented with his Naval Aviation Wings at Pensacola, Florida, on 7 November

1952. Following advanced carrier qualification on USS *Wright* (CVL-49) he served as a pilot with night fighter squadron VF-193 ("Ghostriders"), then transitioning to the McDonnell F2H-3 Banshee at NAS Moffett Field, California. He participated in two deployments to the Western Pacific aboard USS *Oriskany* (CV-34), often flying on the wing of Lt. Cmdr. Alan Shepard. With characteristic audacity, Shepard decided (with the reluctant sanction of the flight schedules officer) to form his own aerobatic team, recruiting John Mitchell to fly the left wing, Preston Luke the right, and Bill Lawrence in the 'slot'. Shepard would call his personal aerobatic team the "Mangy Angels".

After the Korean truce of 27 July 1953, Lt. Lawrence attended Aviation Safety School at the University of Southern California. He went to the Navy's Test Pilot School at Patuxent River, from which he graduated in 1956 first in the twenty-five-strong Class 16. He then became a test pilot in the Carrier Branch of the Flight Test Division of the Naval Air Test Center. While serving as a test pilot at Pax River he became the first naval aviator to fly at twice the speed of sound in a Navy airplane, the F8U-3 Crusader III. Test flying was a risky business, and Lawrence attended the funerals of his colleagues with what he called "a depressing regularity". It was fast becoming a nightmare for Anne; often alone, she grew increasingly dissatisfied and disapproving of his job, and the time that he spent away from their young children, Bill Jr., Laurie and Wendy.

In February 1959, Lt. Lawrence was ordered to attend a mystery assignment in Washington in civilian clothes. During the briefings he grew interested in becoming a



Test pilot Bill Lawrence. (Photo courtesy of Diane Lawrence)

Mercury astronaut, and was one of the thirty-two finalists. However it was found after all the testing that he had a bicuspid aortic valve that excluded him. "Disappointed, I perked myself up with the realization that things usually worked out in my favor," he wrote in his memoirs. "I certainly had no complaints about my career pattern to date. In time, I adjusted and looked forward instead of back."<sup>2</sup>

Lawrence's next assignment was as aide to RADM Tom Moorer, Commander Carrier Division Six, aboard the carrier USS *Saratoga* (CV-60) on deployment to the Mediterranean and North Atlantic. He then served as the assistant operations officer of Fighter Squadron 101 at NAS Oceana, Virginia, where he was responsible for the introduction of the new F4H Phantom jet to the fleet.

His wife's objections to the hazardous flying led Lawrence to consider retiring, but he found that he simply "couldn't step over the threshold". Instead, in June 1961 he took the assignment of a navigator aboard the heavy cruiser USS *Newport News* (CA 148). However, even though he enjoyed the experience, a year of routine and aimless combat-ready duty aboard the ship convinced him that he needed to fly. "It was just too slow a pace for me," he said of his service time on the cruiser. First he had to convince the doctors to allow him to fly again despite his heart murmur. The Navy finally gave him a waiver to stay in naval aviation and cleared him to resume flying. In the fall of 1962 he joined VF-14 ("Tophatters") flying F3H Demons, first at NAS Cecil Field in Florida and then aboard USS *Franklin D. Roosevelt* (CV 42). Upon the



Lt. Cmdr. Lawrence at Cecil Field, 1963, in front of an F-4B assigned to VF-14 squadron. (Photo: Naval Aviation Museum, Patuxent River courtesy of James R. Mitchell)

squadron's return to Cecil Field in April 1963 they transitioned to the F-4 Phantom. On 25 November 1963, Lawrence flew in the 'missing man' aerial formation at the funeral of President John F. Kennedy, assassinated three days earlier in Dallas.

A series of staff and operational assignments followed, including with VF-101 ("Grim Reapers") and VF-121 ("Pacemakers"). In January 1964 he began a tour at Strike Command Headquarters, McDill AFB in Florida, where he would spend the next two years. Keen for reassignment to a fighter squadron, he took a refresher on the F-4 and was deployed to Vietnam in July 1966 as executive officer of VF-143 ("Pukin' Dogs") aboard USS *Constellation* (CV-64). He became the squadron's commanding officer in June of the following year.

On the morning of 28 June 1967, on his seventy-sixth mission, Lawrence's F-4B was shot down by ground fire during a flak-suppression bombing mission over Nam Dinh. Despite hydraulic warning lights and mushy controls, he resolutely pressed on to the target and dropped his bombs. He then wrestled the jet to 10,000 feet using all the skills he had learned as a test pilot, trying to make it to the Gulf of Tonkin, some twenty miles and two minutes away. However, the crippled aircraft eventually went into a flat spin and when it reached 3,000 feet he told his back-seater, Lt. James W. Bailey, to eject. Once he was sure that Bailey had gone, he himself ejected at 1,800 feet. After landing in a paddy field, he was surrounded by a hostile, armed group of North Vietnamese farmers who had also captured Bailey. They were thrown into a pig pen to await collection by the militia. Blindsfolded and manacled, Lawrence and Bailey were driven to Hoa Lo prison in Hanoi, known to its military inmates as the Hanoi Hilton. Here Lawrence was shackled to a bar in a filthy cell, his head forced under the bar, his arms strapped high behind him and another strap tightened around his neck. He later said he was "twisted like a pretzel and in inexorable pain". It was the first time Lawrence underwent such brutal interrogation and torture at the hands of his barbaric captors, but it was far from the last. Over the next six years he would suffer grievous torture and gross indignities that would have broken a lesser person.

Growing up on a Navy base near San Diego, future astronaut Wendy Lawrence was four days from her eighth birthday when her father's aircraft was shot down. It would be fourteen agonizing months before the Navy was able to change his status from MIA to POW. "We expected the worse," Wendy recalled, revealing that once the family knew her father was alive she hardly told any of her friends that he was being held in a Hanoi prison. Instead she devoted her time to study and sports while the family waited for further news.<sup>3</sup>

In those six hellish years of captivity, Lawrence gained the respect of his fellow prisoners. "They didn't give us the option of dying," he said of his captors. Instead, the prisoners made playing cards out of toilet paper and taught each other topics of interest such as military history, automobile repairs and different languages – all in whispers so as to avoid the attention of the guards. Lawrence would spend around sixteen hours per day recalling the names of his first-grade classmates and lines of poetry. He solved complex mathematical problems in his head and, using only his imagination, painstakingly designed houses room-by-room. Once, at a place which they called Camp Vegas, the guards caught him passing a note to another Navy man.

He was thrown into solitary confinement for sixty days as punishment. The tiny cell had no light or vents, a concrete floor and a tin roof. During the day, the temperature in the cell was well over a hundred degrees, and his body was soon covered by heat sores. To get through this ordeal, he slowly composed a poem which he called "Oh Tennessee, My Tennessee".

Lawrence was held by the North Vietnamese until 4 March 1973. He would later be awarded the Distinguished Service Medal for his inspirational leadership of fellow POWs as senior ranking officer of Camp Vegas in North Vietnam. VADM James B. Stockdale, the senior ranking naval POW, later wrote of Lawrence: "he repeatedly paid the price of being perceived by the enemy as a source of their troubles through his 'high crime' of leadership [but] could not be intimidated and never gave up the ship."<sup>4</sup>

Together with James Bailey, 43-year-old Lawrence was among 591 American POWs released in Operation Homecoming in the spring of 1973.

When Lawrence returned from Vietnam, it was to find that Bill Jr. had married and that his older daughter Laurie was already in high school. But the biggest shock was being told that his wife of twenty years had divorced him and remarried during his incarceration. Seven years of uncertainty had caught up with Anne; news that her husband was initially missing and then held prisoner in that protracted conflict had been too hard to bear. During his absence, she had fallen in love with an Episcopal



Shot down as a Navy commander, Lawrence was promoted to the rank of captain while incarcerated in Vietnam. (Photo courtesy of Diane Lawrence)

minister and divorced Lawrence in order to start a whole new life. After all his years of hardship, abuse and mental turmoil he was understandably devastated but slowly picked up the pieces of his interrupted life. He and his former wife talked once after his return, but there could be no reconciliation. Daughter Wendy was only thirteen years old and needed a home; she chose to live with her returned father. "I told my mother I wanted to have an opportunity to get to know my father [and] make up for lost time."<sup>5</sup>

Following his convalescence, Lawrence became a distinguished graduate of the National War College in Washington, D.C., followed by promotion to Rear Admiral in 1974. Meanwhile, a fellow POW from Hoa Lo, John S. McCain, had introduced Lawrence to the physical therapist that was assisting McCain to walk again on his badly injured legs. Her name was Diane Wilcox Raugh and she was a divorcee from Montoursville, Pennsylvania. She and Lawrence soon began dating, and after they married in August 1974 they moved to California, taking Wendy with them.

Lawrence next served as Commander, Light Attack Wing Pacific Fleet at NAS Lemoore in California. He relinquished that command on 29 May 1975 to fellow Mercury naval candidate RADM John M. Tierney. After a period as director of the Aviation Programs Division on the staff of the Chief of Naval Operations, he was made Assistant Deputy Chief of Naval Operations (Air Warfare) in the Pentagon. Between 28 August 1978 and August 1981 he served as the 49th superintendent of the U.S. Naval Academy, during which time he was promoted to vice admiral. His daughter Wendy attended the academy in the Class of '81, only the second class to include female graduates. She graduated with a bachelor's in ocean engineering. In July 1982 she became a naval aviator. In March 1992 she was accepted as a NASA astronaut and participated in four shuttle flights as a mission specialist. She retired from the space agency in July 2006, and two months later from the U.S. Navy with the rank of captain.

Admiral Lawrence said that seeing his daughter fly into space, a dream he once held, "compensates a lot for the difficult things I've faced in my life".<sup>6</sup>

In September 1981, following his tenure as superintendent at the naval academy, VADM Lawrence was appointed to command the U.S. Third Fleet, which was then based in Hawaii. On 28 September 1983 he was assigned command of the Bureau of Naval Personnel in Washington, responsible for formulating and carrying out Navy policies on matters of personnel and training. A month after his annual physical in February 1985, he began to suffer energy-sapping ill health and related depression. No longer able to pass his medical check-ups, Lawrence reluctantly retired from the service on 1 February 1986. At the time, after thirty-seven years in uniform, he was on the threshold of achieving four-star rank and there had been talk of being in line for Chief of Naval Operations. From 1986 to 1994, he occupied the Chair of Naval Leadership at the U.S. Naval Academy, becoming its principal lecturer for several years.

In 1995, following heart surgery to replace the same aortic valve that had kept him out of the astronaut corps, Lawrence suffered a massive stroke which left him partially paralysed down the left side of his body. Treatment lovingly tendered six hours a day, seven days a week by his wife Diane allowed him to resume some less



Old friends and former POWs in Vietnam, Bill Lawrence and John McCain III. (Photo courtesy of Diane Lawrence)

strenuous activities. One of his friends, journalist Frank Aukofer, once wrote that “he likely would have been a wheelchair-bound invalid but for Diane. She used the same harsh and loving tactics on him as she had on McCain, and Bill responded. He could no longer play tennis or drive a car, but he could walk under his own power and function as a human being.”<sup>7</sup>

On 2 December 2005, the day before he planned to attend the annual Army-Navy football game, Bill Lawrence died in his bed at the age of seventy-five. His funeral at the chapel of the U.S. Naval Academy twelve days later was attended not only by his family but also by twenty-five hundred people, all of whose lives he had touched in some way, including a group of twenty-four men led by Senator John McCain with whom he had spent those terrible years as a prisoner of war.

Admiral Lawrence’s medals and awards for gallantry in the service of his nation include the Distinguished Service Medal (four awards), Silver Star (three awards), Legion of Merit, Distinguished Flying Cross, Bronze Star with Combat V, Purple Heart (two awards), Air Medal (three awards), Joint Service Commendation Medal, and Navy Commendation with Combat V (two awards), Combat Action Ribbon, Navy Unit Commendation (with Silver Star), POW Medal, National Defense Service Medal (with Bronze Star), Korean Service Medal, Vietnam Service Medal (three Bronze Stars), Republic of Vietnam Gallantry Cross Unit Citation, United Nations Service Medal and Republic of Vietnam Campaign Medal. He was also the recipient of the National Football Foundation and College Hall of Fame Gold Medal and the

National Collegiate Athletic Association Theodore Roosevelt Award – the highest honours awarded by these associations. He held a master's degree in international affairs from George Washington University and an honorary doctorate in humane letters from Fisk University, as well as being a past president of the Association of Naval Aviation. His life is wonderfully recounted in the autobiographical volume *Tennessee Patriot* (Naval Institute Press), published a month before he died.

"I think he's always been a guidepost to us," his daughter Laurie once wrote. "I think of him as an overcomer. One thing I've learned from my dad is that we can go a lot farther than we think we can. I learned just to persevere and hold to love and duty. I've always been so thankful I can be proud of who my dad is. That's such a gift."<sup>8</sup>

On Saturday, 17 April 2010 at Northrop Grumman Shipbuilding in Pascagoula, Mississippi, Diane, Laurie and Wendy Lawrence christened a new Arleigh Burke Class Guided Missile Destroyer, DDG-110, USS *William P. Lawrence*. During the ceremony, Texas businessman and one-time independent presidential candidate H. Ross Perot, who attended the Naval Academy with Lawrence, delivered the principal address, pointing out, "He lived Winston Churchill's shortest speech, 'Never Give In'. I can't think of a more appropriate motto for the USS *William P. Lawrence*."<sup>9</sup>

Rear Admiral William Landay III added, "Through this magnificent new warship and the name she bears, we honor the very best in human nature and the American spirit – Vice Admiral William P. Lawrence. We are moved and inspired by what he accomplished throughout his naval career, but equally by who he was – an individual of uncommon character and decency."<sup>10</sup>

At that point Lawrence's widow Diane and two daughters Laurie and Wendy, as the warship's sponsors, christened the ship by simultaneously breaking champagne bottles across its bow, whilst declaring in unison, "Sail with the honor of the man whose name you bear."

#### OII TENNESSEE, MY TENNESSEE by Vice Admiral William P. Lawrence

Oh Tennessee, my Tennessee,  
What love and pride I feel for thee.  
You proud ole state, the volunteer.  
Your proud traditions I hold dear.

I revere your heroes,  
Who bravely fought our country's foes.  
Renowned statesmen, so wise and strong,  
Who served our country well and long.  
I thrill at thoughts of mountains grand;  
Rolling green hills and fertile farm land;  
Earth rich with stone, mineral and ore;  
Forests dense and wild flowers galore;

Powerful rivers that bring us light;  
 Deep lakes with fish and fowl in flight;  
 Thriving cities and industries;  
 Fine schools and universities;  
 Strong folks of pioneer descent,  
 Simple, honest, and reverent.  
 Beauty and hospitality  
 Are the hallmarks of Tennessee.  
 And o'er the world as I may roam,  
 No place exceeds my boyhood home.  
 And oh how much I long to see  
 My native land, my Tennessee.

The poem was composed entirely in Bill Lawrence's head and memorised while being held in brutal solitary confinement as a prisoner of war in Hanoi. By an act of the state legislature in 1973 it became the official state poem of Tennessee.

### JACK B. MAYO, USAF

Jack Bernard Mayo was born on 26 December 1929 in Meridian, Mississippi, a city with deep roots in railroading history and, at the time of his birth, the largest city in Mississippi. The oldest of four children born to Otto Bernard and Virginia Mayo, he grew up with brothers Richard and Dale and sister Betty, graduating from Meridian High School before the family moved to nearby Decatur, where both of his parents were employed by East Central Junior College.

In 1950 Mayo applied for an honourable discharge from the Mississippi Army National Guard in order to enlist in the USAF Reserve and undertake pilot training. After preliminary tuition, he took on single-engine Air Training Command (ATC) instruction at Perrin AFB in Texas with the 3555th Basic Pilot Training Wing and gained his wings and a commission as a second lieutenant on 27 October 1951 at Williams AFB in Arizona. After completing gunnery training at Nellis AFB he was sent to the Philippines. Six months later, on 27 April 1953, he was promoted to first lieutenant, volunteered for service in Korea, and was assigned to the 36th Fighter Bomber Squadron ("Flying Fiends"), part of the 8th Fighter Bomber Group (FBG), which was at that time under the command of Lt. Colonel Walter G. Benz, Jr., and stationed at K-13, Suwon, Korea.

Soon after his arrival, Mayo began combat flying assigned to Mike Flight, which operated Lockheed F-80 Shooting Stars. The squadron's first deep thrust into North Korea was against the Army General Headquarters, followed by a May Day assault on radio broadcasting stations at Pyongyang. As the 8th FBG replaced its F-80s with F-86F-30 Sabre fighter bombers, Mayo was assigned aircraft FU-395, finding to his amusement that his crew chief had painted "Sonny Boy" on the nose – the moniker by which he was not only known to the older pilots (and especially Colonel Benz), but one which his father had affectionately called him when he was growing



The 36th Fighter Bomber Squadron, Suwon, Korea. Jack Mayo is top row, fourth from the left. (Photo courtesy of Jeanie Mayo Thornton)



1st Lt. Jack B. Mayo, USAF, Flight Leader, Mike Flight, 36th FBS, Suwon, Korea, 1953. (Photo courtesy of Jeanie Mayo Thornton)

up. In May 1953 Mayo replaced tour-expired Captain Jack Magee as flight commander of Mike Flight.

Bill Demint served with the 36th FBS as flight commander of Uncle Flight, which was “right next to Mike Flight”. He recalls that Mayo had already flown 100 missions in F-84 aircraft and was one of several pilots from the squadron who volunteered for another tour just so that he could fly the F-86, which, as Demint describes it, was “a fighter pilot’s dream aircraft”. As the squadron converted to the F-86, it lost a lot of its senior F-80 pilots because they were permitted to return home. “They had a lot of experience,” Demint relates. “Senior lieutenants, captains and majors. So a lot of us junior birdmen got to take over the flights. I became flight commander with less than a year out of pilot training and with about fifty missions or so, and about 350 hours of flight time – much less than ordinarily the case. I would imagine Jack was similarly experienced.”<sup>11</sup>

During June and July the 36th flew heavy bombing and strafe missions against enemy airfields to prevent any possible build-up of forces as cease-fire negotiations took place. Mayo would fly a total of one hundred and twenty five missions from K-13 and was awarded the Distinguished Flying Cross with one Oak Leaf Cluster for “extraordinary achievement while participating in aerial flight” on 16 July 1953. In that action, the squadron not only smashed communist fortifications, but set a record for sorties flown by a squadron in a single day. Following the signing of the truce on 27 July, the 36th FBS remained at Suwon Air Base for fifteen months, during which time it conducted training operations with Mayo serving as operations officer. Bill Demint left the squadron on 29 July, but recently recalled his wartime friend who stayed behind. “From all accounts he acquitted himself very well in his new capacity, so I’m sure he was well equipped to lead the squadron, and on occasion the Group. We talked sometimes about our futures. He was going to apply for test pilot school and of course he made it. I liked Jack – he seemed to be a real nice guy.”<sup>12</sup>

Jack Mayo vacated his Air Force Reserve commission on 11 February 1954 in order to accept an appointment in the Regular Air Force. The following day he was commissioned a second lieutenant in the U.S. Air Force, Service No. 25938A. But because he was already a reserve first lieutenant, he continued to wear that rank.

His next assignment was Alexandria AFB in Louisiana (renamed England AFB the following year) with the 401st Fighter Bomber Group, attached to Tactical Air Command. The F-86 Sabre equipped 401st had only been activated on 8 February 1954 under the command of Walter Benz, recently promoted to full colonel. At the promotion party for Colonel Benz, Mayo was introduced to Jeanie Johnston from the nearby city of Alexandria. They hit it off and soon began dating. That year he applied for and received an appointment to the U.S. Air Force Institute of Technology (AFIT) at Wright-Patterson AFB, Dayton, Ohio, and with this in hand he proposed to Jeanie, who accepted, and they set a wedding date of 21 December. On 27 October he was promoted to captain and would travel under orders to



When Class 56D graduated from the USAF Experimental Flight Test School in April 1957 it contained four officers (all holding the rank of captain) who became Mercury astronaut finalists. From left (all in front row): Gordon Cooper, James Wood, Jack Mayo and Virgil Grissom. Those in the back row are Maj. Joseph Moore, Capt. Richard Gough, Thomas Gillespie (civilian), Capt. Joseph Edwards and Maj. Thomas Rischer III. (Photo: USAF)

Wright-Patterson, returning to Alexandria for the wedding. After they were married he returned to the Dayton base, this time with his new bride.

Prior to graduating from AFIT, Mayo applied for the Air Force's Experimental Flight Test Pilot School (EFTPS) at Edwards AFB, California, and was accepted for Class 56D, which began in September 1956. There was more joy in store, as Jeanie recalled: "We learned before we left Dayton that we were going to have a baby [and] Douglas Bernard Mayo was born on 29 March 1957."<sup>13</sup> Just five days later, on 3 April, the proud new father graduated from the EFTPS along with James Wood, who would be considered for the first astronaut group, and two fellow students from AFIT who would be successful in that competition – Captains Virgil "Gus" Grissom and Gordon Cooper.

On graduating from EFTPS, Mayo went to Eglin AFB in Florida to check out in advanced aircraft such as the F-105 Thunderchief and received his senior pilot rating on 30 October 1958. At Eglin, his flight duties consisted mostly of armament testing, and he was sent on temporary assignments to Italy for NATO, assisting the Fiat G.91 manufacturer in testing various systems on their aircraft.

His friend from that time and fellow Mercury aspirant Alonzo (Lon) Walter, Jr. wrote, "Jack Mayo and I were stationed together as air armament test pilots at Eglin AFB, Florida, in the late 1950s, assigned to the Test Operations Division. After being asked to participate in the Mercury astronaut selection programme and undergoing the testing connected with that, we returned to our jobs at Eglin to await the selection results. As it turned out, we both were temporarily flying out of Nellis AFB, Las Vegas, Nevada, in April 1959, in connection with a huge aerial demonstration billed as the 'World Congress of Flight' when we read of the final Mercury selections in the local newspaper. Later, we each received a nice letter from NASA, attesting to our having been in the group of 32 finalists, and thanking us for undergoing the selection process."<sup>14</sup>

Jeanie Mayo recalls that this was a heart-breaking time for her test pilot husband. "When he received the letter telling him that he had not been selected as one of the seven Mercury astronauts, he was crushed. He wanted that more than anything he had done." However, there would be joy for the couple on 12 December, when they were blessed with a second son, Timothy Patrick Mayo.<sup>15</sup> Unfortunately, thirteen months later, Jack Mayo was killed during a routine armament test over the Gulf of Mexico.

At time of his death, Mayo was attached to ARDC (Air Research Development Command), Air Proving Ground Center (APGC), Eglin AFB, with an accumulated flying time of 2,597 hours, including 2,023 hours in jets.

As related by Lon Walter, he and Jack Mayo had pursued separate career paths since Walter's transfer to Maxwell AFB, Alabama, in order to attend the USAF Air Command and Staff College. "In January 1961, I received a phone call from a friend at Eglin, informing me that Jack had been killed while flying a test mission in an F-105 fighter aircraft. As I understand it, he was to test fire the M-61 'Vulcan' cannon while flying over the Gulf of Mexico. As it turned out, there had been an explosion, and Jack went down with the aircraft."<sup>16</sup>

The Air Force accident report is basically in line with Walter's recollections. At



Jack Mayo was flying a Republic F-105D Thunderchief similar to these aircraft when he was killed during a firing test. (Photo: USAF)

11:05 CST on 11 January 1961, Mayo took off from Eglin in F-105D-5RE (Tail No. 59-1730) on a flight to demonstrate the M-61 guns firing under specified conditions, namely in tight left and right turns at 20,000 feet, with both firings occurring while pulling 5 gs. He would fire the guns again during a 40 degree dive, and then a final time during pull-up. As he steadied his aircraft for the first test he transmitted, "I'll make the first firing in a left turn." This was acknowledged by his flight controller with two clicks of his microphone switch. Mayo continued, "First firing starting at 30." This was acknowledged with two clicks at 11:13:40. Nothing more was heard. Five minutes later the controller transmitted a message 'in the blind' warning of air traffic north-northeast of Mayo's position and suggesting that he fire his gun south and west, but this and subsequent transmissions passed unanswered.<sup>17</sup> The primary cause of the loss of the F-105 was never determined, but possible factors listed in the accident report were a loss of stabilator (stabiliser-elevator), an engine malfunction, a malfunction of the gun or even incapacitation of the pilot.

Air Force and Coast Guard aircraft, helicopters and ships criss-crossed a 3,200-square-mile operating area in the gulf between Fort Walton Beach and Panama City without result, repeatedly hampered by bad weather, but after several days all hope was gone.<sup>18</sup>

"No remains or aircraft wreckage was ever discovered, and [Jack] was declared officially missing after eight days," reflected Jeanie. "A marker to commemorate his death was placed in the National Cemetery in Mobile, Alabama."<sup>19</sup>

In serving his country, Jack Mayo's medals and awards included Distinguished Flying Cross with one Oak Leaf Cluster; Soldiers Medal; Air Medal with two Oak Leaf Clusters, Good Conduct Medal; Korean Service Medal with a trio of Bronze Stars; United Nations Service Medal; National Defense Medal; Republic of Korea Presidential Unit Citation Emblem, and the Air Force Longevity Service Award Ribbon with one Bronze Leaf Cluster.

### PAUL MILLER, JR., USN

Paul Miller Jr. was born on 12 December 1922 in the Philippine Islands, where his parents Commander and Mrs. Miller were stationed with the U.S. Navy. Realising that any future conflict with Japan would primarily be a naval war conducted in the Pacific, the Navy had set up a strategic base on Luzon in Manila Bay and the Millers were one of the resident families. Commander Miller came from the harbour city of Bath, Maine, and was part of a boat-building family. Prior to being stationed in the Philippines he had been serving aboard USS *Nevada* (BB-36) in the naval base at Hampton Roads, Virginia. His wife Olga (née Wrenn), whom he affectionately called "Snooks", was from McCormick, South Carolina. Following the Philippines' posting the young family would return home and live for a time with her parents, David and Martha, in South Carolina.

Little is known of young Paul's childhood and early education, but he did attend Durham High School in Durham, North Carolina, and then enrolled at Gordon Junior College in Barnesville, Georgia, which was a premier military institution. Next was Greenbrier Military College in Lewisburg, Pennsylvania, where he was a member of the post-graduate class of 1940. When he received a presidential appointment to the U.S. Naval Academy his parents moved to Annapolis, Maryland, and remained there for the rest of their lives. Miller enrolled as a midshipman and on graduating in the Class of 1944 became a naval aviator with a 1310 designator. An officer with this designator might get an AQD (Additional Qualification Designator) to enable them to qualify as either a carrier anti-submarine warfare helicopter pilot or fighter pilot.

While he was attending Greenbrier Military College, Miller met Jean Salisbury from Pennsylvania, who had attended Greenbrier Junior College and graduated from Bucknell University, both in Lewisburg, Pennsylvania. They would marry and later adopt two children, Kemp and Pamela.<sup>20</sup>

On 20 August 1951, following another presidential appointment, Miller attended the Navy Test Pilot School at NAS Patuxent River in Maryland as part of Class 7. It was not uncommon to train civilian test pilots for aircraft manufacturers, and in this class of twenty-six there were two students on exchange from Britain's Royal Navy and Royal Air Force as part of a North Atlantic Treaty Organisation (NATO) cross-fertilisation exercise. By amazing coincidence, there was another class member with an almost identical name – Paul R. Miller (also a Jr.) from Baltimore; in this case a non-flying academic who would be more involved in the technical aspects of testing aircraft. Kendrick De Booy from Arlington, Virginia, was also a civilian. Both were

employees of the Flight Test Division at Patuxent. After six months of intense study and scrutiny in one of the most exclusive schools, involving a total of 330 lectures in twelve courses that roughly equated to an aeronautical engineering degree, the class would graduate on 1 February 1952.

The first month took the class from how to use a slide rule up through algebra, trigonometry and physics in integral and differential calculus. The academic tuition included vastly condensed lectures on aerodynamics, thermodynamics, stability and control, reciprocating engines and jet engines, as well as studies of instrumentation, range, fuel consumption and performance of the aircraft. The class work was in the morning. Most afternoons there was flight training in one of nineteen different types of aircraft, ranging from an old PBY Catalina patrol bomber to recent carrier-based fighter jets. Other types assigned to the class were the Grumman F8F-1 Bearcat, the Beech JRB-4 Expeditor, the Fairchild XNQ-1 Experimental Training Aircraft, the Lockheed P2V-1 Neptune, the Grumman F9F-3 Panther, the Douglas AD-2 and the AD-3 Skyraider. At night, they would have to put in up to five hours of extra studies. Following their graduation from NTPS, these aviators would carry out around thirty months of hazardous work determining how fast a plane could fly, how sharply it could turn, how much fuel it required, and whether it could be safely landed on the deck of an aircraft carrier. As well as the pilots, there were also engineers who took part in the academic work and did some flying as observers. In conducting airborne tests, the pilots flew with a small memorandum board strapped to one leg, above the knee, on which they would jot down all the required readings – some of which were only available momentarily – at intervals timed with a stop watch. Other data had to be recorded simultaneously. They might be aided by the use of an automatic camera aimed at the instrument panel. After landing, the test pilot had to turn his notes into mathematical formulas and equations for the report which had to be submitted that same day.

To conclude their course, Class 7 had the aviation equivalent of a field trip. Over a five day period they visited the Glenn L. Martin Company in Baltimore, Maryland; the Aeronautical Laboratory of the National Advisory Committee for Aeronautics at Langley in Virginia; Grumman Aircraft Engineering Corporation in Bethpage, New York; the Pratt & Whitney Aircraft Division (United Aircraft Corporation) in Hartford, Connecticut; and the McDonnell Aircraft Corporation in St. Louis, Missouri.<sup>21</sup>

Following his graduation from the USNTPS, Miller was assigned duty as a test pilot in the Electronics Test Division at Patuxent River. He was subsequently sent to Air Development Squadron Three (VX-3), based at NAS Pomona near Atlantic City, New Jersey. Its principal task was to develop and evaluate tactics and procedures for the new jet fighters that were being released from research and development and put into production for deployment in the U.S. carrier fleet. Miller served under Captain Robert Dosé as the squadron's executive officer for two years starting in December 1955.

In 1956, VX-3 was one of the first East Coast squadrons to obtain an operational version of the subsonic swept-wing F3H-2N Demon fighter. This was delivered by Miller, now with the rank of lieutenant commander. An old hand with the Demon,



Lt. Paul Miller climbs up to the cockpit of the McDonnell XF3H-1 Demon prototype during carrier trials aboard USS *Coral Sea* in October 1953. (Photo: USN)

he had been the Navy's first test pilot in the evaluation of the all-weather jet aboard USS *Coral Sea* (CV-43) in October 1953, when it was designated the XF3H-1. The trials were fairly successful, although Miller noted problems with low visibility in carrier approach and landing. Prototypes of the carrier-based F8U-1 Crusader also reached VX-3 for evaluation in December 1956, and very few problems were noted.<sup>22</sup>

On 6 June 1957 four Navy pilots performed the first carrier-to-carrier, ocean-to-ocean transcontinental flight in history. They departed from the deck of USS *Bon Homme Richard* (CV-31) in San Diego, California, and landed on USS *Saratoga*, off the coast of Florida. The pilots of the two A3D Skywarrior twin-jet bombers were Lt. Cmdrs. John H. Miller and C.C. McBratnie, and the pilots of the F8U-1 Crusader carrier-based day-fighters were Captain Robert G. Dose, then the commanding officer of VX-3, and Lt. Cmdr. Paul Miller, Jr., at that time the squadron's F8U-1 project officer. The non-stop flight was not conceived as part of any specific Navy project; in fact, the Navy had only set things in motion shortly before in order to demonstrate the capabilities of its new aircraft. Dose and Miller had only been given a week in which to prepare for their record-breaking flight.

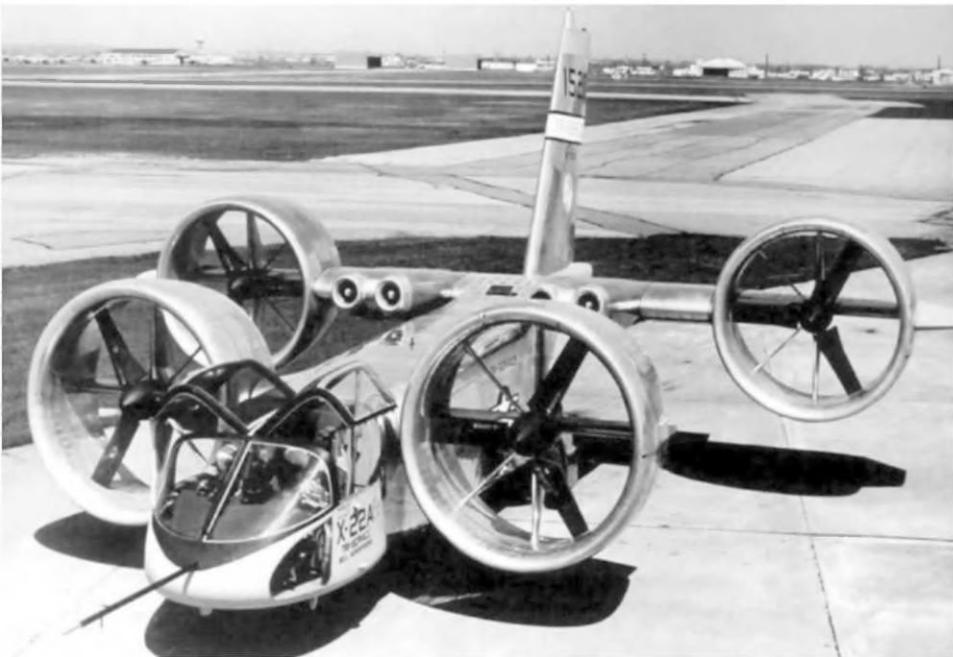


From left: Bob Dosé and Paul Miller together with Lt. Cmdr. John H. Miller and Lt. Cmdr. Charles C. McBratnie, Jr. meet President Eisenhower after their record-breaking flight in 1957. (Photo: USN).

For Captain Dosé, it all began towards the end of May when he received a call from a friend at the office of the Deputy Chief of Naval Operations. He was asked whether he could set up and carry out a tandem flight of the Navy's new supersonic F8U-1 Crusader fighters to coincide with the thirteenth anniversary of D-Day, then just a week away. It was explained that President Eisenhower would be on a two-day visit aboard the *Saratoga* to observe naval manoeuvres off the coast of Jacksonville, Florida. Also on board the carrier that day would be presidential staff, several top government officials, some admirals and members of the press, and it seemed like a good opportunity to impress everyone with a record-breaking, non-stop flight from the Pacific to the Atlantic. Dosé agreed to organise the flight, promising to fly one of the Crusaders himself. While there were plenty of experienced pilots to choose from, Dosé selected his operations officer and regular wingman, Paul Miller, to accompany him on the flight; this would prove to be a good choice.

The two aviators travelled to the Chance Vought factory in Dallas, Texas, where Miller took delivery of a brand-new F8U-1 that had been equipped with an in-flight refuelling probe for the record attempt. Dosé would fly an older Crusader, which had been similarly modified. After a successful practice run to San Diego which included testing in-flight refuelling techniques, the two Crusaders were loaded aboard the *Bon Homme Richard* at NAS Alameda in California, and then the carrier headed south to San Diego.

On 6 June the A3Ds took off first and flew non-stop to Florida without refuelling. They averaged 632 mph on the 2,530-mile flight, and landed on the *Saratoga* after a



The Bell X-22 (Photo: Bell Aircraft Corporation)

journey of four hours and one minute. The F8Us, meanwhile, were refuelled in flight by AJ-2 tankers of VAH-11 operating temporarily out of NAS Dallas. As they made their descent over Florida the two pilots flew beyond Mach 1.0 while setting course for the *Saratoga*, where the President and his entourage were on hand to witness the landing. Dosé and Miller screamed by the ship doing 650 knots, about 100 feet out and just above the level of the deck. As Dosé made his final approach he slowed to 220 knots, raised his 'shoulder' wing for improved lift and lowered the landing gear. "I had about 142 knots very close in and added a lot of power," he later recalled. "I made a big correction near the ramp and caught the number three wire. Paul Miller got aboard OK also. He had a little more time to slow down for his landing."<sup>23</sup>

Immediately upon climbing down onto the carrier's deck Dosé and Miller were mobbed by reporters but they were soon rescued and taken to see Eisenhower, who showed a great deal of interest in their flight. The trip had taken a mere three hours and 28 minutes, during which they achieved an average speed of 730 miles per hour. The record set by Dosé and Miller stands to this day. Once all the fun and formalities were over, they clambered into their F8Us, took off, and headed back to their base in Atlantic City.<sup>24</sup>

The Crusaders and Skywarriors had satisfactorily proved the Navy's ability to shift carrier aircraft from ocean to ocean without any reliance on land bases or the Panama Canal.

On 2 February 1959 Miller was ordered to report to Washington, D.C., where he discovered that he was a candidate for astronaut selection. On the 14th, he attended



Stan Kakol (left) with Paul Miller and the Bell X-22 VTOL aircraft at Niagara Falls in 1967. (Photo courtesy of Pamela Miller Gianola)

medical tests at the Lovelace Clinic in Albuquerque, in the same candidate group as Lt. Charles "Pete" Conrad, Lt. John Mitchell and Lt. Cmdr. Wally Schirra of the Navy, as well as Capt. Jack Mayo and Capt. Alonzo "Lon" Walter of the Air Force. He then underwent further evaluation at Wright-Patterson AFB in the same group as Conrad, Mayo and Walter, along with Navy Lt. Cmdr. Bill Lawrence. But he was not selected.

In August 1962, then squadron-based at Norfolk, Virginia, Miller joined Carrier Air Group 6 aboard *USS Enterprise* (CVA-65) for a Mediterranean cruise with the Sixth Fleet that involved a period of high drama two months later during the Cuban Missile Crisis. Following stand-down orders, the *Enterprise* returned to Virginia in October 1962.

Commander Miller retired from the U.S. Navy on New Year's Eve 1963, at the age of 41. Post-Navy, he became a test pilot with the Bell Aerospace Corporation, based in Rochester, New York. Here, among other projects, he became involved in test-flying the Bell X-22A, a revolutionary two-seat, ducted-fan V/STOL research aircraft, along with the company's Chief Experimental Test Pilot, Stanley Kakol.

Following six months of static tests at Bell's assembly plant in Wheatfield, New York, Kakol and Miller piloted the strange-looking craft on its inaugural ten-minute hover flight on 17 March 1966. Three months later, on 30 June, they completed the aircraft's first STOL (Short Take-Off and Landing) flight. Unfortunately this X-22A had a brief career, being damaged beyond repair and written off on 8 August after a simultaneous failure in its dual hydraulic system which caused the aircraft to impact hard on landing. The crewmembers escaped without injury.<sup>25</sup>

The second Bell X-22A made its maiden flight on 26 January 1967, hovering for 26 minutes at about thirty feet during which it was exercised in azimuth – this being the horizontal angular distance from a reference direction. As before, the pilots were Kakol and Miller. On 9 May that year they made the first public demonstration flight from Niagara Falls International Airport. Questioned later by reporters, they said the X-22A was "easier to fly than a helicopter".<sup>26</sup>

The X-22A would be involved in a flight-test programme with Bell and NASA over two full years, during which time some 220 flights and 110 flying hours were logged.

Around 1970, Miller and his family moved from Annapolis to Port Washington on Long Island, New York, where he had taken up a position at La Guardia Airport with American Airlines. In 1973 they moved to Bedford, Texas, when he was made the airlines' head of Aircraft Maintenance in Dallas.

On 1 February 1977, after a lengthy illness, Paul Miller, Jr. died in Dallas at the age of 54. He was survived at the time by his wife Jean, their adopted children Kemp and Pamela and two grandchildren.

Jean Salisbury Miller passed away at the Lourdes N. McKeen Residence in West Palm Beach, Florida, on 10 January 2005, aged 84. Her funeral notice observed that she was survived by her son, Kemp R. (and Judi) Miller; daughter Pamela (and Jere) Gianola, and grandchildren Erin Miller, Damion Dormeyer, Heather, Justin and Morgan Gianola, as well as by her twin sister, Jane Elliott.<sup>27</sup>

**JOHN R. C. MITCHELL, USN**

Although he never made it into the NASA astronaut corps, retired U.S. Navy Captain John Mitchell nevertheless achieved a little serendipitous notoriety when he featured in Tom Wolfe's best-selling book *The Right Stuff* – even if it was under the alias of Mitch Johnson, a man said to have had "an angel on his shoulder".<sup>28</sup>

Born in Youngstown, Ohio, on 16 August 1929, John Robert Cummings Mitchell was a year old when his family moved to nearby Alliance, where his sister Barbara was born. Later they moved to the Navy town of Quincy, Massachusetts, where baby Stephanie joined the family. Their father, John Henry Mitchell, was a successful sales engineer with a small steel fabrication company which had prospered during the war years. Within a year of the war ending, however, business contracts and income plummeted and his father was laid off. With no job prospects, he and his Azores-born wife Maria (née Viera) were forced to sell their home and move in with his parents, John Robert and Ellen (née Laughlin) Mitchell, who owned a large, two-storey apartment building in nearby North Quincy. Their new waterfront home was across Quincy Bay from NAS Squantum, with a front row view of seaplane activity which four-year-old John found enthralling. Blessed with a natural gift for drawing, he recalls sketching and building models of airplanes from about the age of eight. Downtown, young naval aviators in uniform and with Wings of Gold pinned to their chest stood out as special to him.

NAS Squantum doubled as a private airport, and it was there that Mitchell, as a 13th birthday present, experienced his first (and second) flight. Thrilled by his first, fifteen-minute flight in a closed cabin aircraft he prevailed upon his father to allow him a second flight in an open cockpit, two-seat biplane trainer that he thinks may have been a Stearman N3S. His future, it seemed, was already locked in.

Mitchell began his formal education at Huntington Elementary School and later Central Junior High School. At Quincy High School he found release in athletics and academics and was voted president of the senior class. However, the family was still mired in dire financial straits. Even though he and his sister worked part-time jobs to help to support the family, he reckoned his dreams of a college education were over. Then a friend's relative, a colonel in the Marine Corps, suggested an existing reserve programme. It meant enlisting in the Marine Corps' inactive reserve, participating in monthly drills for a year, attending a two-week "mini boot camp", passing a general education exam and high school graduation. In June 1947, he graduated high school and joined the Marine Corps. Completing all the requirements as a Private First Class (PFC) he was appointed to the USNA as a midshipman in June 1948.

Three months after graduating from Annapolis in June 1952, Mitchell undertook flight training. In December 1953 he received his wings as a naval aviator and was sent to NAS Kingsville, Texas, for jet training. Upon completing this in the spring of 1954, he was assigned to VF-193 ("Ghostriders") – a jet night fighter squadron – at NAS Moffett Field south of San Francisco, flying F2H-3 Banshees off the straight-deck carrier USS *Oriskany* (CV-34). The squadron was in the West Pacific when he arrived in California, so he was ordered to Fleet All-Weather Training Unit Pacific at NAS Barbers Point on the Hawaiian island of Oahu for an instrument course in



John Mitchell (bottom) standing on the flight deck beneath an F-4 Phantom. (Photo courtesy of John Mitchell)

jets, followed by extensive training in radar-equipped F6F-5N Hellcat night fighters and the jet-powered F3D-2T2 Skyknights. Prior to this class, only aviators having prior fleet experience had been trained for night intercept squadrons. He returned to NAS Moffett Field in June 1954 to join his squadron, where the operations officer was Lt. Alan Shepard and the administration officer was Lt. (jg) William Lawrence.

Assigned as Shepard's wingman, Mitchell soon learned to expect the unexpected and came to admire the way Shepard handled himself. "He had an aura of confidence that was unbelievable," he told Neal Thompson for the biography of Shepard, *Light This Candle*. "Whether it was in a roomful of admirals or in mixed company, he just exuded it. And that confidence carried into his flying. He was fearless."<sup>29</sup>

One thing was chasing at Shepard – he was ineligible to join the Navy's Blue Angels demonstration team. This followed the Navy's decision that year to use the aerobatic team as a recruitment device, and only to permit naval aviation cadets to become Blue Angels. He therefore decided to form his own aerobatic group within the Ghostriders, recruiting John Mitchell, Bill Lawrence and one of either Wendell Smith or Preston Luke to fly with him. As Lawrence recalled in his autobiography, *Tennessee Patriot*, "We'd complete the assigned portion of the mission according to the schedule and then use the remaining time for aerobatics. We flew in stair-step and starboard echelon formations but spent considerable time in the diamond. From my slot position in the diamond, slightly below and right behind Shepard, who led from its apex, I had an excellent perspective and could coach Mitchell and Luke or close in or loosen up and to polish the geometry of our manoeuvres." Lawrence doesn't recall who came up with the name, but they became known as the Mangy Angels. "What a marvellous experience, flying with Alan Shepard," Lawrence wrote. "We executed loops, wingovers, and aileron [barrel] rolls and got pretty good at it."<sup>30</sup>

The incident for which John Mitchell received the alias Mitch Johnson from Tom Wolfe occurred on 22 June 1955, while he was coming in for a routine night landing on USS *Oriskany* following a night Combat Air Patrol mission practicing intercepts over the Sea of Japan. In the last moments of the approach his Banshee began to sink, even with full power, so he began a right turn to attempt to clear the ship and avoid the landing signal officer's platform. But he was too low and too late and hit the fantail at the ship's stern. There was an explosion, and the Banshee aft of the cockpit fell into the sea in flames. Amazingly Mitchell survived, suffering only minor cuts and bruises. The canopy was gone, so he unbuckled his harness and scrambled out onto the hangar deck, below the level of the flight deck. Five sailors sleeping on the fantail had been injured and he helped carry one on a stretcher to sick bay. There the doctor checked him out and asked if he had called the ready room to let them know that he was uninjured. Meanwhile, those on the bridge who had witnessed the impact and explosion reckoned there was no way that he could have survived, so it came as a considerable shock when someone claiming to be Mitchell called on the ship's phone. The fellow pilot who took the call told him in outrage that he was a sick person, and another officer grabbed the phone and delivered a tirade of profanity before Mitchell was able to convince them that he had actually survived

the crash. The next morning he was shown the remains of his Banshee – the cockpit section, wedged between a large vertical flight deck support and one of two massive steel cylinders which had once housed anti-aircraft guns. The ample dimensions of the obstacles had permitted the nose of the fighter to pass between them and stop short of the hangar bay. It was something of a miracle. Had Mitchell hit the stern anywhere but in perfect alignment with the cylinder and flight deck support, he would have perished.

Bill Lawrence had landed just ahead of Mitchell and he felt he had seen the last of his Mangy Angels colleague. As he later wrote, “I’ve always wondered if anyone in the annals of naval aviation ever pulled a disappearing act like John Mitchell’s.”<sup>31</sup>

Returning from his first deployment on the *Oriskany*, Mitchell found the *entire* squadron roster had received orders to other duty stations. After being promoted to lieutenant in early 1957, he would depart VF-193 in Hong Kong near the end of his second cruise aboard the angled-deck carrier USS *Yorktown* (CV-10).

On 13 July 1957 he married Kaye Fratus better known as Billie a girl that he had known for some years whilst teenagers. Married in Mountain View, California, they would eventually have five children: Joanne, twins John and Harold, Dana and Ardis. Following the wedding they drove cross-country to Maryland and he reported to NAS Patuxent River for Class 19 at the Naval Test Pilot School. After qualifying, he was assigned to the Flight Test Division “as assistant to everything: Operations, Maintenance, Supply, Safety and Trial Lawyer.” A year later he was assigned to the Carrier Suitability Branch as the F8 project pilot. The assignment included an F8U-1 and F8U-2 plus six maintenance technicians on station from Chance Vought Aircraft to keep them flying.

In February 1959 he went to Washington D.C. and found that he was a candidate for astronaut selection, but was not chosen. His next assignment was Flight Test for



John Mitchell, circa 1960. (Photo courtesy of John Mitchell)

VF-74 ("Bedevilers") in the summer of 1960. The squadron was flying F4D Skyrays and had been chosen for the fleet introduction of the F4H Phantom. It would become the first squadron to deploy the F4 aboard USS *Forrestal* (CV-59).

Promoted early, Lieutenant Commander Mitchell next reported to VF-101 ("Grim Reapers"), Det. Alpha, at NAS Oceana, Virginia. The unit's function was to provide future radar intercept officers with classroom and in-flight training in all-weather and night interceptors. In February 1961 he transferred to VF-74. After extensive training, including seven weeks of operations in the Caribbean, in August 1962 this squadron made the first extended deployment with the F4H Phantom. Meanwhile, on 18 April 1962, NASA had announced that it would accept applications for a second group of astronaut trainees, and Mitchell was invited to put his name forward. The reporting date coincided with USS *Forrestal*'s departure from Norfolk, but he was granted leave to attend. After the evaluation with NASA he returned to Oceana for a refresher instrument training course and rejoined his squadron in Naples, Italy, the ship's first port of call. By the time the ship pulled into port, his second letter of rejection from NASA had already arrived.

