

PIONEERS IN EARLY SPACEFLIGHT

The Last of NASA's Original Pilot Astronauts

Expanding the Space Frontier in the Late Sixties



David J. Shayler & Colin Burgess

 Springer

PRAXIS

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Front: Escorted by Chief Astronaut John W. Young (in the blue flight suit), the prime crew for STS-4, Commander Ken Mattingly II, (foreground) and Pilot Henry 'Hank' Hartsfield Jr., walk out of the crew quarters at the Kennedy Space Center, Florida, to the astronaut transfer van taking them to *Columbia* on the launch pad.

Back LH: Group 5 astronaut Jack Lousma, Pilot Skylab 3, conducts an EVA during the 59-day mission in 1973.

Back RH: On the middeck of *Columbia*, Group 7 astronaut Bob Crippen, Pilot STS-1, takes a moment to enjoy his first space flight in 1981.

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Authors' Preface

This book represents the final chapter in the series of Springer-Praxis titles covering the early NASA Astronaut selections between April 9, 1