In February 1964 Mitchell accepted a posting as Flag Lieutenant and Aide to VADM Paul H. Ramsey, Commander Naval Air Forces, Atlantic Fleet. He admired the man, "One of the last WW-II Navy Cross winners; cigar-smoking, good-natured, hard-drinking fighter pilots (with three stars). Besides all that he was a great boss and loved to travel and meet people at all the worldwide shore-based facilities over which he presided."

In the fall of 1964 Mitchell screened early for squadron command. Then, in May 1965 he left his staff position to obtain F4 refresher training with VF-101 at NAS Key West, Florida, before reporting to VF-33 ("Tarsiers") at NAS Oceana. Not long after joining his new squadron he received a third invitation from NASA, this time to apply for their fifth astronaut group, but he declined the invitation. In the summer of 1967 he reported to the U.S. Army War College in Carlisle, Pennsylvania, for a year of international studies. Aiming to return to research and development, he joined the staff of Task Force 77 for a one-year unaccompanied tour in the Gulf of Tonkin that involved six months of carrier duty on USS *Kitty Hawk* (CV-63) and then six months on USS *Constellation* (CV-64) as the staff anti-air warfare officer. On finishing this tour in late summer 1969, he returned to San Diego. His next post was Commander, Carrier Air Wing 2 (CVW-2), which would include six months of travel and training to become qualified in the A6 Intruder and A7 Corsair II, as well as the F4's future deployment on USS *Ranger* (CV-61). Then a Pacific Fleet staff member alerted him to expect a change of orders. Commander, Naval Air Force Pacific Fleet confirmed his tasking as Commander, Carrier Air Wing 9 (CVW-9), with a brief account of the wing's schedule starting at NAS Fallon, Nevada, in the late fall of 1969, a six-week Caribbean tour on board USS *America* (CV-66) early in the new year (with fellow Mercury astronaut candidate Captain Tom Hayward) and, in April, a seven-month deployment to Vietnam. He was to report to CVW-9 after a month-long F4 refresher qualification with VF-121 ("Pacemakers") at NAS Miramar, with day/night catapult launches and landings on an Atlantic Fleet carrier.

Just before Christmas 1969 a catastrophic event struck the F4 squadrons based at

Miramar as a result of an F8 making an emergency landing. As the pilot crossed the threshold he lost control of his airplane and safely ejected at the eastern approach to the main runway. The pilotless Crusader veered off to the right and flew into an open hangar, destroying or severely damaging several F4Js. Even worse, several squadron maintenance personnel from CVW-9 fighter squadrons VF-92 and VF-96 were killed or injured. The loss of maintenance personnel and F4Js was profound, especially with just two weeks remaining before the wing was scheduled to depart NAS Miramar for the *America* to conduct six weeks of wartime exercises. But CVW-9 rallied, and managed to fly to the Caribbean in time to join the *America* in the Guantanamo Bay training exercise operating area, returning to home base late February 1970. In April the various elements of the wing rejoined the ship either at Norfolk, Virginia, where it had been undergoing last-minute preparations prior to sailing to the Philippines on an eight-month deployment, or after it had deployed and was heading south. Once it was on station in the Gulf of Tonkin, Mitchell conducted day and night combat sorties in the A7E and F4J and some day flights in the A6 from May to November 1970.

During this time Mitchell also qualified as Officer of the Deck Underway, which meant an officer qualified to manoeuvre the aircraft carrier. As he explained, "As Air Wing Officers, we were instructed in conducting approaches alongside supply ships for underway replenishment (unrep). Once alongside, the OOD (Conning Officer) maintains position – speed and separation distance – from the supply ships. Typically an aircraft carrier under combat flying conditions unreps every four nights for several hours."

The *America* arrived back in San Diego in time for Christmas. In January 1971, Mitchell reported to the Commander, Naval Air Force Pacific Fleet as the Air Wing Training officer. Promoted to captain in the spring of 1972, his next assignment was in the Pentagon as F14-A/AWG-9 Program Coordinator, Office of the Vice Chief of Naval Operations (Air). The Phoenix missile of the F-14 Tomcat was completing its research, development, test and evaluation at NAS Miramar. The Phoenix received a lot of Congressional attention owing to its complexity and cost. As part of his duties, Mitchell conducted briefings with the Chief of Navy Military Sales for attachés in the U.S., Europe and the Middle East. He finally flew an F14A himself in March 1973 in order to answer the frequent questions "Have you flown it?" and "What's it like?" He later described his duty at the Pentagon working with such a controversial yet highly successful programme as "a priceless experience".

In June 1974, he was given command of USS *Sylvania* (AFS-2), a Mars-class combat stores ship departing Norfolk early August for a seven-month Mediterranean duty with the Sixth Fleet. On returning to Norfolk in April 1975 the ship went into a dry dock at the naval shipyard and then to Newport News, Virginia, for a six-month overhaul. Halfway through this, Captain Mitchell was given a fresh assignment to the carrier USS *John F. Kennedy* (CV-67). He would join the ship off the coast of Sicily in November, taking over command from Captain William Gureck on 29 November.

A week prior to the change of command, the guided missile cruiser USS *Belknap* (CG-26) collided with the carrier during night flight operations in heavy weather off

the coast of Sicily. Seven men died on the *Belknap*, which sustained major damage, putting her out of commission for over three years. The *Kennedy* was damaged port-side amidships, but flight operations recommenced within a day with waist catapults 3 and 4 and the Fresnel lens optical landing system out of commission for the rest of the three-month deployment. The overhaul was completed in the spring of 1976, and after a period of Air Wing refresher training the *Kennedy* received orders for a three-month cruise to the North Atlantic. The ship was involved in another collision while performing a nighttime underway replenishment north of Scotland on 14 September 1976, this time with the destroyer USS *Bordelon* (DD-881), which had experienced steering difficulties. The *Bordelon* suffered extensive topside damage and was towed to the port of Plymouth in England, where it was prepared for transit by barge to the U.S. for decommissioning and salvage disposition. The carrier sustained only minor damage and returned home two months later. The "Big John", as she was known, left Norfolk on 15 January 1977 bound for the Mediterranean, where she became the first American aircraft carrier to visit Egypt for several decades.

On 14 May 1977, Mitchell handed the *Kennedy* over to Captain Jerry Tuttle and began a second Pentagon tour, this time as Deputy, Carrier Programs Office. Later in the year he divorced his first wife and married Janellen McHugh – a friend of many years acquaintance who had three children of her own: John, Katherine and Marcella. In late 1977 and 1978, the Carrier Programs Office was a focal point for participating in activities by the Pentagon and the Center for Naval Analyses to counter President Jimmy Carter's efforts to cancel production of a second nuclear-powered carrier. The ongoing controversy over the cost of nuclear carriers meant none were funded by the Ford administration, while President Carter vetoed the FY 1977 defence bill, asking that the \$2 billion appropriated for building USS *Theodore Roosevelt* (CVN-71) be reassigned to address other defence needs. The veto went through, supported by Congress, but was overturned in 1980.

In an article titled "In Search of Real Leaders" in the January 2001 issue of the U.S. Naval Institute's *Proceedings* magazine, Captain James F. Kelly, Jr. declared, "One is not a leader by virtue of rank, nor does one inherit the 'mantle of leadership' merely by assuming command or other positions of authority. To be a leader, one must practice leadership behaviours." He added, "Professional dissent at the risk of one's career has been a hallmark of some of the Navy's greatest heroes and leaders." One example he cites is that of Captain John R. C. Mitchell:

In March of 1978, Adm. Tom Moorer, then retired from his last position as Chairman of the Joint Chiefs of Staff, was asked to testify before both the House and Senate with his views on the nuclear-powered carrier (CVN) program. President Jimmy Carter and his Secretary of the Navy had made very clear their opposition to that program and Navy Secretary Claytor had commissioned a Navy study to support the substitution of a smaller, conventionally-powered carrier (CVV) of 60,000 tons or even smaller. A Navy-sponsored [study] reached conclusions favouring the administration's desires based on a series of assumptions that had to be contested effectively if the 'big' carrier program was to survive.

Knowledge of his part in the defeat of President Carter's program cost Captain John Mitchell the stars that he should have had. But without him, we might not have had the nuclear-powered super carriers USS *Theodore Roosevelt*, *Lincoln* or *Washington*.<sup>32</sup>

John Mitchell retired from the Navy in December 1978 with awards including the Bronze Star (CVW-9), Meritorious Service Medal, Strike Warfare (with four stars), National Defense Service Medal (with one star), China Service Medal, Meritorious Unit Commendation (with one star), Armed Forces Expeditionary Medal (with two stars), and the Vietnam Service Medal (with five stars).

His early civilian employment was involved with companies dealing in maritime training for the Navy. He eventually returned to the Virginia Beach area and joined a small family-owned shipyard that had won a contract for the phased maintenance of supply ships. After a decade of intense work effort he joined his second wife Jancy in a small real estate firm owned by a former naval aviator, where they still work as real estate agents. Their active lifestyle includes leisurely cruises to the Caribbean as well as trips to Arizona and Florida.<sup>33</sup>

### **JOHN RALSTON, JR., USN**

Future test pilot and astronaut aspirant John Ralston, Jr. was born at St. Joseph's Hospital in Houston, Texas, on 20 November 1925 to Katherine and John Ralston. His father, who had been born and raised in Galveston, was a display manager with Levy Brothers Dry Goods on Main Street, in that city. He, in turn, was the son of Charles Gilmore Ralston, who had emigrated from England and married a Texan girl, Annie Shean.

Unfortunately little is known of Ralston's early life, as he passed away in 2003 and floodwaters from Hurricane Ike raged through the family's Clear Lake home in 2008, sweeping away or destroying most of his records, photos and memorabilia. It is known that he graduated from Houston's Lamar High School and got his bachelor's degree in mechanical engineering from the University of Illinois. According to his daughter Katie, he was short with red hair, causing him to be nicknamed throughout his life as "Red Ralston" or "Red Rocket". Much later in life he would complete his MBA (Master of Business Administration) at the University of Houston.

His long and distinguished military began at the age of seventeen when he applied for and was accepted into the U.S. Navy's V-5 flight preparatory school programme. After later graduating from the Naval Academy at Annapolis he served the mandatory shipboard duty for two years prior to receiving flight training.

By 1950, six small Basic Training Unit (BTU) squadrons had been established by the Navy to provide initial flight training for future aviators. Ralston attended BTU-1 at the Naval Auxiliary Air Station at Whiting Field, Florida, in April of that year to complete stages A through C. Like other Naval Aviation Cadets he learned his basic flying on the North American SNJ, the Navy version of the T-6 Texan. Then it



As a youth, John Ralston became a marksman as an NRA Junior Club Member. Later, in the Navy, he was one of less than 20 men to receive distinguished medals in both rifle and pistol marksmanship. (Photo courtesy of Patty Ralston Davis)



Ralston completed Basic Carrier Landing Qualifications (six landings) aboard USS *Wright* (CVL-49) off Pensacola on 9 December 1950 in SNJ 3-C No. 51898. (Photo: USN courtesy of Patty Ralston Davis)

was on to stages D and E (BTU-2) at nearby Corry Field, stages F through J at BTU-3 at Saufley Field, and a return to Corry Field for stages K and L in CQTU-4 (Carrier Qualification Training Unit 4); the trainees operating SNJ-5C aircraft to refine their skills in navigation and instrument flying. They then moved on to Advanced Training Unit 2 (ATU-2) at Cabaniss Field, just outside Corpus Christi, Texas, to learn to fly larger and more powerful aircraft.

Returning to CQTU-4A, Ralston's preparation for advanced carrier qualification required him to practice dozens of simulated carrier landings on ground markings at Corry Field in a Grumman F6F Hellcat. He then had to fly from, and land on, the deck of an actual carrier, in this case USS *Monterey* (CVL-26). To qualify as a Navy aviator he had to achieve twelve successful carrier landings within a two-day period. On 27 July 1951 he received his coveted Wings of Gold and was designated Naval Aviator No. T1634 having accrued a total of 345.8 hours accumulated flight time. After JTU-1 (Jet Transition Unit 1) at Kingsville in Texas, he was assigned to Fighter Squadron VF-721 (then "Starbusters" and later "Iron Angels") in December 1951, flying F9F-2B Panther carrier-based jet. It was the same type of aircraft flown extensively by future astronaut Neil Armstrong during the Korean War.

On 19 April 1952 Ralston married Rebecca (Becky) Vann, daughter of Grien and Carlota Vann, at the Corpus Christi Cathedral. Wedding guests were his squadron mates Lt. (jg) C. O. Glisson, Jr., Lt. (jg) R. J. Peterson, and Lt. (jg) W. D. McFarlane, all of whom were members of VF-721. After honeymooning in New Orleans, the Ralstons returned to his squadron's duty station in San Diego, California.<sup>34</sup>

On 11 August 1952 the squadron departed for Korea on USS *Kearsarge* (CV-33) to operate with Task Force 77 off the east coast of the peninsula. Weather permitting, air operations were carried out daily while the carrier was on the line. Ralston lost one of his good friends on 1 November 1952; fellow squadron pilot Lt. Charles Glisson, who had attended Ralston's wedding. Glisson was the pilot of an F9F-2 Panther that was part of a strike force supporting troops on the front line near Chon-Chon, North Korea. He radioed that his engine had begun running erratically, and proceeded to head towards the east coast. His aircraft crashed into the sea about ten miles from the shore, near the K-50 base of Sokcho-Ri. He was officially listed as having been killed in action the following day.<sup>35</sup>

The squadron was redesignated VF-141 on 4 February 1953, and ten days later Ralston made the 30,000th aircraft landing on the deck of the *Kearsarge* before the ship left the conflict zone. By that time he had flown fifty-one combat missions and twenty defensive missions. In November he was transferred to NAS Corpus Christi, Texas, where, as an Instrument Flight Instructor at the U.S. Naval All-Weather Flight and Training School, he instructed pilots in instrument flying on single-engine and multi-engine aircraft. The following year, attached to the Fleet All-Weather Training Unit (Pacific) at San Diego, he and Rebecca were living in Coronado, California with their daughter Martita (Marta). In January 1955 he went to Valdosta, Georgia, as part of the Navy-Air Force Exchange programme. In serving as a senior naval exchange officer with the 3350th Flying Training Wing, based at Moody AFB, he was able to fly some of the hottest aircraft in the sky, including the

Northrop F-89 Scorpion and the F-94 Starfire interceptors. That year Becky gave birth to Katherine Ruth (Katie) Ralston.

Recommended for an appointment to Test Pilot School at the U.S. Naval Air Test Center (NATC) in Patuxent River, Maryland, Lt. Ralston reported on 5 July 1956 as a member of Class 17. Another member of that class was future X-15 pilot, Lt. Cmdr. Forrest S. ("Pete") Petersen. Following graduation on 1 February 1957, he served in the Electronic Test Division at NATC, test flying almost every type of naval aircraft, including single-engine and multi-engine jet-propelled and propeller-driven fighters, attack planes, patrol bombers, transports and sea planes. Another daughter, Patricia Anne (Patty), was born on 22 July 1957. Eight days later, Ralston skilfully survived a flame-out while test-flying an F11F-3 Tigercat. On 9 December 1958 he surpassed 2,000 jet flying hours in an F8U-1 Crusader.

And then in early 1959 Ralston was ordered to report to the Pentagon for a secret briefing, which would turn out to be the beginning of his quest to become a Mercury astronaut. Although he made it into the arena of the final 32 candidates, he was not selected.

Detached from the Electronics Test Division on 15 July 1959, Ralston reported to Heavy Attack Squadron VAII-3 at NAS Sanford, Florida, to attend Class RP-8-59 of the Plane Commander Course for the A3D Skyraider, from which he graduated on 18 December. He then reported to VAH-5, which sailed with USS *Forrestal* (CVA-59) on 28 January 1960. On 15 February he was reassigned to VAII-9 on USS *Saratoga* (CVA-60). This squadron, which called themselves "Hoot Owls" and flew the A3D, was part of Carrier Air Wing Three (CVW-3).

One night Lt. Cmdr. Ralston was involved in a potentially fatal landing accident on the *Saratoga*, ploughing into the ship's safety net after a particularly hazardous landing under extreme conditions. According to Jack Edwards, a *Saratoga* yeoman who helped with the accident report, this took place "in a night approach during a rainstorm. He made a few passes and had to go into the barricade... a wall made out of nylon straps stretched across the flight deck. He caught the barricade and stopped 14 feet from going over the side."<sup>36</sup>

A 2003 tribute to Ralston in the *Houston Chronicle* says that he "made aviation history by successfully completing the first unassisted moving night carrier landing." The article added that he had earlier proved himself an expert marksman; one of only seventeen men in the history of the Navy to receive double distinguished medals in Marksmanship for both Rifle and Pistol.<sup>37</sup>

On 22 August 1960 Ralston would participate in a second cruise on the *Saratoga*, which was deployed as part of the Sixth Fleet. During this tour of duty, he and Becky took a lengthy, well-deserved break in Spain.

On 10 September 1961, Ralston was detached from VAII-9 and following a brief Temporary Additional Duty he received orders to report on 4 October 1961 to Fleet Intelligence Center, U.S. Naval Forces, Europe, which was at NAS Port Lyautey in Morocco. After two years there he returned to New York and on 25 November 1963 was assigned to the Bureau of Weapons, which was responsible for the procurement and support of naval aircraft and aerial weapons. Over the next fifteen months he was a Navy representative to the McDonnell Aircraft Corporation in St. Louis, Missouri.



Cmdr. John Ralston, Jr., USN. (Photo courtesy of Patty Ralston Davis)



In 1968, Ralston retired from the U.S. Navy. That year he was photographed with daughters Patty (left) and Katie. (Photo courtesy of Patty Ralston Davis)

Commander Ralston's final assignment in the Navy involved a return to duties at the Naval Air Test Center, reporting in as its commander on 20 February 1965. Two years later, on 30 June 1967, he retired from active service. By then, he had accrued 4,282 total flying hours; 2,782 of which were in jets, 1,496 in single-prop and twin-prop aircraft, and five hours in rotary wing aircraft. He had also made 255 carrier arrested landings.

In 1968 Ralston returned to his home city of Houston, first taking a position with General Electric and later in the local oil and gas industry. He had many post-service involvements with several organisations, most notably the fraternal Order of the Quiet Birdmen, the Power Squadron (boating safety), and as an Endowment Member of the National Rifle Association (NRA).

Commander John Ralston died on 8 August 2003 in the Christus St. John Hospital in Houston, Texas. He was survived by Becky, his wife of fifty-two years, daughters Marta Clegg (husband Samuel), Katie Ralston and Patty Davis (husband Michael), six grandchildren and a great-grandchild.<sup>38</sup>

His daughter Katie told the author that her father "and his fellow Mercury Seven candidates were the elite of an already elite group, test pilots; men who regularly put their lives on the line in the course of a day's work. They were truly pioneers. I am very proud of him and them."<sup>39</sup>

### ROBERT E. SOLLIDAY, USMC

Robert Edwin Solliday was born in Philadelphia, Pennsylvania, on 4 December 1931, the son of Grace and Harry Solliday and later an older brother to Gordon. His middle name was derived from paternal great-grandfather Edwin Solliday, an engineer and civil war veteran. Their mother was a homemaker and stenographer who was said to have made a great shoo-fly pie, while their father was a salesman for GE light bulbs. Grace and Harry were life-long members of the First Mennonite Church, and would reside in the same Philadelphia home for over thirty years.

Solliday attended Frankford High School in Philadelphia, and for recreation he enjoyed hunting, swimming, fishing, ice skating, bicycle acrobatics and sailing – in fact almost all sports. He was a varsity letterman in high school and earned a football scholarship to Lafayette College in Easton, Pennsylvania. Reading about the aviator Charles Lindbergh inspired him to take up flying lessons, and at the age of seventeen gained his private pilot's licence. For a time he worked at a flying school run by the Flying Dutchman Air Service in nearby Somerton, before joining the U.S. Navy. He began his training at NAS Pensacola, Florida, in January 1952, and completed it the following May. While there, he met a young woman named Charlene on the Jersey Shore. She had graduated with an undergraduate degree in music and had a master's in music education from the University of Pennsylvania. As he explained it, she was the best-looking and smartest girl on the beach. Having earned his aviator's wings in May 1953, Solliday was commissioned into the U.S. Marine Corps. Three days later, he and Charlene were married. That was a Saturday

and the following day he was transferred to NAS Corpus Christi, Texas, for advanced jet training.

2nd Lt. Solliday's first assignment was to the Marine Corps Air Station at Cherry Point, North Carolina, as a member of Marine Night Fighter Squadron VMF(N)-531 ("Gray Ghosts"), part of the 2nd Marine Air Wing. Upon the outbreak of the Korean War the squadron had trained pilots and airborne interception operators specifically for replacement drafts, as well to fulfil Fleet Marine Force commitments flying the squadron's first jet fighter, the Douglas F3D Skyknight. But then the squadron was itself deployed to Korea to escort B-29 Superfortress bombers on night-time raids over North Korea, which is what Solliday did. During his brief tour in South Korea, he was based at Air Stations K-6 Pyongteak and K-3 Pohang. Following the truce of 27 July 1953, Solliday accepted a regular Marine Corps commission, was promoted to first lieutenant, and transferred to VMA-212 ("Devil Cats"), at that time based at the Marine Corps Air Station in Kaneohe, Hawaii. While there, the family gained its first child, a daughter called Robin. The next assignment was to Aircraft Engineering Squadron 12 (AES-12) at Marine Corps Air Station Quantico, Virginia, attached to Aviation Engineering and Demonstration Squadron "Topper 2" which specialised in close air support. In 1957 their second daughter Cynthia was born.

In 1958, by now promoted to captain, Solliday attended Class 20 of the Naval Test Pilot School. His fellow classmates included future astronauts Wally Schirra, Pete Conrad and Jim Lovell.

Although they faced a daunting schedule of academic studies, flight performance and reporting there was some time for relaxation. The members of Class 20 and their families spent many weekends together on the Patuxent River. One favourite pastime was waterskiing, as Bob and Charlene owned a 17-foot Crosby Ski Boat – their first boat. On one occasion, Bob and Pete Conrad came up with the idea of riding a large saucer made out of wood that they named a "jitterboard". They rode this while being towed behind the boat, and to add to the excitement they sometimes sat on a wooden stool atop the jitterboard and performed stunts. With a pilot's competitive spirit and go-fast nature, Solliday and Conrad would start out on water skis and then have the driver push the throttle to high gear. Once a suitable speed was obtained they would jump out of the skis and ski barefoot. "Which was an exhilarating experience until you fell or let go of the rope," Solliday observed, "because it is a hard fall when you hit the water."

After Class 20 graduated on 1 August 1958, Solliday continued at the Flight Test Division of the Naval Air Station, in the Flying Qualities and Performance Branch. Among the aircraft that he was assigned to fly in this role was the supersonic, long-range all-weather interceptor, the McDonnell F4J Phantom II.

It was while Solliday was there that he was ordered to Washington in early 1959 for a top secret briefing that turned out to be about the selection of the nation's first astronauts. While there, he made the acquaintance of fellow naval aviator and future Mercury astronaut Scott Carpenter.

"We had taken a break for lunch at one of the Pentagon's dining rooms and Scott sat down next to me at the table. He introduced himself and stated he was from Class

13 at Pax River," Solliday explained. The two men became immersed in discussions on the various aircraft they had flown, and discovered that they were actually distant cousins. This was the start of a life-long friendship. As they talked, Solliday pointed out to Carpenter that three other members of his own Class 20 were present – Wally Schirra, Jim Lovell and Pete Conrad. For his part, Carpenter introduced Solliday to Major John Glenn, a fellow Marine Corps officer. They were both impressed by the transcontinental speed record that Glenn had set nineteen months earlier in an F8U Crusader.

Aged twenty-seven, Solliday was the youngest participant in the selection process. He was one of the thirty-two finalists but failed to make the final cut.

"It's a pity he missed out," Scott Carpenter told the author in 2010. "He was the sort of guy I wanted to spend my career with. His performance and personality were first rate. I really bonded with him when he was not selected."<sup>40</sup>

Solliday remained at the Patuxent River Flight Test Center, and later in 1959 he and Charlene celebrated the birth of their son, Robert E. Solliday, Jr. By now he was the Flight Test Project Officer for the Lockheed Martin KC-130F, which was then known by its Navy designation of GV-1. It made its first test flight in January 1960. Essentially an extended-range C-130 Hercules, it was to undertake aerial refuelling missions in support of Marine Corps aircraft. He was also involved in flight-testing the Grumman YAO-1 twin-turboprop Mohawk. Until 1961 he was project officer for the innovative single-seat AO-1 Inflatoplane (GA-468), an experimental, 19-foot inflatable rubber aircraft developed by the Goodyear Aircraft Company with a two-cycle, 40-horsepower engine. This was designed as a rescue vehicle that could be dropped in a hardened container behind enemy lines. It was fully inflatable to 25 psi in about five minutes, and when loaded with 20 gallons of fuel it had a range of almost 400 miles. However, the U.S. Army, which had sponsored the inflatable rescue craft, cancelled the project when it could not find a "valid military use for an aircraft that could be brought down by a well-aimed bow and arrow".<sup>41</sup>

Although Solliday had not been chosen as a Mercury astronaut he went on to be involved in the space programme. He served as a Capsule Communicator Assistant on two Mercury missions at Vandenberg AFB in California, as well as in Guaymas, Mexico, for Scott Carpenter's mission in May 1962. He was also regularly involved in performing human capability tests in accelerated fields for NASA at the Navy's centrifuge facility in Johnsville, Pennsylvania.

Solliday next attended the Naval Postgraduate School in Monterey, California, from 1961–64. While he was a student there, he actually taught two flying qualities and performance courses. He also spent time at NAS Monterey, flying the North American T2J-1 Buckeye, an intermediate multi-stage jet training aircraft mostly used for proficiency flying. It was while flying a T2J that he made his first ejection from an aircraft. When the aircraft's fuel system was crippled by a malfunction, he and the other pilot ejected. According to Solliday, he "landed in a large tree in the back yard of a house. A boy had been playing in the yard and yelled for his mom." Fortunately, both pilots walked away with only a few minor cuts and bruises.

Having missed out on the first astronaut group, Solliday applied for the second in 1962, a process he described as "easier, and more sensible". He was in the thirty-two



On the day he was promoted to the rank of major at Point Mugu, California, Bob Solliday was surrounded by his family. On left of photo, Charlene and Cynthia. On the right, Robert Jr. and Robin. (Photo courtesy of Robin Solliday Heyne).

finalists, but once again was not one of those selected. Undeterred, he tried again the following year without result.

In 1964 Solliday was assigned to the Naval Air Station at Atsugi on the Japanese island of Honshu. He served as executive officer of Headquarters and Maintenance Squadron (H&MS) 11, which mostly flew F-4 Phantom jets and the Douglas C-117 twin-engine cargo aircraft. In April 1965 the squadron was deployed to Da Nang in Vietnam as part of Marine Air Group (MAG) 11, in support of counter-insurgency operations.

Returning to the United States and living in Camarillo, California, Solliday was stationed at the Naval Missile Center (NAVMISCEN), Point Mugu, where he served from August 1965 to April 1969, first as the Air-to-Surface Program Officer, then as head of the Fleet Weapons Engineering Department. Here he flew the A-7 Corsair II, a carrier-based subsonic light attack jet introduced to replace the A-4 Skyhawk. The A-7 was the first jet aircraft to carry such a large combination of bombs and missiles. Solliday is proud of the fact that he was once the recipient of the Navy's A-7 Man of the Year Award. At NAVMISCEN he also directed the Fleet Weapons Engineering Department that conducted weapons systems inspections throughout the Navy and Marine Corps, principally as an air-to-surface test programme.



Robert Solliday climbs aboard an A-7 at Point Mugu, California. (Photo courtesy of Robin Solliday Heyne).

His unit also operated a specially equipped A-3B Skywarrior. The NAVMISCEN A-3B "flying lab" (as it was known) took much of the guesswork out of conventional laboratory testing of missiles and weapons systems by flying electronic engineers on a modified aircraft equipped with such items as four television monitors, video and magnetic tape recorders, film and television cameras and oscilloscopes. This allowed complete missile and weapons components to be functionally verified and subjected to laboratory type studies while actually on an aircraft at representative altitudes and speeds. Previously, engineers got flight test information second-hand, relying almost entirely on pilots' reports on the missile's performance. Under Solliday's direction, the engineers conducted in-flight evaluations of hundreds of separate weapons and special missile seekers, various display recorder systems, and infrared and optical seekers.

His next assignment was to the Marine Corps Air Station at Iwakuni in Japan, as commander of Marine Fighter/Attack Squadron VMF-232 ("Red Devils") between 4 March and 14 October 1970. In addition to flying Phantom F-4Js, he flew an R4D-8 transport airplane for Brig. Gen. Robert F. Conley. At one stage, he placed "armed guards around his squadron's planes because they were being sabotaged".

On returning home, Solliday's next assignment was at Marine Corps Air Station El Toro, Santa Anna, California, where he was operations officer of the Marine Air Reserve Training Detachment. He flew a range of aircraft while there, including the A-4, MOV-10, SNB-5, and OE-1.



Lt. Col. Robert E. Solliday, U.S. Marine Corps. (Photo courtesy of Robin Solliday Heyne).

On 31 January 1972, Lt. Col. Solliday retired from the U.S. Marine Corps. As a civilian he took on several major projects as an experimental test pilot for the Hughes Aircraft Corporation using the NAVMISCEN facilities at Point Mugu. This included work on the Phoenix long-range, air-to-air missile project for the F-14A Tomcat. He believes he still holds the record for the longest range for an air-to-air missile flight, with a Phoenix that travelled for 126 miles over the Pacific Ocean on 12 April 1973 (Mission #PP20, AIM-54A Phoenix at Mach 1.51 at 44,000 feet).

When Solliday retired from active test flying, he remained at Hughes, as their Marketing Manager for the Angle Rate Bombing Systems. This was an internally-mounted avionics system originally designed for USMC attack aircraft to improve day and night bombing accuracy while providing close air support using unguided weapons.

When Solliday retired from Hughes, Charlene retired from her thirty-year career as a teacher. "We moved from California to Satellite Beach, Florida, and decided to purchase a boat so that we could cruise the Bahamas," he reflected. "I also began teaching at the Florida Institute of Technology, which I enjoyed, but later retired due to time constraints." He and Charlene spent the next eight years living an idyllic lifestyle cruising the Bahamas.

"We would leave Florida [at] the beginning of May and spend over two months cruising the islands. My love of adventure, my experience and knowledge acquired over many years in a technical field led me to earn a USCG boat captain's licence. Family and friends would fly to different ports [and] meet us. We spent many days exploring the islands, getting to know the islanders, snorkelling and SCUBA diving.



On 12 April 1973, Bob Solliday fired a Phoenix missile a record distance of 126 miles from an F-14A. The actual firing of the missile is shown in this photograph. (Photo courtesy of Robin Solliday Heyne).

[On one occasion] I had a chance to visit the island of San Salvador and stand where Christopher Columbus had landed in 1492."

After their elder daughter Robin and her family settled in Nashville, Tennessee, Bob and Charlene decided to make the move to Brentwood, a suburb of Nashville. In May 2003 they celebrated their Golden Wedding. Daughter Robin now runs her own interior design company in Nashville. She and husband Bill Heyne have two children; Billy and Christian. Bob and Charlene's other daughter Cynthia married Don Starke, and they have two children; Danny and Elizabeth. Son Robert E. Solliday, Jr. never married and is the national sales manager for a leading cosmetics company.

A member of the Society of Experimental Test Pilots (SETP), Bob Solliday once served as National Vice President and also as Treasurer of that organisation. One of Robin's favourite memories is attending the 25th anniversary of the SETP in 1981, with her parents and brother. "SETP was always held in September at the Beverly Hilton Hotel in Los Angeles. My dad was very involved with this group of test pilots and each year my parents would attend the weekend-long events. Many of the events and parties were sponsored by the different aircraft companies. We had grown up hearing many stories about this group of men, so when we had the opportunity to attend with my parents, my brother and I did not hesitate. What an evening it was at the ballroom of the Beverly Hilton – Jimmy Doolittle's wife spoke, we [happened upon] Chuck Yeager in the elevator, and we were shown footage provided by NASA of Bob Crippen's flight aboard the space shuttle. Needless to say, all the tales we had heard growing up were true: great food, drinks, company, and a few crazy test pilots."

Following the move to Nashville, Bob became involved with a retired officers' group and spoke at local schools, "educating children about astronauts and space".

Charlene is today recognised as a talented and leading local artist, and her work has been featured in many galleries.

These days, Bob and Charlene lead a relatively quiet but productive life, while still taking several trips per year to visit their children, grandchildren and friends in other states.<sup>42</sup>

### **JOHN M. TIERNEY, USN**

There are moments in a nation's history when its hopes, fears and confidence in its own destiny are severely tested. Such an occasion arose on 24 October 1962, when the United States' military forces went on a DEFCON 2 alert – the highest ever in American history. On that day, as a defiant President John F. Kennedy figuratively stood toe to toe against Soviet leader Nikita Khrushchev over the rapidly escalating Cuban military crisis, which had thrust the world to the brink of nuclear war, U.S. Navy Commander John Mark Tierney was seated in his bomb-laden Douglas A-4 Skyhawk on the flight deck of the carrier USS *Enterprise*. He and three other pilots in the first take-off wave of strike aircraft were waiting apprehensively for the "start up" signal that would send them and dozens of other carrier-based airplanes hurtling into the skies to reduce strategic targets within Cuba to dust. Fortunately for Tierney, and humanity, that order was never given.

Tierney was born in the small college town of Newark, Delaware, on 29 May 1924. Tradition holds that during the Revolutionary War the Stars and Stripes was unfurled for the first time just outside of Newark in the Battle of Cooch's Bridge. His father William was of Irish descent; his own parents had arrived in the United States as immigrants prior to his birth. An accountant, William had served with distinction as a gunner on naval battleships prior to World War I, even taking part in President Theodore Roosevelt's historic 1907-09 globe encircling demonstration of U.S. Navy power and capabilities that came to be known as the Great White Fleet. He and his Irish-descent wife Helen O'Rourke, whom he had met in church, were both staunch Catholics. This would be evidenced in having and raising seven girls and four boys. Their fourth child was named John. At his teenage confirmation into the Church he adopted Mark as his middle name, taken both from his father's brother and the fact that it had "a strong Irish sound" to it.

Although his father was a substantial role model as John Mark Tierney grew up, his mother imbued in her children the importance of a solid education, despite the prevailing harshness and poverty of the Depression years. She did such a wonderful job in raising her family that in 1965 she was appointed Delaware's Mother of the Year.

The family, thirteen members in all, would share the same three-bedroom house throughout John's childhood. At the age of ten, to supplement the family income he assisted as a caddy at a local golf course. Later he delivered newspapers and mowed neighbourhood lawns. In addition to swimming, sandlot baseball and football, he was an eager member of the Boy Scouts, eventually becoming a senior patrol leader. He also flourished academically, in 1942 graduating fourth in his class of eighty-two



John Mark Tierney, USN

at Newark High School. During his senior year, seeking to follow his father's example, he sent requests for admittance to the U.S. Naval Academy to his two state senators and the state's lone representative in the House, but these would prove unsuccessful. He did, however, secure a first alternative appointment from the representative and one of the senators. Then, like others seeking similar admittance, he had to pass the six two-hour examinations in English, mathematics and science. At the end of three days of written papers in nearby Wilmington, he felt dejected that despite weeks of intense study he had fallen short and would not pass. When his notification arrived two weeks prior to graduation, it was fully an hour before he could bring himself to open it. To his surprise and elation, he had just scraped in.

Owing to the Japanese attack on Pearl Harbor a few months earlier, Tierney was sworn in as a member of the largest incoming class ever admitted to the Academy in Annapolis – thirteen hundred in all. "I became a plebe on June 23, 1942, seventeen days after graduating from Newark High School," Tierney reminisced. He had only just turned eighteen years of age.<sup>43</sup>

His class was accelerated, and eleven hundred cadets graduated in 1945, just three years after being admitted. Academically, Tierney was in the top nine percent. Asked what orders he would prefer, he opted for Navy flight training. Despite his anxiety to begin, there was a standard requirement for completing a two-year posting at sea, as a "black shoe" surface officer. By tradition only naval aviators wore brown shoes, and it was a coveted distinction.

Instead of the expected Pacific posting to a destroyer, Ensign Tierney and almost one hundred other aspiring aviators were assigned to Naval Mine Warfare School in Yorktown, Virginia, to learn about assembling, planting and sweeping for marine mines. Later that year, having graduated from mine school, he was made executive officer of the small minesweeper USS *YMS 163*, which appeared to be permanently moored in retirement in Pearl Harbor. But three months later, to his delight and with just two hours' notice, he was transferred to USS *Henry A. Wiley* (DM-29), a sleek destroyer-minesweeper less than two years old that was preparing to depart Hawaii for San Francisco. Frustratingly, the ship then spent nearly a year in San Francisco before being decommissioned in January 1946 and placed in reserve in San Diego. During this time, Tierney was given executive officer duty on other minesweepers which sailed up and down the Californian coast.

"With my two years of post-graduation sea duty about up, I applied for Flight Training right on time when the ALNAV (All Navy) came out for 1946," Tierney recalled. "I was told by the Bureau of Naval Personnel that I would 'be ordered when made available'." To his consternation, he was instead ordered back to Pearl Harbor and the patrol craft USS *PCE 891* "whose main duty was sitting in the middle of the ocean collecting weather data".

Despite his eagerness to get into the skies, Tierney reasoned that his time spent aboard different ships, especially as executive officer, would prove very beneficial in future commands. It was May 1948 before he finally received the orders he had been waiting for. He transferred to Pensacola, Florida, and received initial instructions in the propeller-driven SNJ – the Navy version of the T-6 Texan – and the new Chance Vought F4U Corsair fighter, eventually flying solo and performing basic aerobatics.

The final stage was carrier qualification on USS *Cabot* (CVL-28), a light carrier that had been recommissioned as a training vessel after the war.

Tierney's first carrier landing was a disaster. Unaccustomed to the exaggerated signals of the carrier's Italian-born landing signal officer, he was expecting a wave-off and only realised at the last moment that he was meant to land. "Disoriented, I landed on the ship without even knowing it. I thought I was still floating above the carrier's deck, a common problem if you're on the wrong fly-path. [...] I pushed the stick to go down. Of course, I was already down. I realized I was on the deck just in time to hit the last of the nine [cross-deck] wires and barrel into the second barrier, which snagged me safely, but not without severely knocking me around." He was sent to his room and then back to Pensacola for more field training before he was permitted to have a second attempt. Returning to the *Cabot* a week later, he easily qualified and would never repeat the calamity of his first attempt. "No matter what the weather, no matter who the LSO, no matter what the plane's condition or how much the waves were tossing around the ship, I touched down safely every time." (In fact, during his service career he would perform 611 carrier landings in 29 different aircraft types.) Next, he was sent to Cabiness Field at Corpus Christi in Texas, and completed advanced carrier qualification in the F4U fighter.

In September 1949 Tierney was given his Wings of Gold and assigned to Attack Squadron VA-25 at NAS Oceana, Virginia, flying the piston-engine Douglas AD-4 Skyraider. His first cruise duty was aboard USS *Franklin D. Roosevelt* (CV-42), and over the next few years he made several peacetime cruises, mostly practicing carrier take-offs and landings. He met his lifelong partner Frances Stuart Rumfelt, known to everyone as Stu, on a blind date. She worked in a Virginia Beach bank and after their first meeting they began to see more of each other. She wrote to him while he was on Mediterranean duty or down in Cuba. Nearing the end of his three-year posting with VA-25, he was able to apply for shore leave and applied to the Naval Post-Graduate School in Monterey, California, to study aeronautical engineering. Meanwhile, Stu accepted his marriage proposal, and they were wed on 12 July 1952. Their first child, daughter Brenda, was born on 22 April 1953.

Following post-graduate school, things began to happen quickly; Tierney and a number of fellow students were sent to the University of Minnesota at Duluth for a summer course in aeronautical engineering. He then went to Princeton for his master's degree. After graduating he applied for jet training. BuPers sent him to a small air station in Olathe, Kansas, for four weeks, and then back to Oceana as maintenance officer of a jet fighter squadron based aboard the newly commissioned supercarrier USS *Forrestal* (CVA-59). The squadron flew the North American FJ-3 Fury, which was experiencing engine problems, particularly at higher altitudes. In order to find a solution he made several hazardous test flights, exacerbated by a persistent frosting on the windscreens. Of this time, he said, "After a few practice flameouts and some thrilling moments of falling with limited aircraft control and next-to-zero visibility, we developed a program to fix the problem."

Meanwhile, the family gained a second child; John Mark, Jr., whom they would call Mark to avoid confusion. Many years later, he would also become an officer in the U.S. Navy.

On his return to Oceana following a seven-month deployment across the Western Pacific aboard USS *Bennington* (CVA-20), Tierney found he had been assigned to the Test Pilot School at Patuxent River, entering in 1957 as part of Class 19. He finished the six-month course as the Honor Graduate and Number One test pilot of his class. At graduation, he was informed he would be staying on with the Test Pilot School as a performance engineer, flight test and spin recovery instructor. On 17 March 1958 Stu gave birth to their second daughter, Maureen. Towards the end of his tour at Pax River, Tierney and several other pilots were instructed to report to Washington and found themselves candidates for astronaut selection. He was one of thirty-two finalists but when the notification arrived it was not the good news that he had hoped for.

Despite his initial disappointment, life went on for Tierney, and he freely admits that he was happy where he was. There was consolation with the birth of their third daughter, Theresa (Terri) on 27 April 1959. Before completing his tour at Pax River, he wound up instructing five future astronauts – Wally Schirra, Pete Conrad, Alan Bean, Jim Lovell and John Young. He enjoyed staying in touch and following their space flights.

Tierney's next assignment was operations officer and the air wing landing signal officer for Air Group 8 aboard USS *Forrestal*, which concluded in early 1962 with a Mediterranean tour. He was then promoted to commander and assigned to command VA-66, which was part of Air Wing 6 based at Oceana, Virginia. This squadron was on USS *Enterprise*, the world's first nuclear-powered aircraft carrier, and it operated the Douglas A-4 Skyhawk. He joined the "Big E" for his fifth Med tour, and arrived back home in October 1962. Within a week of his return, however, he found himself swept up in the high drama of the Cuban crisis. He was to report immediately to the *Enterprise*, and two days later the carrier was stationed off Guantanamo. There was still no explanation for their sudden departure, although there was speculation that it was related to a hurricane warning. Then he was called to the Flag War Room. "The ship's other squadron commanders and I had a meeting at eight o'clock that night with the Admiral. He informed us we had orders to strike Cuba the next morning at first light." Apart from knowing that Soviet missiles were finding their way to the island, no one had really appreciated the extent or seriousness of the situation.

That night, as Tierney recalled, VA-66 hurriedly prepared for the strike, "getting continuous briefings, receiving strike points, working out plans, and loading ordnance into jets. My squadron's target was a surface-to-air missile (SAM) site." At dawn, he strapped into his Skyhawk and waited for the order to take off. After more than two tense hours the pilots were stood down. The following day they sat around the ship's Ready Room rather than in their aircraft until late morning, when they were told that the strike had been called off yet again. Day after day they waited, fully loaded and prepared, until word came that the Russians had in some way backed down. By mid-December they were back home again, greatly relieved that they had not gone to war.

On 31 May 1963, Tierney was relieved as commanding officer VA-66 aboard the *Enterprise* so that he could attend Naval War College in Newport, Rhode Island.



USS *Enterprise* during the Cuban missile crisis. The combat-ready pilots on board included Mercury astronaut finalists Cmdr. John Mark Tierney and Lt. Cmdr. Paul Miller, Jr. (Photo: USN)

Less than a year later, he had completed this senior course and earned his second master's degree, this time in international affairs. He was then assigned to command Air Wing 19 at NAS Lemoore in California, starting in August of 1964.

By May 1965 the conflict in Vietnam had intensified and Tierney deployed with Air Wing 19 to USS *Bon Homme Richard* and their A-4s and F-8s flew missions on a daily basis. The strike targets were primarily troop concentrations, bridges and supply dumps along the supply route known as the Ho Chi Minh Trail. On one occasion his assigned target was a river pier, but as Tierney arrived he found a Viet Cong coastal freighter tied to the dock. Deciding to hit the freighter instead of the pier, he fired his AGM-12 Bullpup radio-controlled missile, which scored a direct hit. The ship sank shortly thereafter. This initiative earned him the first of two eventual Distinguished Flying Crosses.

Remarkably, although he led over a hundred combat flights over North Vietnam, Tierney never took a hit on his aircraft – quite an achievement given the amount of flak that pilots faced. He led the last strikes of his tour on 18 December 1965, after which he received orders to report to the Pentagon.

Once he had settled his family in Washington, D.C., Tierney undertook systems analysis duties with the Tactical Air Division in the office of Assistant Secretary of Defense, Alain C. Enthoven, where he spent the next two years. During this time he was promoted to the rank of captain. But he remained eager to serve his nation in a more active role. "I finally escaped the grasp of the Pentagon in early 1968, and was

selected for deep draft command in the Tonkin Gulf." After a brief refresher, he was given command of USS *Thomaston* (LSD-28), a newly overhauled dock landing ship that had joined Amphibious Task Group Bravo the previous month. The *Thomaston* operated in support of the Special Landing Force marines engaged in the defence of Quang Tri Province, shuttling them to and from shore and serving as a maintenance harbour – it was effectively a repair ship with a built-in dry dock. The ship docked in San Diego on 4 September. Tierney rounded out his tour with the Marines at Camp Pendleton, California.

In June 1969, at the invitation of Rear Admiral Malcolm Cagle, Tierney became Chief of Staff to Commander Carrier Division 1, at NAS North Island, Coronado in California. Several months later CARDIV 1 deployed for a tour of the Tonkin Gulf, which put Tierney back aboard USS *Bon Homme Richard*. "I saw the air war from a new perspective, standing on the ship, rather than in the skies," he reflected. It would be a brief tour, and he came to regard his next assignment as the highlight of his Navy career – command of USS *Constellation* (CVA-64), a *Kitty Hawk*-class supercarrier nicknamed the "Connie".

Captain Tierney joined the ship in the Gulf of Tonkin on 24 January 1970 as its ninth commanding officer, and immediately took over from his predecessor, Captain John Christiansen. Air Wing 14, flying long-range supersonic F-4 Phantom fighter-bombers and A-4 attack aircraft, was onboard. He praised them highly as "a group that really knew how to fly. The wing shot down a few MiGs and bombed everything it was allowed to in North Vietnam and gave ground support to troops in the South, all without a fatality, though it did lose a few planes."

On 9 January 1971, after an unforgettable twelve months aboard the supercarrier, he handed command to Captain Harry Gerhard and joined the Office of the Chief of Naval Operations (OP-90) in the Pentagon, where he was assistant director of Plans, Program and Budget. Although he thoroughly enjoyed working with his immediate superior, Admiral Worth H. Bagley, this role was something of a let-down after his command of the *Constellation*. But his disappointment was short-lived, because he was promoted to the rank of rear admiral on 27 April 1971 and served as director of Plans, Programs and Budget until his Pentagon tour ended in the summer of 1972.

He then returned to his first love, operational flying, this time at NAS Whidbey Island in Oak Harbor, Washington State. As Commander, Medium Attack, Tactical Electronic Warfare Wing, Pacific Fleet, he was the senior officer present. It was an administrative position, with a responsibility for training the squadrons, establishing their syllabi and preparing them for deployment. He was also tasked with "planning for future plane upgrades, providing the squadrons with facilities for training and developing relationships with the [local] community." The Grumman A-6 Intruders and EA-6B Prowlers of the Pacific Fleet were housed there, and Tierney took full advantage to update his flying skills in both of these unfamiliar, advanced airplanes. In 1973, he was also appointed to the board that selected young Washington State men seeking to gain admission to the U.S. Naval Academy.

On 1 July 1975, after three years at Whidbey Island and thirty years of service in the U.S. Navy, John Mark Tierney retired from active duty as a two-star admiral. He had around 6,000 flying hours of flying time and over 600 carrier landings, and



RADM John Mark Tierney, USN

had also been awarded an impressive number of combat awards, including the Legion of Merit, two Distinguished Flying Crosses, the Bronze Star with Combat V, ten Air Medals (Strike/Flight) and the South Vietnamese Gallantry Medal with Palm.

After working for a while with Lulejian and Co., a small company that provided services to the military, Tierney was approached by the U.S. Navy, asking whether he would take on a civilian role running a study of equal employment opportunities in the Civil Service, particularly the issue of racial integration. "It sounded interesting enough, so I took the job. I was given an office and assigned a staff that comprised a mix of both active-duty Navy members and civil service workers." By July 1977 the study and resultant report had been completed. With that experience under his belt, Tierney took up the position of Vice President for Development and Fundraising at St. Joseph's University in Philadelphia. Five years later he resigned and became Vice President of the Lavino Shipping Company, running an office in nearby Wilmington. He spent eight years in this position before the company ran into bad times after the death of the owner and two younger partners took over.

In October 1990 he was appointed president and CEO of the Catholic League in Bala Cynwyd, Pennsylvania, a national group that lobbied on religious issues. The following year, after several disagreements with council members, he was asked to clear out his desk, which he did without contention. Now aged 67, he decided it was time to retire and his wife concurred – with one provision.

"Stu asked that I take her home to Virginia, specifically the Virginia Beach area, where most of her family lives," he said in contemplation. "It's been a great life. I've

had amazing kids who enjoyed the Navy life, moving around to different schools and seeing the world. Stu's planning of our social life keeps me very busy. I also enjoy my investment club, my daily walks and travelling. We're also blessed to be able to see most of our grandchildren fairly frequently.

"Being a U.S. Navy pilot has afforded me many unique opportunities. As I have always said, it's a great life, if you survive."

### **ALONZO J. WALTER, JR., USAF**

Alonzo Joseph "Lon" Walter, Jr. is the son of a pharmacist. He was born on 25 November 1928 in Morgan City, Louisiana, where his mother, Gertrude Norman Walter, was visiting her parents at the time.

Lon attended elementary schools in Erath and New Iberia, Louisiana, then New Iberia High School for two years and finally graduated from Castle Heights Military Academy in Lebanon, Tennessee. He next attended the Virginia Military Institute in Class 49B, and received his commission as a distinguished military graduate and a bachelor of science degree in 1949. After pilot training in Class 50C he received his USAF wings as a 2nd lieutenant at Nellis AFB, Nevada, where he flew the F-51D Mustang.

In the summer of 1950 Walter was assigned to Andrews AFB, Maryland, and the 335th Squadron ("The Chiefs"), attached to the Fourth Fighter Group. Following the outbreak of the Korean War that June, the F-86A-5 Sabres of the Fourth deployed to Korea to counter the MiG-15, which, Walter says, "was having its way with slower American aircraft". While their ship was en route to Korea, however, Chinese forces overran the squadron's intended base of Pyongyang in the captured capital of North Korea and so they were diverted to the Johnson Air Base in Irumagawa, near Tokyo, Japan, where they arrived on 10 November. "This served as our heavy maintenance base," Walter recalls, "and was always home for one of our three fighter squadrons from the Fourth while they rotated to and from K-13 at Suwon, Korea throughout my tour." A composite squadron from the Fourth took the first Sabres into combat from K-14 (Seoul, Korea) in December. Walter flew 48 combat missions over Korea, and was a wingman throughout his tour. He was officially credited with damaging one MiG-15 in combat on 11 July, although he feels certain his machine gun fire badly crippled the MiG, which suddenly snap-rolled and went into a flat spin from which it recovered and began fleeing north. Another pilot later reported seeing a northbound MiG pilot ejecting from his aircraft for no apparent reason, and Walter believes this was 'his' MiG. "The damage I inflicted, or the damage caused by the high-speed snap-roll, or both, may have convinced the MiG pilot that his aircraft was too badly damaged to land." By the time that Walter's tour ended in August 1951, he had also flown several air-to-ground missions in the F-86A.

As a measure of the men with whom he flew, by the truce on 27 July 1953 the 335th boasted an astonishing twelve aces and led all other squadrons with a total of 218.5 enemy aircraft destroyed.



Test Pilot School Class 56C on graduation. Front row (from left): Capt. Alonzo (Lon) Walter, Capt. Robert Jacobson (staff), Capt. Arthur Beard, Capt. Click Smith, Capt. Jesse Green, Capt. Robert Rushworth, Capt. Hal Fitzpatrick, Capt. Neil Garland, Maj. Richard Lathrop (staff). Back row: Capt. Robert Welch, Capt. Harold Eberle (staff), Capt. Paul Hinckley, Capt. Roger Mercer, Capt. Thurman Lawrence, Capt. James King, Capt. Eugene Conley, Capt. Gerald King, Capt. William Spillers (staff), Capt. Ralph Matsen (staff). (Photo: U.S. Air Force Test Flight Center, Edwards AFB).

Back home, 1st Lieutenant Walter returned to Wright-Patterson AFB, Ohio, and attended the USAF Institute of Technology (AFIT), from which he graduated in late 1952 with the equivalent of a master's degree in electrical engineering. Whilst there, he met and married an Air Force nurse, 2nd Lieutenant Doris J. Snyder, who was honourably discharged in early 1952. Their first child, Terry, was born later in that year. After a transfer to Eglin AFB, Florida, in early 1953, Walter served as a Fire Control Branch project officer and test pilot with the Air Force Armament Center. A second daughter, Beverly, was born in late 1953. Walter was promoted to captain in 1954. He completed Squadron Officer School at Maxwell AFB, Alabama, in 1955. His next assignment was Class 56C at the Experimental Flight Test Pilot School at Edwards AFB, California, graduating on 3 January 1957.

Returning to Eglin AFB, Walter served as an air armament test pilot and fighter operations officer for the Air Proving Ground Command. One of his best friends at this time was fellow test pilot, Jack Mayo. In early 1959 both men were ordered to Washington as candidates for astronaut selection, and made it through to the thirty-two finalists.

As Walter relates, "After being asked to participate in the Mercury astronaut selection program and undergoing the testing connected with that, we returned to our jobs at Eglin to await the selection results. As it turned out, we both were temporarily flying out of Nellis AFB, Las Vegas, Nevada, in mid-April 1959 in connection with a huge aerial demonstration billed as 'The World Congress of Flight' when we read of the final Mercury selections in the local paper. Later, we each received a nice letter from NASA, attesting to our having been in the group of 32 finalists, and thanking us for undergoing the selection process."



Alonzo (Lon) Walter, Jr., USAF

In September 1960, Major Walter entered the Air Command and Staff College at Maxwell AFB. After graduating the following year, he was assigned in July 1961 to Headquarters Space Systems Division in Los Angeles, California, serving as a project officer in the Advanced Plans Group. But there had been an underlying reason for his transfer to Los Angeles.

Earlier, the Central Intelligence Agency (CIA) had contracted with Lockheed to build a new high-altitude spy plane to succeed the U-2. This was initially known as the A-12, and then YF-12 and finally SR-71 "Blackbird". As the prototype aircraft was undergoing development, the CIA began to covertly seek suitably trained pilots. Initially, in fact, the selection process was so secret that many of the men who were considered were not even told what the screening process was about. Nevertheless, the CIA required certain qualifications of the men who would fly the new aircraft on intelligence-gathering missions, and these evaluations began in April 1961. Those selected for screening were to be between 25 and 40 years of age, emotionally stable and preferably married, have more than 1,000 operational flying hours in "Century" aircraft, and at least 2,000 flight hours overall. Also, owing to size limitations within the confines of the A-12, the pilots had to be less than six feet in height and to weigh no more than 175 pounds.

After an initial evaluation based on medical reports, psychological assessments, physical examinations and security clearances, the remaining candidates were sent to the Lovelace Clinic in Albuquerque, New Mexico, for full-on, extensive medical and psychological testing identical to the astronaut candidate testing already endured by Walter in 1959. The men still had no clear idea why they were being evaluated, only that it was top secret. As the selection process finally wound down, the final eleven candidates were informed that several of their number would be selected to fly and test an exotic new aircraft for the CIA. As very few details would be made available, the candidates were free to withdraw from the initial stage of the programme at any stage. The final eleven pilots were Kenneth S. Collins, Ron Layton, Francis Murray, Walter Ray, Russell Scott, William L. Skliar, Dennis B. Sullivan, Mele Vojvodich, Jack W. Weeks, David P. Young and Alonso Walter.

In November 1961 the necessary commitments were obtained, and arrangements made with the U.S. Air Force to make appropriate transfers and assignments to cover their training and to lay the basis for their service with the CIA. Meanwhile the pilots made trips to Worcester, Massachusetts, to be outfitted with personally tailored S-901 full-pressure suits.

On 26 April 1962 the first full test flight of the A-12 was successfully carried out, and soon the eleven men were introduced to the sleek Blackbird at a Nevada Test Site facility on Groom Lake that has become infamous as "Area 51". Project Operations Officer Colonel Doug Nelson took the pilots to a darkened hangar where the aircraft was housed, allowing them to inspect it at their leisure. One of the men, Ken Collins, would later recollect of this moment: "What an amazing sight! There were no hangar lights. The sunrays entered the upper hangar windows illuminating only the nose and the spikes. As your eyes adjusted to the restricted light, you began to take in its sleek length, the massive twin rudders and its total blackness. A vision that will never be forgotten."<sup>44</sup>

After flying over 100 hours testing the A-12 for the CIA, and with the aircraft not yet fully operational, Lon Walter withdrew from the programme in the spring of 1964 for personal reasons. Resuming his Air Force career, he transferred in March that year to the U.S. Air Force Academy in Colorado Springs, where he served for a year as Third Group Air Officer Commanding. After being promoted to lieutenant colonel, he was selected to attend the Air War College at Maxwell AFB, from which he graduated in 1966. Then he got combat crew training in the F-100D Super Sabre in preparation for his next assignment to the Third Tactical Fighter Wing in Vietnam. Nearing the end of this course, he awoke one morning to learn that he had Bell's Palsy, a paralysis of one half of his face, and this resulted in him being grounded for what would prove to be an indefinite period of time. Following hospitalisation and extensive tests, he was reassigned to the Aerospace Studies Institute at Maxwell AFB, Alabama, in order to join a small group engaged in Project Corona Harvest, studying the lessons learned from the Vietnam War. Little by little the Bell's Palsy symptoms diminished, and he was returned to flying status. He was selected for promotion to colonel, effective in July 1969.

Colonel Walter then departed for the Republic of Vietnam to serve as Air Liaison Officer for the XXIV Corps, and Director of Direct Air Support Centers at Da Nang and Phu Bai Air Bases. In this capacity, he flew the Cessna O-2A and was in charge of all forward air controllers in northern South Vietnam.

In July 1970 he returned to Washington, D.C. as Plans Officer in the Directorate of Doctrine, Concepts and Objectives at U.S. Air Force Headquarters. The following year he was assigned command of the 31st Tactical Fighter Wing at Homestead AFB in Florida, flying the McDonnell Douglas F-4 Phantom, a long-range supersonic jet interceptor/fighter-bomber. Earmarked for promotion to brigadier general, in April 1974 Walter was assigned as Assistant Deputy Chief of Staff, Plans and Operations, Headquarters, Pacific Air Forces, based at Hickam AFB, Hawaii. His first star was duly issued three months later. Then, from July 1975 to May 1978, he was Deputy Director of Operations, J-3, for the U.S. European Command in Stuttgart, Germany, and in May 1978 he became J-3 of the Joint Chiefs of Staff at the National Military Command Center in the Pentagon.

Brigadier General Walter retired from the Air Force in June 1979. His military decorations and awards include the Distinguished Service Medal, Legion of Merit with two Oak Leaf Clusters, Meritorious Service Medal, Air Medal with four Oak Leaf Clusters, Air Force Commendation Medal, Distinguished Unit Citation with an Oak Leaf Cluster, Air Force Outstanding Unit Award, and the Republic of Vietnam Gallantry Cross with Gold Star.

In retirement, Lon and Doris lived in Springfield, Virginia, until 1981 when they moved to Onion Creek, a suburb of Austin, Texas, where they have remained. Lon is active in community affairs and has been a local and national officer of The Order of Daedalians (the national fraternity of commissioned military pilots) headquartered at Randolph AFB, Texas, near San Antonio.

Today his daughter Terry, who married Don Gabreski, the son of legendary flying ace Francis "Gabby" Gabreski, is a retired three-star general in the U.S. Air Force and former Vice Commander of Air Force Materiel Command at Wright-



Still at home in the cockpit; a recent photo of Lon Walter. (Photo courtesy of Lon Walter)

Patterson AFB, Ohio. Daughter Beverly is married to Gary R. Myers, a retired U.S. Army lieutenant colonel and a professional civil engineer. They reside in Houston, Texas.<sup>45</sup>

### JAMES W. WOOD, USAF

He went by many names, depending on who knew him. To some he was Jim, many knew him as Wayne, while other friends and family members affectionately called him "Woody". Awarded fourteen decorations during his career as a test and combat pilot, he flew fighters and bombers in three wars and was chief pilot on the cancelled U.S. Air Force X-20 Dyna-Soar programme, an innovative forerunner to the space shuttle.

James Wayne Wood was born on 9 August 1924 in Paragould, Arkansas, but he always considered his hometown to be Pueblo, Colorado, because that was where he was raised and educated as part of a large family. His parents, continually struggling against poverty, were Alfreda (née Lowrie) and Henry Paul Wood, a machinist from Tennessee. Young Jim got his early education at Fountain Elementary High School, and later attended Centennial High.

In his youth, Wood wanted to become an architectural engineer, but soon found a passion for aviation. His cousin Esther Lee Martin recalls that in high school he took

a job operating an elevator in an office building. "His family, with all those boys to feed, never had enough money, so Wayne worked evenings and weekends to help out. His manners were those of his southern mother, so he was very popular. He was always humble, never complained, and always had a smile on his face."<sup>46</sup>

His military career began on 12 March 1943, at the age of nineteen, becoming an aviation cadet in what was then called the Army Air Forces. He would subsequently be assigned overseas duty and fly as pilot on ten bombing missions over France and Germany in a B-17 Flying Fortress. After the war Wood undertook retraining as a fighter pilot, but he also attended church services regularly in his hometown. It was there that he met Virginia Waye, who was also from Pueblo, and after an enjoyable day-outing on a church hayride they began dating. They were married in 1946 and their first child, Diane, was born on 4 December 1947.

From 1948–51 Wood spent twenty-nine months with the 49th Fighter-Bomber Group based at Misawa Air Base in Japan. In the Korean War he became one of the first pilots to complete one hundred combat missions flying the F-80 Shooting Star, which was the first operational American jet fighter, and the F-86 Sabre. His family accompanied him on the tour and on 15 February 1951, just before departing Japan for the United States, Virginia gave birth to their second daughter, Susanne.

Wood then spent twenty-eight months as an F-80 and F-86 gunnery instructor at various state-side bases. He then attended the USAF Institute of Technology (AFIT) at Wright-Patterson AFB in Dayton, Ohio, where he became good friends with fellow pilots Gus Grissom and Gordon Cooper. The family was completed on 27 May 1955 with the birth of their third child, James. On 28 August 1956 Wood graduated with a bachelor's degree in engineering sciences, aero-mechanical option. Immediately on leaving the AFIT he reported to Edwards AFB to attend the Experimental Test Pilot School, from which he graduated on 3 April 1957 in the fifteen-member Class 56D. Grissom and Cooper were also in his class, along with another Mercury finalist, Jack Mayo. Wood remained at Edwards for the next nine years, serving as a test pilot and project officer in the Flight Test Center. He was project pilot for all models of the Air Force's supersonic aircraft. He flight-tested the F-102 Delta Dagger, formed the joint US-Canadian-German F-104 Starfighter test team, served as director of the F-5A/B Freedom Fighter test force, and test-flew the F-106B Delta Dart.

Aviation artist Rick Broome was related to James Wood. Too young in the mid-1950s to understand the relationship of cousins, he grew up calling Wood his uncle. "When I was about ten years old he became 'Uncle Woody' and later I became aware that he was my cousin, once removed. Woody was often able to fly from Edwards, and trips to see him arrive or depart from Pueblo's aerodrome were a regular treat. He would fly various jets home to see his folks, including the F-80, T-33, F-84 and F-86. He encouraged my own interest in aviation to a great degree."<sup>47</sup>

According to his younger daughter, Susanne, Wood wasn't the type to talk about his accomplishments, but he did love to talk about flying. "One thing I know he was kind of proud about," she told the author, "is that he never lost a plane – he never bailed out though he did crash land a couple of times. In fact, there is a film of him crash landing that used to get shown as PR about Edwards. It was during a landing



James Wood with an F-104 Starfighter at Edwards AFB. (Photo: USAF courtesy of Wood family)

test in an F-104. You can see on the film the plane skidding down the runway, and then it rolled and flipped over on its back. Dad had to crawl out through the engine compartment, and as he was trying to free himself, some of the crew from the crash truck and fire engine, which I guess were always on hand during tests, started moving towards the plane to help him. You can see him waving everyone back because he was worried the plane might explode and he didn't want anyone to get hurt. That was so my dad.<sup>48</sup>

It was during this time that he was called to Washington and found that he was a candidate for astronaut selection. On 10 March 1959, while waiting to hear if he had been successful, Wood took part in aerial checks on the behaviour of the X-15/B-52 combination, flying one of two dual-seat F-100 chase planes along with an Air Force movie cameraman. The second chase plane with another cameraman was flown by Alvin White. Disappointing news arrived early the following month in the form of a letter from NASA dated 3 April 1959 and signed by Charles Donlan, advising Wood that he had been unsuccessful in his application. Stoically putting his feelings aside, he pressed on with his test duties. He and Al White continued the X-15 aerial checks on 8 June 1959, once again flying chase in their F-100s along with cameramen.

Then came one of the highlights of his military career, when he was selected as chief pilot for the Air Force's winged space plane programme. The programme was officially known as the X-20, but it was given the alternative designation of Dyna-Soar, a contraction of the words Dynamic Soarer. The programme took a large step forward on 9 November 1959 when, after two years of feasibility studies, the USAF selected Boeing Aircraft as the prime contractor for a winged boost-glide spacecraft to be crewed by Air Force pilots. The Martin Company was contracted to supply the associated booster rocket. Initially this was to have been a Titan I, but as the weight of the Dyna-Soar increased during its development the considerably more powerful Titan III, which could place the space plane into orbit, became the preferred booster. The X-20 was to carry out a variety of military missions, including reconnaissance, bombing, space rescue, satellite repair, and the sabotage of enemy satellites.

The small delta-wing space plane was initially to be launched on a suborbital arc and glide to a horizontal landing on a runway on one of the islands down range from the launch site at Cape Canaveral. Orbital missions would land in a similar manner at Edwards AFB. The need for extremely skilled test pilots resulted in ten active NASA and USAF test pilots undergoing secret physical examinations in August 1959. Seven were selected on 1 April 1960 to train for the military missions that were expected to begin four years hence. They were NASA X-15 test pilots Neil Armstrong, William Dana and Milton Thompson, along with Air Force designees Captains Henry Gordon, William ("Pete") Knight and Russell Rogers, and Major James W. Wood.

On 26 December 1961 the Air Force announced that the Department of Defense had authorised it to skip the planned suborbital tests for the Dyna-Soar space glider and to "move directly from manned drops... from a B-52 to orbital flight".<sup>49</sup> Armstrong and Dana left the programme in the summer of 1962, and they were both replaced by Air Force Captain Albert Crews. On 19 September 1962, with General Bernard A. Schriever presiding, the Air Force and NASA jointly announced the six "pilot engineers" for the Dyna-Soar programme, along with the public unveiling of a

full-size wooden mock-up of the space plane and the six men chosen as its first cadre of pilots.

The Dyna-Soar pilot-astronauts began to train for their missions at Edwards and Wright-Patterson air bases, but the programme never reached operational status. On 10 December 1963, even before the first prototype could be built, the programme was cancelled. U.S. Defense Secretary Robert S. McNamara told a Pentagon press conference that he had directed the Air Force to forgo further development. It had already cost \$660 million, according to public records. He instead directed the Air Force to develop an orbiting laboratory to be manned by Air Force personnel. The first one was to be launched in late 1967 or early 1968. This programme was rather unimaginatively called the Manned Orbiting Laboratory, or MOL.

Had the Dyna-Soar programme not been cancelled, the first manned single-orbit flight, planned for July 1966, would have been flown by the senior test pilot, James Wood.

The MOL was essentially a pressurised, instrument-laden cylinder about the size of a small house trailer, crewed by at least two men. They would ride into orbit in a modified Gemini spacecraft mounted on top of the laboratory and a Titan III launch vehicle. In orbit, the crew were to pass through a hatch in the rear of their spacecraft and enter the MOL, in which they would be able to conduct experiments in a shirt-sleeve environment for around two or three weeks before returning to their Gemini spacecraft to leave orbit and splash into the ocean in the same manner as the NASA version of this spacecraft. McNamara said the MOL programme would provide data for navigation aids, meteorological programmes and "other" classified projects.

The only Dyna-Soar pilot to transfer across to the MOL programme was Albert Crews. However, in June 1969 the new Nixon administration cancelled it without a single mission being flown.

After the cancellation of the Dyna-Soar programme in December 1963, Wood participated in the M2-F1 Lifting Body programme as its fifth pilot. The M2-F1 was an unpowered craft of wooden construction, initially towed into captured flight along the Edwards dry lakebed behind a modified Pontiac Catalina. Later, it was to be towed aloft by a C-47 Dakota and released for approach and landing demonstrations. Although Wood made one car-towed flight on 6 February 1964, he was transferred out before having the chance to fly an air-tow test.

On Monday, 10 May 1965, Lt. Colonel Wood became the first military test pilot to fly the F-111A variable-sweep-wing supersonic jet fighter-bomber. Initially called the TFX, this innovative aircraft was designed to fly at Mach 2.5 with its wings fully swept back. Accompanied by civilian co-pilot Val Prahl from the General Dynamics Corporation, which built the aircraft, Wood carried out the centre's first official test of the two-man craft. On a familiarisation, stability and control test lasting seventy-five minutes, he roared over Edwards at Mach 1.2, climbed to 30,000 feet, and then swooped down for a smooth 'touch and go' landing.

In 1967 he attended and graduated from the Air War College at Maxwell AFB, Alabama, and then headed a test unit that developed an electro-optical guided aerial bomb at the Armament and Development Center, based at Eglin AFB in Valparaiso, Florida.



Dryden Flight Test Center, 1974. Standing in front of the X-24B Lifting Body aircraft are, from left: Lee Scherer (Center Director), Lt. Gen. Howard Lane, X-24B pilot Lt. Col. Michael V. Love, and Col. James Wood. Col. Love died in an F-4 crash two years later. (Photo: NASA courtesy of Diane Wood)

From 1968–69 he flew thirty-four combat missions in Southeast Asia – his third war – with an F-4 Phantom test squadron based in Thailand and South Vietnam. He flew command missions over Laos and North Vietnam for the Seventh Air Force's Thailand-based Eighth Fighter Wing, and for his last ten months in theatre served as chief of the Current Operations Division for the Seventh Air Force at Tan Son Nhut air base near Saigon. In this capacity he was responsible for directing air operations over Laos and North Vietnam, for which he would be awarded the Legion of Merit.

Wood's next assignment was a two-year tour, planning test programmes for the advanced F-15 Eagle fighter at Wright-Patterson, as chief of the project's Test and Deployment division. He delivered a paper at the annual symposium for the Society of Experimental Test Pilots in September 1970 entitled "The F-15 Air Superiority Fighter". In 1971, now with the rank of colonel, he returned to Edwards for a three-year stint, serving initially as test wing commander and then as deputy commander

of operations. This involved directing flight tests, flying and related activities while supervising over 1,200 military and civilian pilots, engineers, researchers, and other support personnel while also continuing his involvement in the F-15 test programme.

When Colonel Wood retired from the Air Force in 1975, he had logged around 6,000 military flying hours in thirty-five types of aircraft. His awards included the Legion of Merit with an Oak Leaf Cluster, the Distinguished Flying Cross, the Air Medal with nine Oak Leaf Clusters, the Air Force Commendation Medal with one Oak Leaf Cluster, a Presidential Unit Citation and a Republic of South Korea Presidential Unit Citation.

After just six months of retirement spent indulging in his favourite pastime of golf, Wood was enticed into the aerospace business as a pilot and consultant, firstly with Northrop and then with TRW as an advisor/consultant to the Iranian Air Force which involved acting as F-16 project officer and working directly with the Iranians for eighteen months. During this time he and Virginia lived in Teheran, leaving just ahead of that country's rapidly escalating social turmoil, with major demonstrations against the Shah in January 1978. He joined Canadair in October 1978, working on the development of a family of business jets designated the Challenger 600 series. Based at Mojave, California, about one hundred miles north of Los Angeles, Wood directed the seven-day-a-week, twenty-four-hour-a-day schedule that resulted in the certification of the Challenger. He later became the director of aircraft operations and a test pilot for Mojave-based Tracor Flight Systems Incorporated, a company which was involved in aircraft testing, operation and maintenance services, target drones, radar systems and simulators.

Altogether, Wood spent more than a decade at the Mojave testing facility, which has evolved into a major civilian air and space test facility and calls itself the Mojave Space Port. The spindly, record-breaking Voyager aircraft that circumnavigated the globe without stopping or refuelling left from there in 1981, as did SpaceShipOne in 2004 when it made the world's first privately funded human spaceflight. Following his work with Tracor, Wood retired from the aviation business. He remained a Fellow (and former president) of the Society of Experimental Test Pilots.

In speaking about Wood as a friend of more than forty years, former test pilot Norvin ("Bud") Evans recalled a man unbending in his devotion to perfection in flight testing. "He ended his thirty-three years of flight testing in a typical 'Woody' style, by flying a full test mission in an F-4, ending it with a symbolic touch-and-go landing on the runway here at Edwards, where his flight test career began, and then made his final landing at Mojave where his civilian flight test career began and ended. Woody was unselfishly dedicated to his profession, never seeking personal acclaim. However, he achieved what every man dreams of but few ever realize, and that was the full respect, trust and admiration of his fellow man."<sup>50</sup>

In late December 1989, Jim Wood and his wife Virginia flew from their home in Lancaster, California, to be with their daughter and her family during the Christmas holidays. On New Year's Day, aged just 65, he and Virginia were still on vacation at the Florida home of his long-time friends, Bud and Nancy Evans, when he suffered a massive, fatal heart attack. His family believes he died almost instantly.

Daughters Diane and Susanne told the author that their beloved father "serves



James Wood and his wife Virginia at Mojave Airport, 1989, following his final flight and landing in an F-4. (Photo courtesy of Diane Wood)



Colonel James Wayne Wood, USAF. (Photo courtesy of Diane Wood)

with his many fellow war heroes in the final landing field of the Riverside National Cemetery, Riverside County, California.” His son Jimmy also spoke of the pride he and his family still feels for “Woody”. He wrote and recorded a tribute song to his father called “Starfighter’s Pride”, with his two sisters singing background harmony.

“We saw our father as an American hero,” Jimmy added. “A lot of folks use the term these days, but our father lived it. He also was such a self-made man when you think about it, rising from poverty basically, and ending up in the pages of *Life* magazine. There was also very little ego involved, a lot of quiet pride though. He was the ultimate Starfighter.”<sup>51</sup>

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# 6

## Lovelace Clinic, New Mexico

With the preliminary examinations out of the way and the final thirty-two candidates chosen, a comprehensive physical evaluation began at the Lovelace Foundation for Medical Education and Research, commonly referred to as the 'Lovelace Clinic', in Albuquerque, New Mexico. Dr. W. Randolph Lovelace II oversaw the medical and biological aspects of the selection process. These gruelling and clearly comparative tests were designed to determine the physical health of each candidate and identify any previously undiagnosed problems that might preclude him from the rigours of space travel.

### PHASE THREE BEGINS

The clinic was an excellent facility with a background in aviation medicine research, as well as the clinical examination of commercial airline pilots and aviation-industry test pilots. For this, and other related reasons, it was felt the clinic was well qualified to conduct the examinations more so than other institutions such as university and military hospitals. However, the role of the civilian pilot was a far cry from that of an astronaut pilot, and many dissatisfied individuals from the Air Force medical service made it known that they were unhappy with the choice of the independently operated Lovelace Clinic – particularly as this research was being funded by a U.S. Air Force grant.

Because the astronaut testing programme was to be conducted in secrecy, each of the thirty-two finalists was allocated a number, 1 through 32, by which they would be identified at all times in order to preserve their anonymity. They were also required to use this number to identify themselves in all correspondence and phone conversations relating to the tests in New Mexico and, later, at the Wright Aero Medical Laboratory in Ohio, and were not to discuss the purpose of their visit with anyone. For their part, the administrators took steps to avoid drawing public attention to the operation.

To facilitate close scrutiny of each candidate by a limited number of examiners, the finalists were split into six groups: four containing five candidates and two with



The Lovelace Clinic in 1959. (Photo courtesy of Susan Wilson, Director of Public Relations for Lovelace Health System)

six. The screening began at the two test sites in staggered groups, a week apart, and the candidates travelled separately on commercial airlines to escape the attention of any suspicious members of the press.

One of the physicians heavily involved in the testing at the Lovelace Clinic was Dr. Robert Secrest, a specialist in internal medicine who had been a flight surgeon during the Korean War and had worked alongside Dr. Lovelace at the clinic since 1955. In discussing the clinic's involvement during a 1996 interview with Professor Jake Spidle of the University of New Mexico's Department of History, Secrest also recognised the tremendous work of his colleague, Dr. Ulrich Lust, the eminent head physiologist at Lovelace who was an authority in the fields of lung physiology and high altitude acclimatisation. He had been in charge of the Department of Aviation Physiology at the Aeromedical Research Institute in Berlin during World War II, and was part of Operation Paperclip by which dozens of German scientists were brought to the United States after that war. Arriving in 1947, Lust was appointed to



Dr. Ulrich Luft in his laboratory. (Photo: Lovelace Respiratory Research Institute)

the Air Force School of Aviation Medicine at Randolph Field, Texas, before Dr. Lovelace invited him in 1954 to head the Department of Physiology at the Lovelace Clinic.

"Dr. Luft had come to the clinic to work, and he was a very driving force, too, particularly as far as pulmonary and circulatory research was concerned. He was a very capable man," Secrest has observed. "He was really a main cog in the clinical, physiologic research part of the program. Without him, I doubt seriously if we would have been more qualified than any other clinic to do the work. Of course, Randy [Lovelace] was able to sell the clinic, and rightfully so, because we had the people there to do the work. I was asked to do the clinical work because I'd had aviation medicine and could give pilots license physicals."<sup>1</sup>

For the astronaut selection process, Dr. Luft was to conduct an extensive battery of physiological testing. Having secured this phase of the selection process for his clinic, Lovelace handed over most of the administration for the testing operation to Albert Schwichtenberg, M.D., a recently retired Air Force general and physician.

"Well, Schwichtenberg came just about the time we were really getting going," Secrest added. "I guess it was really too much for Randy to do all the ramrodding. Randy was the CEO, but he had his fingers in many things and so he kind of gave Schwichtenberg the responsibility of keeping the astronaut testing organized."<sup>2</sup>

The first contingent of astronaut candidates arrived at Albuquerque airport on 6 February 1959, checked in to their approved motel, and entered the Lovelace Clinic the next day. The others would similarly arrive over succeeding weeks for seven and a half days, and three evenings, of intense, painful, humiliating and often degrading medical scrutiny and thirty different laboratory tests.



Dr. Luft (standing with dark tie) supervising astronaut testing on a bicycle ergometer with an unnamed subject. (Photo: Lovelace Respiratory Research Institute)

The tests had six basic components: the candidate's medical and aviation history; a physical examination; lab tests; a radiographic examination; physical competence and ventilator efficiency tests; and then a final evaluation. The Lovelace examiners were instructed to eliminate anyone who was not in perfect physical condition and health. "We could not afford to overlook any test that might catch even a minor defect," Lovelace later told *Life* magazine in discussing the medical programme. "There might, for example, be a tiny congenital opening between the right and left sides of the heart. Normally a man so afflicted might never show a sign of heart trouble, but under extreme circumstances, such as sudden decompression at high altitude, such a defect could mean death."<sup>3</sup>

## DOCTORS AND PILOTS

Historically, the relationship between pilots and physicians has been adversarial. There was an understandable antagonism directed towards doctors who could so



Dr. Randy Lovelace II at his Lovelace Clinic desk. (Photo: Lovelace Respiratory Research Institute)



Deke Slayton undergoes a medical check-up at the Lovelace Clinic. (Photo: Lovelace Respiratory Research Institute)

easily ground a man from flying for what could otherwise be considered a minor ailment. But at Lovelace the pilots realised that to progress to the next phase they would simply have to grin-and-bear-it. "If you didn't like doctors," Deke Slayton later said, "it was your worst nightmare. Take the standard medical examination... and multiply it by ten. They had a captive audience, and they exploited it."<sup>4</sup>

For their part, the examiners needed to determine which (and how many) of the thirty-two candidates were sufficiently motivated to endure the rigour of the testing.

But as candidate Chris Christian has pointed out, it all kicked off with a warm reception. "Upon arrival at a motel in Albuquerque we were graciously received by Dr. Lovelace's folks and invited to a sort of reception at his home that evening. I recall what a neat and genuine gentleman he was. We were given an introductory schedule of events for the next few days and told we would get a far more specific schedule the next day at the clinic. We were told that during the process, our identity would not be revealed and that we would be referred to by numbers. I do recall, however, that names must have been available because the staff had a little party for me on my birthday."<sup>5</sup>

Dale Cox, who arrived in the fourth group on 20 February, has retained his copy of the test programme the candidates faced.<sup>6</sup>

### **Friday**

Evening: Collect first stool specimen Friday night or Saturday morning. A special container will be provided for this purpose. Bring this specimen with you to the laboratory on Saturday morning. Nothing to eat, drink or smoke until after first blood specimen is taken Saturday morning.

### **Saturday**

7:00 a.m. Nothing to eat, drink or smoke on arising until after collection of blood specimen.

8:00 a.m. Report to laboratory on first floor for taking the first blood specimen.

9:00 a.m. Before leaving for breakfast, report to Miss Thomas in main Clinic lobby on first floor for special instructions.

1:00 p.m. Following a normal lunch, report to Miss Thomas' desk on the first floor. You will be called in order for X-rays of the heart and sinuses, and for hydrostatic weighing.

1:00 p.m. Starting at 1:00 p.m., collect all urine in container provided for this purpose. Continue collecting urine in this container until 1:00 p.m. Sunday.

Evening: No restrictions on eating, drinking or smoking this evening. Collect second stool specimen Saturday night or Sunday morning.

### **Sunday**

9:00 a.m. Following a normal breakfast, report to main Clinic lobby for electrocardiogram testing. Bring second stool specimen.

1:00 p.m. Turn in 24-hour urine specimen. Balance of afternoon and evening open after completion of electrocardiograms.

7:00 p.m. No smoking after 7:00 p.m. until completion of blood volume determination at approximately 2:30 p.m. Monday.

Evening: No restrictions on eating or drinking Sunday evening. Note that Monday morning you should have only a light breakfast.

#### **Monday**

8:30 a.m. Following light breakfast report to Physiology Department, first floor Clinic building, for exercise test (bicycle test).

10:00 a.m. Immediately following exercise test, report to Dr. Secrest's office on third floor for physical examination and review of medical history.

11:30 to 12:30 p.m. Light lunch.

1:00 p.m. Report to Dr. Cardus in Physiology Department for blood volume determination.

2:30 p.m. Immediately following completion of blood volume test report to Ophthalmology Department on second floor of Clinic for eye examinations, which will take most of the balance of the afternoon.

12:00 p.m. Nothing to eat, drink or smoke after 12:00 midnight until approximately 12:30 p.m. Tuesday.

#### **Tuesday**

7:00 to 11:00 a.m. Report to Dr. Howarth in Radiation Therapy Building for total body water test.

11:00 to 12:00 p.m. Report to Laboratory for BSP [sulfobromophthalein] liver function test.

12:00 to 1:00 p.m. Normal lunch.

1:00 p.m. Report to Miss Barnhisel in basement for audiometric testing.

2:30 p.m. Report to Otolaryngology Department on second floor of Clinic for ear, nose and throat examination.

12:00 p.m. Nothing to eat, drink or smoke from midnight until approximately 10:00 a.m. Wednesday.

#### **Wednesday**

7:00 a.m. Nothing to eat, drink or smoke on arising.

7:30 a.m. Report to laboratory on first floor, Lasseter Laboratory Building, for the tests listed below:

- |                      |  |
|----------------------|--|
| • Differential       | Special hematology smear                       |
| • Hemoglobin         | Cholesterol                                    |
| • Leucocytes         | Blood sugar                                    |
| • Hematocrit         | Blood urea nitrogen                            |
| • Grouping           | Protein electrophoresis                        |
| • RH factor          | Protein bound iodine                           |
| • Serology           | Serum electrolyte studies                      |
| • Sedimentation rate | (CO <sub>2</sub> , potassium, sodium chloride) |

8:30 a.m. Immediately following laboratory work report to Physiology Department on first floor of Clinic for pulmonary function test.

9:30 a.m. Following pulmonary function test, breakfast available at Bataan Hospital cafeteria.

11:00 a.m. Report to X-ray Department, first floor Clinic building, for dental

X-rays. Following dental X-rays report to Miss Thomas for instructions for preparation for proctoscopy.

1:45 p.m. Report to Miss Anderson, first floor emergency room, for proctoscopy examination.

2:30 p.m. Following proctoscopy examination report to X-ray Department for spine X-rays.

4:00 p.m. Following spine X-rays report to Dr. Plank's office on third floor of Clinic building for G.U. [genitourinary] examination and instructions for collecting semen specimen.

5:00 p.m. Following examination by Dr. Plank, report to Miss Thomas for instructions for preparation for gastric analysis and colon X-ray Thursday morning.

Evening: Preparation for gastric analysis and colon X-ray.

12:00 p.m. Nothing to eat, drink or smoke until after completion of colon X-ray Thursday morning.

#### **Thursday**

6:00 a.m. Nothing to eat, drink or smoke on arising.

7:30 a.m. Report to Lassetter Laboratory Building for gastric analysis. Also turn in semen specimen.

10:00 a.m. Immediately following gastric analysis report to X-ray Department for colon X-ray.

12:00 noon Return to motel and wash hair. Do not apply oil after washing hair.

12:30 to 1:30 p.m. Normal lunch.

1:30 p.m. Report to Dr. Amick on second floor of Clinic for neurological examination.

3:00 p.m. Immediately following neurological examination report to Miss Thomas for electroencephalogram. You will receive at this time instructions for stomach X-rays for Friday morning.

Evening: EVENING FREE!

12:00 p.m. Nothing to eat, drink or smoke after 12:00 midnight until after completion of stomach X-ray Friday morning.

#### **Friday**

7:30 a.m. Nothing to eat, drink or smoke on arising.

8:00 a.m. Report to X-ray Department for stomach X-ray.

10:00 a.m. Report to Cardiology Department on first floor of Clinic building.

1:00 p.m. Report to Carco Air Service for flight to Los Alamos Medical Center. Potassium-40 (total body mass/weight test).

Chris Christian, like the other candidates, was apprehensive about the medical tests. "Dr. Lovelace had warned us that we would probably question some of the medical activity, but [we must] realize that little was known about how man would react to space travel, and since some of us would do so, it was very important that the medical community have some base data to refer back to in the future. And he was right . . . I have never had such a *complete* physical in my life."<sup>7</sup>

The completeness to which Christian was alluding was the invasive nature of some of the examinations. The candidates were military test subjects and they came to know this very quickly. They were prodded and probed beyond anything any of them had experienced before. Every day began before seven o'clock, with often a twelve-to-fourteen-hour day of testing ahead of them.

## MORE THAN A MEDICAL

Among a raft of examinations, detailed X-rays were made of each candidate's body while chemical, encephalographic and cardiographic data was recorded, as well as brain waves and total body radiation count. Their ears, nose and throat were closely examined by ophthalmologists and otolaryngologists, while cardiologists monitored their hearts. There were seventeen separate procedures in the examination of their eyes.

Strapped into a device resembling a Pilgrim dunking stool, each man was fully immersed into a tank of warm water in order to measure his body's specific gravity. As John Glenn recalled, "they knew what your weight was, and to get your exact body volume, they got us in a tank, and then you rubbed all over your body to get even the tiniest of air bubbles off, and you submerged in the tank and they made a measurement then as to what your exact body volume was by the amount the water had raised. So they then could define from that what your lean mass and body proportions were, things like that you'd never think of."<sup>8</sup>

Each candidate was also subjected to bicycle ergometer tests that involved him pedalling against increasing brake loads in order to record his pulmonary (i.e. lung) function under exertion.

The results of all the tests were recorded, and copies of each candidate's results were forwarded to the Wright Aero Medical Laboratory in Ohio in advance of their arrival for the Phase Four tests.

John Tierney was in the first group to arrive at the Lovelace Clinic. "There had never before been a space program, and accordingly, doctors didn't exactly know what they should be looking for in their tests," he recalled. "Upon arrival, we were handed an empty jug and told to carry it around at all times. The jug was for urine." This was no exaggeration, because they were required to carry around that gallon jug everywhere they went in order to collect a twenty-four-hour urine sample to measure the excretion of steroid hormones. "We were to pee in that jug, and only that jug, for the whole week. We were to have it with us at all times. I think the nurses had a ball watching us walk around carrying jugs of our own pee."<sup>9</sup> If a candidate forgot his jug, even once, he had to start all over again.

Scott Carpenter was in great physical shape, and would continually impress the white-coated medics – as well as his fellow pilots. He recalls that one instance of his fitness was in the pulmonary function test. "The object here was to breathe in room air and then exhale it into rubber bags at the same time you were riding a bicycle that got progressively harder to pedal. The purpose of the test was to trap the air that we exhaled in order to determine how efficiently our lungs worked. They had seventeen

rubber bags standing by for me to fill. But I fooled them. I kept going so long that they ran out of bags.”<sup>10</sup>

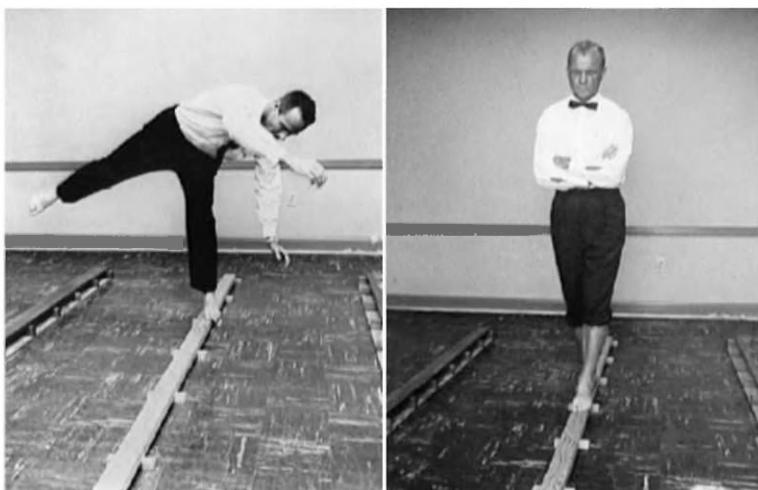
“He had us all psyched out,” said candidate Bob Solliday, speaking of Carpenter. “He had the lowest body fat, the best treadmill test, cycled forever, held his breath longer, never lost his cool. We were afraid to arm-wrestle the guy!”<sup>11</sup>

One common recollection is the force with which the prostate examination was carried out; some of the men even bled from the anus after an unnecessarily rigorous probing. One candidate reflected on what they called with alacrity “riding the steel eel”. It involved a metallic probe being inserted up their anus and then spread open inside the rectum to allow physicians to peer into their bowel.

According to John Tierney, “I don’t know if some of the doctors were sadists, but they sure wanted to know what we could take. Specialists had us bend over benches and went roaring up our rear ends.” He says that one subject, his friend Pete Conrad, angrily flipped over his bench and yelled at the doctor “after a particularly invasive, and probably unanticipated, rectal exam. The medical staff was prepared, though, with a male nurse as big and adept at handling Pete as any bar bouncer.”<sup>12</sup>

Frank Frazier still recalls his acute embarrassment “when I walked in for the colon exam and the doctor holding the protoscope was a woman!”<sup>13</sup>

Although seriously annoyed with many of the tests, Alan Shepard was able to have a little fun with a young doctor carrying out the “steel eel” probe test. While fellow Navy candidate John Mitchell watched on with blatant amusement, Shepard began moaning softly and rocking his hips with feigned pleasure as the probe was inserted into his backside. The further up the probe travelled, the louder he cried out, breathlessly saying it felt good and asking for more. As Mitchell tried desperately to hold in his chuckles, the poor physician was turning bright red with embarrassment.<sup>14</sup>



Scott Carpenter (left) and John Glenn (right) are tested at Lovelace for their sense of balance. Not unusually, Glenn wore his trademark bow tie for the test. (Photos: NASA)

## LOOKING BACK

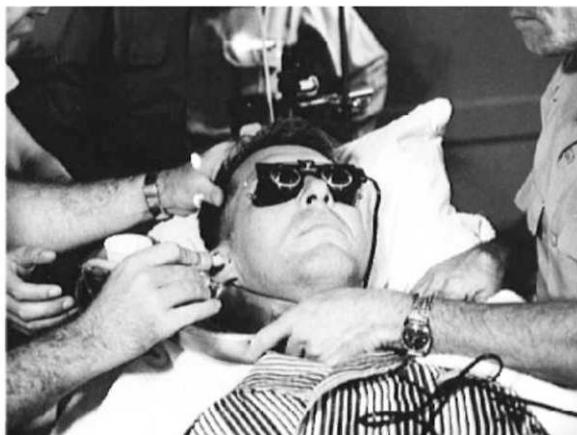
Reflecting on those days, Lon Walter was far more philosophical about the prostate tests. ‘Having had many more of those since then (I’m a prostate cancer survivor), I don’t think the Lovelace procedure was unnecessarily painful.’<sup>15</sup>

Tom Hayward tends to agree. ‘While the examinations were certainly extensive and intrusive, I must have expected much the same. Not that I liked any particular bodily examination or psychological test, the very compliment that I might have a chance at being chosen as one of the original astronauts made all this ‘part of the course’. I must have been a very boring subject.’<sup>16</sup>

For his part, Gordon Cooper felt that much of what the doctors were doing ‘was pure guesswork’. The physicians, he said, ‘got real creative, coming up with some unusual tests – such as blindfolding you and sticking a hose in your ear and pumping cold water into your ear canal. Just when you thought your eyeballs were going to float away, they’d take out the hose and remove the blindfold and jot down some notes on a pad. Any questions like ‘What’s that for?’ were met by grunts or some equally dismissive response, as in *Don’t worry, you don’t need to know.*’<sup>17</sup>

The test mentioned by Cooper was actually designed to establish the subject’s susceptibility to motion sickness and dizziness, and it would have done no harm to discuss this with the men. In fact, it was a continuing frustration for the candidates that they were given little or even no feedback on the results of the tests or even on their purpose. If anyone asked why such an elaborate or invasive examination was necessary, this either went unanswered or they were told it was too complicated to explain.

Although the candidates were intelligent, well-educated individuals, they felt the Lovelace physicians were simply not used to dealing with military flying personnel.



Candidate Wally Schirra undergoes a modified caloric test to check on his balance mechanism. Cold water is run into the ear to measure the effect on eye motions, or nystagmus. (Photo: NASA)

Some of the candidates, for instance, asked why they had to undergo a sperm count test, involving masturbation. Characteristically, they made light of this at the time, asking about female assistance and “doing it” for Uncle Sam, but it probably would have interested them to know that the study was related to the very serious issue of radiation in space and its possible effects on the reproductive organs. This required “before and after” comparative testing in order to check after a space flight for any sterility problems resulting from their exposure to cosmic radiation.

As recalled in candidate James Lovell’s memoir, *Lost Moon*, the Lovelace time was a “nightmare week”. He wrote, “In submitting to these whole-body violations, the candidate astronauts would have their livers injected with dye, their inner ears filled with cold water, their muscles punctured by electrified needles, their intestines filled with radioactive barium, their prostate glands squeezed, their sinuses probed, their stomachs pumped, their blood drawn, their scalps and chests plastered with electrodes, and their bowels evacuated by diagnostic enemas at the rate of up to six per day.”<sup>18</sup>

“The medical tests were required not just to see who could withstand the rigours of it all,” Dr. Voas later commented by way of explanation, “but also to ensure that, after we had put something like a million dollars into each of these guys, we had a good long-term investment.”<sup>19</sup>

### TESTS CONTINUE

The Lovelace Clinic tests were so strict that a minor ailment almost washed out one promising candidate: Gus Grissom. He suffered from hay fever, which the doctors



Gus Grissom undergoes medical evaluation at the Lovelace Clinic. (Photo: Lovelace Respiratory Research Clinic)

realised during their tests. One of them gravely advised Grissom that, in his opinion, he was disqualified. But the veteran pilot was not going to give in without a darned good dogfight, and he strenuously argued that he wouldn't encounter any ragweed pollen in space. It was a pivotal moment for Grissom, but eventually common sense won out: the ailment was noted in his file but he remained a candidate.

The programme scheduled one afternoon on which the candidates made a quick flying trip to Los Alamos. There, each man was laid in a cylindrical trough and then placed in a body-radiation counter to measure radioactive potassium-40. Since most potassium is in the muscles, this allowed scientists to estimate the ratio of muscle to fat.

In a soundproof chamber, each candidate would also undergo a series of hearing tests and a speech test. The latter was a check of the clarity of the subject's voice for transmission purposes. Dr. Charles Van Riper of Western Michigan University had devised a passage that contained all the speech sounds in the English language, and the men were required to read it aloud. The passage read:

You wished to know all about my grandfather. Well, he is nearly ninety-three years old; he dresses himself in an ancient black frock coat, usually minus several buttons; yet he still thinks as swiftly as ever. A long, flowing beard clings to his chin, giving those who observe him a pronounced feeling of the utmost respect. When he speaks, his voice is just a bit cracked and quivers a trifle. Twice each day he plays skilfully and with zest upon our small organ. Except in the winter when the ooze or snow or ice prevents, he slowly takes a short walk in the open air each day. We have often urged him to walk more and smoke less, but he always answers, "Banana Oil!" Grandfather likes to be modern in his language.<sup>20</sup>

One of the more diabolical and unpopular tests, graphically featured in the movie *The Right Stuff*, was the electromyography test of the candidate's nervous system and muscles, administered by specialist Dr. Lawrence D. Amick. To test each candidate's neuromuscular system, a small electrode was painfully inserted into a hand muscle in order to measure the electrical response of the muscles to nerve stimulation. Then, to test fatigue when the blood supply is inadequate, the circulation was cut off in that arm until the candidate reported the onset of characteristic pins and needles. At that time successive electrical shocks stimulated the nerves, causing the subject's fist to involuntarily clench and unclench. The pain associated with this exercise prompted many a profane outburst.

Wally Schirra also almost became a casualty of the medical examinations when his throat was examined by Dr. Schwichtenberg. The physician saw something that worried him and called in another doctor. "They peered down my oesophagus, and I feared it was serious," Schirra recalled. "I was a heavy smoker then. As it turned out, the doctors had only discovered nodes on my vocal cords."<sup>21</sup> Otherwise an outstanding candidate, Schirra received a call the following month from Charles Donlan, asking whether he would be willing to travel to the U.S. Navy Hospital near Bethesda, Maryland, for an operation on his vocal cords. He suggested with emphasis that if Schirra was agreeable, he would then be a serious candidate for final



Drs. Albert Schwichtenberg (left) and William Rutherford of the astronaut testing programme inspect a test apparatus. (Photo: Lovelace Respiratory Research Institute)

selection. It was only a minor operation that could be done under local anaesthetic, so Schirra agreed. He would be glad he did.

"...the doctors decided to go ahead and operate immediately," Schirra points out. "They arranged to give me what was normally a two- or three-month treatment in two or three days to get it over with. That, of course, was the bona fide proof that I was on the bandwagon and that they really cared. The doctor who was lined up to operate on me and remove the polyp was not too pleased over all the rush. He was called in on the double and told to go to work. He looked me over and frowned a few times, then said, rather gruffly, 'From all the fuss they're making over you, you must be getting ready to go to the moon or something.'"<sup>22</sup>

"I knew some of the other pilots who were being considered," Gordon Cooper later revealed in his memoirs. "Guys like Deke Slayton from Fighter Operations at Edwards, for example. Some of the Navy guys seemed sharp too. I could see that there was going to be stiff competition for what we were told would be a dozen astronaut jobs. At that point I felt I would be lucky if I made the grade, but I wanted a chance to fly in space so much that I was determined to do my best."<sup>23</sup>

"It was the first time that I had pictures taken of the back of my eyeball," recalls Chris Christian, "the first time I had swallowed radioactive material; the first time I had given myself enemas; the first time I had ever been measured for BMI; the first

time I had been weighed to determine body mass; the first time I had been evaluated to determine bone mass and its ratio to fat and so forth; the first time I had ever had my total body scanned and measured for various radiated elements; the first time my total lung capacity was measured. [And there] were all the usual evaluations, such as upper and lower GI tract, urinalysis (for which we carried a gallon jug everywhere for twenty-four hours), eyesight, heart, blood, hearing, balance, feel, height, weight, and so on.”<sup>24</sup>

One particularly humiliating test was gleefully highlighted in the film adaptation of Tom Wolfe’s *The Right Stuff*, in which the victim was Alan Shepard. It concerned the lower GI (gastrointestinal) tests. After barium had been pumped into the subject’s bowels, he had to follow an orderly through public corridors and descend in an often crowded elevator to the nearest toilet, two floors below, dressed only in a loose and revealing hospital gown, whilst running hunched over with a balloon-capped rubber tube protruding out of his anus, which was literally ready to explode.

“It was certainly one of the more memorable and embarrassing episodes for me,” Frank Frazier told the author. “How could anyone forget the public exposure during the barium enema tests, running around the hallways with a technician, holding a tube up your behind and our split-tail robe flapping in the breeze.”<sup>25</sup>

Pete Conrad, who had been reluctantly giving himself enemas, was incensed at the lack of dignity and human decency involved and one day he decided enough was enough. He grabbed that morning’s used enema bag, stormed into Schwichtenberg’s office, and plonked the laden bag onto the startled general’s desk. He then declared in brittle terms that he had given himself his last enema. As Wolfe wrote, “Word of the Enema Bag Showdown spread quickly among the other candidates, and they were delighted to hear about it. Practically all of them had wanted to do something of the sort.”<sup>26</sup>



Lt. Charles (Pete) Conrad, Jr. (Photo: NASA)

## PLAYING THE GAME

Wally Schirra would often talk about his experiences at the Lovelace Clinic. With typical dry humour he once pointed out, "We were well patients being looked at by sick doctors."<sup>27</sup> He also recalled with great humour how, the night before his group was to have barium enemas to enable the doctors to examine their intestines, Pete Conrad had taken them to Old Town Albuquerque for a fiery Mexican dinner. According to Schirra, the mischievous Conrad insisted it was their only chance for revenge.

Being test pilots, the candidates were naturally competitive and they disliked any form of favouritism unless it happened to go their way. One man, who will not be named here, told the author that while they were at the clinic John Glenn appeared to be benefiting by "getting repeats to improve scores on some tests, while the rest of us were not. We suspected it was because of his assignment at the time of the selection process or else some political reason. We weren't thinking in terms of political party or anything like that; only [about] who he knew and who might have an influence on his selection. We did not know who he was at the time, and our questions only came from watching the process."

Psychologist Robert Voas later admitted that Glenn's "cooperative attitude" both at Lovelace and later at the Wright Aero Medical Laboratory had likely resulted in some disproportionately high test grades from the examiners. "The interesting thing about John is that he overwhelmed everybody. He had a charismatic personality, and just about everybody who dealt with him was highly impressed and rated John right up at the top. I always smile a bit about that, because in some of the physical and mental tests, for example, his scores weren't all that much better than those of some of the other candidates. But the physicians gave him top evaluations due largely, I believe, to his strength of personality and dedication."<sup>28</sup>

According to Robert Secrest, it seems undeniable that the Lovelace examiners favoured Glenn as a candidate. "Toward the end of the process we had the chance to let our hair down, have a beer or two, and talk. I was always impressed with John Glenn. The guy's a pretty solid citizen... You don't really like to pick out any one specifically; they were a fairly impressive group. Alan Shepard had a personality something like that basketball player for the Bulls – you know... a little like the Michael Jordan approach to things: 'Here I am. Take me. Now go find the rest of them.' But he calmed down considerably later on."<sup>29</sup>

Albert Schwichtenberg was in agreement. "It was almost unanimous, the number one man was John Glenn. We were all enormously impressed with him. A lot of the astronauts themselves thought he was too... well, I can't think of a good term... but he was Mister Straight, and they weren't. The others were typical fly-boys in many respects, but they were all outstanding ones."<sup>30</sup>

For his part, Glenn mostly shrugged off the nature of the tests at Lovelace. "I didn't find the tests as humiliating or infuriating as some of the other candidates did... It was all in the interests of science, and going into space was going to be one of the greatest scientific adventures of all time."<sup>31</sup> But he is on record as later wryly observing, "I didn't know the human body had so many openings to explore."

Scott Carpenter tended to agree, although he knew some others found it all quite confronting. "Depends on who you asked," he mused. "I found it fascinating. It was intense competition. They examined every body opening; they made some others in doing that! It was a fascinating thing, because it gave us a new appreciation for what a marvellous machine the human body is."<sup>32</sup>

## HANDING OVER

As their week of medical tests drew to an end, each group of candidates was finally able to relax as the clinic staff pored over their records to ensure that each man had completed all the tests and that nothing had been overlooked.

The outgoing group was then given the chance to meet and brief the incoming group. As test pilots in a rather limited fraternity, they generally knew many of the others, so these meetings used typical test pilot humour. Part of the indoctrination ritual was to tell the newcomers what they could expect, which included the use of blunt, square needles, and proctoscopes with the dimensions of the Mount Palomar telescope.

Eventually, satisfied that their findings were fully recorded, the physicians told the outgoing group to make their way to the Wright Aero Medical Laboratory, where they were to undergo psychological and stress tests.

The extent of what the candidates had endured at his facility was not lost on Dr. Lovelace. "I just hope they never give *me* a physical examination," he observed with feeling. "It's been a long, rough period that they've been through. But when we can work with highly motivated and intelligent men like these, it makes our job much easier."<sup>33</sup>

On 21 March 1959, Dale Cox sent the following letter to Randy Lovelace:

As the senior naval aviator of the group of Naval Officers recently subjected to the famous "Lovelace space treatment", I would like to convey the appreciation of the group for the cordial treatment afforded to us by the clinic. We all certainly appreciate in retrospect the enthusiasm and good nature with which the members of your staff applied their skills toward learning our innermost secrets.

The cocktail party at your home was doubly enjoyed for simultaneously signalling the end of the course and the first night without restrictions. Please convey our appreciation to your delightful hostesses, Mrs. Lovelace and her charming assistants.

Most sincerely, Dale W. Cox, Commander, U.S. Navy<sup>34</sup>

As a postscript, no further NASA-sanctioned astronaut testing was carried out at the Lovelace Clinic. Nevertheless, while NASA would develop its own independent medical testing facilities, the clinic did carry out contract and consultancy work for the space agency. And Randy Lovelace, while remaining at the clinic, served first as the chairman of NASA's Special Advisory Committee on Life Sciences until 1963,

then senior consultant to its Office of Manned Space Flight, and finally the agency's Director of Space Medicine.

Meanwhile, in 1960, world-renowned pilot Jacqueline (Jackie) Cochran, the first woman to fly faster than Mach 1 in 1953, had teamed up with Randy Lovelace in a comparative exercise to determine whether woman pilots could endure many of the same physical and psychological tests carried out on the Mercury finalists the year before. Although the tests were never authorised or sanctioned by NASA, Lovelace was willing to place the clinic's sophisticated facilities at the women's disposal as he was personally interested in the psychological and medical evaluations that would result. Cochran herself was too old to do well in the testing, but set things in motion. That year, 29-year-old professional pilot Geraldyn (Jerrie) Cobb became the first test subject. Her results were medically impressive, and in 1961 twenty-five top women pilots were tested for their physical suitability for space flight at the Lovelace Clinic. When the results had been compiled and assessed, twelve women had joined Jerrie Cobb as subjects deemed psychologically and medically comparable to the earlier male astronaut candidates. The group would become known in space circles as the FLATs (Fellow Lady Astronaut Trainees), and, decades later, as the "Mercury 13".



One of the women test subjects, Jerri Truhill, during the tilt table test under the supervision of Dr. Robert Secrest and Nurse Sadie Rhoades. (Photo: Lovelace Respiratory Research Institute)



On 21 April 1964, Dr. Lovelace was sworn in as Director of Space Medicine for NASA by President Lyndon B. Johnson. From left, President Johnson, Dr. John Sellman, Christine Lovelace Sellman, Dr. Lovelace II, Mary Lovelace, NASA Director James Webb and New Mexico Senator Clinton P. Anderson. (Photo: Lovelace Respiratory Research Institute)

While Cochran, Cobb, and others applied political pressure on NASA to accept women into its ranks as astronauts, the space agency took no action. When the issue was raised in a public hearing by the House of Representatives' Space Committee in July 1962, NASA explained that because applicants were required to be military test pilots, no American women were qualified for selection. Also, NASA argued that it had not authorised the Lovelace testing, and despite their obviously excellent results it would not be pressed into considering the thirteen women for astronaut selection.

In the end, Congress decided that excellent medical results did not make up for a lack of jet piloting experience, and therefore refused to direct the space agency to integrate women into its space programme.

Three years later, on 12 December 1965, Randy Lovelace was aboard a chartered flight with his wife Mary, flying home to Albuquerque from Aspen, Colorado. Half an hour after take-off a navigational error took pilot Milton Brown into a blind, snow-filled mountain canyon. Disoriented, he attempted a 180-degree turn, but the canyon was too narrow and the twin-engine Beechworth Travelair crashed into a rock wall. All three occupants were killed. The small aircraft was not located for two days due to heavy snow and mist in the area. The three bodies were recovered the following day.

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# 7

## Wright-Patterson: the final hurdle

Wright Brothers Hill is located a little east of Dayton, Ohio, in an area now known as Area B of Wright-Patterson Air Force Base. There is a leafy, tranquil park atop this small hill, in which stands a 17-foot-high, pink granite tower erected in honour of the Wright brothers and their magnificent accomplishments in aviation history. Officially dedicated by Orville Wright on his 69th birthday, 19 August 1940, the monument was rededicated on that same date in 1998 following some extensive restoration work.

### WRIGHT AIR DEVELOPMENT CENTER

From the vicinity of that tower in 1959 one could look down on the Huffman Prairie, where the Wrights completed their flying trials after Kitty Hawk and demonstrated the world's first practical aircraft. Further afield, one would have seen a sprawling cluster of research laboratories, giant wind tunnels, test cells, fuel storage containers and a long, impressive row of aircraft hangars. Complementing these facilities was the wide 10,000-foot runway and an array of gleaming aircraft on the adjoining apron. This was the Wright Air Development Center (WADC) of the Air Research and Development Command (ARDC) of the U.S. Air Force.

The WADC included the Aero Medical Laboratory (AML), established in 1935. By the 1950s the various laboratories of the AML were housed within eight modern brick buildings and seven barrack-type buildings. It also possessed an engineering building, a research bioacoustics laboratory, and a large veterinary laboratory. The AML was populated by a veritable army of researchers, including anthropologists, biochemists, biophysicists, blood and heart specialists, psychologists, veterinary pathologists and surgeons, and acoustical, electronic, mechanical and aeronautical engineers... and even specialists in the design of clothing.

It was at the AML that the Human Factors Division of the ARDC established a programme in 1952 to select pilots for special research flights, and it was there that the stress testing for Phase Four of the astronaut screening process was undertaken. This involved a five-day battery of psychological, anthropological, physical fitness, biological acoustical, thermal and acceleration tests conducted by the investigating

team led by Lt. Colonel William R. Turner, USAF, MC, Chairman of the Candidate Evaluation Committee, with the assistance of Capt. Charles L. Wilson, USAF, MC, Candidate Evaluation Program Task Officer. It began on 16 February 1959 with the arrival of the first group of finalists after their medical tests at the Lovelace Clinic, and concluded with the departure of the sixth and final group on 28 March.

Whereas the purpose of the Lovelace Clinic examinations had been to establish the medical status of the finalists, the WADC programme would determine their physical and psychological well-being as a means of judging how they might respond to the physical and mental stresses likely to be involved in human space travel.

### **PREPARING TO MEET THE CANDIDATES**

According to retired Lt. Colonel Walter B. (Sully) Sullivan, Jr., USAF, who as a first lieutenant was the liaison officer between the AML staff and the thirty-two finalists, "Much of the testing at Wright Air Development Center's AeroMed Lab, related to the physiological response to stress in 'unusual environments', was based on research conducted there during the latter '50s by Captain (Dr.) Terence F. McGuire, USAF, MC, and to a somewhat lesser extent by Captain (Dr.) Frank J. Leary, USAF, MC. This work was performed under Project No. 7164, Task No. 71832, 'Physiological Criteria for Extended Environments'."<sup>1</sup>

In reviewing the events of half a century ago, Sullivan conceded that things were vastly different back then. "Unlike today, where it has become quite difficult to enter a military installation in the United States, in the late '50s it was far less difficult to gain entrance to a base like Wright-Patterson AFB. In those days, reporters from the Dayton newspapers and any other media had only to request a Press ID pass which then gave them easy access to most of the base during normal duty hours. For this reason, it was necessary for all of us at AML to keep a tight lid on the work that we were doing in connection with the evaluation of the Mercury candidates.

"The first I knew of what was to take place at AML, beginning on Saturday night, 14 February 1959, was when I was called into the office of my boss, Lt. Col. William R. 'Tux' Turner, USAF, MC, on 2 February, who told me that we had just been tasked by the Air Research and Development Command's Bioastronautics Office, headed by Brig. Gen. Don D. Flickinger, USAF, MC, to commence the screening of many Air Force, Navy and Marine test pilots from whom would be selected the Project Mercury astronauts. This was very early in February 1959 and we were to begin this testing on Monday, 16 February, at 0800. We at AeroMed Lab had become used to this kind of thing as we were usually the 'first stop' for every military balloonist, U-2 and X-series pilots, and most other research activities involving flight at high-altitude since early in the days of the old Army Air Service.

"We had many unique facilities including a human centrifuge, high-altitude/low-pressure chambers, heat stress chambers, vibration and acoustic/anechoic chambers, among other things. Many of the great names in aviation and aerospace history have passed through the AeroMed Lab, including Neil Armstrong, Scott Crossfield, Bob White, Al White, Joe Connor, Malcolm Ross, Lee Lewis, Victor Prather, Doug



1st Lt. Walter B. Sullivan, Jr., USAF, in an MC-1 Partial Pressure Suit after a two-day endurance run to high altitude in the AML Chamber, circa June 1958. In February 1959 he became the astronaut candidates' liaison officer at Wright ADC. (Photo courtesy of Walter B. Sullivan, Jr.)

McClure, David Simons, Joe Kittinger (who was also my contemporary at AeroMed Lab), Iven Kincheloe, and just about every other aviation or space pioneer including Wiley Post.

"With less than two weeks before the first of the candidates were due to arrive, it became very quickly apparent that we had to shift into high gear in order to be ready by Monday, 16 February, for at least five 'visitors' a week for six weeks."

For Sullivan and the staff at the AML there were several immediate problems to be resolved: where the candidates would be billeted; how they would be moved from one testing venue to another several times a day (each man would be required to be at a different place at a different time); and how they would provide for the necessities of life over five and a half days, especially because it would be necessary to restrict contact with the candidates to those who would perform the testing.

"Of course we at AML could not provide all these things ourselves, so Colonel Turner and I turned for help to the Base Commander [...] Brig. Gen. John D. Howe and his staff. When we met with General Howe, he brought along his Director of Personnel and Base Services, Colonel Truman H. Baldwin, the 'power behind the throne' who really made WPAFB tick. When we left our meeting [...] we knew we had most of our problems solved. They gave us a virtual carte blanche which made our upcoming task almost seem easy.

"In view of our need to keep everything we were up to *sub rosa*, Baldwin gave us many useful privileges. First he put a full-time car and driver at our disposal until the job was done, and also provided me with a car to keep 24/7 with no need to turn it in every night – which was the usual rule; no filling out and turning in daily 'trip-ticks'. They only saw my car at the motor pool when I needed it washed or gassed up. It was also generally forbidden to park a government issued (GI) vehicle at home overnight, but I was allowed to do so for six weeks.

"Usually when an officer goes on temporary duty, he'd check into the Bachelor Officers' Quarters (BOQ) for a place to lay his head. Baldwin gave me the authority to manage a whole block of the BOQ to house the Mercury candidates, along with the ability to levy and settle their billeting charges by myself, with no questions asked – unheard of! Not only that, but I also settled their laundry charges so that they never became exposed to the scrutiny of on-base services, which is why I still have the original laundry tickets for about half of them.

"In those days, most officers belonged to their home base officer's club, which would admit them to any 'O Club' worldwide. Since these officers would not be in uniform they might be subject to challenge at the WPAFB Club where they were to eat all of their meals. A memo from Colonel Baldwin took care of this little matter. In fact, every request that we made over the six weeks was approved and satisfied by Colonel Baldwin."<sup>2</sup>

## PHASE FOUR BEGINS

The first thing Sullivan had to do in his role as liaison officer to the candidates was to work out the schedule of where each of the finalists in that group was required to be

for five and a half days a week, each differently every day. Then it was necessary to coordinate each testing venue's schedule for the whole six weeks. Almost before he knew it, the first group of candidates were on their way from Albuquerque on late-night "red-eye" flights.

#### **Mercury Astronaut Candidate Evaluation**

Group I, 15–21 Feb: Bell, Cooper, Givens, Shepard and Tierney

Group II, 22–28 Feb: Conrad, Lawrence, Mayo, Miller and Walter

Group III, 01–07 Mar: Baldwin, Ekeren, Hayward, Mitchell and Schirra

Group IV, 08–14 Mar: Cox, Grissom, Ireyworth, Jacobson, Ralston and Lovell

Group V, 15–21 Mar: Crandall, Christian, Iddings, Slayton and Wood

Group VI, 22–28 Mar: Bogan, Carpenter, Corbett, Frazier, Glenn and Solliday [Warren North of the NASA Space Task Group went through the testing "for the experience" with one of the latter groups – either Group V or VI]

On arrival at James Cox Municipal Airport, Dayton, Ohio, just after midnight the finalists reported to the airline office and asked for Colonel William Turner, as their means of identification, whereupon they were welcomed by their liaison officer, Lt. Sullivan, who had arrived at the airport half an hour earlier.

"I'd hang out by the airline check-in desk and wait for guys with 'white sidewall' haircuts to walk up to ticket agent and ask for Colonel Turner," Sullivan says. "You could tell them from a mile off. Then I'd approach and take them under my wing. On the twenty or so miles back to WPAFB, all the conversation between them was about all the holes in their bodies that had been pierced or probed over the last six days at Lovelace. Little did they know of the 'torture' that awaited them, beginning Monday morning."<sup>3</sup>

After being told they would be briefed at 10:00 a.m., the group was billeted in the Bachelor Officers' Quarters. Each man was handed an outline of what lay in store for him, as well as the schedule they were to follow.

Dale Cox still retained his message of welcome:

The USAF has been privileged by the opportunity to participate in the selection of volunteers for Project Mercury. The Aero Medical Laboratory, Wright Air Development Center, has a Crew Selection Development Program which will be used on the subjects. The Laboratory Coordinator for the entire program is Lt. Colonel William R. Turner, USAF (MC), the Task Coordinator is Captain Charles L. Wilson, USAF (MC), and the Escort Officer is 1st. Lt. Walter B. Sullivan, Jr., USAF (MSC). You will be given the office and home extensions of each of these people.

The purpose of this Crew Selection Development Program is to examine each NASA candidate and evaluate his physiological and psychological behavior under a variety of stresses. The records of the performance of each candidate will be forwarded to NASA, which will then utilize these data as well as those collected at the Lovelace Clinic and other testing facilities. NASA will then make the final selection. Therefore, the main contribution of

the Aero Medical Laboratory will be to subject each of the candidates to a standard series of crew selection tests and submit the results to NASA for interpretation. The data collected in this program will be used for Project Mercury purposes only and will not be incorporated into flying records, and is therefore not a threat to flying status if a subject should become light-headed or faint.

At the end of this one-week program of stress testing, each of you will be asked for your critique of the scheduling, transportation, billeting, and for any other constructive criticisms you may have of the series.

You are requested to familiarize yourself with your schedule, noting that each is different. On the mornings for which you are scheduled to report to Acceleration or Respiration, please do not drink coffee or tea for breakfast since this affects the biochemical test on your urine. So that you may be in the best physical condition during this week, you are encouraged to get as much sleep as possible and drink only moderately. Before reporting to Anthropology go to the Basement of Building 248 where you will be dressed in underwear and a flying coverall. You will then return to shower and dress. You are requested not to discuss at any time your reactions or impressions of any of the tests with the other candidates. Preconceived ideas as to a response in the test will considerably alter the final evaluation of the subject.

On pages 26-43 of the brochure you will receive are maps of Wright-Patterson Air Force Base and a list of the various on-base recreation and restaurant facilities and their hours.

For your on-base transportation, a driver and staff car from the Base Motor Pool has been assigned to each NASA group for one week. This car will be at your disposal, taking you to and from the Aero Medical Laboratory each day. For off-base transportation, the telephone number of the Fairborn Cab Company is Trojan 8-8608.

Finally, it is a great pleasure to have you here at Wright-Patterson. We wish to make you as comfortable as possible during your visit and we look forward to an interesting and profitable week with you.<sup>4</sup>

The candidate briefings on Sunday morning were conducted by the laboratory coordinator, the administrative assistant, the task officer, another investigator from the Physical Fitness Test Unit, and an investigator from the Psychology Test Unit. They were advised to perform to the best of their ability and not to be discouraged if they felt that they had underperformed on any particular exercise. Although the tests were deemed stressful and difficult to accomplish, the candidates were told that each investigator had experienced his particular stress test and there were no safety or risk factors. And they were further reassured that none of the medical, psychological or performance records would be included in their personal flight records unless they specifically requested that this be done. They were also reminded not to discuss the administration or results of their particular tests with the other candidates. With the aid of a slide projector, they were shown the specific tests they would undergo, each of which was briefly explained. The tests, they learned, would be:

- A. Psychiatric interview
- B. Rorschach test
- C. Positive g profile
- D. Transverse g profile
- E. Anthropometric studies
- F. Heat test
- G. Harvard Step test
- II. Flack and Valsalva Overshoot test
- I. Treadmill test
- J. MC-1 partial pressure suit test
- K. Tilt table test
- L. Equilibrium chair test
- M. High-energy sound test
- N. Recommendation committee's meeting<sup>5</sup>

There was an additional test—the Cold Pressor test—but this was deliberately excluded from the presentation because the medical investigators did not want the candidates to be forewarned. Once all the men's questions had been answered, the briefing was adjourned.

Secrecy was to be maintained at all times during the candidates' stay at WADC, and anonymity was a key factor in the stress testing. For administrative purposes, each candidate was assigned a test number from 1 to 31, and this was to be used if they needed anything, such as a vehicle from the motor pool. In addition, each man had an alphabetical designator that would only ever be known to the administration and liaison personnel. Even today, only a handful of people know what alphabetical designator was given to which candidate, and they regard themselves as still being sworn to secrecy. As there were 31 candidates, 26 were assigned letters A to Z and the other five were AA to EE.<sup>6</sup>

After lunch, the candidates were given an overview of what would happen over the following week. Lt. Sullivan participated in this part of the briefing. "They were instructed that if they needed any base service (taxi, etc.), they were to invoke either Colonel Turner's or my name. Later, after the selection had been made, John Glenn, in a letter to me, referred to it as having taken part in 'Lieutenant Sullivan's Party' at Wright Field!

"It also fell to me to maintain regular contact with the folks at Lovelace, mainly Dr. (Brig. Gen.) Albert H. Schwichtenberg, who was the Director of the Department of Aviation and Space Medicine at the Clinic. I also was in regular contact with Dr. Allen O. Gamble at NASA Headquarters in Washington and the Space Task Group at the Langley Research Center in Virginia. Neither we at AeroMed Lab nor the people at Lovelace really selected any of the astronauts, though on the side Schwichtenberg and I had our 'list of possibles' which we kept to ourselves until 9 April 1959."<sup>7</sup>

On completion of the information briefings on the opening day, the testing phase could begin.



This test in the Sound Chamber studied the effects of increasing noise levels on human activity; stimuli which has the potential to cause serious distraction during even simple mental tasks. Each subject was tested individually in a small, reverberant room. An intense noise of up to 145 decibels was produced by a broadband siren, in which high-pressure air was blown through a fire hose, which produced the entire sound spectrum. The subject's ears were protected by ear muffs. They were allowed three minutes to perform a number of relatively easy mental arithmetic tasks; first in quiet, then in noise, and finally in quiet once again. While Scott Carpenter undertakes the test, a physician is timing his responses. (Photo courtesy of Derek Kaufman, Wright-Patterson AFB).

## DOWN BY ONE

Jim Lovell was somewhat surprised and not a little relieved when he received orders to travel to Wright-Patterson AFB for Phase Four testing. He had resumed test duties back at Patuxent River at the end of what he would later call a "nightmarish week" at the Lovelace Clinic, which came to a devastating climax when he was asked to report to Albert Schwichtenberg's office. Once he was seated, the director looked Lovell straight in the eye and said, "Have you been ill lately, lieutenant?" Lovell, confused, answered in the negative. Schwichtenberg then opened a folder on his desk and read part of a medical report stating that his bilirubin was a little high. When Lovell asked for an explanation, he was told that bilirubin is a natural liver pigment, and he had a small excess of it. Worst of all, Schwichtenberg stated that Lovell could not proceed to the next phase of the testing.

In his co-authored book, *Lost Moon*, Lovell said that the doctor's response to his protests was met with a firm rebuttal. "Lieutenant, I have five men out there who don't have a bilirubin problem, and twenty-six more on the way who probably don't. I have to base my decision on something. I know you've been through a lot in the past week, and we thank you for your time." Lovell then asked whether the liver test could be repeated, suggesting the possibility that the reading had been wrong. "We already did," Schwichtenberg replied, closing the folder. "It wasn't. But we do thank you for your time." Lovell flew back to Maryland the following day, bitter and not a little upset.<sup>8</sup>

Nevertheless, Lovell received orders to travel to Wright-Patterson. Upon arrival, he introduced himself to the other five candidates billeted in the BOQ. At breakfast the following morning, another test pilot met them and apologised for being late, as he had just arrived from Edwards AFB. Suddenly the numbers didn't add up. Lovell then had some shocking news delivered to him by the liaison officer, Lt. Sullivan. The tests which showed a small anomaly in his liver function had apparently been



Jim Lovell would miss out on the first astronaut group, but not the second (Photo: NASA)



Treadmill tests were conducted to study the physical fitness of the candidates, as well as their stamina and motivation. The treadmill was operated at a speed of 3.4 miles per hour. Starting from the horizontal, the angle of the treadmill was raised by just under an inch each minute to a maximum angle of 25 degrees. The test would be terminated if the candidate experienced any unbearable discomfort, if their pulse reached 180 beats per minute and remained there for at least a minute, or at the discretion of the physician. Here a technician is raising the forward end of the treadmill while Tom Bogan is being tested. (Photo: USAF courtesy of Bogan family).



Chris Christian jokes with a physician after completing an exercise on the treadmill.  
(Photo: USAF).

examined once again, with the same conclusion. Somewhere, it seemed, there had been a lamentable mix-up in communications.

"On Monday we got the call at the AML that the tests were redone and he still had the problem," Sullivan commented. "That was when I told him that he was to return home for treatment."<sup>9</sup>

Understandably shattered, Lovell resumed his duties at Pax River, but took the time to send a message of support to his temporary roommate at WADC, Dale Cox. "Dear Astronauts," it began, "That bad Japanese booze has cut the competition to 35 [sic] – Good Luck! Jim: America's First Ex Space Cadet."<sup>10</sup>

Lovell was joined two weeks later at Pax River by the recalcitrant Pete Conrad. They both applied for the second astronaut group in 1962 and both made it into the selected group of nine. For his part, Lovell breezed through the NASA physicals at Brooks AFB in San Antonio, Texas, without any hint of a liver problem. Following his record-breaking flight aboard Gemini 7 in 1965, he said he was speaking to an unnamed doctor from the Lovelace Clinic and, to his surprise, was told that they "had made a mistake" in diagnosing bilirubin and he should have been allowed to complete the tests at the AML. In other words, he had been perfectly fit to proceed. "Well, that doctor was wrong," Lovell pointed out for this book. "He visited me at NASA at the time I had more time in space than anyone in the world."<sup>11</sup>

## A MIXED ROUTINE

For the candidates, the next five days at the AeroMed Lab would be a mixed routine of physical endurance tests involving hotboxes, centrifuges and isolation chambers, and a battery of psychological measurements involving such profiling expedients as Rorschach inkblot tests and question-and-answer sessions. As Wally Schirra noted, "Bob Voas, who stayed with Mercury as our official head shrinker, explained we had been found fit. Now, he said, they were going to test our physical and psychological capabilities to respond effectively to the stresses associated with space missions."<sup>12</sup>

Today, it is difficult to understand the extent of the physical exertions to which the candidates were subjected; in these stress tests they were really run through the proverbial mill, prompting candidate John Tierney later to describe the WADC as being "home to a whole host of new torture machines to test our group of astronaut hopefuls". The physicians involved in administering these tests would probably be aghast at Tierney's over-simplified but nevertheless graphic descriptions of some of the tests, but many aspects of those days remain intensely vivid to him, as he relates in his unpublished memoirs: "We would put on flight suits with a hole in the bottom and sit on a chair in an oven with a rectal thermistor inserted as the scientists cranked the kiln up to 130 degrees. Later, we sat in an airplane simulator as the operators on the outside tilted and shook the mockup violently. Inside, we were blindfolded, and had to use our other senses to keep the test craft level as the operators tried forcefully to vibrate the vessel and direct the plane off course."<sup>13</sup>

Dick Corbett also recalled this particular test. "The Equilibrium Test where you are 'flying' a seat was very interesting. The neutral point of the stick constantly changed as the seat was in continuous motion. You kept the seat level by constantly moving the stick. This was a piece of cake until you were blindfolded. Amazingly, I could still stay upright and relatively stable."<sup>14</sup>

As John Tierney wrote, there was still much more to endure. "Scientists had us blow up balloons over and over until we had run out of breath and been brought to exhaustion, nearly passing out ... These guys loved to press the limits. They were scientists, or maybe sadists, in a theme park of their dreams with no rules.

"The examinations continued when we were strapped into pressurized suits and locked into accelerometers to test our G-tolerance. The machine spun around faster and faster until the subject was on the brink of passing out. The scientists were kind enough to allow the subjects a stick for some small measure of control while being pushed to the max. I had prior experience with G-testing from my air squadron days. All pilots are required to sit in an accelerometer during training, but those tests didn't push us as far as the NASA one did. Most airplanes are built to withstand about eight Gs. When pulling out of a dive-bomb you pull between five and seven Gs. Here... I could get to about 10 Gs before blacking out. I suppose it's something you get used to."<sup>15</sup>

In another test, the men were isolated in soundproof rooms with no instructions beyond staying put. In this anechoic chamber absolutely no sound was reflected and the silence was so profound that a man could not only hear his heart beating but also the sound of blood rushing through the vessels of his ears. John Tierney wrote: "One



As the Mercury spacecraft would be subject to high temperatures, particularly during the critical period of re-entry, the candidates' tolerance to heat and their ability to function under stressful heat loads was tested. In this photo, Scott Carpenter is shown suiting up in preparation for his turn in the Heat Chamber. Clothing for the heat test consisted of one set of long, cotton thermistor underwear, a K-2B flying suit, a pair of cotton socks and leather shoes. Each candidate would be given an auscultatory heart examination before and after the test. Sensors attached to the candidate's body continually recorded their blood pressure and heart rate by EKG on a cathode-ray oscilloscope and on paper. (Photo: USAF).



Tom Bogan undergoing the heat chamber test. "Two hours at 130F [54.4C]," he later wrote as a caption to his photo. "Wasn't bad at all as humidity was 10% or less. Suit I'm wearing contains 34 temperature pickups plus one on head and hand plus one other. Weight was measured precisely before and after. I only lost two pounds. Blood pressure checked every fifteen minutes." (Photo: USAF courtesy of Bogan family).



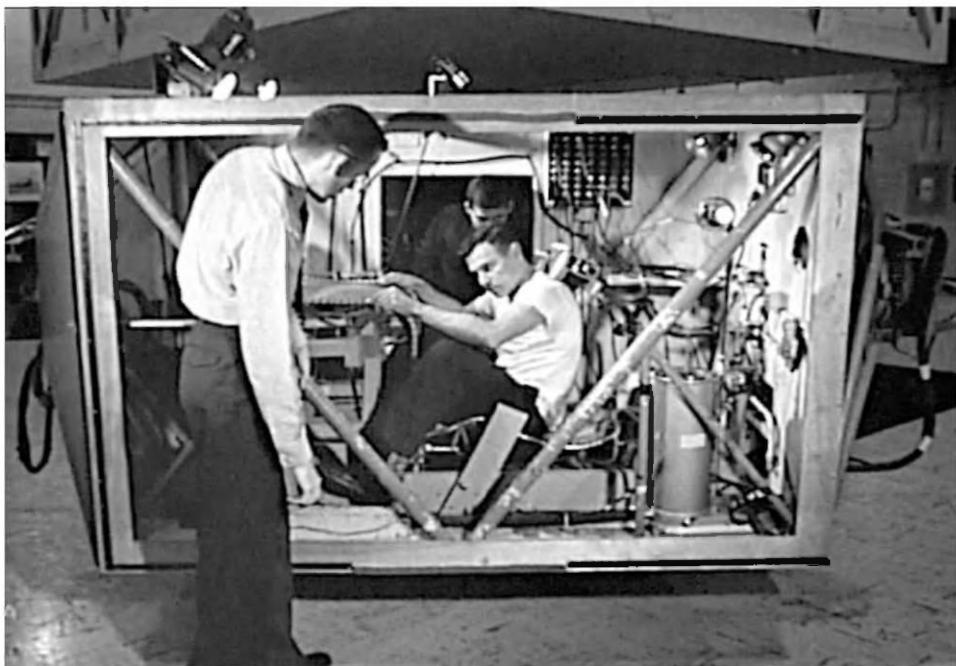
During the spacecraft re-entry phase, it was felt an astronaut might encounter low-frequency, high-amplitude vibrations. This test in the Equilibrium-Vibration Chair was to determine a candidate's ability to perform in such an environment and to maintain the horizontal position during low-frequency vibrations while counteracting pitch-and-roll disturbances. Each subject was blindfolded so that the modalities of equilibrium, other than vision, could be studied. The seat was constantly repositioned by a programmer, while at the same time it vibrated up and down from five to thirteen cycles per second. Programme inputs and corrective motions were all recorded for later analysis. Archie Iddings is filmed preparing for the test. (Photo: USAF).

at a time, we would sit in a blackened room or chamber, and have to endure sensory deprivation for two hours. I guess the psychologists wanted to know if anyone would just start talking to himself – and what he might say if he did.”<sup>16</sup>

The isolation chamber was not going to defeat Wally Schirra. “The room was pitch-black, with no sound or light,” he recorded in the book, *We Seven*. “And when you can’t hear *anything* in a room, you can imagine that you hear a lot. I beat that test by going to sleep in the middle of it. The doctors had me sit in a chair and they asked me not to get on to the bed which was nearby because they were using it for some other tests. But they didn’t say anything about not using the pillow that I found on the bed. So I stuck it on the back of the chair and fell sound asleep. They had to wake me up when the test was over.”<sup>17</sup>



In the second photo, Tom Bogan is photographed being shaken at seven cycles per second. The device's hydraulic pumps whined loudly, so the operator had to wear ear protectors. (Photo: USAF courtesy of Bogan family).

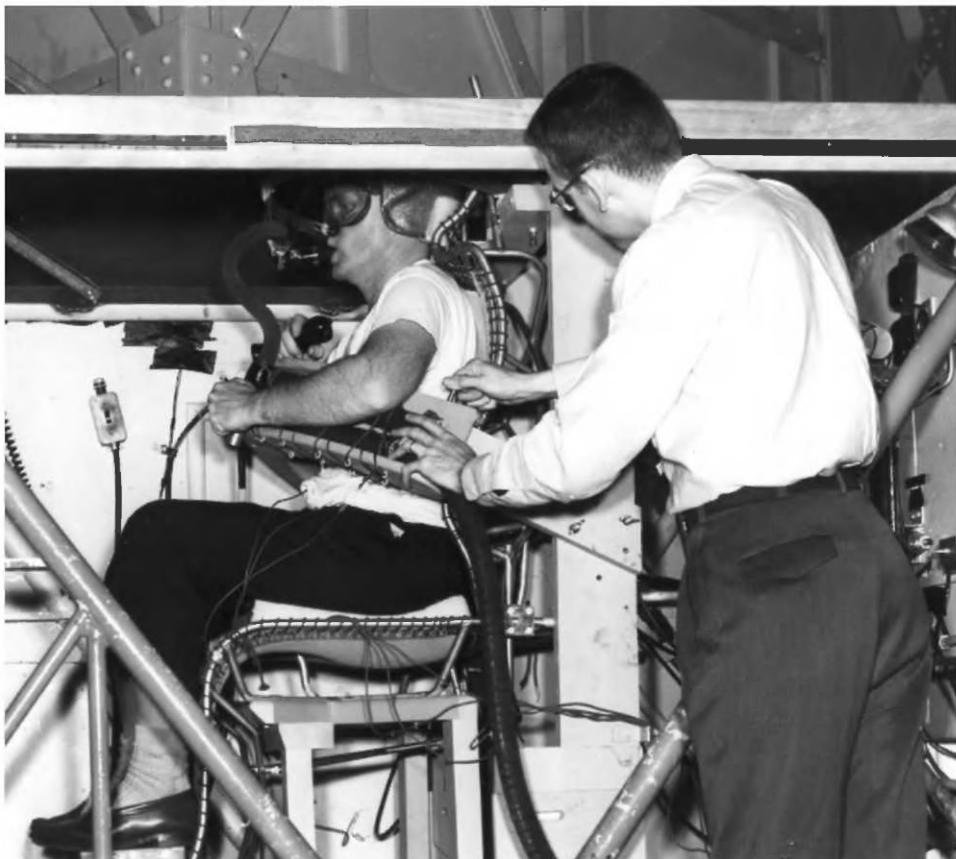


Bob Solliday is inserted into the centrifuge of the Aerospace Medical Laboratory for the first of two runs. The chamber was rotated around an axis in a circular motion to evaluate the decrement in respiratory function during acceleration. The first, seated position run would measure positive 'g' force, head-to-toe. The candidate was supported by an adjustable nylon-net seat. (Photo: USAF).

### IDIOT BOXES AND STEP TESTS

Yet another stress test the candidates were exposed to involved a device known as a Complex Behaviour Simulator (CBS) – which the candidates dubbed the Idiot Box. They would be seated at a console with a white-smocked observer standing behind them, and they were to make different responses to each of fourteen signals which appeared in random order and at increasing rates of speed. To maximise confusion and frustration in the subject, the action of each switch, lever or device was reversed from the normal. According to Walter Sullivan, this “was intentionally designed to violate every conventional good practice for instrument layout”. Lights would begin flashing all over the contraption’s panel, which had to be extinguished by throwing the correct switch [and] pushing a button. If they fell behind any prompt, however, a loud horn would blare in their ears. It was intended to measure the candidate’s ability to organise their behaviour and to maintain emotional equilibrium while subjected to stress.

George Ruff, the Air Force psychiatrist, was quite amazed at the results of this daunting test. He revealed that no one was expected to keep up with the device, and



John Glenn before the first of his two centrifuge runs. The vital lung capacity would be measured by means of the large-bore rubber tube inserted in his mouth, which connected the candidate's mouthpiece to the collecting chamber of a spirometer mounted in the centrifuge cab. The goggles were worn to shield the eyes as the resultant windblast might cause them to water at the higher rotational speeds. Their vital capacity was measured at 5-g and 8-g plateaus. (Photo: USAF).

yet many of the candidates not only kept pace with it, but performed it well beyond expectations; he was most impressed.

Then there was the Harvard Step test, in which a candidate had to step up and down on a 20-inch-high platform to the beat of a metronome. It was not long before his feet started to feel like lead. "You jump up and down off the platform for about five minutes," Deke Slayton stated in the book *We Seven*. "Then they throw you on the tilt board, which stands you straight up while they measure your blood pressure and your heart rate. I ran out of steam before I finished on the step. The tilt table didn't bother me. I just relaxed and started to go to sleep. I think this kind of shook them."<sup>18</sup> John Glenn was so fatigued when he had completed this particular test that he breathlessly referred to it as the 'Starvord Hep test'.



Bob Solliday and Frank Frazier strapped in for the second centrifuge run. For this second run the candidate's body was rotated until their back was almost parallel to the ground, at a 12 degree angle in the direction of the acceleration vector. The second transverse profile recorded vital capacity measurements at plateaus at 5, 8 and 12 g's. To monitor the possibility of a subject "blacking out" during this run, a control in the right hand allowed the candidate to extinguish a light whenever it flashed in front of them, which signalled to controllers that they were conscious and alert. (Photos: USAF).



For the Isolation Chamber test, each candidate (in this case John Glenn) was confined to a dark, soundproof room for three to four hours. While not particularly stressful in itself, data was obtained on their individual style of adaptation to isolation. Mental activity was measured by skin resistance during the test. This test could identify those who might not easily tolerate enforced inactivity, enclosure in small spaces, or the absence of external stimuli. (Photo courtesy of Derek Kaufman, Wright-Patterson AFB).



Pete Conrad sitting in front of a device the physicians called the Complex Behavior Simulator, but which was more simply known to the candidates as "The Idiot Box." In this test, the candidates were required to initiate different responses to each of fourteen signals which appeared in random order at increasing rates of speed. Developed by Dr. Bryce O. Hartman of the USAF School of Aviation Medicine, it was specifically designed to produce confusion and frustration in the candidates, while also measuring their ability to organise their behaviour and maintain emotional equilibrium under stress. Lights would come on or go out and had to be quickly turned back on or off by the subject. Needles would move and had to be centred by pushing or pulling levers. Reaction times were noted by oscilloscopes. For thirty minutes the device ran at a steady speed, then another thirty minutes at double speed, then forty minutes with the speed doubled again. (Photo: USAF).



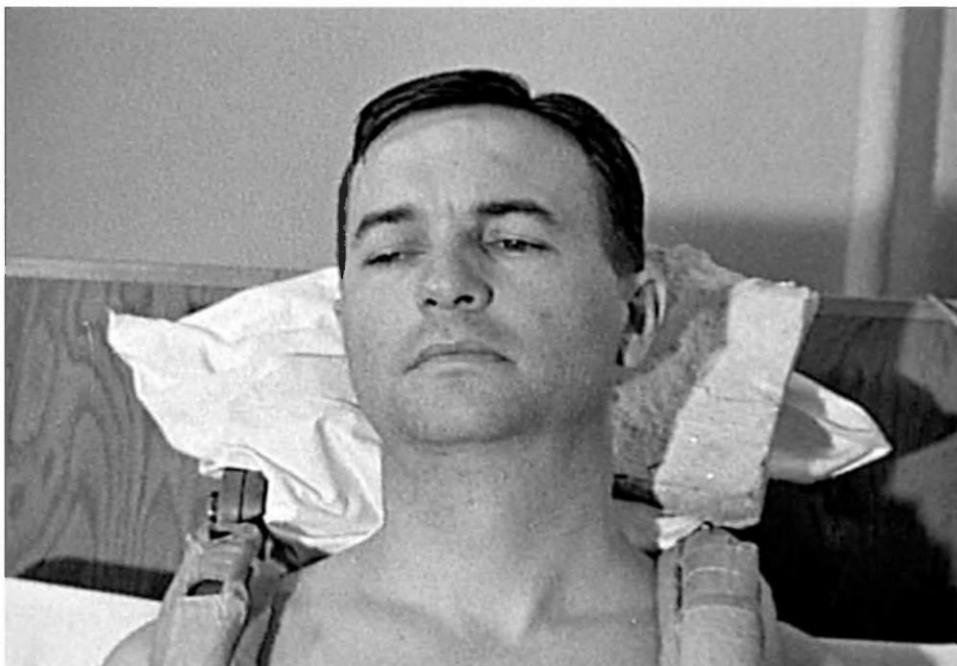
A physician checks Deke Slayton's equipment prior to the Low-Pressure Altitude Chamber test. He is dressed in long underwear, socks and shoes and an M-2 helmet and facepiece, then seated in a comfortable chair while being denitrogenated on pure oxygen for two hours to purge the blood of nitrogen. As soon as the candidate began denitrogenating he was fitted with EKG leads and then assisted into an MC-1 partial pressure suit. Blood specimens were taken before and after this test. At the end of an hour the subject was placed in the low-pressure chamber, breathing from a portable oxygen tank. All communications and monitoring leads were connected and the pressure suit inflated. With the physician observing through a viewing window the chamber was evacuated to 45,000 feet, then 55,000 feet and finally 65,000 feet for a full sixty minutes. After ten minutes at 65,000 feet the candidate had to read a specially prepared speech to check for speech intelligibility in a pressure suit. He was then given the option of briefly experiencing the chamber evacuated to 100,000 feet, although this was not part of the test; it was intended for familiarisation and experience only. (Photo: USAF).



In the first part of this Harvard Step test, the subject (in this instance Frank Frazier) had to step up onto a 20-inch-high platform in one second, and step down the next. This was to continue for five minutes, with the aid of a metronome set at one beat per second. The investigator would measure the subject's pulse during three periods – between 60 and 90 seconds, between 120 and 150 seconds, and between 240 and 270 seconds. All pulses were recorded by precordial auscultation. All 31 candidates completed this five-minute test. (Photo: USAF).



The Harvard Step would be used again in the tilt table test. The subject would wear a blood pressure cuff and stethoscope. After a five-minute rest period the candidate would stand upon the tilt table with his feet on a fixed platform, previously adjusted to the subject's comfort, as illustrated by Tom Bogan. The head of the tilt table had been set at 65 from horizontal. (Photo: USAF).

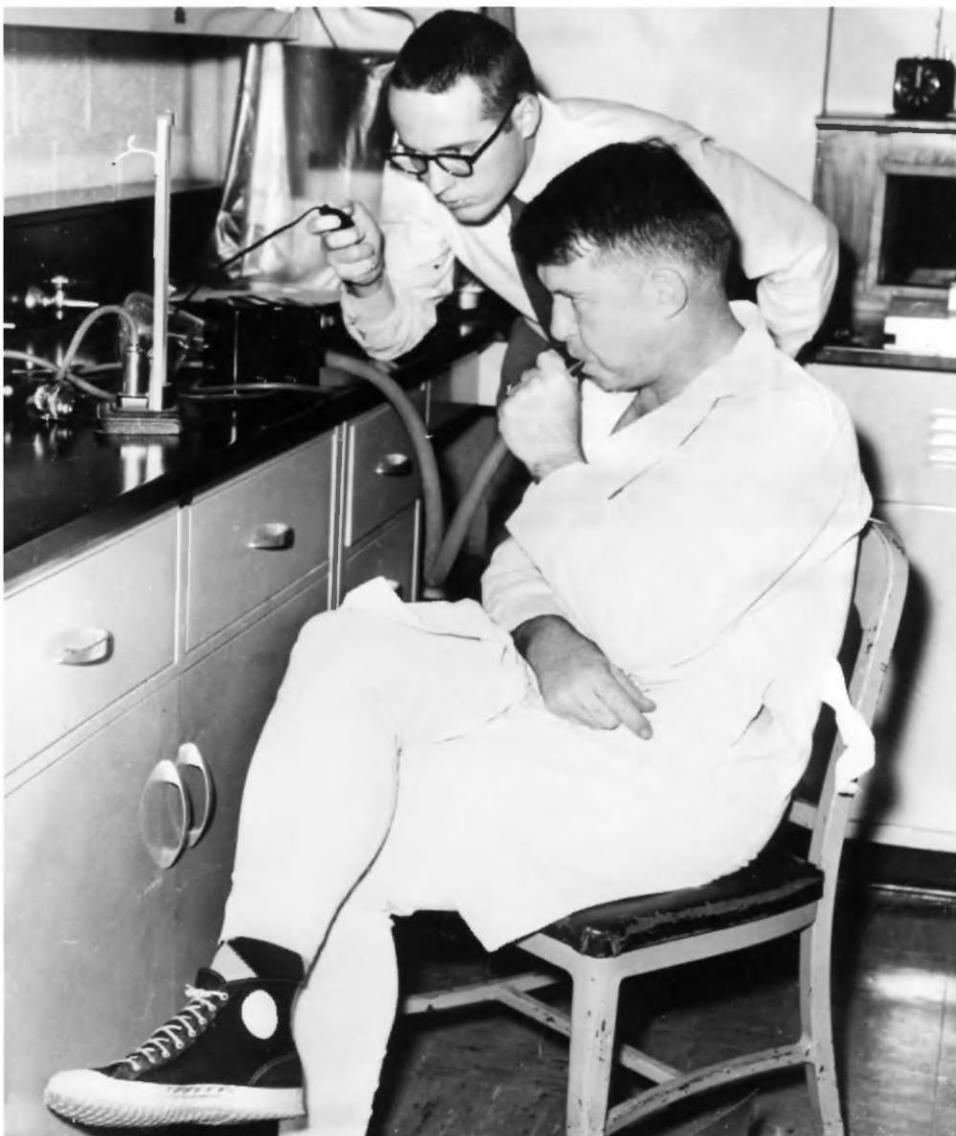


During the tilt table test, the subject was asked to relax, and not move his arms, legs or hips, and to avoid unnecessary talking. During each minute of the 25-minute test with the table tilted at 65 degrees the pulse and blood pressure were recorded. The strain of this test is evident in the face of candidate Archie Iddings. At the end of 25 minutes the table was returned to the horizontal and three final blood pressures and pulses were recorded at one-minute intervals. (Photo: USAF).

During his turn on the tilt table, Dick Corbett says that the monitoring physician periodically asked him whether he was okay, which he found annoying after a while. "I kept replying that I was okay. Because he continued to enquire I finally asked if he thought I was doing alright, and he just said 'Yes, you're doing fine.' I then said, 'If I'm doing fine, then why do you keep asking me?' To which he replied, 'Because you look like shit!',"<sup>19</sup>

There was a test for which the candidates were not briefed, as the investigating physician did not want them to anticipate or somehow prepare for it. In what was known as the Cold Pressor test, they were taken barefoot into a comfortably heated room and seated, following which their blood pressure and pulse rate were recorded. They were then told not to discuss what was to follow with any of their fellows. An assistant then came into the room carrying a tin pan filled with freezing cold water and ice cubes.

As the pan was placed on the floor in front of the subject they were told that they had just one opportunity to complete this particular test. Following this admonition, they were instructed to immerse their bare feet into the pan of water. The object was to record their blood pressure and pulse rate at one-minute intervals during the next



The Flack and Valsalva Overshoot test. The equipment used in this lung capacity test was a rubber mouthpiece with connecting tubing, a mercury column manometer, and an electric clock with a sweep second hand. The goal for the subject was to maintain the pressure as long as possible by blowing into the mouthpiece in such a manner as to support the column of mercury at 40 mm. Once this was achieved the clock was started. Then, when the column dropped below 40 mm the clock was stopped. The mean time was 66 seconds, although one candidate held the column of mercury for an amazing 171 seconds. The lowest time recorded was only 27 seconds. Wally Schirra is shown during his test. (Photo: USAF).



The Cold Pressor was the only test for which the candidates did not receive any prior briefing. After their blood pressure and pulse was recorded, a pan filled with cold water and ice cubes was placed in front of the barefooted subject, who was directed to immerse his feet for seven minutes, with further blood pressure and pulse readings taken every minute. The candidates were advised they could terminate the experiment at any time. The subject in this instance was Frank Frazier. Fellow candidate Tom Bogan later stated, "The first four minutes hurt, but the last three weren't bad. The trick was to hold your feet absolutely still." (Photo: USAF courtesy of Frank Frazier).



In a scene that could have come from science fiction writer Ray Bradbury's book *The Illustrated Man*, Tom Bogan had lines drawn all over his body, with daubing to provide more contrast to stereo photographs taken at four different angles as part of the gathering of anthropometric data on each candidate. The negatives from this topographical measurement were then sent to an aerial photogrammetry company in Texas who made topographical maps of the candidates' bodies, giving extremely precise measurements. (Photo: USAF courtesy of Bogan family).

seven minutes. If they suffered severe discomfort they could remove their feet from the ice water at any time, the experiment would be terminated, and their endurance time recorded. "It's surprising how sharp the pain of near-freezing water is on bare skin," John Tierney recalled.<sup>20</sup>

Altogether, only three candidates did not last the full seven minutes. One subject completed the test with very little comment and apprehension, although it was noted that his blood pressure and pulse rose markedly during the time his feet were in the water, and he sustained a systolic elevation even after he removed his feet from the water. However one unnamed candidate decided it was time to rebel, as recorded in the WADC Technical Report 59-505:

This subject complained bitterly when presented with this test and stated that he was sure he would be unable to keep his feet in the water. When he was finally convinced that it was necessary, he placed his feet in the water,

complaining bitterly all the time. At the end of 15 seconds, he complained of severe pain and withdrew his feet. He made a half-hearted second try but finally refused any further attempt. His resting blood pressure was 119/60, his resting pulse 85. Immediately after placing his feet into the water the first time, his blood pressure rose to 150/110.<sup>21</sup>

Walter Sullivan agreed that this act of token rebellion had taken place. "We had one guy who flatly refused to immerse his feet in the basin of water and ice cubes at thirty-two Fahrenheit for the Cold Pressor test. It was seven minutes of agony but, ironically, it felt less agonizing the longer your feet were in the ice bath. Everyone's feet after five minutes looked like he was wearing a pair of red wool socks! He was warned that his continued refusal would certainly disqualify him from further consideration."<sup>22</sup>

**Final Ranking Of Candidates On Physical Fitness Tests**  
Subjects Score Expressed as ( - or + ) from the Mean Score

Rank	Subject	Score
1	K	-9.28
2	EE	-4.80
3	BB	-3.98
4	V	-2.42
5	G	-2.41
6	H	-2.03
7	Y	-1.59
8	DD	-1.52
9	S	-1.23
10	L	-1.17
11	P	-1.13
12	Z	-0.84
13	AA	-0.72
14	C	-0.39
15	A	-0.37
16	E	-0.28
17	R	-0.23
18	O	1.48
19	CC	1.87
20	T	-2.19
21	M	-2.23
22	X	-2.62
23	I	-2.75
24	U	2.84
25	J	-2.99
26	W	-4.13
27	Q	-4.87
	B*	
	D*	
	F*	
	N*	

\* Denotes subjects who terminated tests for psychological reasons

**Final Ranking Of Candidates**  
**Unit Ranking**

Acceleration acoustics noise	Biological acoustics vibration	Biological fitness	Heat	Physical	Psychology
DD	D	J	G	K	EE
G	V	H	P	EE	R
J	E	B	Q	BB	Z
R	S	Q	U	V	DD
M	BB	EE	DD	G	K
K	G	U	I	H	CC
O	P	F	E	Y	L
F	Q	A	H	DD	G
V	I	C	V	S	Q
D	U	V	AA	L	U
X	AA	P	S	P	J
U	B	BB	L	Z	E
H	A	G	K	AA	O
P	R	L	C	C	BB
EE	CC	X	A	A	S
BB	C	W	N	E	W
S	Y	CC	BB	R	Y
AA	J	K	CC	O	AA
E	DD	S	EE	CC	B
Z	T	T	Z	T	P
W	X	DD	F	M	X
L	L	D	D	X	I
Y	K	Y	M	I	A
T	EE	M	B	U	C
C	N	Z	J	J	M
A	M	R	Y	W	V
B	O	I	O	Q	N
N	H	O	R	B	H
Q	W	AA	W	D	D
CC	Z	E	T	F	T
I	F	N	X	N	F

The final report "Project Mercury Candidate Evaluation Program", WADC TR 59-505, dated December 1959, lists in tabular form the test results ranked for each of the 31 candidates within a given test. Each candidate was given a randomly chosen designator using letters A through EE, without a key as to which man was associated with which letter(s). James Lovell was not on this list because he was in attendance for only one day.

## PSYCHOLOGICAL EVALUATION

After an extensive evaluation of each candidate's physical status, he was subjected to psychological testing to investigate his motivation and personality. Hence after each

strenuous day of rigorous stress testing, a candidate was subjected to psychological grilling that lasted several hours which severely taxed their endurance, patience and concentration.

As Dr. George Ruff told the author, it was decided that since the candidates had their evenings essentially free after the stress testing, this was a chance to conduct a more extensive battery of tests than those carried out in Washington. "These were assembled, off-the-shelf, from the air force and naval schools of aviation medicine. Many had been used in pilot selection. There was a lot of publicity about this and it was covered in the *Life* series as well as in Tom Wolfe's book, *The Right Stuff...* which accurately conveys the spirit of what went on." When Ruff had proposed a programme containing around thirty hours of intensive psychiatric evaluation and psychological testing he had been fairly sure that NASA would severely reduce its scope, and so was pleasantly surprised when the space agency accepted "the whole program as we set it up".<sup>23</sup>

These tests included the famous Rorschach inkblot test, in which the subject's perceptions of different shapes are recorded and analysed in order to evaluate their personality characteristics and emotional functioning. Pete Conrad, as a deliberate ploy designed to provide what he reckoned the test was meant to show, said that one inkblot reminded him of a vagina and another was a man and a woman engaged in a sexual act. Despite this and other acts of hormonal levity, Ruff and Levy later stated that responses to the Rorschach were well organised. "Although not overly rigid, they did not suggest much imagination and creativity. Aggressive impulses tended to be expressed in action rather than fantasy."<sup>24</sup>

The irrepressible Pete Conrad believed that the 20-card Thematic Apperception Test (TAT) was where his candidacy came to a sticky end, as he tended to be overly flippant in his responses. During this test the candidate was presented with nineteen pictures one by one, each with 'loaded' content. They had then to visualise a story involving what they saw and describe this to the psychologist. It was a little like the Rorschach test, but with real-life situations. His zany sense of humour came to the fore when the psychologist administering the test, Dr. Mildred B. Mitchell, showed Conrad the twentieth card and invited him to tell a story about what he saw. If the candidate simply retorted that it was blank, this would be recorded as showing an inhibited imaginative capacity. "So I took hold of the thing," Conrad later related, "and then I turned it over and said, 'You gave it to me upside-down!' And that did it. It was over – right there."<sup>25</sup>

It wasn't only these cards that were stacked against Conrad; he had not endeared himself to the doctors who were natural enemies of pilots at the Lovelace Clinic, especially when he placed his used enema bag on General Schwichtenberg's desk.

Apart from the Rorschach and thematic apperception quizzes, the testing for the finalists also included sentence completion, draw-a-person, an officer effectiveness inventory, and one of the most probing: being asked to write twenty answers to the question "Who Am I?" Additionally, there was a peer rating question in which each candidate was asked to say which of the other members of his group he liked best, which of them he would most like to accompany him on a two-man space mission,

and which one he would assign to the flight if he could not go himself. In total, the finalists had to answer 566 questions on the personality inventory test.

"Closer to the end," John Glenn mused, "you were describing yourself in ways you hadn't thought of very much."<sup>26</sup>

"The days were exhausting," reflected John Tierney, "but a couple of the guys would still find the energy to get dressed up, go out and chase women. At the end of all the experimenting, we were told that 12 of the 31 of us would be selected as astronauts."<sup>27</sup>

Once all these tests had been completed, an overall evaluation of each candidate was made during a final conference of those who compiled the psychological data. Then the committee ranked them all on the basis of their overall performance, with special aptitudes being taken into consideration, so that a ranking within the group could be determined. By combining the psychiatric evaluations, the results of the physical examinations and physiological data from the stress test procedures, the candidate group list was then subdivided under three headings: outstanding, highly recommended, or not recommended. WADC Technical Report 59-505 provides the final breakdown.

In an approach to final candidate recommendations, it was the unanimous opinion of the Committee that candidates with character traits undesirable in the team effort should not be recommended. It was the opinion of the Committee that there were eight candidates who should not be recommended for Project Mercury because they demonstrated a lack of the attributes necessary in the team effort of Project Mercury.

The remainder of the candidates (23) were divided into outstanding or highly recommended. Those who were chosen as outstanding candidates demonstrated excellence in maturity, intelligence, motivation and emotional stability. It was desirable but not mandatory that they also demonstrated excellence in physiological performance to the stressful tests which were given throughout the Aerospace Medical Laboratory. The candidates ranked as highly recommended performed in a highly satisfactory manner and were seemingly adequate for Project Mercury. But on the basis of competitive performance they had not attained that degree of excellence which had been demonstrated by those rated as outstanding. Seven candidates were recommended as outstanding, without reservations. Three additional candidates were recommended as outstanding with reservations. The reasons for reservations were:

1. One candidate was not entirely sure that he desired to continue on in Project Mercury.
2. One candidate had a heart murmur of probable organic etiology.
3. One candidate had a very high index of strain as a result of his performance on the heat test.<sup>28</sup>

The purpose of the reservations was to bring these problems to the attention of the NASA selection team. As a result of the committee's findings, the final analysis came to this:

Outstanding without reservations:	7
Outstanding with reservations:	3
Highly recommended:	13
Not recommended:	8

In summing up, Drs. Ruff and Levy concluded that certain general comments could be made on the thirty-one men who received the complete series of selection procedures.

The mean age was 33, with a range from 27 to 38. All but one were married. Twenty were from the Midwest, Far West or Southwest. Only two had lived in large cities before entering college. Twenty-seven were from intact families. Twenty were only or eldest child. (In this connection it is perhaps worth noting that 4 of the 7 men chosen are named "junior".) Pronounced identifications with one parent were about equally divided between fathers and mothers, although mothers with whom such identifications were present were strong, not infrequently masculine figures.

Impressions from the interviews were that these were comfortable, mature, well-integrated individuals. Ratings in all categories of the system used, consistently fell in the top third of the scale... Most were direct, action-oriented individuals, who spent little time introspecting.

A high proportion of these men apparently passed through adolescence in comfortable fashion. Most made excellent school and social adjustments. Many had been class presidents or showed other evidence of leadership.<sup>29</sup>

The report further found that while most of the candidates had demonstrated an interest in flying from an early age, it was not atypical of most boys, and the majority had entered military life during World War II. Half had volunteered for training as test pilots, while the others were selected due to achievements in other assignments.

Their profession is aviation and they want to be in the forefront of its progress. Danger is admitted, but de-emphasized – most feel nothing will happen to them. But this seems to be less a wishful fantasy than a conviction that accidents can be avoided by knowledge and caution. They believe that risks are minimized by thorough planning and conservatism. Very few fit the popular concept of the daredevil test pilot.

Their reasons for volunteering for screening to be astronauts displayed a mixture of professionalism and a love of adventure, with candidates being uniformly eager to be part of an undertaking that they considered to not only be of great importance and a logical step in the progress of aviation, but it also represented a personal challenge.

One man expressed the sentiments of the group by saying, "There aren't many new frontiers. This is a chance to be in on one of them." Other expressions included; "a new dimension of flight," "a further stage in the flight envelope of the manned vehicle," "a chance to get your teeth into something big," "the sequel to the aviation age," a "contribution to human knowledge," "an

opportunity for accomplishment," "the program of the future," "an interesting, exciting field," "a chance to be on the ground floor of the biggest thing man has ever done."

Most reflected the opinion of the candidate who, when asked why he had volunteered, explained: "In the first fifty years since the Wright brothers, we learned to fly faster than sound and higher than 50,000 feet. In another five years we doubled that. Now we're ready to go out 100 miles. How could anyone turn down a chance to be part of something like that?"<sup>30</sup>

## LOOKING BACK

In the course of researching this book, candidate Chris Christian was asked by the author to comment on the contents of the "Project Mercury Candidate Evaluation Report" edited by Capt. Charles L. Wilson (WADC Technical Report 59-505). He expressed surprise at some of the contents. "One point that I find throughout the report is that every test was a 'competition'. During the testing I do not recall that point being stressed and, in fact, I am a little non-plussed by the authors indicating and admitting that was the case. The tenor given us [at the time] was more one of gathering information as base points for future study. That may seem to be a fine line, but when you are the participant, it does change one's thinking or strategy."<sup>31</sup>

As Deke Slayton recorded in his memoirs, he could see the reasoning behind the earlier testing at the Lovelace Clinic, even although he found it "excessive", but the concept behind the stress tests at WADC puzzled him. "I'd flown combat missions and done operational and test flying for seventeen years by that point [just] like most everybody else in the process. The fact that I had survived should have told them all they needed to know about stress. What were they supposed to learn from hooking me up to an idiot machine with flashing lights? Or asking me what I saw on a blank piece of paper? Or baking me in a chamber to 130 degrees? At least by putting me in a blackout chamber they let me catch a nap."<sup>32</sup>

From NASA's JSC Archives, a preliminary report drafted by Robert Voas dated 28 August 1963 gives a brief summation of the selection process:

225 USAF personnel records screened

225 Navy personnel records screened

23 Marine Corps personnel records screened

35 Army personnel records screened

508 TOTAL records screened (Jan. 1959)

110 TOTAL met minimum standards, in terms of test-pilot school, jet hours, age, height, technical education

69 Reported to briefing in Washington, two groups Feb. 2 and 9, 1959)

-5 Too tall

-8 Declined

---

56

-1 Too tall

---

55

-8 Declined

---

47

-15 Eliminated (by NASA)

32

-1 Eliminated

31 TOTAL sent through Wright Aeronautical Laboratory Tests

0 Eliminated

31 TOTAL for final selection

-24 Passed over

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7 TOTAL selected as Mercury astronauts (Apr. 1, 1959)<sup>33</sup>

#### Final Recommendations

Outstanding without reservations	Outstanding with reservations	Highly recommended	Not recommended
G	R	A	B
L	V	C	D
K	DD	E	F
S		J	H
U		M	I
Z		O	N
EE		P	T
		Q	X
		W	
		Y	
		AA	
		BB	
		CC	

The final report "Project Mercury Candidate Evaluation Program", WADC TR 59-505, dated December 1959, gives the final recommendations of the selection committee, but it does not identify which candidate is associated with which letter(s). Despite seven candidates being ranked 'Outstanding without reservations', the seven selected for the first astronaut group were candidates G, K, R, S, U, Z and EE.

In an oral history interview with NASA in May 2002, Robert Voas offered some insights into the final selection of the Mercury astronauts. "Those that were giving all these tests, both at Lovelace and at Wright Field and certainly, I suppose, ourselves in Washington, couldn't help but react to these officers... potential candidates, to a great extent based on their personalities... and how they reacted. So in addition to whether the heart had responded as expected when the foot was placed in the ice water, you would get a report that clearly indicated how that physician had responded and liked the individual. So you could see things begin to emerge... John Glenn always had high ratings, and I was never sure that it had to do with what his heart had done. But this is how people reacted to him.

"Some of the officers didn't help themselves because they would complain or get very negative or there would be anecdotes about how they'd behaved. So this process, which in Lovelace was focused on the medical health and physiology, and in Wright Field was more focused on, I suppose, the psychological status, brought in these other features to it by the way that the sort of ratings came in from all of this, and I was to collect all those and summarize them. But you could sort of see the pattern here of factors other than the specific medical tests that were making the tape or play a role.

"So there was some selection for individuals that was based on their... I guess, personalities and so on... in that process."<sup>34</sup>

After all the information and data was fully summarised, the selection committee met in Langley, Virginia, late in March 1959. This was to be Phase Five – the final phase. Acting under instructions from NASA, the final number of astronauts to be selected had been reduced to six, but when this proved to be too difficult a task, the director of the Space Task Group, Robert Gilruth, relented and raised the number to seven. Voas goes on, "That session, besides the selection team itself, we had people like Flickinger from the Air Force, and my mentor, Norman Lee Barr, [...] and they went through all the candidates and came up with a recommendation to Gilruth. It worked out very nicely in the sense that we had three Navy and three Air Force and one Marine, which, I guess, from a political point of view, was good, and there was certainly some jockeying for those kinds of positions."<sup>35</sup>

The twenty-four candidates who were passed over for selection were informed by a telephone call on 1 April. All were thanked for their participation. They were also invited to reapply for any future selection process. The follow-up letters, dated April 3, 1959, were signed by Charles Donlan. The letter received by Lt. Hal Crandall was typical of those received by all the unsuccessful finalists:

Lt. Hal R. Crandall  
MOQ 941-A NAS  
Patuxent River, Maryland

Dear Lieutenant Crandall,

I am writing to advise you of the outcome of the Project Mercury Pilot Selection Program in which you have been participating. While I regret to inform you that you are not one of the seven pilots that have been selected for the initial group of Mercury astronauts, I wish to extend to you our deepest

gratitude for your participation in our program. It should be of great personal satisfaction to you to know that you were one of a group of 32 men who, as a group, has been singled out to us as the finest group ever to undertake special mission examinations at the Lovelace Clinic and at WADC. Our final selection was most difficult because of the extraordinarily high caliber of the candidates.

Our selections were also influenced by a desire to bring a variety of technical experiences and backgrounds to Project Mercury. No plans exist at this time for increasing the number of astronauts beyond seven but your records will be kept on file for future consideration should circumstances warrant a change in these plans.

Also, the names of all participants except the seven selected will be kept in strict confidence. You are again reminded of certain confidential aspects of Project Mercury that you should refrain from discussing with others.

Sincerely yours,  
Charles J. Donlan,  
Assistant Director of Project Mercury<sup>36</sup>

John Tierney recalls waiting at the Test Pilot School at Pax River for notification either way of the selection decision. "When the announcements finally came, I spent an agonizing day waiting for the phone to ring. Around four o'clock in the afternoon, the phone rang. 'Have you heard anything?' It was an anxious Wally Schirra. 'No, have you?' I said. 'No,' Wally responded. Wally was lying. He had heard. He had been chosen. He guessed after he called me that I had not been among those selected. The list finally came out, but it was not a list of 12 as we had originally been told. Instead, it was a list of only seven."<sup>37</sup>

Dale Cox felt he had done well in all the tests, and reckoned he stood a good chance of being selected. "I had been Admiral [Arleigh] Burke's personal jet pilot and had just set two transcontinental speed records. Not only that, I was the only Caltech graduate in the program. I was confident!"<sup>38</sup>

For Alan Shepard the wait seemed interminable. He had heard on the grapevine that NASA was thinking of reducing the number of astronauts from twelve to six or seven, so he had even more concerns about his chances. "It was a Thursday morning when the word came," he said in the book *We Seven*. "I was just leaving the office in Norfolk to spend a long weekend in Boston with Louise, we were going to be guests at a family wedding, when the telephone rang. It was Mr. Donlan at NASA. First, he asked me if I was still interested in being an astronaut. I told him that I was. Then he asked me if I could report to work the following Monday. I said I could, and after I hung up – the office was empty – I let out a loud whoop. I was very happy. I could not reach Louise on the phone, so I drove home without hitting anyone or breaking any laws. Louise and I just held each other after I told her. I could see that she was as happy as I was. Then we flew to Boston, where my parents and sister met us at the airport. As soon as we were all by ourselves I said, 'Guess what, Mother – I'm getting out of the Navy.' She looked so shocked that I had to hurry up and explain to her that it was just a temporary transfer."<sup>39</sup>

NASA's newly appointed Chief of Manned Space Flight, George M. Low, later

explained why the number of astronauts required unexpectedly fell from twelve to six. He stated that during the briefings and interviews "it became apparent that the final numbers of pilots should be smaller than the twelve originally planned for. The high rate of interest in the project indicates that few, if any, of the men will drop out during the training program. It would, therefore, not be fair to the men to carry along some who would not be able to participate in the flight program. Consequently, a recommendation has been made to name only six."<sup>40</sup>

Asked in 2010 about this, Dr. Stanley White replied, "During the discussions of the Selection Team... several decisions that would change the final results had been made. It was decided to reduce the number to be selected from twelve to seven or eight. The issue leading to this, was the number of flights that were being planned versus the number [of astronauts] who could be expected to get a flight. A decision had been made early in the program. Preparing the spacecraft design proposal we put information and associated controls for the crewmember to use in the flight operation rather than having him a passive rider in the flight. Our first flight goal was to prove this was a valid approach. There were many critics from all disciplines who felt this approach was foolish and would doom future space exploration. Plus they felt the weight this decision took could be better spent for other purposes.

"With this approach, the operations side of the Space Task Group began to identify the background and experience needed to answer the questions as to what we should test [in order] to prove one way or another the scope, capacity and quality of the astronaut's performance. This is how we got the final 31 candidates in the final pool. It was from this pool that the final seven were chosen by the NASA Selection Team. It was a rich pool, since some of this final pool came back and were selected in later selection cycles.

"One other point; the Medical, Psychological and Physiological team worked on the concept that there was an abundance of candidates available, therefore we only offered up candidates that were judged fully acceptable from our point of view. If the operations side of the house had some reservation on one of the candidates, then we re-examined his file and discussed it in detail with the operations staff."<sup>41</sup>

It has been suggested by Charles Donlan that one or more candidates developed a little negativity about their possible future role in Project Mercury. In relation to this Dr. White said, "I think what Mr. Donlan was referring to, was the occurrence of one or two of the thirty-one who changed their minds about being willing to continue to be considered further after they heard some of the continuing changes in the number of flight opportunities with Project Mercury as the details became clear and the future beyond Mercury was unclear."<sup>42</sup>

Lt. Walter Sullivan, the candidates' liaison officer during the tests at WADC in February 1959 only remained in the U.S. Air Force until the following year. "After I left active duty with the Air Force on 31 January 1960, I was a civilian once again – [although I remained] active in the Air Force Reserve. The following September, I matriculated at the Faculty of Medicine at McGill University in Montreal, Province of Quebec, Canada, to study medicine with the hope of a career as a thoracic surgeon or an emergency (trauma) physician. Within a year and a half I had run out of all the money I had saved and found it impossible to continue my medical studies. Had I

waited two years longer to apply. I could have taken advantage of the Department of Defense's new Berry Plan, whereby the Air Force would have picked up the tab for my studies at McGill in exchange for a six-year commitment after residency.

"I returned to Rochester, New York, and then submitted my application for employment to NASA Headquarters in Washington, D.C. And on 4 March 1962, I reported for duty with the Office of Space Medicine in the Office of Manned Space Flight at NASA Headquarters and spent the rest of my working life at NASA as a biomedical engineer tending to the need of astronauts in space. My first boss at NASA was none other than Col. William R. "Tux" Turner, who had been detailed by the USAF to NASA!"

'Sully' Sullivan had one more memory of the Mercury selection to share. At the conclusion of the WADC tests, he and Brig. Gen. Albert Schwichtenberg had made a secret list of who they thought would be selected – which they would reveal to each other after the announcement. "When the seven of them were introduced to the world that Thursday in Washington, [...] we] found that we had the same seven names and had both only missed by one. We attributed our predictive prowess to a factor that we had dubbed 'The Schwichtenberg-Sullivan Index of Cocksmanehip.' Tom Wolfe later called it 'The Right Stuff'!"<sup>43</sup>

## MISSING OUT

Dale Cox was still based at the Naval Air Facility based at China Lake, California, when he received the devastating news in a phone call that he had missed out. Later an envelope arrived from Space Task Group at Langley Field, Virginia. In it was a letter dated 3 April 1959, signed by Charles J. Donlan, Assistant Director of Project Mercury, which told him that he had not been selected. Less than a week later, he watched on television as the seven chosen men were introduced to the public as America's Mercury astronauts.

Over several years, Cox had been achieving and defining his test-pilot career while he and his lovingly supportive wife Patricia had been raising their children Brian and Dale III, as well as a third son, Gary, born in September 1955. With the birth of Gary, however, the young couple found themselves facing one of the most harrowing and deeply troubled times of their lives as a family. Gary was born with pulmonary artery stenosis. He required remedial open-heart surgery to unblock the malfunctioning heart valves which were restricting blood flow, but it could not be attempted until he was five years old and the volume of his chest was sufficient to allow this delicate surgery. The operation, which was a relatively new procedure, occurred in March 1961 and was a success. Today, with a PhD in political science from Caltech, Gary Cox leads a normal life. Among his many accomplishments, he was part of a team that built the Gossamer Condor, the first man-powered airplane. The Condor was a predecessor to the Gossamer Albatross, the first man-powered airplane to cross the English Channel and thereby win the Kremer Competition. He now works for the National Academy of Sciences.

Dale Cox had selflessly taken on land-based duties in order to support his family,



Seen here during an inspection parade, Dale Cox would serve another three years with the U.S. Navy before eventually retiring with the rank of captain and going into private industry in August 1962. (Photo courtesy of Dale Cox)

and especially his youngest son. After leaving China Lake, he was stationed in the Weapons Division of the Lawrence Radiation Laboratory in Livermore, California. Upon arrival he reported personally to the laboratory's director, Dr. Edward Teller, known colloquially as "the father of the hydrogen bomb" – a title that the eminent physicist spurned. These were the years of the Cold War with the Soviet Union, and the Weapons Division was mostly engaged in design concepts for delivering nuclear warheads. Cox participated in the development of the warheads for the Polaris and Minuteman missiles and was then reassigned under temporary orders to take up an appointment at the Nuclear Test Site in Nevada. It was early 1962, and John Kennedy had ordered additional atmospheric testing after the Russians had completed a series of bomb tests in violation of an agreement with them.

"At the time, I was forty one years old, a commander in the US Navy, assigned duty as the Navy Test Director at the Nuclear Test Site (NTS), Mercury, Nevada for this country's last atmospheric experiments with nuclear weapons. The NTS is sixty-five miles northwest of Las Vegas in the corner of a vast Prohibited Area controlled by the US Government. Most of the military stationed there were US Army, maybe one hundred officers and men; the senior officer was a full colonel. In addition, the US Air Force had a dozen or so officers and men with another colonel over them. I was in charge of a small Navy contingent of one Navy lieutenant and four enlisted

men. All the Navy personnel had arrived there kicking and screaming, knowing that duty at a tri-service command was the official path to oblivion in the naval service."

The mood was uneasy owing to the developing superpower stand-off, but Cox laughingly recalls an occasion when he was under orders "to take possession of an atom bomb" and to "expend same". His orders took him to Nellis AFB, where the two-and-a-half kiloton demolition bomb, known by the code name 'Johnnie Boy', was being delivered by an Air Force transport plane for subsequent detonation at a remote site on the western boundary of the NTS, identified as Area 18. After he and his driver parked by the Air Force transport plane, Cox signed for the device and it was quickly loaded into their grey Atomic Energy Commission (AEC) Ford F-150 pickup truck and tied down with ropes. At no time during the operation did anyone ask to see any form of ID.

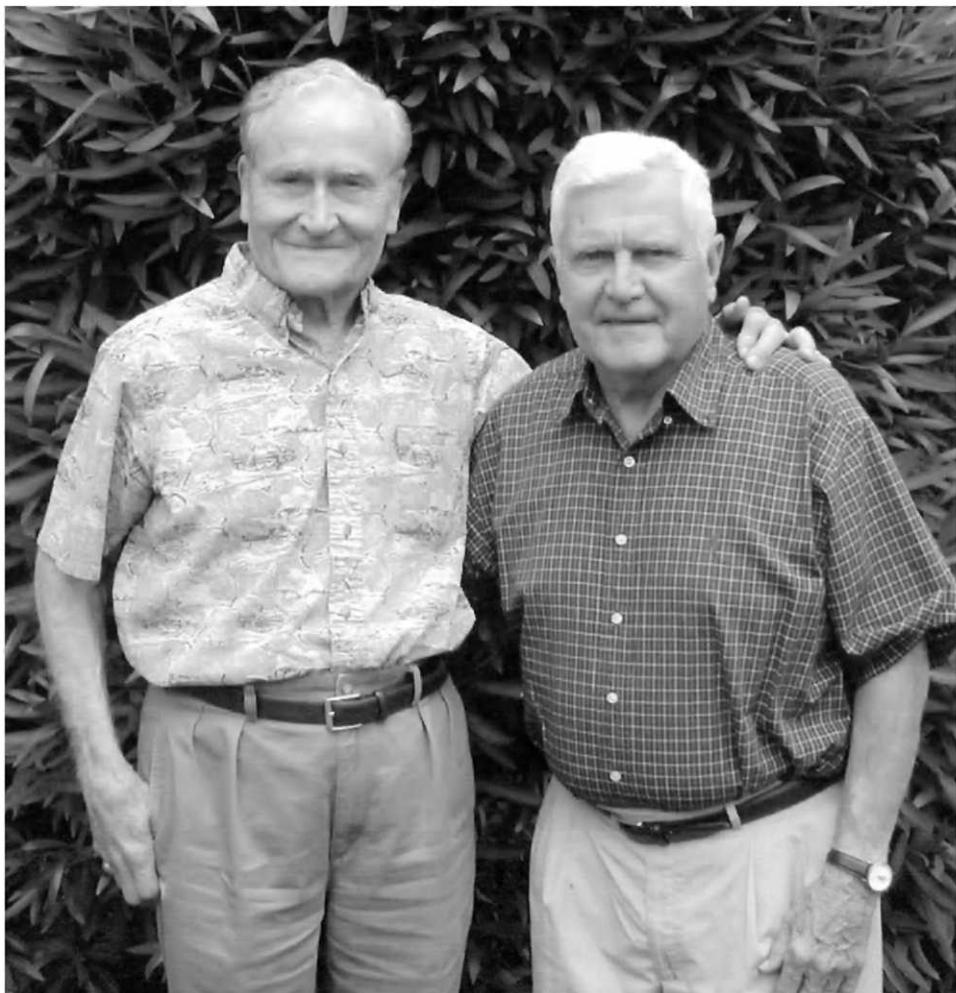
"Back at Mercury, the military guards on the gate saluted smartly, and passed us through perfunctorily. We drove directly to the Nuclear Preparation Facility where all of the dozen or so weapons that were to be fired in the atmospheric test series were prepped. It was a 'very secure area' inside a 'secure area'. Neither Joe nor I had ever been inside the heavily guarded Prep Facility. The AEC's civilian guards checked our IDs carefully, then passed us through. We dropped off our drum of enriched uranium with the proper authorities. I signed several important documents and the first phase of the 'Johnnie Boy' event was complete. Actually, it would have been more difficult to check out a book at the local library than it was to pick up that nuclear weapon at Nellis Air Force Base from the nation's War Reserve arsenal!"

The 'Johnnie Boy' device was exploded at Area 18 at precisely 8:45 a.m. on 11 July 1962.



A 1953 photo of the main gate at Mercury, Nevada, the guarded entrance to the proving grounds. (Photo courtesy of National Nuclear Security Administration/Nevada Site Office)

Despite having been promoted that year to the rank of captain, Cox felt the time was right to move into private industry. Retiring from the U.S. Navy on 31 August 1962, he joined Sea Space Systems, a start-up company founded by a Naval Academy classmate. “Our only customers were the U.S. government – principally the CIA and the Atomic Energy Commission,” he told the author. “Our expertise was inflatable surveillance systems. We designed, built and flew the first balloon [that was] capable of reaching 150,000 feet. Also, our balloons had the capability of changing altitude, to conserve helium and to move into jet streams.”



Dale Cox (left) with former combat pilot, Vietnam POW and Medal of Honor winner Jim Stockdale. They met at the Navy's Test Pilot School in 1954 and remained lifelong friends until Stockdale's death in 2005. (Photo courtesy of Dale Cox)

In 1968 he moved to Pressure Systems Incorporated (subsequently taken over by the major aerospace company TRW). It had pioneered the development of titanium pressure vessels for spacecraft such as Pioneer and Mariner, as well as the fuel tanks for the SR-71 Blackbird reconnaissance aircraft. Two years later, in 1970, he began a new company, Western Magnum Corporation (WMC), headquartered in El Segundo, California. It had two divisions: Consumer Products and Printed Circuit Boards. Cox was CEO and Chairman for ten years. He later turned over the CEO role to another employee, but remained chairman and principal shareholder until his retirement in November 2009. While with the company he filed five patents, primarily related to purifying water using hydrodynamic cavitation.<sup>44</sup>

One friend with whom he has remained in contact since his Naval Academy days is Lee Scherer. After graduation in 1942 Scherer was assigned to a destroyer, and like Cox, saw plenty of combat in the Solomon Islands. "Then I went into flight training and Dale followed a few months later," Scherer told the author. "I went into fighters and he went into bombers. Later we both went to Caltech a year apart. I then focused on aero engineering only, while he became an expert on aircraft that carried nuclear bombs. About 1956, I was on the staff of the Secretary of the Navy. He applied to be an astronaut and dropped by to discuss that program with me. He told me that he was in the top twelve. [but] when that number was reduced to seven he was no longer in the group. One of his next duties was to fly the Chief of Naval Operations, Admiral Arleigh Burke, in the A3D to Moscow. We both retired from the Navy in the 1960s and both ended up in California. In recent years I became a consultant on U.S. space missions in San Diego, while he started his own company in the Los Angeles area. We formed a group of four classmates living in the same area and made numerous vacations together in the west. We stopped that recently [because] two of the four classmates died."<sup>45</sup>

Today, Dale Cox keeps himself busy by concentrating on publishing two novels he has written. Both, he says, are based on actual events as told to him by his CIA Case Officer. He and Patricia now live in contented retirement in the city of Palos Verdes Estates in Los Angeles County, California.

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# 8

## Announcing the Mercury astronauts

It was Wednesday, 8 April 1959, a few hours before a gala NASA press conference was due in Washington, D.C., as test pilot Captain Hal Ekeren took to the skies for what would prove to be the final time. The press was attending the conference in excited droves, as NASA was about to announce the names of the seven Mercury astronauts, and introduce them to the public.

### THE UNFORGIVING SKY

Although somewhat disappointed that he had missed out on being selected, Mercury candidate Hal Ekeren was once again at home in the skies over Nevada. Attached to the Air Force Flight Test Center at Edwards AFB's Air Research and Development Command, he had been test-flying several variants of the 100-series jet aircraft while waiting to hear from NASA. He had not done his case any good by admitting during the stress-testing phase that he had some reservations about giving up test flying to become an astronaut.

On that fateful day Captain Ekeren was on temporary assignment at Nellis AFB, Nevada, conducting short test flights in preparation for the much-anticipated World Congress of Flight that was planned for the week 12–19 April. During his career he had logged 2,780 hours in the air. At 1125 local time, he took off from Nellis in a Convair F-106A-50 Delta Dart, serial number 57-229A, ahead of a second F-106 piloted by Captain William E. Powers. Both aircraft were assigned to the Joint Test Flight at Edwards AFB. They were to practice a low-altitude supersonic fly-by at Nellis' Gunnery Range No.1, situated four miles north of Nevada's Indian Springs AFB. The weather was clear, with twenty-five miles visibility. Having climbed to 9,000 feet, both aircraft began a planned shallow dive toward Indian Springs, with Powers flying at Mach 0.96 about a mile astern of Ekeren.

As they approached Indian Springs, Ekeren called Powers and said that his oil pressure warning light had illuminated; he was going to gain altitude and make an emergency landing at Indian Springs. Powers and ground observers reported grey smoke or vapour streaming from the tailpipe of the F-106 as Ekeren made several small turns to begin to line up for his approach. Powers then observed two small



Capt. Halvor Ekeren, Jr., USAF. (Photo courtesy of David Ekeren)

explosions inside the tailpipe, which instantly began to issue thick, black smoke. A few moments later Ekeren ejected at an altitude of around 6,000 feet, just before a large explosion blew off the aircraft's nose cone and tore the fuselage in half at the turbine section. As Captain Powers continued to observe Ekeren's descent, he could see that the man was struggling to free his parachute, which was entangled with the ejection seat. When the chute finally came free, instead of deploying the canopy it streamed behind the plunging pilot.

A crash crew with a doctor immediately set off from Indian Springs AFB, but owing to the rough terrain it was fully half an hour before they reached the downed pilot. A helicopter from Nellis AFB arrived to evacuate him. He was rushed to the base's hospital, but died two hours later.<sup>1</sup>

At the same time, seven apprehensive pilots were attending a briefing at Langley Field, Virginia, in preparation for an historic NASA press conference in the nation's capital the following afternoon.

#### A CROWDED PRESS CONFERENCE

A yellow, three-storey house still occupies the northeast corner of Lafayette Square, just across Pennsylvania Avenue from the White House in Washington, D.C., and a weathered plaque informs admirers that this was once the post-presidency home of James and Dolley Madison. However the former president was only an occasional visitor to the stately home. Following his death in 1836 the Dolley Madison house became known as the epicentre of social life in the city, well known for extravagant parties hosted by the former First Lady and attended, until her death in 1849, by the capital's rich and famous.



The Dolley Madison House on Lafayette Square, Washington, D.C. (Photo: NASA)

In 1958, the newly formed NASA acquired the refurbished and expanded Dolley Madison House to serve as its temporary headquarters until a more suitable facility could be found elsewhere in the city.

At 2:00 p.m. on 9 April 1959, press reporters and news crews were crammed into a converted ballroom in the expanded south side of the building, waiting expectantly

for an important announcement from the nation's space agency. Full to bursting, the room was abuzz with noise and chatter when, right on cue, the curtains at one end of the room were whisked open to reveal a long, felt-covered table. A large NASA logo hung on a second set of curtains behind the table, and there was an American flag at each end of the stage. Scale models of an Atlas rocket and a Mercury spacecraft were dramatically propped in front of the tables. To the right and left of the table were the presiding NASA spokesman Walter T. Bonney, NASA Administrator Dr. T. Keith Glennan, Dr. W. Randolph Lovelace II (now Chairman of the NASA Life Sciences Committee), Brig. Gen. Don D. Flickinger (USAF), Capt. Norman Lee Barr (USN), Robert R. Gilruth (Director of Project Mercury) and Gilruth's assistant Charles J. Donlan.<sup>2</sup>

As television cameras came to life and flashbulbs popped in a dazzling crescendo of light and sound, seven men dressed in civilian clothing were ushered in. They sat in alphabetical order right to left behind the table. They had mostly learned of their selection a week earlier, and were still assimilating the idea. Only the previous day, they had met some of the NASA people such as Walter Bonney and John "Shorty" Powers, their public relations officer, at Langley Field. As Deke Slayton recalled, it wasn't until the morning of the press conference that he actually got to meet and congratulate his fellow selectees.

While Bonney was NASA's top public affairs officer, he had allowed his young assistant Paul Haney to brief the astronauts on what they could expect. "They won't just ask about your flying," Haney had warned. "They'll ask about your religion, do



The seven Mercury astronauts at the press conference, 9 April 1959. On stage, from left: B/Gen. Don Flickinger, Deke Slayton, Alan Shepard, Wally Schirra, Gus Grissom, John Glenn, Gordon Cooper, Scott Carpenter, Capt. Norman Barr, Robert Gilruth, Walt Bonney (standing). Charles Donlan is mostly obscured behind Bonney. (Photo: NASA)

you go to church regularly? They'll ask about your wife and kids. What's your political affiliation? Were you a Boy Scout as a kid?"<sup>3</sup> Now the seven men peered apprehensively into the swarming sea of faces and exploding flashbulbs as NASA spokesman Walter Bonney patiently began to call for order.

Wally Schirra would later describe it as "a scary event, as we faced a thundering herd of reporters and photographers".<sup>4</sup>

Deke Slayton agreed. "I've never seen anything like it, before or since," he said in his memoirs. "It was just a frenzy of light bulbs... it was some kind of roar."<sup>5</sup>

## THE MERCURY SEVEN

After the initial clamour for photographs and footage had died down, Bonney started to speak. "Ladies and gentlemen, may I have your attention please. The rules for this briefing are very simple. In about sixty seconds we will give you the announcement that you've all been waiting for: the names of the seven volunteers who will become the Mercury astronaut team. Following the distribution of the kit and this will be done as speedily as possible – those of you who have p.m. deadline problems had better dash for your phones. We will have about a ten- or twelve-minute break during which the gentlemen will be available for picture taking. There will be no talk, however. Then we will reconvene, hoping that the p.m. boys have done their file and come back and start the presentation and the Q and A."

As attendants handed out press kits, Bonney pointed at the seven men seated self-consciously on the stage, and in a booming voice announced, "Gentlemen, these are the astronaut volunteers. Take your pictures as you will, gentlemen!"

It again proved difficult to maintain any sort of order as the unruly pack of press cameramen, eager for the best possible shot, kept surging to the front of the stage to get photographs of the seven men, all of them shouting to attract the attention of the bemused astronauts. Alan Shepard leaned back a little in his chair, glanced at Slayton and Schirra on either side of him, and said in mild shock, "I can't believe this. These people are *nuts!*" Slayton agreed. "It's a worm farm out there," he growled.<sup>6</sup> The men could not believe the maelstrom of noise and adulation taking place in front of them. They were being applauded, hailed as if they were a group of heroes who had done something extraordinary, yet all they had done as a unit was to turn up in civilian attire for a press conference.

"It happened without us doing a damn thing," Slayton later mused. "We show up for a news conference... and now we're the bravest men in the country. Talk about crazy!"<sup>7</sup>

Eventually the disorderly press corps was ushered back from the stage by NASA officials as the head of the agency, T. Keith Glennan, stood patiently waiting for the uproar of voices to diminish.

"Ladies and gentlemen," Glennan then announced, his eyes sweeping the packed ballroom. "Today, we are introducing to you and to the world these seven men who have been selected to begin training for orbital space flight.

"These men, the nation's Mercury astronauts, are here after a long and perhaps

unprecedented series of evaluations which told our medical consultants and scientists of their superb adaptability to their upcoming flight. Which of these men will be first to orbit the Earth, I cannot tell you. He won't know himself until the day of the flight.

"The astronaut training program will last probably two years. During this time our urgent goal is to subject these gentlemen to every stress each unusual environment they will experience in that flight. Before the first flight, we will have developed the Mercury spaceship to the point where it will be as reliable as man can devise. We expect it to be as reliable as any experimental aircraft."

"It is my pleasure to introduce to you - and I consider it a very real honor, gentlemen from your right: Malcolm S. Carpenter, Leroy G. Cooper (missing the Jr. suffix), John H. Glenn, Jr., Virgil I. Grissom, Walter M. Schirra, Jr., Alan B. Shepard, Jr., and Donald K. Slayton... the nation's Mercury astronauts!"

### **QUESTION TIME**

Following his own short speech of welcome, Gilruth handed over to Dr. Lovelace. He briefly mentioned without any specific details the physical examinations the men had completed at the clinic bearing his family name. He even raised a few chuckles when he reflected on the Lovelace tests and said, "I just hope they never give me a physical examination!"

Behind the table, the seven men were fidgeting. Slayton, Shepard and Schirra were nervously puffing on cigarettes.

Next, Bonney handed the microphone over to General Flickinger. "I really am here as a spokesman only for the team of scientists which we pooled together at the AcroMed Lab at Dayton," Flickinger said. "We pulled these scientists together from both the Army and Navy and Air Force resources. This was a composite team whose objectives were to subject all of the candidates to stresses which most nearly simulated those which we project for the individual in the first orbital flights of Project Mercury. All that I have to say, Walt, is that from our standpoint the most difficult job was in not taking all of the 31 or 32 that started through. It was really a difficult job and it is a great tribute, I think, to our Air Force, Navy and Marine flying personnel that they came through with such flying colors. I've been very proud to be associated with this project, and we on the aeromedical side have learned a great deal from it."

Bonney took the floor again, mildly rebuking the press that it was still not time for them to be taking photographs. He then handed over to Charles Donlan.

"There is little I can add to what has been said except that we are delighted to have these astronauts with us," Donlan stated. "They bring to the program a wide range of experience, engineering, and flying, and other scientific engineering disciplines. I hope we are going to have a chance to work with them with a bigger proportion than we have had to date."

At this, Bonney said it was time for questions. Many were the trite queries Paul Hancy had predicted: their religion, their motivation, their astronaut salary, how



Charles Donlan. (Photo: NASA)

many of them smoked, and why only married men were selected. Footage of the conference shows most of them ill at ease with the personal nature of the questions and having to produce adequate responses.

As Gordon Cooper recalled, one of the first questions directed at them was not about their military or flying backgrounds, but about how their wives and children had reacted to their selection. He and Trudy were in a marriage that had long been disintegrating, but both realised the importance of maintaining the appearance of a stable marriage.

“I don’t remember what I said,” he later wrote. “Whatever I mouthed, it came from behind the mask of a career officer – a few platitudes, then shutting up and hoping like hell that no one knew the truth about my marriage.”<sup>18</sup>

The only member of the group who looked truly at ease that day was John Glenn. While his colleagues mostly muttered monosyllabic answers, Glenn seemed to be in his element and he was soon feeding a grateful press with well constructed quotable responses that hinted at a man with strong family values, convictions and patriotism; even making wryly humorous observations. And the press loved him. On a question about their motivation, Glenn listened to the awkward responses given by Slayton, Shepard, Schirra and Grissom, scribbling notes as they spoke. Then it was his turn, and he was right at his John Glenn best.

“In answer to this same question a few days ago from someone else I – jokingly, of course – said that I got on this project because it probably would be the nearest to Heaven I will ever get and I wanted to make the most of it.” He was greeted with a wave of appreciative laughter. “But my feelings are that this whole project with regard to space sort of stands with us now as, if you want to look at it one way, like the Wright brothers stood at Kitty Hawk about fifty years ago, with Orville and Wilbur pitching a coin to see who was going to shove the other one off of the hill down there. I think we stand on the verge of something as big and as expansive as

that was, fifty years ago. I also agree wholeheartedly with Gus here. I think we are very fortunate that we have, should we say, been blessed with the talents that have been picked for something like this. I think we would be almost remiss in our duty if we didn't make full use of our talents. Every one of us would feel guilty I think if we didn't make the fullest use of our talents in volunteering for something that is as important as this is to our country and the world in general right now." Glenn was proving to be a PR dream.

The service symmetry came into question: three Air Force, three Navy and one Marine astronaut. Was this deliberate?

Bonney responded before the astronauts could say anything. "They did it by the numbers, not by the service. It just happened that way."

Another question concerned the enthusiasm, or otherwise, of their families for a particularly hazardous undertaking. The first men to respond talked about their wives supporting them in their service careers despite the risks associated with being a test pilot, but it was Carpenter who drew the best reaction.

"My wife's enthusiasm has matched mine throughout the program," he said. "As a matter of fact, when I was notified that I was being considered [...] I was at sea at the time, and so my wife called Washington and volunteered for me!" Everyone in the auditorium roared with laughter, and Carpenter settled back in his chair with a satisfied smile.

The questions continued, but after ninety minutes it became apparent that most of the astronauts and their support team were flagging and becoming mentally fatigued. Glenn, however, seemed indefatigable. Despite Bonney trying to steer questions to the other six selectees, the freckle-faced Marine had become the focus of the media. Then as the conference was winding up, a female reporter asked for a show of hands as to how many of the men were confident they would come back from outer space. Like reluctant schoolboys, six of the men stuck a hand in the air; Glenn set himself apart once again by cheekily raising both arms. Wally Schirra noticed this and stuck his other hand in the air as well, much to the delight of the crowd.

Finally, much to their relief, Bonney called an end to the conference at 3:25 p.m. and a final appreciative round of applause erupted around the room. As the nation's seven astronauts left the stage, each departed with the realisation that their lives had changed forever. They were no longer just another test pilot, anonymous to all except their family members, friends and colleagues. Suddenly they were the nation's newest heroes, and each of them was wondering how it would affect him, his family and his career.

That night, the Mercury astronauts enjoyed a dinner with NASA Administrator Keith Glennan, Air Force Chief of Staff General Thomas White, and Chief of Naval Operations Admiral Arleigh Burke. They were introduced to Ed Thompson of *Life* magazine and to the entrepreneurial tax attorney Leo D'Orsey, who was present to finalise a deal in which *Life* would get exclusive rights to the personal stories of the astronauts in exchange for \$500,000 spread over four years, this sum being shared equally by the seven.

Powers assured the men that this was the best way to ensure they would not be constantly hounded for information and personal stories by reporters while engaged



The seven astronauts posing for photographers. (Photo: NASA)

in their training schedule. It would also shield their families from the media circus. And, of course, about \$70,000 per man before taxes represented a fortune in relation to their military salaries. With everyone agreeing it was a good, solid and protective arrangement (and one which had received the blessing of President Eisenhower), all seven men signed their names to the contract.

That night, the television news carried highlights of the conference, and the next morning newspapers across the nation heralded the seven Mercury astronauts. Their military careers and personal details were revealed, even to the extent of publishing their full home addresses. It was almost as if these seven men now carried the hopes of a nation on their shoulders. Literally overnight, they had become the focus of an insatiable and lasting curiosity.

Their lives had indeed changed forever, two years before the first of them would ever ride a rocket.

Even as the astronaut press conference was taking place at the Dolley Madison House, a solemn, tearful church service was being conducted elsewhere to recall the noble life and achievements of U.S. Air Force Captain Halvor Ekeren, Jr., who had died in a tragic accident the day before. On Saturday, 11 April, he was interred with dignity and honour close to the Tomb of the Unknown Soldier in an older section of Arlington National Cemetery, the nation's most hallowed ground.<sup>9</sup>

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# 9

## Back in contention

Some three years after the initial intake of astronauts, NASA sought applications for a second group. It required between five and ten men to augment the original Mercury astronauts in preparing for and flying the more-advanced Gemini series of two-man missions.

Initially, serious thought had been given to simply re-assessing the twenty-five unsuccessful finalists from the first intake, but many of them had moved on to other ventures – three years is a long time in advanced aviation and aerospace. So while they were invited to re-apply, NASA also invited applications from new candidates.

### SELECTING THE SECOND GROUP

The NASA announcement came on 11 April 1962. By 1 June a total of two hundred and fifty-three applications had been received. Given the slightly roomier size of the Gemini spacecraft interior, the height restriction was relaxed by a single inch to six feet. After the initial screening process, thirty-two applicants were sent for medical evaluation – this time at the Aerospace Medical Science Division at Brooks AFB in Texas – between May and August 1962. There were thirteen Navy, ten USAF, three USMC and six civilian applicants. Only four had applied from the original intake: Lt. Charles Conrad, Jr., USN; Lt. Cmdr. James A. Lovell, Jr., USN; Lt. Cmdr. John R. C. Mitchell, USN; and Capt. Robert E. Solliday, USMC. Unfortunately Hal Ekeren and Jack Mayo had both died in air accidents prior to the invitation being announced. Ed Givens was heavily involved in other military matters and so he did not apply.

The full finalist list, as provided by noted space historian David J. Shayler, is as follows:<sup>1</sup>

- Neil A. Armstrong (civilian)
- Lt. Cmdr. Roland E. Aslund, USN
- Lt. Alan L. Bean, USN
- Lt. Cmdr. Carl Birdwell, Jr., USN
- Maj. Frank Borman, USAF

Capt. Michael Collins, USAF  
Lt. Charles Conrad, Jr., USN  
Capt. Roy S. Dickey, USAF  
Thomas E. Edmonds (civilian)  
Capt. William E.H. Fitch III, USMC  
John M. Fritz (civilian)  
Capt. William J. Geiger, USMC  
Lt. David L. Glunt, Jr., USN  
Lt. Richard F. Gordon, Jr., USN  
Orville C. Johnson (civilian)  
Lt. Cmdr. William P. Kelly, Jr., USN  
Lt. Cmdr. James A. Lovell, Jr., USN  
Lt. Marvin G. McCanna, Jr., USN  
Capt. James A. McDivitt, USAF  
Lt. Cmdr. John R. C. Mitchell, USN  
Capt. Francis G. Neubreck, USAF  
Lt. Cmdr. William E. Ramsay, USN  
Elliot M. See, Jr. (civilian)  
Capt. Robert W. Smith, USAF  
Capt. Robert E. Solliday, USMC  
Capt. Thomas P. Stafford, USAF  
John L. Swigert, Jr. (civilian)  
Capt. Alfred H. Uhalt, Jr., USAF  
Capt. Kenneth H. Weir II, USAF  
Capt. Edward H. White II, USAF  
Lt. Cmdr. Richard I. Wright, USN  
Lt. Cmdr. John W. Young, USN

After written examinations to assess their scientific and engineering knowledge, they received personal interviews with a selection board. This board included Deke Slayton, who had been made Chief Coordinator of Astronaut Activities, Mercury astronaut Alan Shepard, and former NASA test pilot Warren North, Chief, Flight Crew Operations at the (then) Manned Spacecraft Center in Houston.

### **MISSING THE FINAL CUT**

When the names of the nine successful applicants were announced at the University of Houston on 17 September 1962, Mitchell and Solliday found that they had again missed the final cut. Neither would apply again. In Mitchell's case, his naval career had reached a pivotal point where he believed it would be better for him to remain in the active service.

It has also been suggested that selection board member Slayton was instrumental in Solliday's rejection. There had apparently been a little verbal sparring between the two men when at Wright ADC for the Mercury testing process, with Slayton stating,

rather unpleasantly that, at 27 years of age, the Marine test pilot was too young to be considered, and hence should not have been there. Ironically, as it turned out, Soviet cosmonaut Yuri Gagarin was 27 years old when he made history's first human space flight. Solliday later mused that this earlier rivalry had been recalled by Slayton and may have affected his chances of making the second group.

However two of the Group One finalists had made it through. Pete Conrad and Jim Lovell not only became NASA astronauts, they also went on to have long and spectacularly successful careers with the space agency. And four other members of that second group of finalists would reapply and be selected in later groups: Bean, Collins, Gordon and Swigert.

The only other member of the original Mercury finalists who would one day become a NASA astronaut was Ed Givens, but not until the Group 5 selection in April 1966.

### CHARLES CONRAD, JR., USN

Over the years, casual observers of America's space programme had become inured to the use of acronyms and generally austere words uttered by NASA's astronauts. It therefore came as something of an unexpected surprise to witness an excited Apollo 12 commander, the diminutive Captain Charles ("Pete") Conrad, jump down off the ladder of lunar module *Intrepid*, while gleefully announcing, "Whoopee! Man, that may have been a small one for Neil, but that's a long one for me!" However, it was not an abnormal choice of expression for a man whose personal motto was "If you can't be good, be colourful."

Charles Conrad Jr. was born in the affluent Main Line suburbs of Philadelphia, Pennsylvania on 2 June 1930, the third child and first son of Frances De Rappelage (née Vinson) and Charles Conrad, a World War I balloonist who had later enjoyed considerable success in real estate and investment broking. At his christening, and contrary to his mother's wishes, the swaddled infant received his father's name and the Junior title. She had wanted to name him Peter and when she took to using that name regardless, others followed suit. Although later shortened to Pete, he happily carried it throughout his life.

Conrad recalled being fascinated by engines and by building model aircraft, and at the age of six decided that he wanted to become a test pilot. He used to construct aircraft "cockpits" in his bedroom using chairs and soapboxes, and would drift into fantasies of emulating his hero, Charles Lindbergh, in crossing the Atlantic. By the time he was twelve, however, the United States was hit by the Depression. After his father's wealth rapidly vanished, they were obliged to sell their magnificent manor house and move into a small carriage house. A broken man, his father would one day move out of the family home.

Conrad attended Haverford School in Pennsylvania. Not realising that he was struggling with dyslexia, a condition which at that time was not widely known, his mother could never understand why his grades were so poor. When he inexplicably failed his eleventh grade examinations, he was dismissed from the school. He began

working in garages, and as an apprentice mechanic and general hand at the machine shop of the nearby Paoli airfield, where he took flying lessons. He first flew solo in 1946 at the age of sixteen. On being sent to Darrow School in New Lebanon, New York, he found a 'systematic learning' way that got around his dyslexia. His rapidly improving grades enabled him to graduate in 1949. At five feet six inches he was never a big person and for a long time he was NASA's shortest astronaut but he more than made up his short stature with feistiness and vigour, and not only played centre in Darrow's football team but was voted team captain.

Conrad went to Princeton (one of the "Ivy League" centres of higher learning) on a U.S. Navy scholarship, completing the regular NROTC programme and graduating in 1953. While there he met his future wife Jane DuBose, a student at Bryn Mawr College in Pennsylvania. They would raise four sons before divorcing in 1988. After graduating, and with his ROTC commission in hand, he applied for flight training to become a naval aviator. Sometime in his early days in the Navy, Conrad acquired a tattoo – a blue anchor surrounded by stars with his initials underneath. It is known that the Mercury astronauts were tattooed with tiny dots to indicate medical device placement, but in the unlikely event that any of the early Soviet cosmonauts had one, Conrad would set a minor spaceflight record as the first person to wear a decorative tattoo in space.

Ensign Conrad reported to NAS Pensacola, Florida, on 1 July 1953 for his basic flight training, and was activated on flying status with Fighter Squadron 43 (VF-43) on 11 August the following year. In 1956 he transitioned into the Grumman F9F-8 Cougar, qualified for carrier operations, and became proficient in target shooting at the Navy's remote shooting range in El Centro, California. For three years running, he was rated in the top five pilots on that range. On 1 August 1958 he arrived at the Navy Test Pilot School, Patuxent River, where he found himself in some rather fine company as a member of Class 20 with naval aviators and future astronauts Wally Schirra and Jim Lovell, and Marine Captain Bob Solliday, another finalist in the first astronaut selection round. Their flight instructor was yet another soon-to-be Mercury finalist, John Tierney, who had just completed two tours as a combat pilot in Korea. In a possible harbinger of things to come, Jim Lovell was named on graduation as the outstanding member of Class 20, with Schirra and Conrad tied for second place.

Conrad remained at Pax River following graduation, serving as a test pilot, flight instructor and performance engineer. He would later point out that it was during this time that he developed the "killer instinct" of a true test pilot. He tested such aircraft as the F4H Crusader on assignment to VF-121 and later with VF-96 on the aircraft carrier USS *Ranger* (CV-41).

When he was called to Washington D.C. in early 1959 and found himself eligible for consideration as an astronaut, his impressive background and skills worked in his favour but his relaxed, indeed flippant attitude during the medical and psychological examinations did not impress the selection panel and he was rejected because he was deemed unsuitable for prolonged space missions. Conrad's exploits at the Lovelace Center and the Wright ADC would later feature in the Tom Wolfe classic, *The Right Stuff*. Nevertheless, when the space agency wanted a second group of astronauts, Lt.



Navy Test Pilot School, Class 20. Pete Conrad is at the far right, front row, while Bob Solliday (Marine Corps cap) is fourth from the left, second row. Wally Schirra is at extreme left, third row, and Jim Lovell is third from right, third row. (Photo: USNTPS courtesy of Robin Solliday Heyne).

Conrad was asked to volunteer again, and in September 1962 he was one of the nine new recruits.

Ironically for someone who had been dismissed as unsuitable for a long-duration mission in space, Conrad's first assignment was to the long-duration Gemini-Titan 5 (GT-5) flight, with Mercury veteran Gordon Cooper. In April 1963, while in training, Conrad was made a lieutenant commander. In August 1965 they orbited Earth for eight days, which was long enough finally to claim the endurance record from the Soviets. Conrad later served as backup commander for Gemini 8. On 4 September 1965 he was appointed a full commander by President Lyndon Johnson. Twelve months after that, in September 1966, he returned to orbit as the commander of Gemini 11, with his good buddy and fellow naval aviator, Dick Gordon. They successfully docked with an Agena rocket stage and used its engine to set an altitude record for that time of 850 miles.

Just three years later, on 14 November 1969, Pete Conrad was on his way to the moon as commander of Apollo 12, along with Dick Gordon and Alan Bean, one of his former students at Pax River. Their Saturn V was launched in a thunderstorm and was twice struck by lightning, 36 and 53 seconds after lift-off, disabling the power supply of the spacecraft. After several moments of anxiety, their training came to the fore and with the well-trained help of flight controllers they were able to restore the spacecraft to full operation and proceed with the mission.

After guiding the lunar module *Intrepid* to a safe landing on the Ocean of Storms on the Moon, Conrad and Bean spent three hours and 56 minutes on the first of two



Apollo 12 moonwalkers, Pete Conrad and Alan Bean. (Photo: NASA)

planned moonwalks; planting the Stars and Stripes into the lunar surface, setting up experiments and collecting rock samples. The following day on a moonwalk lasting three hours and 49 minutes, they collected more samples and visited a nearby crater in which the unmanned *Surveyor 3* had landed in April 1967, cutting pieces from it for return to Earth.

Immediately upon returning to Earth, Conrad was promoted to the rank of captain by President Richard Nixon.

In its original plans for Project Apollo, NASA had manifested lunar landings up to and including Apollo 20. Had the final three Apollo missions not been cancelled, Pete Conrad was in line to command the final mission, which would have made him the only man to land on the moon twice. But when Congress vetoed the final three lunar flights, Conrad turned his attention to the Skylab programme in which crews would spend long periods aboard the science laboratory in low Earth orbit. He was named to command the first three-man crew. When Skylab was launched on 14 May 1973 it sustained crippling damage that caused its interior to overheat well beyond human tolerance. When the crew lifted off eleven days later, one of their first tasks was to install a sunshade to protect the skin of the laboratory and make it habitable.

Conrad would later consider his 28-day Skylab mission the most satisfying and challenging of his four space flights – including walking on the Moon. Working with crewmembers Joe Kerwin and Paul Weitz on hazardous spacewalks, he managed to free a damaged solar panel. They not only saved the space station but also a multi-billion dollar science programme. Skylab was subsequently occupied by two further crews.

Upon the completion of his Skylab mission, and his astronaut career, Conrad had established a personal space endurance record across four flights of 49 days, 3 hours

and 37 minutes. He retired from NASA and from the U.S. Navy in 1973. Years later, astronaut Wally Schirra would wryly comment that Pete Conrad had certainly proved the examining doctors at the Lovelace Clinic wrong. "Conrad, they felt, wasn't able to live alone in space, or endure in space. The shrinks pretty-well screwed up on that one. He lived on a space station for a month and flew Gemini 5, a long-duration flight. On flights like those, it's not like you can eat out!"<sup>2</sup>

After NASA, Conrad worked in the private sector as chief operating officer for the American Television and Communications cable television company in Denver, Colorado, then in 1976 he joined the aviation giant, McDonnell Douglas. In the early 1990s, as a vice president of the company, he began development work on an innovative, reusable launch vehicle called *Delta Clipper*.

In 1988 Pete and Jane were divorced, and two years later he married attractive divorcee Nancy Crane from Denver. That year, sadly, he also lost his 29-year-old youngest son Christopher to bone cancer.

On Thursday, 8 July 1999, Conrad was riding a Harley-Davidson motorcycle together with his wife Nancy and some friends on Highway 150, three miles outside of Ojai (ironically a Native American word for "moon"), California, when his cycle hit some gravel on the edge of a sweeping bend in the road. None of the bikes were travelling fast and he was wearing a helmet and full riding gear, but he fell hard on his chest. He did not look badly injured, but he said his chest was hurting and he was having trouble breathing. He was taken to the Ojai Valley Community Hospital, but his condition rapidly deteriorated. The resident physicians tried their best, but failed to locate the source of some internal bleeding. His blood pressure continued to drop and the famed, 69-year-old astronaut died on the operating table five hours after the accident.<sup>3</sup> He was buried at Arlington National Cemetery with full military honours



Captain Charles "Pete" Conrad, Jr., USN. (Photo: NASA)

on 19 July, with F-14 Tomcat fighters flying overhead in the Missing Man formation as a mark of respect and farewell.

During his lifetime Charles "Pete" Conrad received literally dozens of awards and honours, most notably the Congressional Space Medal of Honor in 1978. Two years later, he was also enshrined in the Astronaut Hall of Fame. In 1975 he appeared as a news commentator in the fictional made-for-television movie *Stowaway to the Moon*, and played himself in the 1991 telemovie, *Plymouth*. In 1995 he was portrayed in the Tom Hanks film, *Apollo 13*, by actor David Andrews. In the 1998 HBO series *From the Earth to the Moon* he was played in two separate episodes by actors Peter Scolari and Paul McCrane. Almost an entire chapter was devoted to Pete Conrad in the Tom Wolfe book, *The Right Stuff*, but he was never mentioned in the eponymous film. In 2005 his official biography, *Rocketman: Astronaut Pete Conrad's Incredible Ride to the Moon and Beyond*, was released, co-written by his widow Nancy and screenwriter Howard Klausner.

### JAMES A. LOVELL, JR., USN

James Lovell became one of the best-known of America's pioneering astronauts. Not so much because he was involved in a number of early record-breaking missions and space firsts, and was later a member of first crew to fly around the moon, but because he commanded the historic Apollo 13 mission – the lunar flight that almost ended in catastrophe and provided one of the most gripping and best-known stories of survival of modern times.

James Arthur Lovell, Jr. was born in Cleveland, Ohio. His father was a coal furnace salesman, while his mother Blanch (of Czech descent) worked as a secretary. An only child, he was just five years old when his father was killed in a car accident in 1933. Times proved tough for the mother and son, and for a time they lived with a relative in Terre Haute, Indiana, before moving to Milwaukee, Wisconsin, in 1938, where Blanch took on work with a heating firm in the city's northwest.

Jim attended elementary schools in Milwaukee and then got his higher education in the city's Juneau High School. One of the early influences in his life was an uncle who graduated from the Naval Academy in 1913 and became one of the first naval aviators to fly in an anti-submarine unit during World War I. However, while Lovell was interested in airplanes and aviation, his real interest centred on rockets and rocket propulsion, and he experimented with crudely constructed rockets in his back garden. Learning everything he could about astronomy, physics and engineering, he received good grades in high school and was elected to the National Honor Society as a junior – a privilege usually reserved until the senior year. He also played football, but as his school newspaper once noted, he was more interested in "experimenting in physical science". It also stated that, "He is especially apt at making rockets which don't quite reach Mars."<sup>4</sup>

While still a junior at Juneau High, Lovell became interested in a thirteen-year-old freshman named Marilyn Lillie Gerlach. In order to get a free lunch he used to work behind the counter of the school cafeteria, and Marilyn was a regular customer. One

day he plucked up the courage to ask her to accompany him to the junior prom, and with that their youthful relationship grew and flourished. She remembers sitting on the Lovell's porch with Jim's mother, watching him attempt to launch homemade rockets from a nearby vacant lot. "We would both say, 'He's crazy, this is insane,'" she said. "But he just kept at it."<sup>5</sup>

In September 1946 Lovell entered the University of Wisconsin under the V-5 naval pilot training programme. Over the next two years, he combined engineering studies with continuing to play football. His only listed extracurricular activity while at the university was the Alpha Phi Omega fraternity, which was a national service group of members with Boy Scout training. He went on to become an Eagle Scout. He and Marilyn continued dating. Both were fond of water skiing and boating, and often spent time together at these activities. In March 1948, he applied for and was granted an appointment to the U.S. Naval Academy through State Representative, John C. Brophy. He entered the venerable institution that July as a member of the Class of 1952. In working for his bachelor's degree he wrote a thesis on the history and development of rockets; he sent his notes to Marilyn and she typed them up for him. In a bold move during his second year at Annapolis, he casually mentioned to her that many of his fellow midshipmen were getting engaged so they could marry after graduation. To his delight she thought that was a very good idea. So, less than four hours after the newly commissioned ensign graduated with his degree from the academy on 6 June 1952, they were married in Annapolis's St. Anne's Episcopal Cathedral.

After fourteen months of naval aviation training in Pensacola, Florida, Lovell was assigned to NAS Moffett Field, California, and Composite Squadron Three, which was attached to USS *Shangri-La*. There and in Japan he received advanced training in the dangerous business of carrier night flying in F2H Banshee aircraft. "Night flying off carriers separates the men from the boys," he once observed.<sup>6</sup>

Lovell later became an instructor on such aircraft as the FJ-4 Fury, F3H Demon and F8U Crusader. In 1957, nearing thirty years of age and with two small children, Barbara Lynn and James Arthur III, he sought and received a transfer to the Naval Aircraft Test Center in Patuxent River, Maryland. He went through the Navy's Test Pilot School in 1958 as part of Class 20, along with future astronauts Wally Schirra and Pete Conrad. It was the impish Conrad who gave Lovell the humorous moniker of "Shaky" because he had so much nervous energy – it was not a nickname sought by a pilot. On graduation, Lovell found he had come in at the top of his group, with Schirra and Conrad tied for second place. As a laconic Schirra observed some years later, "Pete Conrad and Jim Lovell I knew well already as they had been classmates of mine at test pilot school – Class 20. All three of us went through those early Mercury tests together, to see which one of us would survive, and somehow I did. Pete and I water-skied a lot back then, and he and I tied for second in our test pilot class. Lovell studied, so he became first!"<sup>7</sup>

Lovell spent another three years at the Maryland base as a test pilot, serving as a programme manager with F4H Weapons Systems Evaluation. During this time, he underwent testing as a Mercury astronaut finalist, but was ruled out with a suspected liver complaint that was later reasoned to have resulted from an erroneous reading at



Standing in front of an F2H-3 Banshee, Jim Lovell and a group of Annapolis classmates (Class of 1952) aboard USS *Shangri-La* (CVA-38) in 1956. Front row (left to right): Charlie Andrews, Jim McFeeley, Herb Burridge, Windy Rivers, Joe Wilkinson. Back row: Lovell, Bill Knutson, John Derr, Pete Maloney, John Kuncas. (Photo courtesy of John Derr)

the Lovelace Clinic. Bitterly disappointed, he returned to his squadron. In 1961, he graduated from the Aviation Safety School at the University of Southern California and then served as a flight instructor and safety engineering officer with VF-101 at NAS Oceana, Virginia. It was in April the following year that he saw an article in the magazine *Aviation Week* entitled "NASA Wants to Select Some More Astronauts". The Navy asked him if he wished to apply for this second group, and he was keen to try. "They didn't know that I was kicked out because of a physical," he later revealed.<sup>8</sup> He put his name in and did the physical examination – this time at Brooks AFB in Texas. He had no problem on this occasion and swept through the weeks of medical tests and other examinations. On 17 September 1962, NASA announced the appointment of nine new astronauts, including Navy Lt. Commander James Lovell, Jr.

His first flight assignment was backup pilot for the Gemini 4 mission, launched on 3 June 1965. Along with Lt. Colonel Frank Borman, he was then assigned to the

prime crew of Gemini 7. In one of the toughest flights in that series, he and Borman spent fourteen days circling the globe, seated side-by-side in a cramped cockpit no bigger than the front seat of a Volkswagen Beetle. Gemini 6, the flight planned to precede theirs, was postponed when their Agena rendezvous target destroyed itself heading for orbit. Still anxious to practice rendezvous techniques, mission planners decided to launch Gemini 7 first, and then launch Gemini 6 to meet up in space with its sister ship, although no actual docking would take place between the two manned spacecraft.

Gemini 7 was launched on 4 December 1965. Revised plans called for Gemini 6, with Wally Schirra and Tom Stafford aboard, to follow Borman and Lovell into orbit eight days later. However the Titan II's engines shut down 1.2 seconds after ignition due to a small plug falling loose. The cause of the launch failure was quickly located and the chase began three days later, on 15 December. During a momentous, morale-boosting mission for NASA, the two spacecraft flew in close formation in orbit for a period of several hours before Gemini 6 withdrew and returned to Earth. By the time Borman and Lovell returned they had set a new space endurance record of 330 hours and 35 minutes while completing 206 orbits of Earth.

On 11 November 1966, NASA closed the chapter on its Gemini programme with the successful launch of Gemini 12, under the command of Jim Lovell. Sharing the flight with him was Edwin (Buzz) Aldrin, who would later walk on the moon with Neil Armstrong. On this, his second space flight, Lovell skilfully manoeuvred the spacecraft to a successful docking with an Agena target rocket despite the failure of the radar system. During the flight, Aldrin completed a successful extra-vehicular activity (EVA, or spacewalk) that greatly eased concerns following problems with aborted attempts on earlier missions.

Two years later, in one of the most audacious space flights ever undertaken by NASA, Captain Lovell was the command module pilot aboard Apollo 8 along with Major Bill Anders and mission commander, Colonel Frank Borman. They were the first crew to ride the massive Saturn V rocket. "Of all the Apollo flights, it was the most successful," Lovell told interviewer Sandra Fredrick from *Interspace News*. "It was the highest point of my space flight career. We were the first people to leave the confines of the Earth and captured by another body in space, and we were the first three people to see the far side of the moon." The launch window meant they would arrive at the moon on Christmas Eve, 1968. On noting this, the crew decided to say something profound to mark the occasion. "I don't know if you recall 1968," Lovell continued, "but it was a very poor year in our country – two assassinations, the Vietnam War was going on and the riots in Chicago at the Democratic Convention so we didn't know what to say."<sup>9</sup> Eventually they decided to read the first ten verses of the Book of Genesis from the *Bible*, so on their final orbit around the moon they took turns transmitting their reading to the people on what they called "the good Earth". It is widely considered one of the most moving and memorable transmissions ever made from space.

After serving as backup commander of Apollo 11, Lovell began his fourth and final mission on 11 April 1970 as commander of Apollo 13, with Jack Swigert and Fred Haise. Two days later, and ninety percent of the way to the moon, an oxygen



The crew of Apollo 8, reunited in December 2008 for a special commemorative event at the San Diego Air and Space Museum. From left: Bill Anders, Frank Borman and Jim Lovell. (Photo courtesy of Shalene Baxter, SDASM)

tank in the service module explosively ruptured and put the mission and its crew in immediate danger. With most of the power lost in their command module *Odyssey*, they had to work with ground controllers to loop around the moon and convert their still-attached lunar module *Aquarius* into a “lifeboat”. By conserving every possible watt of electricity and other supplies, the near-frozen astronauts finally made it back to a safe splashdown after six days of high drama.

As Lovell told Sandra Fredrick, they turned a potential disaster into a successful recovery. “I think it is a monument to the ability of the people in the control center,



A triumphant return to earth for the crew of Apollo 13. From left: Fred Haise, Jim Lovell and Jack Swigert. (Photo: NASA)

the mission control team and the crew to take an almost certain catastrophe, losing all the electric power and oxygen and the propulsion system some 200,000 miles away from Earth and then successfully utilizing the lunar module to get home – and solve each crisis as it came along.<sup>10</sup>

Following the flight of Apollo 13, Lovell served in a number of positions within the management structure of Project Apollo and the ensuing Skylab programme. In May 1971 he took a leave of absence from NASA to pursue an ambition to take the Advanced Management Program at Harvard Business School. Having successfully completed his studies, he served another two years before resigning from the space agency and from the Navy on 1 March 1973. He joined the management staff of the Bay-Houston Towing Company, and then became president and chief executive two years later. After four years he joined Fisk Telephone Systems as its president. Later, he formed and became president of Lovell Communications, a business involved in the dissemination of information about the U.S. space programme.

In the early 1990s, Lovell joined with space historian Jeffrey Kluger to write the book *Lost Moon*, which told the dramatic story of the aborted mission of Apollo 13. Released in 1994, the book captured the attention of film director Ron Howard, who transformed it the following year into the blockbuster movie *Apollo 13*, in which

Tom Hanks starred as Jim Lovell. In a small cameo role at the end of the movie, Lovell played the captain of the aircraft carrier that recovered the three astronauts at the end of their perilous flight. The success of the film gave Lovell an intriguing new career in public speaking, and with his earnings he launched into a whole new venture – a restaurant called Lovell's of Lake Forest, near Chicago, Illinois, where his son James (Jay) Lovell III is the executive chef.

His numerous honours and awards include the Congressional Space Medal of Honor and the Presidential Medal of Freedom. He was inducted into the Astronaut Hall of Fame in 1993 and has received honorary doctorates from Rockhurst College in Missouri, Illinois Wesleyan University, Western Michigan University and Mary Hardin-Baylor College, Texas. During his service career he logged more than 5,000 hours, including more than 3,500 in jet aircraft. He and Marilyn had four children: Barbara (13 October 1953), James Lovell III (15 February 1955), Susan (14 July 1958) and Jeffrey (14 January 1966).

Captain James A. Lovell, Jr., the first person to fly into space four times, remains one of only twenty-four men to have travelled to the vicinity of the moon, the first of only three people to have flown there twice – and the only one of those three to have done so without making a landing on his second visit. A small crater that lies across the eastern edge of the walled plain named Apollo on the far side of the moon bears his name.

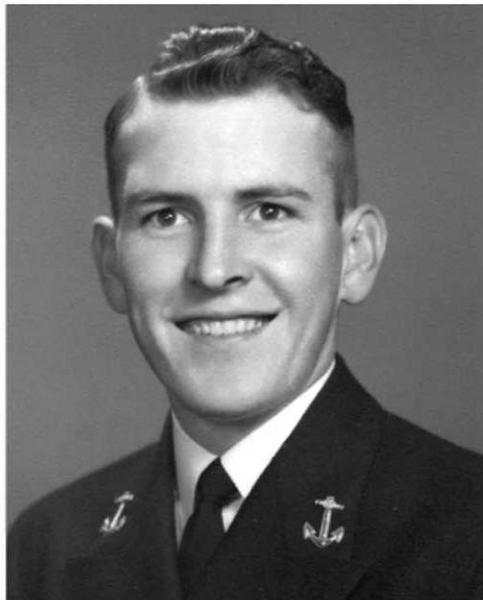
### **EDWARD G. GIVENS, JR., USAF**

Although he was not selected for the first astronaut group, Ed Givens finally became a NASA astronaut in the space agency's fifth contingent, announced on 4 April 1966. Just fourteen months later, long before his dream of flying to the moon on an Apollo mission could become a prospect, he was tragically killed in a car accident.

Edward Galen Givens, Jr. was born on 5 January 1930 to Helen (née Jarrell) and Edward (Bill) Galen Givens, who worked as a bookkeeper in the small farming town of Quanah in the bend of the Texas panhandle.

He proved quite bright scholastically, and when he reached Quanah High School he took on extra courses in order to skip a year and graduate early. His ambition and passion from a very early age was to become a pilot. To this end he took on work in a grocery store and washed cars to earn money for flying lessons. His father once told a reporter that their son (whom they always called Galen) "had never been interested in anything but aviation". When he had the funds for another lesson young Galen would hitchhike out to the Childress Municipal Airport, where his instructor "Red" Emerson from the Ragsdale Flying Service helped him to obtain his student pilot's licence in 1946. The day after he turned sixteen he made his first solo flight.

After graduating from Quanah High, Givens spent a semester at Texas A&M University and three semesters at the University of Oklahoma before receiving an appointment to the U.S. Naval Academy as a member of the Class of 1952. He not only impressed his mathematics professors with his proficiency in the subject, but won acclaim as an adept midfielder at varsity lacrosse.



Ed Givens at the U.S. Naval Academy, Annapolis. (Photo courtesy of Edward Galen Givens III)

Tragedy struck the Givens family around this time when his younger brother and only sibling, Donald, a navy aviator, was killed along with nine other cadets, enlisted men and officers in an airplane crash while based at NAS Corpus Christi, Texas.

After graduating from the Naval Academy with a bachelor's in naval sciences in 1952 (and now preferring to be called Ed), Givens chose to enter the U.S. Air Force. His first training flight at Goodfellow AFB in San Angelo, Texas, was on 18 August 1952 in a North American T-6 Texan training airplane. He finished his training there on 4 February 1953, was commissioned as a second lieutenant in the Air Force, and gained his wings. As one of the top-ranked students, he was allowed the privilege of deciding which branch of the Air Force he preferred, and opted for fighters. Givens subsequently received advanced training at Williams AFB in Phoenix, Arizona, and Perrin AFB in Sherman, Texas. In 1954, newly promoted to first lieutenant, he was assigned to the 35th Fighter Interceptor Group, which was at that time deployed to Japan. As a fighter pilot and flight commander on this two-year posting, he began to relish the prospect of one day becoming a test pilot back in the United States. Upon returning home, he received an assignment in January 1956 as an instructor at the Air Force Interceptor Weapons School in Panama City, Florida, where he remained until March 1958. To his delight, he was then sent to the USAF Experimental Flight Test Pilot School at Edwards AFB in California with the rank of captain. On graduation, he received the A.B. Honts award as the outstanding student of Class 58B. He also received the Empire Test Pilots' School Award for academic achievement – one of the few graduates ever to receive both awards. He stayed at Edwards as an instructor in the Stability and Control section.



Ed Givens at Edwards AFB, California. (Photo: USAF)

It was during this time that he received the call to attend a briefing in Washington, D.C. for possible astronaut selection. Rejected, he continued his instructing duties at Edwards. Later, in company with civilian instructor colleague William Schweikhard, he took the concept for a full aerospace course to the desk of the new commandant of the TPS, Maj. Richard C. Lathrop. Lathrop saw great merit in their proposal, because the Air Force was slowly moving towards manned spaceflight operations, and asked his special assistant, Maj. Thomas McElmurry, to help the men to get their project up and running. When future astronaut Captain Frank Borman joined Group 60C early in 1961, he too became a staunch advocate of the aerospace course and provided help as the others presented their concept to the Air Force echelon, steadily gaining sufficient support for developing the advanced course. On 5 June 1961 the Aerospace Research Pilot School (ARPS) was created at Edwards with an initial class of student aerospace pilots.

Givens himself was not included in this initial aerospace course, having returned to the Navy on a two-year posting as an exchange project pilot with Air Development Squadron 4, which was based at NAS Point Mugu, near Los Angeles, where he was responsible for conducting and developing procedures and tactics for fleet operations of the F8U-2N Crusader.

Givens returned to Edwards AFB in November 1961 with duties in Stability and

Control, and was then assigned as special assistant to the new Commandant of the ARPS, Lt. Colonel Robert Howe, pending a permanent assignment within the staff. Meanwhile he became a member of the third ARPS group, Class III. Other future NASA astronauts in this intense eight-month course were Charlie Bassett, Michael Collins and Joe Engle. At a party on New Year's Eve to usher in 1962, he met his future bride, German-born Ada Eva Muuss. On graduating from the ARPS, Givens became a qualified USAF astronaut-designee, which meant that he was qualified for any of the Air Force's proposed manned space programmes – or even as a NASA astronaut. His hope was to fly the X-20 Dyna-Soar space plane, but when this was cancelled in December 1963 the effort switched to the Air Force's Manned Orbiting Laboratory (MOL). Givens was assigned to the Air Force Systems Division Office, Det. 2, as a project officer at NASA's Manned Spacecraft Center in Houston, where he was involved in designing the Astronaut Maneuvering Unit (AMU) intended for spacewalking MOL astronauts.

In September 1965 NASA launched a fresh recruiting drive for a new intake of astronauts, and Givens applied. As previously, he endured probing interviews and a thorough physical checkout, this time at the School of Aviation Medicine at Brooks AFB in San Antonio, Texas. Another astronaut candidate attending Brooks on the same day was Jack Lousma, and he recalls it as being a day filled with bitter irony. Lousma told the author that while they were undergoing tests they heard the awful news that two NASA astronauts preparing for the Gemini 9 mission, Charlie Bassett and Elliot See, had died that morning when their T-38 jet airplane hit the roof of the McDonnell plant in St. Louis, Missouri, in which their spacecraft was being built. It was a very sobering piece of news for two potential astronauts.

By March 1966 the list of candidates had been pared down to thirty-five. Next it was cut to nineteen possibles. Deke Slayton, the head of the selection panel, looked through the list and then made the considered decision to accept all nineteen. In view of NASA's extensive plans for ongoing lunar and Earth-orbiting missions, Slayton reckoned there would be work for all nineteen. The names of the Group 5 astronauts were officially announced on 4 April. Givens was on the list and arrived for training on 1 May.

By now, he and his wife Ada had two young daughters; Cathrine, born 11 April 1963, and Edward Galen III on 12 June 1964. Following his preliminary orientation training, Givens had survival exercises in the Nevada desert and in the Panamanian jungle. He elected to concentrate his training on the command module of the Apollo spacecraft, believing that he would first fly to the moon as a command module pilot prior to cross-training to become a lunar module pilot and land on the moon. In the late summer of 1966 he became involved in a facility in Houston called the Space Environment Simulation Laboratory (SESL) which was a large chamber capable of simulating the vacuum and extreme heat/cold conditions of space. Teamed up with fellow astronaut Joe Kerwin and Captain Joe Gagliano of the Air Force, he "flew" a simulated six-day mission to the moon inside an Apollo spacecraft in the completely air-evacuated chamber. This test revealed a number of design flaws and procedural errors that could be rectified in time for the first actual manned lunar mission.

By this time, NASA had announced the first three Apollo crews and their back-up

crews. Deke Slayton and Jim McDivitt – whom Slayton had appointed to command Apollo 2 in the summer of 1967 – had decided that a mission should have a support crew to carry out flight-related duties that might otherwise take crew members from vital mission training. All of the support crewmen for the first three missions were Group 5 astronauts. Givens was delighted to be assigned to support the first manned test of the Apollo spacecraft, along with fellow group members Ron Evans and Jack Swigert. Although this mission was to be called Apollo 1, it was known internally as Apollo-Saturn 204 (AS-204) because it would use the fourth Saturn IB rocket. Their task was to assist the prime and backup crews in engineering details, gather essential information and carry out pre-flight preparations. As 1967 began, he received further confirmation that he was in line for a mission when he was listed to begin helicopter training starting on 27 February, along with Fred Haise. A month before Givens was to begin this training, the space programme suffered a disaster on Friday, 27 January 1967, when the crew of AS-204 died aboard Spacecraft 012 in a launch pad fire at the Cape. The tragic loss of astronauts Gus Grissom, Roger Chaffee and Ed White had an immediate and profound impact on America's space programme, and led to a lengthy hiatus while a multitude of safety changes were initiated and implemented. But the issues with the command module did not prevent unmanned testing of the Saturn V rocket and the lunar module, and it soon became evident that by the time the first manned test would fly, it would be as Apollo 7. In command would be the veteran astronaut Wally Schirra, with rookies Donn Eisele and Walt Cunningham. Givens, Evans and Swigert were reassigned as their support crew.

On 22 March 1967, Givens received some good news with the birth of a second daughter, Diane Susan. Sadly, he would hardly get to know her.

At about 11.30 p.m. on 5 June 1967, he made his way across the parking lot from the Skyway Hotel in Pearland, Texas, heading for his modest (for an astronaut) 1964 Volkswagen Beetle sedan. He was accompanied by two USAF reservists, Bill Hall and Fran Dellorto, who had gratefully accepted his offer of a ride to their quarters at Ellington Air Force Base. The three men had been guests at the motel for a meeting of the Ancient Order of the Quiet Birdmen, a fraternal organisation of air force pilots and former officers.

Givens had an early morning appointment with Deke Slayton, so whilst he had thoroughly enjoyed the company at the function, he had not been drinking alcohol. The roads, glistening with the recent downpour, were heavy with traffic, and Givens was unable to change lanes to make the necessary left turn at some lights. Instead he continued up the street and turned left on Knapp Road, which he figured would also take them to the air base. The road was poorly lit, so Givens was driving cautiously, according to information supplied to the author in 2001 by Bill Hall. They did not realise it, but straight ahead was a dangerous, poorly illuminated S-bend in the road, with no road signs to warn drivers. Local residents had seen or heard several drivers come to grief on the first, brutally sharp bend, and the road was covered in multiple skid marks. Too late, Givens saw the first sharp bend and braked hard. The wheels locked and the car began to slide out of control along the slippery road as they headed for what Bill Hall believed to be a grassy field in the car's headlights.

Unfortunately there was a deep drainage or irrigation ditch alongside the road. The front of the car plunged off the unprotected bank and into the bottom of the ditch, about four feet down. Dellorto, sitting in the front passenger seat, suffered a broken leg and several deep cuts. Hall, seated in back, was thrown out of the car on impact. He sustained a badly broken eye socket and three of his teeth were smashed. When Hall regained consciousness the police and ambulance had already arrived. In fact the neighbouring houses had witnessed so many accidents on the bends that they knew the emergency numbers by heart. Hall heard the ambulance people murmur to each other that one of the crash victims wasn't going to make it.

The one who didn't make it was Ed Givens. When the front of his car impacted the bottom of the ditch he was thrown violently forward, smashing his sternum into the steering column. He suffered a crushed chest and massive internal injuries, and died en route to hospital.

Two days later, near the Manned Spacecraft Center, a service was held in the Seabrook Methodist Church which Givens and his wife had attended. Then his body was flown to Quanah in an Air Force transport plane. The next day another service took place at the First Baptist Church there. The pallbearers that day were the prime and backup Apollo 7 crew members Wally Schirra, Donn Eisele, Walt Cunningham, John Young, Tom Stafford and Gene Cernan. Afterwards, Givens was laid to rest in the old cemetery in Quanah's Memorial Park.

Apart from his grieving widow, Ed Givens had left behind a very young family – daughter Cathrine, aged four, son Edward, almost three, and baby Diane, a mere ten weeks old.<sup>11</sup>

Apollo 16 Command Module Pilot Al Worden joined NASA in the same Group 5 cadre of astronauts as Ed Givens, and he was asked to reflect on his fellow astronaut. "Ed was an interesting guy," he mused. "He was older than several of us... in fact the oldest in my group, and he knew many of the guys already there. I never got to know Ed very well. We'd only been there just a little more than a year. He was not around long enough for me to form an opinion, although I did notice he jumped right into his assigned work. He was gone before anyone got assigned a flight. He was a loner, but he kept in touch with many of his test flight friends by going to old timers' meetings. He was driving home from one of those meetings when he hit the ditch."

Sadly, Ed Givens receives very little recognition for his all-too-brief role as a NASA astronaut, and Worden agrees. "He is overlooked because he died in a car, not a plane. It would have been interesting to find out what flights Ed might have been assigned to."<sup>12</sup> Ed Givens did make it to the moon, albeit in a symbolic way, when his name was included on a list of 'fallen' astronauts and cosmonauts that was printed on a card and left on the lunar surface by the crew of Apollo 15.

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# 10

## The Mercury Seven

Only seven could be chosen, and very few would argue that those seven served with utmost distinction and professionalism throughout their astronaut careers. They were simply “the best of the best” as Dr. George Ruff described them.<sup>1</sup>

### “WE MUST HAVE DONE SOMETHING RIGHT”

Dr. Allen Gamble declared the entire selection process to be one of the highlights of his professional career. “I have never worked with a finer group of men...” he later wrote, “the NASA and military men who were engaged in the selection process, the test-pilot astronaut candidates, and especially the seven selected to be the first Americans to fly into space... we were plowing new ground, full of stumps and rocks, with few landmarks to guide us. At times we felt that we were fumbling in the dark. But I think events have proved that we must have done something right!”<sup>2</sup>

Each of the seven men would eventually fly into space. Scott Carpenter and Deke Slayton would only make the journey one time; John Glenn, Gus Grissom, Gordon Cooper and Alan Shepard twice, while Wally Schirra would fly in each of NASA’s first three space programmes – Mercury, Gemini and Apollo. Only one of the group, Alan Shepard – the first American in space – would realise the absolute triumph of walking on the moon.

At the time of writing this book, only John Glenn and Scott Carpenter are still with us. Four of their colleagues were lost through natural causes, but Gus Grissom perished in a horrific launch pad fire that set the nation’s space programme back on its heels for nearly a year and a half.

In order of their first flight, here are the stories of NASA’s Mercury Seven astronauts.

### ALAN B. SHEPARD, JR., USN

On the sun-drenched Florida spring morning of 5 May 1961, a thirty-seven-year-old test pilot squeezed into the tiny Mercury capsule named *Freedom 7*, ready to ride a



The Mercury Seven astronauts examine contoured couch moulds. From left, Alan Shepard and John Glenn (kneeling), Wally Schirra, Scott Carpenter, Gordon Cooper, Deke Slayton, Gus Grissom and Robert Gilruth, head of Project Mercury. (Photo: NASA)

rocket into the beckoning skies. Commander Alan Shepard, USN, was trained to the hilt and more than ready to become the first American into space.

Achieving this flight was the incredible honour that Shepard had relentlessly pursued since his selection as a Mercury astronaut two years earlier. Despite this, a hollow feeling pervaded his excitement. Whatever accolades he might receive later that day, they would never make up for what he had deemed to be an even greater but lost glory. Renowned for his cocksure determination and a wicked sense of humour, he had pressed himself to the limit to become the first person to fly into space, but to his chagrin would fall just twenty-three days short of his dreams, having lost out to a beaming Soviet cosmonaut named Gagarin.

Alan Bartlett Shepard, Jr., who could trace his New England ancestry through eight generations to the *Mayflower*, was born on 18 November 1923 and raised in Derry, New Hampshire. The second child of Renza (née Emerson) and insurance businessman Alan B. Shepard, also a career Army officer, he was brother to Pauline, who preferred to be called Polly. He took his elementary education in a one-room country school in East Derry. As a youth, he showed an early interest in aircraft and took on work at a nearby airfield while still in high school. On graduating from the



Alan B. Shepard, Jr. (Photo: NASA)

Pinkerton Academy in Derry in 1940, he attended the Admiral Farragut Academy in New Jersey for one year before accepting an appointment to the Naval Academy in its Class of 1945.

While at Annapolis, midshipman Shepard met his future wife Louise Brewer of Kennett Square, Pennsylvania, at a Christmas party held at his sister Polly's Principia Christian Science School in St Louis, Missouri. After a wartime-accelerated course he graduated from the Academy on 7 June 1944, was commissioned an ensign, and saw action in the Pacific aboard the destroyer USS *Cogswell* (DD-651). The ship returned to the West Coast to undergo repairs in late February 1945 and Alan and Louise were married on 3 March. They managed to fit in a short honeymoon before the *Cogswell* sailed again, making its way into the South Pacific. Shepard found that he had been elevated from Junior Officer of the Deck to Officer of the Deck.

Post-war, Shepard undertook naval flight training at NAS Corpus Christi, Texas, and at NAS Pensacola, Florida. He was so impatient to fly that he also studied and received a pilot's licence at a civilian flying school. Shepard was awarded his naval aviator's wings in March 1947 and over the following three years flew F4U Corsair aircraft from USS *Franklin D. Roosevelt* (CV-42) with Fighter Squadron 42 (VF-42), based at NAS Norfolk, Virginia. In 1950, following several tours of sea duty, he was sent to the Test Pilot School at NAS Patuxent River in Maryland, where he stayed on as a test pilot. As his expertise grew, he participated in carrier suitability trials for the F2-H3 Banshee and helped with trials of the first 'angled deck' carrier. Next was an assignment to VF-193, a Banshee night fighter unit at NAS Moffett Field, California, where he remained from 1953 to 1955. During this time, as the

squadron's operations officer, he served two cruises in the western Pacific aboard the carrier USS *Oriskany* (CV-34). On a second tour of duty at Pax River he tested an impressive number of Navy aircraft, including the F-3II Demon, F-8U Crusader, F-4D Skyray, and F-11F Tigercat. A skilled, unflappable test pilot, his abilities did not go unnoticed and he was appointed Project Test Pilot on the F-5D Skylancer, and he spent the final five months of his tour as an instructor at the Test Pilot School.

On his next assignment, Shepard reported to the Naval War College in Newport, Rhode Island, where he took every opportunity for technical and skills advancement. After graduating from the War College in 1958 he was assigned to the staff of the Commander in Chief, Atlantic Fleet, as aircraft readiness officer. He was serving in this capacity and preparing to become the commander of his own carrier squadron when he received orders to report to Washington, D.C. in civilian clothes. He was selected as a NASA astronaut in April 1959.

On the afternoon of 19 January 1961, a day before the inauguration of newly-elected U.S. President John F. Kennedy, the chief of the Space Task Group, Robert Gilruth, called the seven **Mercury** astronauts together to reveal who would fly the prized first mission. He wasted little time, announcing that Alan Shepard had been selected. There was a stunned silence in the room. "I did not say anything for about twenty seconds or so," Shepard later recalled. "I just looked at the floor. When I looked up, everyone in the room was staring at me. I was excited and happy, of course, but it was not a moment to crow."<sup>3</sup> The other six, although deeply disappointed, put smiles on their faces as they came over to congratulate him.

Shepard's **Mercury**-Redstone flight (MR-3) aboard spacecraft *Freedom 7* was originally scheduled for 24 March, but in late January the Kennedy administration received a damning report on space activities from a government science advisory group known as the Wiesner Committee, which recommended postponing the first manned flight. Part of this argument was the unreliability factor of the Redstone booster. One of the committee's heads, George Kistiakowski, even declared that to launch Shepard prematurely would provide the astronaut with "the most expensive funeral man has ever had".<sup>4</sup>

The Wiesner Report heavily criticised many aspects of NASA's manned space programme, which placed enormous pressure on the agency's recently appointed administrator, James Webb, and Robert Gilruth. They discussed the flight at length with key **Mercury** personnel and, with considerable reluctance, told Wernher von Braun and his rocket team that a further unmanned test flight, a so-called "booster development launch", would have to be made on the date set aside for MR-3. If it proved successful, then Shepard would fly on 25 April. Von Braun, who had already been pressing for another test of the Redstone launch vehicle, was not unhappy with the decision.

As an impatient Shepard waited, von Braun had his final proving test. Nineteen days later, a triumphant Soviet Union successfully shot a man into space. This news both shattered and infuriated Shepard. As the astronauts' nurse Dee O'Hara recalled, "It was a big blow to everybody and a great disappointment. Gagarin's flight made us look like fools. Alan was bitterly disappointed, and I could understand that."<sup>5</sup>



Alan Shepard, aboard *Freedom 7*, became the first American in space on 5 May 1961.  
(Photo: NASA)

Despite losing the coveted position in history as being the first man into space, Shepard flew an almost flawless, 15-minute suborbital mission in *Freedom 7* on 5 May 1961. His first remark upon being hoisted into the recovery helicopter was an exuberant "Boy – what a ride!"

The news of Shepard's safe recovery was greeted with a mixture of relief and jubilation across America. An elated President Kennedy, who had watched the launch live on television in Washington, promptly called USS *Lake Champlain* (CV-39) by radio-telephone to offer Shepard his congratulations.

The next day President Kennedy received a message from Soviet Premier Nikita Khrushchev saying this "latest outstanding achievement in man's conquest of space opens up unlimited possibilities for the study of nature in the name of progress". But the Soviet press derided Shepard's 15-minute ballistic shot as being insignificant in comparison to the orbital mission of Gagarin.

Flown to Washington three days after his mission, Shepard was honoured at the White House, where President Kennedy presented him with NASA's Distinguished Service Medal "for outstanding contributions to space technology".

Prophetically, Shepard called his flight aboard *Freedom 7* "just the first baby step aiming for bigger and better things".<sup>6</sup> However, it always galled him that an overdose of caution had cost America (and him) the chance to be first in space. His suborbital flight might seem inconsequential when compared with today's space-flight activities, but it galvanised and united Americans at the time, giving them a renewed sense of pride and achievement. It also set in motion mankind's greatest scientific undertaking. Just twenty days after Shepard's triumph, the President stood before a joint session of Congress and committed America to landing a man on the moon by the end of the decade.

Once astronaut Virgil (Gus) Grissom had virtually replicated Shepard's flight in July, NASA decided to press on with an orbital mission. This was first achieved by John Glenn aboard *Friendship 7* in February 1962. After another two such missions, it was announced that Project Mercury would conclude with Gordon Cooper flying a 22-orbit mission in May 1963.

However Alan Shepard was keen to fly again, and if it meant using a little of his renowned tenacity then he was prepared to give it his best shot. He knew a spacecraft (15B) had already been assigned to a possible final Mercury mission and it had been substantially upgraded, making it capable of operating a prolonged flight. Since the other astronauts who had flown were now engaged in tasks specifically related to the follow-on Gemini and Apollo programmes, he and Cooper were the only astronauts still actively involved in Mercury training. As Cooper's backup for the MA-9 mission Shepard would have automatically slotted in as prime pilot for an additional flight, with Cooper performing backup duties.

Shepard resolutely went ahead with his plans for MA-10, to the point of renaming spacecraft 15B *Freedom 7 II* and having that logo painted on its shingled exterior. By this time NASA had more or less decided to scrap plans for a final one-man flight, so in a typically audacious move Shepard went above his NASA bosses with an attempt to enlist the personal support of the President for an open-ended mission to round out Project Mercury. But Kennedy told the astronaut that the final decision rested entirely with NASA Administrator James Webb. After weighing up the arguments for another Mercury flight, Webb told the Senate Space Committee in June 1963, "There will be no more Mercury shots." He then pointed out that Project Mercury had satisfactorily accomplished its goals and there were new priorities. All the energies of NASA and its contractors, he said, should now be fully employed in focusing on the Gemini and Apollo missions. As it turned out, even if Shepard had realised his unlikely goal of an assignment to a second one-man flight, it was a mission he was destined never to fly.

Some early consolation came for Shepard when he was selected to fly the first Gemini two-man flight, with rookie Tom Stafford as his co-pilot. Early in 1964 they had begun preparatory training in the simulators when Shepard was suddenly struck down by an ailment that threatened to end not only his astronaut career, but also his days as a pilot. He had awakened one morning feeling a little giddy, and collapsed when he tried to stand up. Believing it to be an isolated incident, he was not overly concerned. But then five days later he suffered another bout of dizziness, vomited uncontrollably, and developed a loud, recurring ringing in his left ear. After several such incidents, he realised that it was not something he could simply tough out and reluctantly went to see the flight surgeons. The resulting tests prompted a panel of NASA physicians to recommend that he be removed immediately from the flight rotation.

The ailment proved to be Ménière's Syndrome. "The problem is not considered very significant for an Earth-bound person, but it sure can finish you as a pilot," he said during a 1970 interview for *Naval Aviation News*. "I convinced myself it would eventually work itself out, but it didn't. Tom Stafford had told me about Dr. House, out in Los Angeles, who could perform an operation on this particular kind of inner

ear trouble. At first it sounded a little risky but in 1968 I finally decided on having it done. With NASA's permission I went out to California. In order to keep the whole business quiet, Dr. House and I agreed that I should check into the hospital under an assumed name. It was the doctor's secretary who came up with it. So, as Victor Poulis, I had the operation, and six months later my ear was fine.”<sup>7</sup>

But long before this surgery, Shepard had lost his chance to fly on Gemini, and there were serious doubts about whether he would ever fly in space again. In order to remain part of the astronaut cadre, he had accepted an interim appointment as Chief of the Astronaut Office, which made him a major force in the training and assignment of his fellows. The successful surgery enabled him to return to active astronaut status, and he quickly began a campaign to fly on an Apollo lunar mission. Almost a decade after his historic flight aboard *Freedom 7*, Shepard returned to space on 31 January 1971 as commander of Apollo 14. Now 47 years of age, he became the oldest of the twelve men to leave their footprints in the lunar soil. He and his lunar module pilot Edgar Mitchell spent thirty-three hours traversing and exploring the Fra Mauro area. He freely admitted shedding tears of wonder and joy when he stood on the moon's surface for the first time beneath lunar module *Antares*.



The only Mercury astronaut to stand on the moon: Captain Alan Shepard poses by the American flag during the Apollo 14 mission. (Photo: NASA)

At the end of their final lunar excursion, Shepard pulled out a club head that he had secretly brought along. With practiced care he clipped it onto the shaft of a soil-sample tool. With all in readiness, he then dropped a golf ball onto the lunar surface and began a modified one-armed backswing. "Unfortunately the suit is so stiff I can't do this with two hands," he reported back to Earth, "but I'm going to try a little sand trap shot here." Using only his right hand he whacked the first of two balls in the low gravity for what he later described with a wide aviator's grin as "miles and miles".

In June 1971, Shepard resumed his duties as Chief of the Astronaut Office, and in December of that year the Navy promoted him to the rank of rear admiral. On 31 July 1974 he retired from the Navy and resigned from NASA. He then went into private industry by joining a Houston-based construction company as partner and chairman, and he later served as president of a Coors beer distribution company. In 1986 he became president of Seven-Fourteen Enterprises in Houston, the company name reflecting his two space missions. Along with the other surviving Mercury astronauts and Betty Grissom, Shepard founded the Mercury Seven Foundation in 1984, which was dedicated to raising money for scholarships awarded to college students studying science and engineering. He became the foundation's first president and chairman. In 1995 the organization was renamed the Astronaut Scholarship Foundation, but poor health forced him to turn over both positions to fellow former astronaut Jim Lovell in October 1997.

On Tuesday, 21 July 1998, the world lost America's first astronaut in space to the insidious disease leukaemia. He left behind his wife of fifty-three years, Louise (who would die of a heart attack just five weeks later) and daughters, Laura (born in 1947) and Juliana (born in 1951), as well as Alice, a niece of his wife that they raised as a daughter, and six grandchildren. He had fought a typically stoic and mostly private two-year battle against the tenacious cancer, but it was one even he could not win.

Rear Admiral Alan Shepard, an authentic twentieth century hero, passed away in his sleep at the Monterey Community Hospital in California. He was seventy-four years old.

Among Shepard's many honours were the Congressional Space Medal of Honor, two NASA Distinguished Service Medals, the NASA Exceptional Service Medal, a Presidential Unit Citation, the Navy Distinguished Flying Cross, the Langley Gold Medal of 1964 (highest award of the Smithsonian Institution), the Lambert Trophy, the Iven C. Kincheloe Trophy, the Cabot Award, the Robert J. Collier Trophy, the City of New York Gold Medal for 1971, and the American Astronautical Society's Flight Achievement Award for 1971. In addition, he was inducted into the National Space Hall of Fame in August 1969; into the International Aerospace Hall of Fame in San Diego, California, in 1971; and into the Hall of Honor of the National Museum of Naval Aviation at NAS Pensacola, Florida.

### **VIRGIL I. GRISSOM, USAF**

Gus Grissom (as he was best known) never seemed to fit the archetypal American hero mould. A stocky, stubby man just five feet seven inches tall, he had more the



Virgil (Gus) Grissom, prior to his Mercury selection. (Photo: USAF)

appearance of a motor mechanic or television repairman than an astronaut. Had fate not intervened with a final, tragic twist to his story, he might now be remembered as the first man to set foot upon the moon. His boss, Deke Slayton, had informed Gus that he was in line to command the first lunar landing mission.

Virgil Ivan Grissom was born on 3 April 1926 in the small Midwestern town of Mitchell, Indiana. He would become the eldest of four children for Dennis David and Cecile (née King) Grissom. His father was a long-serving employee of the Baltimore and Ohio Railroad, and although the family was far from being rich they were able to enjoy a comfortable and contented family life.

Young Virgil's lifelong nickname came about during a game of cards when a young friend read 'Gris' upside-down on a score card and translated it to 'Gus'. The name stuck. He met his future wife Betty Moore at Mitchell High School, and there was an instant attraction. He later told Betty that the first time he saw her he decided she was the girl he was going to marry.

Grissom went directly from high school into flight training with the Army Air Corps cadet programme in 1944, but was discharged from the service at war's end before he had been awarded his wings. On 6 July 1945 he and Betty married. Their first son, Allan Scott, was born on 16 May 1950. Another son, Mark, completed the family on 30 December 1953. Meanwhile, after working for a company that made school buses, he enrolled at Purdue University to study for a bachelor's degree in mechanical engineering.

Grissom graduated from Purdue with his degree in 1950, then undertook aviation cadet training with the Air Force, being awarded his wings at Luke AFB, Arizona, in March 1951. He was immediately assigned to the 75th Fighter Interceptor Squadron at Presque Isle AFB, Maine. He was then sent to Korea where he flew one hundred combat missions, piloting F-86 Sabre jets with the 5th Air Force's 334th Squadron. He received both the Distinguished Flying Cross and the Air Medal with Cluster for his combat work in Korea.

Upon his return, he became a jet flight instructor at Bryan AFB, Texas, and in August 1955 Captain Grissom entered the Air Force Institute of Technology (AFIT) at Wright-Patterson AFB to complete a course in aeronautical engineering. In October 1956 he was admitted to Class 56D at the Test Pilot School at Edwards AFB. Then it was back to Wright-Patterson in May 1957 where he served as a test pilot assigned to the Fighter Branch, test-flying such advanced aircraft as the T-33, F-86, F-94, F-100, F-102 and F-104. One momentous day at Wright-Patterson his adjutant handed him a mysterious teletype classified Top Secret directing him to report to Washington, D.C. in civilian clothes.

On 21 July 1961, Captain Virgil Grissom became America's second man in space with his suborbital flight aboard Mercury spacecraft *Liberty Bell 7*. Having splashed down, and as a recovery helicopter hovered overhead, Grissom completed his final checks and prepared the hatch for opening by arming the explosive bolts. Without warning, the hatch suddenly blew off, and water began to pour in. He immediately scrambled out and swam away from the sinking capsule. The helicopter managed to secure a steel cable to *Liberty Bell 7* in a desperate attempt to save it, but the weight of the water in the capsule was so great that the helicopter had to use full power and

when this caused an engine warning signal (later proved to be erroneous) the pilot reluctantly severed the cable. If that warning light had not illuminated, the helicopter would probably have been able to recover the spacecraft; instead it sank and came to rest on the floor of the Atlantic. Meanwhile, with water leaking into his suit through an open oxygen connector, Grissom was struggling to keep afloat. As a photographer in another helicopter industriously took photographs of him in the water, the astronaut frantically signalled for help. When a line was finally lowered he was bare moments away from sinking. To make matters worse he was hauled underwater for several feet before finally being winched upwards. His first words on reaching safety were hardly history-making. "Give me something to blow my nose," he growled. "My head is full of sea water!"

Grissom always maintained that he had not blown the hatch, either intentionally or accidentally, but the later ignominies and presidential snubs that he and his family were alleged to have suffered as portrayed in the film *The Right Stuff* were grossly exaggerated. He admitted to being scared during lift-off, but the Hollywood film gave the impression of a panicky astronaut who completely lost control after splashdown, which is simply not true. Grissom, completely exonerated, was still one of NASA's and his country's favourite sons.

Almost four years later he served as command pilot on the first two-man Gemini mission following the unavailability through illness of Alan Shepard. Together with



Gus Grissom (left) and John Young completed the first two-man Gemini mission.  
(Photo: NASA)

Group Two astronaut John Young, he took to the skies atop a modified Titan II from Pad 19 at the (newly renamed) Cape Kennedy on 23 March 1965. Although NASA had ordered an end to the practice of naming spacecraft, Grissom, tongue in cheek, referred to his new one as *Molly Brown*, in reference to the then-popular Broadway show about a *Titanic* survivor, "The Unsinkable Molly Brown". The three-orbit test flight was completely successful, and was the first to involve in-flight modifications of an orbit trajectory. Grissom took a further place in history as the first person to accomplish two space flights.

Grissom's next assignment was as backup commander for Gemini 6, which flew in December 1965. In March 1966 he was selected to command the first test of the three-man Apollo spacecraft – not a bad achievement for a man who would later be portrayed in *The Right Stuff* film as panicky and snubbed by an embarrassed NASA. For his part, Grissom was delighted, because Deke Slayton, who was now in charge of the Astronaut Office, told him that if that mission was a success, then the 'rotation system' would give Grissom a chance at commanding the first lunar landing, and so become the first person to set foot on the moon.

"I remember how happy he was when they told him he would [command the] first crew to go to the moon," Betty Grissom reflected in her book, *Starfall*. "I thought to myself, 'How's that going to change our lives if he's the first on the moon?' But I put that out of my mind. It was too far in the future, and I guess it's just as well I did."<sup>8</sup>

1967 was a tragic year for America's astronauts. Unflown Mercury candidate Ed Givens lost control of his car on a rain-slicked road and was killed. C.C. Williams, a member of a group of astronauts selected in 1963, died after a low-altitude ejection from his crippled T-38 jet over Florida. But the worst accident of all, one which was to have far-reaching implications for the United States' space programme, occurred on 27 January 1967.

There is an often repeated story that Grissom was so disgusted with the constant problems and failures of the Apollo 1 spacecraft's systems that he hung a lemon on it. In fact he hung the lemon on the spacecraft simulator, which was never up to date and was in a constant state of breakdown, leading to pent-up frustration and consternation for the professional but gruff Grissom. It is true, however, that things weren't going very smoothly for the crew, and Grissom was becoming increasingly vocal about the lax state of preparedness and safety concerns by the contractor, North American. In the days of Mercury and Gemini he could take any problem directly to the president of McDonnell Aircraft for rectification, but things did not work that way with North American. Grissom perceived the company as having too many bosses and too little decision making. He and his crew, Ed White II (who had performed the nation's first spacewalk on the Gemini 4 mission in June 1965) and rookie Roger Chaffee, named to the mission in the wake of an injury to original choice Donn Eisele, were equally annoyed by the seeming lack of commitment evidenced in the numerous failures of the spacecraft systems.

There was an intense urgency to deliver the spacecraft from the plant in Downey, California. There was pressure, though few would admit it, to push Spacecraft 012 to a satisfactory completion for the scheduled delivery date. When ship-out time came, Grissom reckoned that there were too many technical problems still to be resolved.

By Friday, 27 January 1967, the Apollo spacecraft had undergone twenty weeks of tests and modification at the Kennedy Space Center. An Overall Plugs-Out test had been scheduled for that day to test the space vehicle and instrumentation in conditions almost identical to actual flight, in which the umbilicals would be disconnected at the appropriate phase of the countdown. It was not considered to be a dangerous test of the spacecraft and its systems, since the Saturn I rocket was not loaded with fuel; the "wet" mock test would not be performed until shortly before launch, which was due the following month.

At 7:42 a.m., NASA technicians powered up the spacecraft, sending electric current surging through nearly thirty miles of wiring coiled in thick bundles around the floor and through enclosed recesses above and below the astronauts' contoured couches. Grissom, White and Chaffee, in full flight suits, entered the spacecraft four hours later and plugged in their respective communications and oxygen systems. As commander, Grissom occupied the left-hand couch. White was in the middle, with Chaffee on the right. They were fed pure oxygen at a pressure of sixteen and a half psi to ensure that no contamination could intrude from the atmosphere outside. The heavy and cumbersome hatch was closed from the outside and sealed in a manner designed to prevent it from inadvertently blowing open in space. As the crew slowly worked their way through the tedious checklists, they grew impatient by a series of minor problems. Grissom's exasperation reached boiling point during a persistent communications problem. "How are we going to get to the moon, if we can't talk between two or three buildings?"<sup>9</sup>



The ill-fated crew of Apollo 1 (official designation Apollo/Saturn 204). From left: Edward H. White II, Gus Grissom and Roger Chaffee. (Photo: NASA)

At 6:30:55 p.m., just one minute after Grissom's frustrated outburst, somewhere in those thirty miles of wiring, one segment arced across to another with a spark that ignited brightly in the pure oxygen environment, and the greatest catastrophe to that time in the United States' space programme had begun. Within a matter of seconds, the three men died from inhaling the toxic fumes created within the flame-engulfed spacecraft. In all, from the time the alarm was first raised until the heavy hatch was opened, five minutes and twenty seconds had elapsed.

Gus Grissom and Roger Chaffee were buried with full military honours at Arlington Cemetery in Washington, D.C. on 30 January 1967, while Ed White was buried at West Point.

Subsequent to his monumentally successful mission aboard Gemini 3 in 1965, Grissom had actually foretold his own fate at a press conference, although he was speaking on behalf of the entire astronaut corps. "If we die, we want people to accept it. We are in a risky business and we hope that if anything happens to us, it will not delay the program. The conquest of space is worth the risk."<sup>10</sup>

In addition to his war service medals, Grissom earned two NASA Distinguished Service Medals, the NASA Exceptional Service Medal, the Air Force Command Pilot Astronaut Wings, the National Aeronautic Association (NAA) Robert J. Collier Trophy of 1962, the Society of Experimental Test Pilots (SETP) Iven C. Kincheloe Award of 1963, and in June 1962 the General Thomas D. White Air Force Space Trophy for 1961.

#### **JOHN H. GLENN, JR., USMC**

On joining the first group of NASA astronauts, John Glenn could lay claim to many distinctions: he had the most extensive combat record of the seven; he was the most decorated; he held a new transcontinental speed record flying a Navy jet; and he had appeared on television, teaming up in 1957 with 10-year-old Eddie Hodges on *Name That Tune*. With the future astronaut's help, young Eddie won \$12,500. At 38, Glenn was also the oldest in the group.

John Herschel Glenn, Jr. was born at home at 1201 Foster Avenue in Cambridge, Ohio, on 18 July 1921. Rather prophetically, the Glenn coat of arms bears the motto *Alta Pete ad Astra* Aim High to the Stars. Two years later the Glenn family moved to nearby New Concord and built a new home that doubled as a rooming house for students from nearby Muskingum College. Along with his younger sister Jean, Glenn was raised in comfortable, upper-middle class surroundings in the small Midwestern town, which he came to think of as his hometown. His father, a former soldier in the American Expeditionary Forces and post-war railroad conductor, opened a plumbing and heating business in New Concord, while his mother, Clara Sproat Glenn, was the daughter of a local doctor.

Glenn, who happily bore the nickname of "Bud", attended elementary and high schools in Concord, and in high school was not only an honour student, but won his letters in football, basketball and tennis, was elected to the school council, became a reporter for the school newspaper, acted in school plays, played the trumpet, sang in



U.S. Astronaut John H. Glenn, Jr., USMC and his wife Annie (Photo: NASA)

the church choir, and over four summers worked as a general hand and lifeguard at Camp Nelson Dodd, the state YMCA camp. After graduating from high school in 1939, he took on studies as a science major at New Concord's Muskingum College. Along with four fellows he also learned to fly in a Navy programme for civilians in nearby New Philadelphia, and was in his second year at college when the Japanese attacked Pearl Harbor. He dropped out of college and went to Columbus to enlist in the Naval Reserve V-5 programme as a seaman 2nd class. Having already decided to join the Marine Corps, Glenn was called to active duty on 28 May 1942 and sent to Naval Aviation Pre-Flight School in Iowa City, Iowa. He was designated an aviation cadet on 4 August, and between 23 August and 17 November received primary flight training at the Naval Reserve Air Base in Olathe, Kansas. After further instruction at the Naval Air Training Center in Corpus Christi, Texas, he won his aviator's golden wings on 30 March 1943 and terminated his enlistment in the Naval Reserve in order to accept a commission as a second lieutenant in the U.S. Marine Corps Reserve.

Less than a week after graduating, Glenn returned to New Concord and married his childhood sweetheart, Anna (Annie) Margaret Castor. His mother, Clara, said the couple had known each other most of their lives. "When our children were small, we generally took them with us when [our social] club met. Annie and John weren't in school yet, and pretty soon they became playmates. When they started school, they just naturally 'paired off' whenever they went to children's parties."<sup>11</sup>

After advanced flight training, and having completed an assignment to VMJ-353, a Marine squadron flying Douglas R4D transport planes, Glenn joined Marine Fighter Squadron 155 (VMO-155), Marine Aircraft Group 31, Fourth Marine Aircraft Wing. In October 1943 he was promoted to full lieutenant. From February 1944, he spent a year with VMO-218 flying F4U Corsair fighters on strafing and escort missions in the Marshall Islands. In all, he flew 59 combat missions during his World War II service.

On returning from overseas in February 1945, Glenn was assigned initially to the Ninth Marine Aircraft Wing at the Marine Corps Air Station at Cherry Point, North Carolina, and then the Naval Air Station at Patuxent River, Maryland, where he was promoted to the rank of captain in July 1945. On 13 December of that year he and Annie became the proud parents of a son named John David. Their second child, a daughter named Carolyn Ann, was born on 19 March 1947.

After the war Glenn elected to stay in the Marine Corps, and after serving at the Marine Corps Air Station at El Toro, California, he undertook a second tour of duty with Fighter Squadron 218 on North China Patrol, and subsequent duty on the island of Guam. From June 1948 to December 1950 he was an instructor in advanced flight training at Corpus Christi, Texas, and then attended Amphibious Warfare School at Quantico, Virginia. Following a period on a staff assignment, Glenn was given a jet refresher course and once again saw active service, this time in Korea. He flew sixty-three missions with Fighter Interceptor Squadron 311 in Grumman F9F Panther jets. His aircraft was struck several times by gunfire, one time gaining some 300 holes in the fuselage. In fact the Panther was shot up so badly that it was astonishing he was able to keep it in the air, let alone land it safely. He attracted so much gunfire on his missions that he was given the humorous nickname "Ol' Magnet Ass".

From February to September 1953, Glenn served as an exchange pilot with the Fifth U.S. Air Force on a second Korean combat tour. Now flying an F-86 Sabre jet, he completed twenty-seven missions with the 25th Fighter Squadron, 51st Fighter Interceptor Wing. During this second tour he was also awarded the oak leaves of a major. During the last nine days of fighting in Korea, he downed three MiG-15s in combat along the Yalu River. Overall, his service in World War II and Korea was rewarded with the Distinguished Flying Cross four times and an Air Medal with an impressive eighteen clusters.

After Korea, Glenn attended the Test Pilot School at the Naval Air Test Center, Patuxent River. Following the graduation of TPS Class 12 on 9 July 1954 he stayed with the Armament Test Division there and became project officer for a number of experimental Navy aircraft. He was next assigned to the Fighter Design Branch of the Navy Bureau of Aeronautics in Washington, D.C., and while serving there between November 1956 and April 1959 he also attended the University of Maryland.

Glenn achieved a further degree of fame and another Distinguished Flying Cross on 16 July 1957 when, under the project name "Operation Bullet", he flew non-stop from Los Angeles to New York in an F8U-1P Crusader, setting a new coast-to-coast supersonic speed record by maintaining an average speed of 726 miles an hour and completing the trip in 3 hours, 25 minutes and 8.4 seconds.



Maj. John Glenn climbs down from the cockpit of the F8U-1P Crusader after his record-breaking transcontinental flight in July 1957. (Photo: USN)

At the time that Glenn attended the astronaut briefings in Washington, D.C., he was a major, but on 1 April 1959, eight days prior to his selection by NASA, he was promoted to the rank of lieutenant colonel.

As a member of the first astronaut team, Glenn elected to specialise in the layout of the Mercury spacecraft interior, contributing in no small way to the design of the



On the morning of launch, Glenn is inserted into his spacecraft, *Friendship 7*. (Photo: NASA)

instruments and controls. He was understandably disappointed to be overlooked for the first Mercury flights, which went in turn to Alan Shepard and Gus Grissom. But when NASA cancelled further suborbital flights, on 29 November 1961 Glenn was delighted to be assigned to the first orbital mission, MA-6 (Mercury-Atlas 6). The ensuing months proved to be a time of frustration for Glenn, NASA, and the United States, as they endured eleven flight postponements owing to technical problems or unsuitable weather. It was proving a tense time, but on 27 January 1962 everything seemed to be ready as Glenn once again clambered into his spacecraft, which he had christened *Friendship 7*. Five hours later, to his chagrin, he was extricated from the spacecraft yet again due to adverse weather with just thirteen minutes remaining on the clock. As he said afterwards, "I learned early in the flight-test business that you have to control your emotions. You don't let these things throw you."<sup>12</sup>

Finally, on 20 February, everything came together and the mighty Atlas rocket left the launch pad, carrying John Glenn and *Friendship 7* into history. However it was not a trouble-free flight. One dire situation occurred when a Mission Control meter indicated that a clamp holding the spacecraft's heat shield had prematurely released. If the shield slipped while the astronaut was re-entering the atmosphere, *Friendship 7* and its human cargo would be incinerated. Instead of jettisoning the retrorocket pack after the deorbit manoeuvre, he was told to leave it on so that the straps would help to hold the shield in position.

As Glenn entered the atmosphere after his third orbit he heard banging on the exterior of his craft. "I saw one of the three metal straps that hold the retro-pack in place start flapping around loose in front of the window," he told a *Life* reporter later. "Then I began to see a bright orange glow building up around the capsule. The loose strap burned off at this point and dropped away. Right away I could see flaming chunks go flying by the window... I thought that the heat shield might be tearing apart."<sup>13</sup> As it turned out, the heat shield was never in danger of slipping; a faulty switch in the shield's circuit had given a false reading.

Over the next few days Glenn received a tumultuous hero's welcome—he was showered with ticker-tape during a parade in New York City that was attended by some four million people, had presidential meetings, and gave an address to a rare joint meeting of Congress.

In 1964, Glenn slipped on a rug in his bathroom and hit his head. The resultant concussion caused him to postpone plans to run for the U.S. Senate, and he spent almost a year recovering from the effects of the fall. That same year, on 27 October, he was promoted to the rank of colonel. On 1 January 1965, after twenty-three years of distinguished service to his nation, John Glenn retired from the Marine Corps. A month later he became a consultant to the NASA Administrator. He then became an executive with soft-drink company Royal Crown Cola, in Atlanta, Georgia, and also served on the boards of several corporations. In 1968 he joined Bobby Kennedy's presidential campaign, only to be horrified when the young candidate was gunned down on 4 June. It fell to John and Annie Glenn to tell the man's children that their father had been killed. "It was one of the hardest things I ever had to do," he related in his memoir.<sup>14</sup>

Eventually, Glenn became interested once again in entering politics in his home state of Ohio. After several setbacks, in 1974 he won his Senate seat, carrying all 88 counties of Ohio. He was re-elected in 1980 with the largest majority in Ohio history. He ran for president in 1984, his prospects at the time boosted by publicity from the release of the film version of the popular Tom Wolfe book, *The Right Stuff*, but did not show the ruthless tenacity of his opponents and failed to politically engage with the public. He went from early front-runner to being eliminated by eventual nominee Walter Mondale. However, he went on to serve another fourteen years in the Senate, and in the summer of 1996, drawing upon his experience as a member of the Senate Committee on Aging, he approached NASA with a bold proposal that he be given a seat aboard a space shuttle mission, selling his mission by reflecting a long-standing interest by medical experts on the effects of weightlessness on the aging human body. When word of a pending space flight for the veteran Mercury astronaut leaked, both Glenn and NASA Administrator Dan Goldin made it clear that the former astronaut would not fly unless there was a legitimate scientific rationale for doing so. Despite criticism that his inclusion on a shuttle crew was something of a publicity stunt and could not altogether be justified, NASA agreed to include Glenn on the crew of the STS-95 mission.

Fellow Mercury astronaut Wally Schirra was not surprised by the announcement. "John Glenn craved the publicity. I think even John would admit that. When he went into politics that became pretty obvious. We all saw that he knew how to do



In orbit once again, Glenn conducts experiments on the mid-deck of *Discovery*. (Photo: NASA)

public relations from that original press conference. We weren't prepared for that at all – we were looking over, thinking, 'What is this guy saying?' We finally did adapt!"<sup>15</sup>

At 2:15 p.m. on 29 October 1998, after two short but suspenseful delays, shuttle *Discovery* soared into the Florida skies. A quarter of a million people were present to witness the launch. "Liftoff of *Discovery* with a crew of six astronaut heroes and one American legend," stated Lisa Malone, the countdown commentator, as the vehicle roared away from the launch pad.

Several hours into the flight, mission commander Curtis Brown told a delighted Mission Control, "Let the record show, John has a smile on his face and it goes from ear to ear. We haven't been able to remove it yet." Thirty-six years after his Mercury mission, 77-year-old Glenn was back in orbit, the oldest person ever to fly into space. The nine-day mission landed back at the Kennedy Space Center on 7 November after 134 highly-successful Earth orbits.

These days, John and Annie Glenn are still actively finding ways to improve the lives of others – especially young people. To this end, in 2006 – despite both being

injured in a car accident they set up the John Glenn Center for Public Service and Public Policy at the Ohio State University, which prepares students for careers in the public and non-profit sectors.

In addition to the awards mentioned above, Glenn's military medals comprise the Navy Unit Commendation for service in Korea, the Asiatic-Pacific Campaign Medal, The American Campaign Medal, the World War II Victory Medal, the China Service Medal, the National Defense Service Medal, the Korean Service Medal, the United Nations Service Medal, the Korean Presidential Unit Citation, the Navy's Astronaut Wings, and new insignia of the Marine Corps (an Astronaut Medal). And his civilian awards include the Congressional Gold Medal, the Congressional Space Medal of Honor, the NASA Distinguished Service Medal, the Woodrow Wilson Award, and the Thomas D. White National Defense Award.

### M. SCOTT CARPENTER, USN

At the time of his selection as a Mercury astronaut, Scott Carpenter had accumulated 2,800 flying hours, only 300 of which were in jets. Had he not impressed the testing doctors with his incredible fitness, combined with a sharp, logical engineering mind, this lack of jet flying hours may have seen another candidate chosen.

Carpenter also possessed a wry sense of humour. Once, when asked about the make-up and compatibility of the Mercury Seven, his eyes twinkled when he replied, "There is rivalry of course, but the Navy people are the best. There's no doubt about that. And the fact that we have three Air Force people with us was purely political, and one token Marine – that's alright; Marines are part of the Navy anyway."<sup>16</sup>

Malcolm Scott Carpenter was born in Boulder, Colorado, on 1 May 1925, the only child of Florence Kelso (née Noxon) and research chemist Dr. Marion Scott Carpenter. He seldom saw his father, who was struggling to make a living in New York City during the Depression, and lived with his mother in Boulder. His parents divorced when he was four years old, but after his mother entered a sanatorium with tuberculosis he was raised by her father, Victor Noxon, at that time the editor of the *Boulder County Mine and Farmer*. His mother was eventually able to return home, but when Carpenter was only thirteen years old his grandfather passed away, and he became something of a rebel. Despite his wayward teen years ("I stole things from stores and I was just drifting through, sort of no good," as he later told interviewer Loudon Wainwright)<sup>17</sup> he was still a notable athlete in high school, lettering in gymnastics and serving as president of the ski club.

When Japanese forces attacked Pearl Harbor in December 1941, Carpenter was only sixteen years old and a junior in high school. The suddenness and gravity of the attack not only had a profound effect on him, but he came to admire the daring and defiance of the U.S. Navy and Marine combat pilots, especially after seeing the film *Wake Island*, and vowed to join them in the air as soon as he could. True to his word, when he completed high school in 1943, the 17-year-old Carpenter travelled to San Francisco and applied to the Twelfth District Naval Headquarters for the V-5 flight



Scott Carpenter (right) and Mercury colleague John Glenn pose for a photo at Cape Canaveral in 1962. (Photo: NASA)

training programme sponsored by the U.S. Navy. He was accepted on 11 April, and that September entered basic training at Colorado College. By January 1945 he had advanced to pre-flight training at St. Mary's College in Moraga, California. But in August 1945, just as he finished four months of primary flight training in Ottumwa, Iowa, the Pacific war ended – and with it the V-5 programme. Disappointed, he was demobilised with only eight hours of flying time recorded in his log. On returning to Boulder, he re-entered school at the University of Colorado on the G.I. Bill to major in aeronautical engineering.

In 1946 Carpenter came close to being killed after falling asleep at the wheel of his car and plunging a hundred feet off a mountain road. He suffered a number of serious injuries, but following a lengthy convalescence he married his sweetheart Rene Louise Price and rejoined the Navy through their Direct Procurement Program. He received his bachelor of science degree from the University of Colorado in 1949, subsequently reporting to NAS Pensacola in Florida as an ensign on 30 October. The following year he was finishing his flight training there and at Corpus Christi, Texas, when the Korean War began. On 19 April 1951 he was awarded his wings as a naval aviator – they were pinned on by his wife Rene. He next attended the Fleet Airborne Electronics Training School in San Diego and was sent in November of that year to a Lockheed P2V Neptune transitional training unit for multi-engine aircraft at Whidbey Island, Washington. Following a tour of duty flying P2V aircraft on anti-submarine patrols with Patrol Squadron Six (VP-6) based on the island of Guam, during which he flew aerial mine-laying missions and shipping surveillance in the Formosa Strait, the Yellow Sea and the South China Sea, Carpenter was promoted to full lieutenant. Also in 1954 he learned to his joy that through his squadron commander Captain Guy Howard's recommendation he had gained an appointment to Class 13 of the Navy's Test Pilot School at Patuxent River, Maryland.

After graduating, Carpenter remained at Pax River until 1957, serving as a test pilot in the Electronics Test Division, conducting flight-test projects on such aircraft as the Douglas A-3D jet bomber and the Grumman F9F Panther and F11F Tiger jet fighters. Having completed a year's training in electronic intelligence (ELINT) at the Navy's Postgraduate School in Monterey, California, he was assigned to the Navy's Air Intelligence School in Washington, D.C. The next assignment would normally be a three-year tour of sea duty as a Navy intelligence officer. By now he and Rene had four children, Scott, Jay, Kristen and Candace. Sadly, another son named Timmy had died in his sleep of a viral infection, aged just six months. The ship to which Carpenter was assigned as Air Intelligence Officer in August 1958 was the Essex-class USS *Hornet* (CVS-12). In January 1959 it had left dry dock, and was moored at San Diego ready to join the Seventh Fleet in anti-submarine warfare tactics in Japan and the Philippines, when Carpenter was ordered to Washington D.C. in civilian clothes, whereupon he found that he was a candidate for astronaut selection. After the initial briefings he returned to his ship, which sailed for sea trials. The letter advising him that he was one of the thirty-two candidates came in the mail while he was at sea, so his wife, knowing that he would want to continue with the selection process, telephoned in his "volunteer" request. The captain of the *Hornet* was not

impressed when his intelligence officer had to suddenly leave the carrier. Following the medical tests at the Lovelace Clinic and Wright ADC, Carpenter returned to his ship. When Charles Donlan called with the news that Carpenter had been selected as a Mercury astronaut, Rene said he was on the *Hornet*, now in dock, and so Donlan placed a call to the carrier and Carpenter was given a slip of paper with instructions to call him. When Carpenter rang from a shoreside payphone, Donlan told him to report to NASA. The *Hornet's* captain was furious that his intelligence officer was leaving yet again, this time for good, and it took a call from Admiral Arleigh Burke, Chief of Naval Operations, to convince the captain not to try to have the disembarkation countermanded.

In October 1961, coincidentally on the anniversary of the launch of Sputnik, the seven Mercury astronauts met with Robert Gilruth and Walter Williams, his flight operations director, at which John Glenn was announced as the pilot for America's first orbital mission, MA-6, with Scott Carpenter as his backup. After a number of irritating delays, Glenn was finally dispatched aboard *Friendship 7* on 20 February 1962. Stationed in the blockhouse during the countdown to launch, just yards from Pad 14, Carpenter spontaneously intoned his famous invocation, "Godspeed, John Glenn." As he later explained, "It just popped out of thin air. He needed speed, his name was John Glenn, and it was sort of a salute to a friend, and a plea to the higher power."<sup>18</sup>

Three weeks after that, Carpenter received some unexpected news. The prime pilot for the next orbital mission, Deke Slayton, had been unceremoniously dropped from MA-7 after a centrifuge training session when doctors noticed an irregularity in his heartbeat and diagnosed him with idiopathic atrial fibrillation, a rare disorder that is generally overcome by exercise. But NASA chiefs were concerned about sending an astronaut in less-than-perfect health into orbit, and a devastated Slayton was told he had been grounded. Although Wally Schirra was Slayton's backup and hence in line to step forward, it was felt that Carpenter, having backed up Glenn's flight for more than five months, was fully trained for what was basically a repeat of Glenn's three-orbit mission, with the launch just eleven weeks away. He was given the now-traditional honour of naming his spacecraft, and settled on *Aurora 7*. At the time he explained that Aurora meant 'dawn' and he felt that they were at the dawn of a new age. But it also had an unmistakable connection with his boyhood home in Boulder, Colorado, where he had grown up on the corner of Aurora and Seventh Avenues.

Originally scheduled for an April launch, MA-7, like its predecessor, endured its own share of scrubs. But on 24 May 1962 everything fell into place and the vehicle was launched. "I feel the liftoff," he reported. "The clock has started."

*Aurora 7* went into orbit at precisely the desired angle, travelling at close to 17,500 miles an hour. Minutes into the flight, with Africa looming and a heavy load of experiments to conduct, he reported that his pitch attitude "did not agree" with his onboard navigational readings. Despite an onerous workload scheduled for his three-orbit flight, Carpenter managed to convey vivid descriptions of what he saw through his periscope, revelling in the spectacle of the first of three sunrises and three sunsets he would witness from orbit. Post-flight he would say they were the most awesome phenomena he saw, and were well beyond his powers of description. He

became the first American astronaut to eat and digest solid food in space. He also discovered that the mysterious "fireflies" reported by John Glenn were ice particles that had formed on the spacecraft's cold exterior, and were readily dislodged by rapping on the cabin walls. When he reported that he was spending far more precious fuel on a multitude of manoeuvres specified in the flight plan, Mercury Control suggested his thrusters might be malfunctioning, but he said he had checked them thoroughly and they were not. After the flight, it was discovered that the principal cause was an intermittently malfunctioning pitch horizon scanner that had been feeding erroneous pitch attitude data. When the spacecraft was on autopilot the thrusters were being automatically fired in order to "correct" what the scanner was instructing.

Five hours after lift-off, as Carpenter prepared for re-entry at the end of his third orbit, he switched as planned to autopilot and the spacecraft immediately lurched out of alignment in both pitch and yaw, canting the nose sharply to one side. In response he switched back to manual control, but he was unable to fully correct the alignment, with the result that at retrofire *Aurora 7* was about 25 degrees off in yaw (the side-to-side axis) and he overshot the target point in the Atlantic by some 250 miles. But he was not concerned and forty minutes after splashing down, the "lost" astronaut was spotted by a Navy P2V aircraft. On being recovered, he was then transported to the aircraft carrier USS *Intrepid* (CV-11).

Despite overshooting the landing site, Carpenter proved that human pilots were essential to spaceflight. The automatic systems had failed, but he had calmly brought



Scott Carpenter (right) with his good friend Jacques Cousteau. (Photo courtesy of Jake Ehrlich, Jake's Rolex Watch Blog)

his training and skill to bear and steered *Aurora 7* to a safe splashdown. Without his asserting manual control, the spacecraft would never have made it back home. But a gross injustice would prevent him from ever flying into space again. Even as he was plummeting earthward, flight director Chris Kraft was blaming the astronaut for the lack of fuel and the overshoot. In his memoirs he wrote that he “swore an oath that Scott Carpenter would never again fly in space”.<sup>19</sup> An investigation after the mission exonerated Carpenter, but he had been tainted by incorrect speculation that he had wasted fuel manoeuvring to gaze at Earth.

In 1963, following the advice and encouragement of his admired friend Jacques Cousteau, Carpenter sought and was granted a leave of absence from the astronaut corps in order to participate in the U.S. Navy's underwater habitation project known as Sealab. This called for a small team of divers to be lowered inside a submersible chamber to a depth of around 200 feet off the coast of Bermuda. He was assigned to the team, but was involved in a motorcycle accident in Hamilton, Bermuda, that left him with mangled left arm and a broken left toe, preventing him from taking part in the dive. Worse news came later when an orthopaedic surgeon found that the break had permanently limited the rotational ability in his left arm. This ruled out a further space flight. However, he was given command of Sealab II. On 28 August 1965 he dived with the first crew to conduct experiments both in and outside the pressurised laboratory at a depth of two hundred feet off La Jolla, California. Fifteen days later the first team was replaced by a second team of nine divers. Carpenter remained on board as team leader and spent a month on the sea floor.

With the successful conclusion of the Sealab project, Carpenter resumed working for NASA as executive assistant to Robert Gilruth, tasked with assisting the design of a neutral buoyancy training programme for extravehicular activities and



From astronaut to aquanaut: Scott Carpenter as commander of Sealab II. (Photo: USN)



Scott Carpenter sits with author Colin Burgess at a 2002 book signing in San Diego.  
(Photo courtesy of Francis French)

participating in the design of the Apollo lunar module. On 10 August 1967, restless and with no possibility of a second space flight, he resigned from NASA. Two years later he also resigned his commission in the U.S. Navy and founded Sea Sciences Incorporated. Over the years he involved himself as a consultant in a number of engineering and environmental ventures. He also wrote two techno-thrillers, *The Steel Albatross* in 1991 and *Deep Flight* in 1994. In January 2003 he released his autobiography, *For Spacious Skies: The Uncommon Journey of a Mercury Astronaut*, jointly written with his daughter, Kris Stoever. His website ([www.scottcarpenter.com](http://www.scottcarpenter.com)) says he "continues to apply his knowledge of aerospace and ocean engineering as a consultant to industry and the private sector. He lectures frequently in the U.S. and abroad on the history and future of ocean and space technology, the impact of scientific and technological advance on human affairs, and man's continuing search for excellence. An avid skier, he spends much of his free time on the slopes in his home of Vail, Colorado."<sup>20</sup>

Scott Carpenter's many awards include the U.S. Navy's Legion of Merit, the Distinguished Flying Cross, the NASA Distinguished Service Medal, U.S. Navy Astronaut Wings, the University of Colorado Recognition Medal, the Collier Trophy, the New York City Gold Medal of Honor, the Elisha Kent Kane Medal, the Ustica Gold Trident, and the Boy Scouts of America Silver Buffalo. He has also received seven honorary degrees.

#### **WALTER M. SCHIRRA, JR., USN**

Born in Hackensack, New Jersey, on 12 March 1923, Walter Marty Schirra, Jr. grew up in a family noted for speed and daring – a pilot born of pilots. His Philadelphia-

born father, later a civil engineer with the U.S. Air Force in Hawaii, had served as an aviation officer in the Army Air Corps during World War I, flying reconnaissance and bombing missions over France, in the pursuance of which he was shot down three times and listed as missing in action. During the 1920s both parents became daredevil stunt fliers, barnstorming their way around county fairs throughout the eastern United States in a Curtiss JN-4 Jenny biplane. His mother, formerly Florence Shillito Leach from Brooklyn, New York, would 'dance' on the lower wings of the aircraft being piloted by his father. Schirra was always fascinated by their boldness. "It looked hair-raising and no doubt was. Her act attracted customers who would pay five dollars for a turn around the field."<sup>21</sup> He added that his mother only gave up wing-walking "when I was in the hangar".<sup>21</sup> After the birth of their son, Walter Schirra Snr. finally settled down to a military career. A daughter, Georgia, was born in 1927 to complete the family.

Schirra attended primary and junior high schools in Oradell, New Jersey, then he graduated in 1940 from Dwight Morrow High School in nearby Englewood. Earlier, when he was thirteen, he was handed control of an aircraft by his father 3,000 feet over Teterboro Airport in New Jersey. Flying lessons continued, and he soloed at the age of sixteen. He was attending the Newark College of Engineering when Japanese forces attacked Pearl Harbor.

With the eager support of his father, and keen to become a service pilot, Schirra sat for an exam to qualify for entrance to the military academy at West Point, near to where they lived in northern New Jersey. He knew that a military education would be a quick ticket to a career in aviation. At the top of his examination papers he wrote "USMA" as his preferred military institution, and then answered a number of tests in mathematics and science in which he felt he had done well. Then the exam overseer announced that anyone wishing to join West Point should remain behind to complete a further exam on the academy's history. "Wally knew that there was way too much history associated with West Point," his future wife Jo would tell the author, "so he asked if he could get his paper back and changed his preference to USNA – the naval academy. When he was accepted his father thought there'd been some sort of mistake, but after Wally told him what he'd done he went along with it. I'm glad, because if Wally hadn't changed his mind back then we would never have met."<sup>22</sup>

In 1942, Schirra entered the portals of U.S. Naval Academy, graduating as an ensign three years later in a war-accelerated class. Before he could apply for flight training he was meant to complete two compulsory years of "black shoe" service on board U.S. Navy ships. He reported to the armoured battle cruiser USS *Alaska* (CB-1) in July 1945. It was stationed in Buckner Bay, Okinawa, which was a Seventh Fleet staging area. He was on the ship when the war ended the following month. Schirra was then reassigned to flight training at Pensacola, Florida, where he won his wings as a naval aviator in June 1948 and joined Navy Fighter Squadron VF-71, initially flying the F8F Bearcat and later the F8F2. Before completing his flight training he travelled to Arlington, Virginia, in order to visit his parents and serendipitously met Josephine (Jo) Cook Frasier by the pool at the nearby Army-Navy Country Club. She was the stepdaughter of retired Admiral James L.

Holloway, Jr. They got married on 23 February 1946 and moved into a garage apartment on Staten Island.

Ensign Schirra was assigned as a briefing officer to the staff of Admiral Charles Maynard Cooke, Commander, Seventh Fleet, aboard the communications ship *Estes* (AGC-12) in Tsingtao, China, so Schirra flew over, followed soon after by his new bride. With the onset of the Korean War in June 1950, Schirra volunteered for the Navy's exchange programme with the National Guard in order to get into the action sooner. Now with the rank of lieutenant, he became an exchange pilot with the 154th Fighter Bomber Squadron, a Texas-based Air National Guard unit. In 1951 he saw active service with this squadron in Korea, flying low-level bombing and ground-strafing runs. During an eight-month tour, he flew ninety combat missions in F-84E Thunderjet fighters and was credited with downing one MiG-15 as well as scoring a probable MiG-15 kill. He was awarded the Distinguished Flying Cross and two Air Medals.

On returning to the United States he served as a test pilot at the Naval Ordnance Test Station in China Lake, California, where he helped in the initial development of the heat-seeking Sidewinder missile. One particular memory he has of that time was successfully evading a Sidewinder that had unexpectedly turned on his aircraft during an exercise. Schirra coolly looped inside the smaller missile. On leaving China Lake in 1954 he served as Chief Test Pilot at NAS Miramar near San Diego for the F7U3 Cutlass twin-engine fighter, an aircraft he disliked intensely, and then went to NAS Moffett Field near San Francisco as a member of training squadron VC-3 in order to train pilots on that same aircraft. "We were the F7U3 Cutlass team of a



Walter M. Schirra, Jr. (Photo: NASA)

transitional training unit," he recalled. "There were three other teams in the unit. Bob Baldwin, a graduate of the naval academy and TPS Patuxent, and today a retired vice admiral, led a team that trained on the FJ3 Fury, the Navy version of the F-86. We also had teams on the F9F6 Grumman Cougar and F2H2 McDonnell Banshee, and since we cross-trained, I got to fly all of the [Texas Tech University] aircraft. I no longer flew only the damn Cutlass."<sup>23</sup>

In 1957 a tour of aircraft carrier duty with the 124th Fighter Squadron on USS *Lexington* (CVA-16) then took Schirra back to the Pacific. Later that year he spent four months completing Naval Air Safety School at the University of Southern California and in January 1958 entered Class 20 at the Naval Test Pilot School, Patuxent River. Bob Baldwin was one of the instructors, and Jim Lovell and Pete Conrad were fellow students. Lovell would be named the outstanding member of that class, with Schirra and Conrad tied for second place. Upon graduation, Schirra stayed at the Naval Air Test Center as a test pilot with the rank of lieutenant commander. In October 1958 he was sent to Edwards AFB in California to help to develop the McDonnell Phantom F4H1 fighter. While there, he was ordered to Washington D.C. in plain clothes for a secret briefing at the Pentagon. It was a difficult decision to proceed with testing to become a NASA astronaut. "I was very reluctant to chuck thirteen years of flying to take part in what at first sounded like a stunt," was his subsequent comment on the life-changing decision he had to make that fateful day in February 1959.<sup>24</sup>

On joining NASA, each Mercury astronaut had to specialise in one particular aspect of the programme, and Schirra elected to take on the development of life-support systems for the astronauts, which included their pressurised suits. Initially named as the backup pilot for Deke Slayton's MA-7 mission, which was scrubbed when Slayton was medically grounded by a minor heart ailment, Schirra then found himself backing up the better mission-trained Scott Carpenter, who flew the MA-7 mission in May 1962. On 3 October of that year Schirra skillfully flew the *Sigma 7* spacecraft on a successful six-orbit MA-8 mission that lasted just over nine hours. Typically understating his role in the flight, he later said, "It was a routine, textbook flight. I was able to accomplish everything I wanted during the flight. It was a honey of a machine."<sup>25</sup>

Promoted to captain, Schirra then helped further develop the Gemini programme before being given command of Gemini 6, along with Maj. Tom Stafford of the Air Force. Their task was to track down and dock with an Agena satellite, but the Agena exploded before reaching orbit, causing a substantial change to the flight plan. They would now have to wait for the launch of Gemini 7, crewed by Frank Borman and James Lovell and rendezvous with them instead – although a docking would not be possible. Gemini 7 was launched on 4 December 1965. Eight days later, the Titan II booster beneath Schirra and Stafford ignited and promptly shut down again. Schirra had to make the immediate decision whether to remain with the spacecraft and risk disaster, or to eject and write off the mission; he chose to sit tight. Technicians later traced the problem to a plug in the base of the booster, designed to fall out when the vehicle lifted off, which had separated prematurely. Schirra and Stafford were lauded for their coolness under pressure, which certainly saved the mission. But there was



In May 1959, a month after his selection as a Mercury astronaut, Wally Schirra poses with Clifford P. Case from the Aeronautics and Space Sciences Committee of the Senate. (Photo courtesy of Rutgers University Library, New Jersey)



The crew of Apollo 7: from left, LMP Walt Cunningham, Mission Commander Wally Schirra, and CMP Donn Eisele. (Photo: NASA)

another twist – a protective cover had inadvertently been left in the engine and if the plug had not fallen out and aborted the lift-off, the vehicle would have begun to rise and then stalled in flight, obliging the crew to eject. Three days later, with the cover removed from the engine, the Titan II lifted off successfully. Less than six hours into its mission the Gemini 6 spacecraft had completed the rendezvous and was flying in close formation with Gemini 7.

Schirra's final launch came on 11 October 1968 when he commanded Apollo 7 with Walt Cunningham and Donn Eisele. As the first manned test of the spacecraft, the eleven-day, 163-orbit mission had essentially the same objectives as assigned to Gus Grissom, Roger Chaffee and Ed White. Unfortunately, the mission is generally remembered for some particularly terse comments between the spacecraft and flight controllers after the crew developed bad colds, and for Schirra's refusal to comply with requests for actions that were not in the flight plan. "At times he gave us a hard time during his flight, but technically what he did was superb," according to former NASA flight director Chris Kraft.<sup>26</sup>

The following year, on 1 July 1969, Schirra left NASA and retired from the Navy with the rank of captain. He had logged more than 295 hours in space, and was the only astronaut to have flown on all three of NASA's space programmes – Mercury, Gemini and Apollo. He once told an interviewer that he had a standard answer for anyone who asked him what he thought was the most beautiful sight of all during his missions: "The parachute. If it didn't come out it was a lousy ride."<sup>27</sup>

He was content and somewhat proud of what he had accomplished as a NASA astronaut, but had no desire to return to space, unlike John Glenn who flew a space shuttle mission in 1998. "I was amazed, frankly, when John Glenn, who had only five hours in space, was anxious to go up there for – what was it? – 8.3 days or 9.3 days," he stated. "I was *bored to tears* up there for eleven days. I mean, bored! Fighter pilots like to fly for an hour, an hour-and-a-half, come back, and do something else. Maybe two flights a day, three flights, then you go to the bar – unless you're going to fly it the next day and then you don't go to the bar. And to sit up there for eleven days, oh that was so bad!"<sup>28</sup>

Post-NASA, Schirra became a commentator for CBS News covering significant space events, often teaming up with anchorman Walter Cronkite. He also ventured into private industry. He began by becoming president of the Denver-based financial company Regency Investors Incorporated. From 1970 to 1972 he was chairman and CEO of the ECOO Corporation. In January 1973 he was elected vice chairman of the board for SERNCO Incorporated, and was then promoted to chairman of the board in July. He became director of technology purchase for the Johns Manville Corporation in 1975. The next year was made director of Power Plant and Aerospace Systems. In January 1978 he became president for development with the Goodwin Corporation, and the following year set up his own company, Schirra Enterprises, before retiring from the business world at the end of that decade. Living a contented life with Jo in Rancho Santa Fe, near San Diego, California, he loved nothing better than sailing on the *Windchime*, his 36-foot sailboat. He also enjoyed skiing, hunting and fishing, and remained active as a popular orator on the guest speaker circuit.

Wally Schirra was enshrined in the National Aviation Hall of Fame in 1986, and was inducted into the U.S. Astronaut Hall of Fame in 1990. In 2000 he was inducted into the Naval Aviation Hall of Honor. In 2005 he was named a NASA Ambassador of Exploration.

In 1988 he issued the autobiographical book, *Schirra's Space*, co-authored with Richard N. Billings. In 1995 he shared authorship with Richard Cormier, Phillip Wood and Barratt Tillmen of the Phalanx book, *Wildcats to Tomcats: The Tailhook Navy*, and in 2005 he co-authored a third book, *The REAL Space Cowboys* with his good friend Ed Buckbee.

In an interview just a month before his death, the ecologically passionate Schirra repeated a phrase he had often used in his speeches over the years: "I left Earth three times. I found no place else to go. Please take care of Spaceship Earth."<sup>29</sup>

On 3 May 2007 the ebullient, much loved and ever-wisecracking Wally Schirra suffered a fatal heart attack while undergoing treatment for abdominal cancer at the Scripps Green Hospital in La Jolla, California. He was 84 years young.

In speaking of his Mercury colleague and friend, Scott Carpenter took time to reflect on a superb pilot and inveterate prankster. "He was a practical joker, but he was a fine fellow and a fine aviator. He will be sorely missed in our group."

Wally Schirra's ashes were committed to the sea in a moving ceremony aboard USS *Ronald Reagan* (CVN-76). Then in San Diego on 9 March 2009, a large crowd applauded as Jo Schirra broke the traditional bottle of champagne over the bow of a 689-foot-long dry cargo/ammunition ship that had been christened and launched as USNS *Wally Schirra* (T-AKE 8) in honour of her husband. The U.S. Military Sealift Command took delivery of the ship on 1 September of that year.

The pioneering astronaut is survived by his wife Jo and children Walter III and Suzanne. His sister Georgia (Burhans) predeceased him in April, 2000, aged 73.

Walter M. Schirra, Snr. once gave a *Life* reporter a fittingly poignant quote about his son, the test pilot and astronaut. "You don't raise heroes, you raise sons. And if you treat them like sons they'll turn out to be heroes, even if it's just in your own eyes."

## **L. GORDON COOPER, JR., USAF**

At 32 years of age when selected, Gordon Cooper was the youngest of the Mercury astronauts. In the movie adaptation of the best-selling Tom Wolfe book, *The Right Stuff*, he was portrayed as a cocky, swashbuckling fighter jock with an easy grin and the classic throwaway line, "Who's the best pilot you ever saw? You're lookin' at him!" Conversely, the real-life Cooper was a mild-mannered but accomplished test pilot with a soft Oklahoma drawl. He concedes he never actually uttered those words ascribed to him by Tom Wolfe, but says, "It was something he picked up that I hinted to him I kind of said."<sup>30</sup>

On 6 March 1927, Leroy Gordon Cooper, Jr. (later nicknamed "Gordo") was born in the city of Tecumseh, some five miles south of Shawnee, Oklahoma, and grew up an only child. His father, a post-World War I pilot who later served as a

lawyer and then judge of the superior and district courts in Shawnee, was married to the former Hattie Lee Herd, who happily shared his passion for flying.

When young Gordon was only five years old his father strapped him into a Curtis Robin monoplane and gave the excited boy his first ride in an airplane. By the time he was eight, filled with boyish enthusiasm, he was often taking over the controls from his father, and when he was twelve he made his first, unofficial, solo flight with the aid of seat cushions and custom pedal blocks. "I grew up flying; it was something I loved doing," he once stated. "I started at a very early age. I just thought everybody flew airplanes."<sup>31</sup>

Growing up in Shawnee, he got his early education at Jefferson School and later at Shawnee High School. At sixteen, having paid for flying lessons by working in his spare time, he could legitimately claim his first solo flight in a J-3 Piper Cub to gain his pilot's licence. A talented sportsman, upon graduating from high school in May 1945 he rejected a football scholarship in order to enlist in either the Army or Navy for flight training. Instead, he had to join the Marine Corps as the other services were not taking candidates in their flight schools. He was subsequently assigned to the U.S. Naval Academy Preparatory School (NAPS). During the war his father had served as a legal officer in the USAAF, and post-war was stationed at Hickam AFB in Hawaii; he would retire as a colonel in 1957. In August 1946, after being discharged from the Marine Corps, Cooper joined his parents on the island of Oahu, where he attended the University of Hawaii to study engineering and obtained his commission as a second lieutenant in the university's ROTC.

While at college, Cooper met an attractive flight instructor named Trudy Olson at a local aero club, and they often flew together around the island. They were married in Honolulu on 29 August 1947. Cooper continued his studies, and later transferred his commission to the Air Force. He was called up for extended active duty in 1949, and after basic flight training at Perrin AFB, Texas, he received advanced training at Williams AFB, Arizona. From 1950–54 he was a pilot with the 86th Fighter Bomber Squadron assigned to Landstuhl Air Base in West Germany, flying F-84 Thunderjets and F-86 Sabres. He later became flight commander of the 525th Fighter Bomber Squadron. While in Germany, he took on further university courses at the European Extension of the University of Maryland. After being transferred home with his wife, he undertook a two-year bachelor's degree in aerospace engineering at the Air Force Institute of Technology at Wright-Patterson AFB in Ohio, from which he graduated in 1956. He was then assigned to Class 56D in the Experimental Test Pilot School at Edwards AFB. On graduating in 1957, he remained in the Flight Test Division there as a test pilot and project manager, test-flying such supersonic aircraft as the F-102A and F-106B. By this time he and Trudy had two children – daughters Camala Keoki and Janita Lee, born in 1948 and 1950 respectively.

Selected as a Mercury astronaut in April 1959, one of Cooper's first major tasks was to assist in integrating the Redstone missile with the Mercury spacecraft. After watching four of his colleagues fly into space, his first assignment was backing up Wally Schirra on the MA-8 mission in October 1962. Then on 14 November he was assigned to fly MA-9, with Alan Shepard as his backup. The launch was scheduled for 14 May 1963, but the day before that Cooper came perilously close to losing the



L. Gordon Cooper, Jr. (Photo: NASA)

flight when, in a rash moment, he decided to buzz the Cape in one of NASA's F-102 aircraft. There was an immediate, furious uproar and calls for Shepard to replace the recklessly flamboyant Cooper. Things eventually calmed down, but it was several hours before the NASA hierarchy finally relented and allowed a relieved Cooper to retain the flight. There was a launch scrub on the scheduled day, but on 15 May the

final Mercury mission began just after 8:04 a.m. with a perfect lift-off. The flight of *Faith 7* stretched the capabilities of the Mercury spacecraft to its limits. In a mission lasting more than 34 hours, Cooper completed 22 orbits of Earth – more than three times longer than any preceding manned United States space flight. He also became the first astronaut to sleep in space, dozing for seven hours. His mission was hardly trouble-free; apart from rising temperatures and excessive carbon dioxide levels, he also reported a slow oxygen leak. Then, just ahead of re-entry, his automatic control system malfunctioned, obliging him to manually align *Faith 7* with Earth's horizon.

"All of [the systems] went out," he recalled in an interview in 2000. "They were electrically connected. Anything that had to do with electronics was gone."<sup>32</sup>

Cooper then had to manually fire the retro-rockets and control the spacecraft all the way through a hazardous re-entry. He performed the re-entry flawlessly, and the capsule splashed down in the Pacific less than four miles from the waiting recovery carrier USS *Kearsarge* (CV-33). He elected to remain onboard the capsule as it was lifted by helicopter to the ship. The post-flight medical found that he had lost seven pounds in weight due to excessive sweating caused by the overheating problems. He was found to be dripping wet inside his spacesuit and was also noticeably pale and a little dizzy. He had, however, performed with great calm and competence throughout the dramatic re-entry.

Two years later, on 21 August 1965, Cooper was launched into orbit once again, this time as command pilot of Gemini 5. The primary goal of the eight-day mission with Pete Conrad was to prove that an astronaut could survive in space for the time required to travel to the moon and back. The flight plan included testing the fuel cell power system and evaluating the performance of rendezvous guidance and navigation systems using a radar pod. It was a not a trouble-free mission. Although the pod was successfully deployed, the test had to be curtailed when the fuel cells began to suffer difficulties. They therefore had to fly most of the mission with their craft drifting in a powered down state. When the fuel cells began to recover, the battery of the pod was flat, so they performed a "shadow rendezvous" with an imaginary spacecraft. On the plus side, the mission set a new space endurance record by flying 3,312.993 miles in 190 hours and 56 minutes. Cooper also became the first person to fly a second orbital mission.

Cooper's next assignments were as backup command pilot for the final Gemini mission and then as backup commander for Apollo 10. By the crew rotation system then in place this put him in line to command Apollo 13, which was scheduled for a lunar landing in April 1970. However, to his undisguised chagrin, command of that mission went to Alan Shepard, who, having successfully overcome a debilitating ear problem, had used his considerable influence to take precedence over Cooper. When it became clear that Shepard was not ready, Apollo 13 was given to Jim Lovell. After serving as an assistant to Deke Slayton, then as crew operations chief for the Apollo Applications (later Skylab) Program, a shattered Cooper resigned from both NASA and the Air Force on 1 July 1970, and soon after that he and Trudy formally ended a marriage that had been on the rocks for some years. Among his awards, decorations and honours were the Air Force Legion of Merit, the Distinguished Flying Cross with Oak Leaf Clusters, the NASA Exceptional Achievement Medal, the Collier



Safely on the deck of USS *Kearsarge* after his MA-9 mission, Cooper flashes a happy smile as he prepares to exit his *Faith 7* spacecraft. (Photo: NASA)

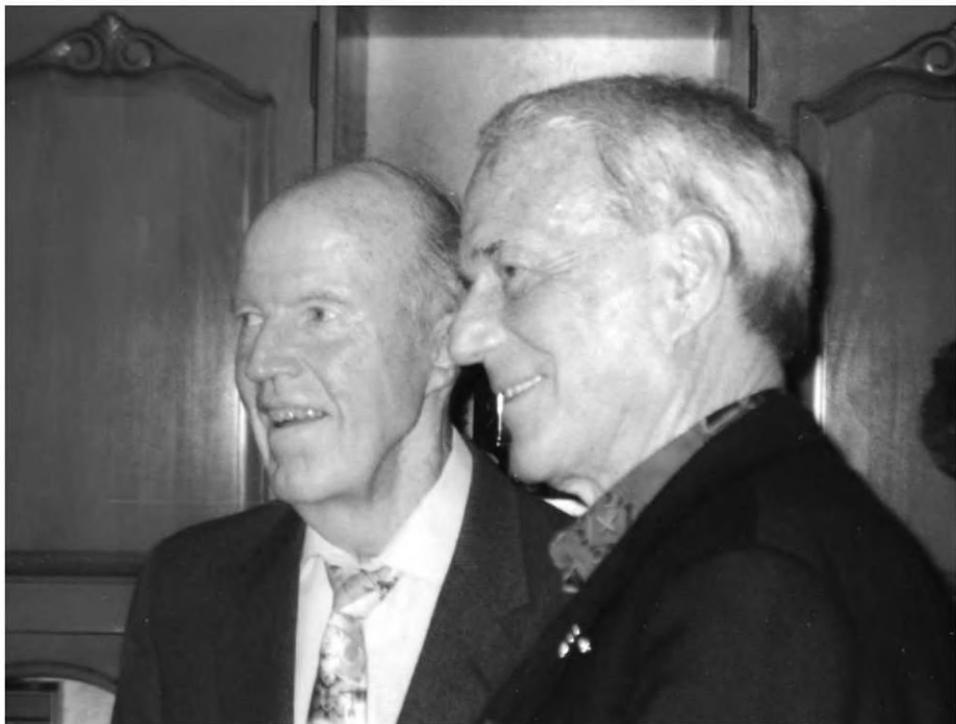


Pete Conrad and Gordon Cooper aboard USS *Lake Champlain* (CV-39) at the completion of their eight-day Gemini mission. (Photo: NASA)

Trophy, the Harmon Trophy, the DeMolay Legion of Honor, the John F. Kennedy Trophy, the Iven C. Kincheloe Award, the University of Hawaii Regents Medal and the Columbus Medal. He was also a member of several groups and societies including the Society of Experimental Test Pilots, the American Astronautical Society, Scottish Rite, York Rite, Shriners, Rotary Club, Order of Daedalians, Confederate Air Force and Boy Scouts of America.

On 6 May 1972, Cooper married for a second time, to Suzan Taylor, a teacher. They would also have two daughters Elizabeth Jo and Colleen. Post-NASA, he formed his own aviation and aerospace consulting company, Gordon Cooper and Associates, and then from 1974 to 1980 served as vice president for research and development for Walt Disney Enterprises. He was later appointed president of a company developing alcohol-based aviation fuel, and in 1989 became a partner in Galaxy Aviation, an aeronautical design firm in Van Nuys, California. Unwilling to give up his love for aviation and speed, he continued to design and test new aircraft. In 1998, he told one reporter, "I get cranky if I don't fly at least three times a month."<sup>33</sup>

Co-written with Bruce Henderson, Cooper's autobiography, *Leap of Faith*, was published in 2000. It left many of his admirers puzzled and disbelieving, since much of it focused on his fascination with unexplained flying machines and alleged alien encounters, and even his own supposed sightings of UFOs. Space historian Robert



Lifelong friends Gordon Cooper and Scott Carpenter at the launch of Carpenter's autobiography in 2003. (Photo courtesy of Colin Burgess)

Pearlman once wrote when reviewing Cooper's book, "While no one can argue with someone's experiences, in this case Cooper's own sightings, I found some difficulty understanding how someone so connected with ground-breaking technology and science could easily embrace ideas such as extraterrestrial visits with little more than anecdotal evidence. Indeed, Cooper goes beyond mere acceptance, helping establish an institute which at its central core attributes some of our greatest accomplishments to the influences of an advanced alien civilization communicating through telepathy."<sup>34</sup>

Late in life Cooper developed Parkinson's Disease, and on 4 October 2004 he passed away at his home in Ventura, California. That date was significant in space history, not only for being the 47th anniversary of the launch of Sputnik, but on the same day Cooper died an experimental vehicle named *SpaceShipOne* operated by Scaled Composites Incorporated soared to an altitude of 69.6 miles over California's Mojave Desert, earning pilot Brian Binnie his astronaut wings. On 29 April 2007, a sample of Cooper's ashes were launched on a 20-foot-tall SpaceLoft XL sounding rocket operated by the privately owned UP Aerospace. There to witness the launch from New Mexico's Spaceport America was his widow, Suzy. "Supposedly, we are all made of stardust," she said at the time. "So then it is only natural to one day return to the stars once our lives have ended on this Earth."<sup>35</sup> Following a successful

suborbital flight, the capsule containing Cooper's ashes (along with those of James Doohan, who played "Scotty" in Star Trek, and 206 others) was temporarily lost in rugged mountains of the White Sands Missile Range, with the search hampered by bad weather. However, the capsule was eventually located intact on 18 May and the ashes returned to the families. On 3 August 2008, Cooper's ashes were once again launched, this time atop a Falcon 1 rocket on what was planned as an orbital flight, but the rocket went awry two minutes into flight when two stages failed to separate, and the wreckage fell into the Pacific about 2,500 miles southwest of Hawaii.<sup>36</sup>

## DONALD K. SLAYTON, USAF

Because he did not fly into space until sixteen years after his selection as a Mercury astronaut, a lesser aura always surrounded Deke Slayton. He stood impatiently by as his colleagues returned from their missions to global adoration and adulation. And yet, despite a crushing disappointment early in his astronaut career, the stoic Slayton exerted more sway on the crewing of those vital early missions than any other person. It was the venerable Deke who wound up running the Astronaut Office, and decided who should be partnered with whom on each flight, based on ability and perceived compatibility. Without Deke firmly at the helm, it is very likely that today we would be celebrating the names of different astronauts as the first humans to walk upon the moon. Such was his extraordinary influence.

Donald Kent Slayton was one of seven children born to Charles Sherman and Victoria Adelia (née Larson) Slayton, being raised along with his three brothers and two sisters on the family farm near Leon, Wisconsin, which was five miles south of the upper Midwest town of Sparta, in Monroe County. After attending Leon Public School in an old two-room schoolhouse on Jameson Road, Slayton continued his education at Sparta High School, where he excelled in track athletics. He also played on the Future Farmers of America basketball team and showed Oxford sheep one year at a state fair in Milwaukee. His schoolmates once described him as a reserved youth who drew little attention, never did anything terribly memorable, worked hard, and never got into scrapes.

It was during his high school years that he first became interested in aviation. As he told correspondent Nora Magelee of the *La Crosse Tribune*, "I guess it was when I was pitching hay on the farm when I was in high school as I watched planes from Volk Field and Camp McCoy fly overhead. I was wishing I was up there rather than down here, pitching hay, and knowing there must be an easier way to make a living."<sup>37</sup> So he transferred out of his agricultural courses to concentrate on physics, chemistry and mathematics, much to the annoyance of his father.

Known as "Don", he graduated from Sparta High School in May 1942, having already enlisted as an aviation cadet with the U.S. Army Air Force on 8 April 1942. He got his flight training in Class 43E (D) at Vernon, Texas, and at Waco, Texas, receiving his wings and a commission as a second lieutenant on 22 April 1943. He had been deeply concerned about his Air Force physical, thinking that he might be disqualified because he had lost the ring finger of his left hand in his youth. At five



Deke Slayton (right) stands in front of a Douglas A-26 with 1st. Lt. Ed Steinman (wearing cap) in the summer of 1945. Location not identified, but is most likely the island of Okinawa. (Photo: NASA)

years of age he had been trying to assist in the fields by cleaning some hay out the sickle bar on a horse-drawn hay mower being operated by his father, and as he stuck his hand in to clear out some stuck hay the horses moved forward and “zipped that finger right off”.<sup>38</sup> To his delight, the Air Force physicians later decided the missing digit presented no impediment. Following three months’ training, he entered World War II as the co-pilot of a B-25 Mitchell with the 340th Bombardment Group. He flew 56 combat missions over Europe earning the Air Medal with Cluster, before returning home in May 1944 to be assigned to Columbia in South Carolina as a B-25 and Douglas A-26 Invader instructor pilot. On 13 July 1945 he arrived in Okinawa to participate in the Japanese campaign. He had flown only seven A-26 combat missions over the Ryukyu Islands with the 319th Bombardment Group by the time the war ended. Much as he wanted to transfer to single-engine fighters, he rotated home and resumed duty as a B-25 instructor pilot in Albany, Georgia and Boca Raton, Florida.

In November 1946, now with the rank of captain, Slayton resigned from the Army in order to pursue his college degree and gain a regular commission in what was still known as the Army Air Force (it did not become an independent service

until 1947). He enrolled at the University of Minnesota at the start of the year, but maintained his membership in the Minnesota Air National Guard and flew T-6 trainers with the Air Force Reserve. On graduating with a bachelor's in aeronautical engineering in 1949, he then worked for a time in Seattle as an aeronautical engineer for Boeing Aircraft.

Recalled to active duty in early 1951, and while awaiting medical clearance to fly, Slayton was assigned to the Minneapolis Air Guard as maintenance test officer for a squadron flying the F-51 Mustang. He was later assigned a technical inspector at the Twelfth Air Force Headquarters in Wiesbaden, Germany, and then as a squadron maintenance officer with the 36th Fighter Day Wing, flying in T-33 and F-86 jets. It was while in Wiesbaden that he met Marjorie Lunney from Los Angeles, who was working as a secretary to the inspector general with the U.S. Air Force. They began dating, and soon were engaged. At one time they bought a Weimaraner puppy they named Acey, and Marjorie is said to have been much impressed by the gentleness of her fiancé in training the dog. After they were married in Ramstein, Germany on 18 May 1955, the young couple spent their honeymoon in Paris before Slayton received orders to return home and attend the Test Pilot School at Edwards AFB, California.

Slayton arrived at Edwards in June 1955 and spent six months with a group of twelve pilots undertaking academic studies and flying high performance jet aircraft. When Class 55C graduated in January 1956, Slayton was delighted to be invited to remain at the Flight Test Center at Edwards, assigned to Fighter Test. Still known as "Don", he was often confused with another test pilot named Don Sorlie. It was then that he received the nickname by which he was henceforth known. "To my family, and to the rest of the world until I was in my thirties, I was always Don Slayton."<sup>39</sup> His colleagues soon switched to his initials D.K., and he became "Deke". On 8 April 1957, the Slaytons celebrated the birth of their only child – a son named Kent Sherman. Among his many assignments as a test pilot, Slayton was the project pilot for the Convair F-102A Delta Dagger. He later moved into the Republic F-105 Thunderchief as overall test project manager, and flew some tests in the F-106 Delta Dart.

Then in early 1959 Slayton was ordered to Washington, D.C. in civilian clothes. He was in the second group assigned to the briefings, a week after the first group, so when a few of those potential candidates arrived back at Edwards and explained that it was all about applying for astronaut testing, his earlier suspicions were confirmed and he knew what to expect. On 2 April 1959, Slayton received a phone call from Robert Gilruth's assistant, Charles Donlan, informing him that he had been selected as an astronaut and therefore must attend a pre-announcement briefing with NASA officials in Washington.

As a Mercury astronaut, Slayton undertook responsibility for gaining familiarity with the Atlas booster that would launch the orbital missions. The original planning envisaged three Mercury-Redstone suborbital missions, which is why Alan Shepard, Gus Grissom and John Glenn were named as a group, with John Glenn aimed at the third such flight, but after two successes it was decided to send Glenn into orbit and assign Carpenter as his backup. On 29 November 1961 Slayton was selected as the prime pilot for the second orbital mission, with Wally Schirra as his backup. Slayton



During training for the Apollo 11 mission, CMP Michael Collins (left) gained some additional weightless training flying arcs in a T-38 with chief astronaut and director of flight crew operations, Deke Slayton. (Photo: NASA)

happily declared that because his would be the fourth Mercury flight he would name his spacecraft *Delta 7*, after the fourth letter of the Greek alphabet. But on 15 March 1962, just three weeks after Glenn's successful mission, NASA grimly announced that a heart condition would prevent Slayton from making his space flight. He had been diagnosed by physicians with idiopathic atrial fibrillation, a mild irregularity of the heartbeat. It had been noted in August 1959 while he was undergoing stress tests on the centrifuge but was not considered an impediment. Now it was being treated as a serious issue. The news came as a devastating blow on two fronts; not only had he lost out on making that all-important space flight, but under Air Force regulations he was immediately disqualified from flying alone in high performance aircraft. For a time, he was the picture of abject misery, but came to terms with it and thereafter selflessly devoted himself to helping to prepare crew members for his lost flight and those that followed.

Slayton never lost hope of flying into space. He gave up coffee and cigarettes, cut

back drastically on his alcohol intake and began taking vitamins on a regular basis. In September 1962 he was made Coordinator of Astronaut Activities, reporting directly to Robert Gilruth. Apart from administering and organising the routine activities of his fellow astronauts, such as training schedules and visits to contractor facilities, he also coordinated their public appearances and media interviews. However, one of his principal responsibilities was that of assigning astronauts to missions. The following year, after resigning his commission as a major in the Air Force in November 1963, Slayton was further appointed Assistant Director of the Manned Spacecraft Center for Flight Crew Operations. He was placed in charge of the Astronaut Office, the Aircraft Operations Office, and the Flight Crew Support Division, but in the hope of eventual reinstatement to flight status he continued to train with the first two astronaut groups. He was awarded the NASA Distinguished Service Medal in 1965.

A July 1970 physical found no further indication of heart fibrillation in Slayton, and following an agonising wait he was eventually restored to his former status as a flight-eligible astronaut in March 1972. Later that year, as Slayton checked out solo in jet trainers, the United States and the Soviet Union made the first tentative moves towards a joint space venture. In 1972, President Richard Nixon and Soviet Premier Alexei Kosygin signed a formal Apollo-Soyuz agreement, and on 9 February 1973 NASA announced that the American crew would be the veteran Tom Stafford, with Vance Brand and Deke Slayton; the latter serving as "Docking Module Pilot". Over the next two years the three men underwent an extensive training programme which included learning basic Russian and making trips to the Soviet training centre near Moscow. In order to focus on the mission, in February 1974 Slayton stepped down from his administrative positions.

On 15 July 1975, Soviet cosmonauts Alexei Leonov and Valery Kubasov lifted off from the Baikonur Cosmodrome and entered orbit. Seven hours later, the Apollo spacecraft launched from the Kennedy Space Center. Two days on, the two vehicles docked in orbit using the purpose designed docking module. As well as conducting a number of symbolic functions for the worldwide media, the two crews performed several joint scientific experiments and engineering investigations. With all major mission objectives completed the two spacecraft separated and the Apollo splashed down on 24 July.

Slayton's space flight almost ended in disaster when highly toxic thruster fumes leaked into the spacecraft at around 14,000 feet during the descent, causing the crew to cough and sputter. As soon as the spacecraft had splashed down and righted itself in the water, Stafford threw open the hatch to get fresh air into the cabin. Brand had passed out. The crew spent nearly two weeks in Tripler Marine Hospital, Hawaii, as they slowly recovered from the toxic and corrosive fumes.

Following his space mission, Slayton resumed managerial duties, directing early tests of the space shuttle. From November 1977 to February 1982 he was a manager for the Orbital Flight Test programme, directing orbital mission operations during the first four shuttle missions. On 27 February 1982 he retired from NASA to take up a position as president and vice chairman of the board of Space Services Incorporated, the first privately financed American space enterprise, conveniently



Deke Slayton and cosmonaut Alexei Leonov during the ASTP mission in July 1975.  
(Photo: NASA)

headquartered in Houston. The following year, Space Services combined with American Science and Technology and the Aero Data Corporation to form a joint venture known as Space America, with Slayton appointed chairman. He and Marge had meanwhile separated, and were divorced in 1983. On 8 October of that year, he married Bobbie Osborn.

On 13 June 1993 Deke Slayton died in League City, Texas, from complications arising from a brain tumour. His honours included three NASA Distinguished Service Medals, the NASA Exceptional Service Medal, the SETP (Society of Experimental Test Pilots) Iven C. Kincheloe and J.H. Doolittle Awards, the General Billy Mitchell Award, the National Institute of Social Sciences Gold Medal, the University of Minnesota's Outstanding Achievement Award, the Collier Trophy, the American Institute of Aeronautics and Astronautics Special Presidential Citation and its Haley Astronautics Award for 1978, and the Wright Brothers International Manned Space Flight Award. He also received an honorary doctorate in engineering from Michigan Technological University.

In his 69 years of life, Deke Slayton proved to be a pragmatic, often enigmatic man, but even death did not rob us of the end of his story. A strange and somewhat baffling incident took place on the day he died, and it remains unexplained; a true mystery of the air. It occurred at John Wayne Airport in Orange County, California, at 7:57 a.m. local time on 13 June 1993, some three-and-a-half hours after Slayton's passing in League City, Texas. Witnesses testified that a bright red Williams Midget Racer took off from the airport at that time and began performing aerial

manoeuvres in the vicinity. The noise of the aircraft's high-speed racing propeller attracted much attention, so there were many witnesses. As the small airplane soared and looped, a number of people wrote down a description of the maverick craft and its registration number, which was clearly visible on the side of the bright red fuselage: N21X. The FAA quickly determined that mandated noise levels had been exceeded and a Notice of Violation, Section 2-1-30, was duly written up. A letter with the notice, signed by John Wayne Airport Director Janice M. Mittermeier and dated 28 June, was sent to the home of Donald K. Slayton in Houston. On 20 July, more than five weeks later, the FAA letter was opened by Bobbie Slayton, who could not believe the contents. The registration of the aircraft was given, the date of the incident and the local time, as well as the noise limitation register recorded three times on the aircraft that day. It stated, "The John Wayne Airport (JWA) Noise Abatement Office has recorded noise levels in excess of the nighttime curfew standards permitted under the JWA Noise Ordinance by an aircraft registered in your name."<sup>40</sup> A somewhat confused Bobbie Slayton rang the FAA to tell them that the report was an impossibility. For starters, she pointed out that her husband, a Mercury astronaut, had died at 3:22 a.m. on the morning in question, four hours before the alleged flight. And she stated that her husband's aircraft, which indeed had that registration number, had been donated to a racing museum in Sparks, Nevada, several months earlier and that prior to being displayed, the aircraft's



Deke Slayton's Williams W-7 Midget Racer N21X, now on display at the Planes of Fame Air Museum, Chino Airport, California. (Photo courtesy of Gary T. Takeuchi)

engine had been removed and was on public display *beside* the Midget Racer. Furthermore, the aircraft in question was said to have taken off under its own power. Yet as a weight-saving measure, his aircraft had no electrical starter. This meant that the engine could *only* be started by someone outside of the aircraft, spinning the propeller by hand while the pilot worked the cockpit controls.<sup>41</sup>

In a 1994 article co-written by Loyd Auerbach and well-known aviation author Martin Caidin titled “Of Moon Shots and Ghost Astronauts”, the two men wrote of the incident:

Witnesses at the airport who were questioned first by the local authorities, and then by pilots talking to other pilots, and then by still more pilots and investigators sent to Santa Ana for further confirmation, all agreed that the airplane taking off the morning on June 13, 1993, was not only clearly identified as N21X, but that this particular airplane, which had flown for years with this federal registration, was an all-red Formula One racing aircraft, that it departed from the airport in Orange County, flew through various manuevers in the area, and then flew off in a steady gradual climb on a westerly heading and was never seen again.<sup>42</sup>

Although the mystery of that red racing aircraft has never been solved, Bobbie Slayton, who died in 2010, eventually saw some humour in the story, stating that it probably took Deke several hours to locate Gus Grissom and have his great friend start the airplane for him.

No explanation has been produced for the mysterious, so-called “last flight of Deke Slayton” that day.

### **“THE CREAM OF THE CROP”**

Recently Dr. George Ruff, who was an integral part of the Mercury selection process, was asked to reflect on the first Mercury flights, and his role in identifying those who might best carry out the role of astronaut.

“I was part of the project through the first five flights,” he responded, “[until] they decided our research on stress imposed on the astronauts was no longer needed. I had known the men through repeated interviews and informal contacts over the past few years. I knew that they were intelligent and well-trained problem solvers. So I wasn’t surprised that they did well.

“I was thrilled to have been a small part of the process, but didn’t think that my recommendations had played a major role in their success. I could have imagined that the great majority of the other twenty-five would have done just as well. Having been test pilots, they were already the cream of the crop and proved their ability to accomplish their tasks and deal with stress – just as the ones who were chosen were able to do.”<sup>43</sup>

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# Appendices

## PROJECT MERCURY FINALISTS

Name	Service & Rank (1959)		Born	Died	Final Rank
BALDWIN, Robert Bemus	USN	LCDR	24.04.1923		VADM
BELL, Robert Graham	USAF	CAPT	23.05.1930	16.05.1965	MAJ
BOGAN, Thomas Rex	USAF	CAPT	04.10.1923	05.12.1980	LTC
CARPENTER, Malcolm Scott	USN	LT	01.05.1925	–	CDR
CHRISTIAN, Harold Winfield, Jr.	USAF	MAJ	04.03.1923		COL
CONRAD, Charles, Jr.	USN	LT	02.06.1930	09.07.1999	CAPT
COOPER, Leroy Gordon, Jr.	USAF	CAPT	06.03.1927	04.10.2004	COL
CORBETT, Richard Marvin	USAF	CAPT	29.04.1926	–	COL
COX, Dale William, Jr.	USN	CDR	17.12.1920	–	CAPT
CRANDALL, Hal Russell	USN	LT	15.01.1929	24.07.1963	LCDR
EKEREN, Halvor Martin, Jr.	USAF	CAPT	23.05.1923	08.04.1959	CAPT
FRAZIER, Frank Daniel	USAF	CAPT	17.11.1929	–	LTC
GIVENS, Edward Galen, Jr.	USAF	CAPT	05.01.1930	06.06.1967	MAJ
GLENN, John Herschel, Jr.	USMC	MAJ	18.07.1921		COL
GRISOM, Virgil Ivan	USAF	CAPT	03.04.1926	27.01.1967	LTC
HAYWARD, Thomas Bibb	USN	LCDR	03.05.1924	–	ADM
HEYWORTH, Lawrence, Jr.	USN	CDR	10.02.1921	04.05.2003	RDMU
IDDINGS, Archie Tibbs, Jr.	USAF	CAPT	20.06.1928	20.08.2007	COL
JACOBSON, Robert H.	USAF	CAPT	26.12.1924	15.03.2003	LTC
LAWRENCE, William Porter	USN	LCDR	13.01.1930	02.12.2005	VADM
LOVELL, James Arthur, Jr.	USN	LT	25.03.1928	–	CAPT
MAYO, Jack Bernard	USAF	CAPT	26.12.1929	11.01.1961	CAPT
MILLER, Paul, Jr.	USN	LCDR	22.12.1922	01.02.1977	CDR
MITCHELL, John Robert Cummings	USN	LT	16.08.1929	–	CAPT
RALSTON, John, Jr.	USN	LT	20.11.1925	08.08.2003	CDR
SCHIRRA, Walter Marty, Jr.	USN	LCDR	12.03.1923	03.05.2007	CAPT
SHEPARD, Alan Bartlett, Jr.	USN	LCDR	18.11.1923	21.07.1998	RDML

SLAYTON, Donald Kent	USAF	CAPT	01.03.1924	13.06.1993	MAJ
SOLLIDAY, Robert Edwin	USMC	CAPT	04.12.1931	-	LTC
TIERNEY, John Mark	USN	LCDR	29.05.1924	-	RDMU
WALTER, Alonzo Joseph, Jr.	USAF	CAPT	25.11.1928	-	BGEN
WOOD, James Wayne	USAF	MAJ	09.08.1924	01.01.1990	COL

<sup>-</sup> At 38 years of age, Dale Cox was the oldest of the 32 candidates for Project Mercury

<sup>- +</sup> At 27 years of age, Robert Solliday was the youngest of the candidates

## SPACE FLIGHTS BY GROUP 1 ASTRONAUTS

Name	Space Flights	Spacecraft	Mission	Launch Date	Landing Date	Mission Duration (dd:hhmm:ss)
Alan B. Shepard, Jr.	2	Freedom 7 Apollo 14	MR-3 AS-14	05.05.1961 31.01.1971	05.05.1961 09.02.1971	00:00:15:28 09:00:01:57
Virgil I. Grissom	2	Liberty Bell 7 Gemini 3	MR-4 GT-3	21.07.1961 23.03.1965	21.07.1961 23.03.1965	00:00:15:37 00:04:52:52
John H. Glenn, Jr.	2	Friendship 7 Discovery	MA-6 STS-95	20.02.1962 29.10.1998	20.02.1962 07.11.1998	00:04:55:23 08:21:44:56
M. Scott Carpenter	1	Aurora 7	MA-7	24.05.1962	24.05.1962	00:04:56:05
Walter M. Schirra, Jr.	3	Sigma 7 Gemini 6A Apollo 7	MA-8 GT-6A AS-7	03.10.1962 15.12.1965 11.10.1968	03.10.1962 04.10.1962 22.10.1968	00:09:13:11 01:01:51:43 10:20:09:03
L. Gordon Cooper, Jr.	2	Faith 7 Gemini 5	MA-9 GT-5	15.05.1963 21.08.1965	16.05.1963 29.08.1965	01:01:19:49 07:22:55:14
Donald K. Slayton	1	Apollo ASTP	AS-210	15.07.1975	24.07.1975	09:01:28:00

## SPACE FLIGHTS BY OTHER GROUP 1 FINALISTS

Name	Space Flights	Spacecraft	Mission	Launch Date	Landing Date	Mission Duration (dd:hhmm:ss)
Charles Conrad, Jr.	3	Gemini 5	GT-5	21.08.1965	29.08.1965	07:22:55:14
		Apollo 12	AS-507	14.11.1969	24.11.1969	10:04:36:25
		Skylab 2	SL-2	25.05.1973	22.06.1973	28:00:49:49
James A. Lovell, Jr.	4	Gemini 7	GT-7	04.12.1965	18.12.1965	13:18:35:17
		Gemini 12	GT-12	11.11.1966	15.11.1966	03:22:34:31
		Apollo 8	AS-503	21.12.1968	27.12.1968	06:03:00:42
		Apollo 13	AS-508	11.04.1970	17.04.1970	05:22:54:41

N.B. Edward G. Givens, Jr., was selected in NASA's Group 5 but was killed in an accident prior to a flight assignment, although he served on the support crew for Apollo 204/1 and Apollo 7.

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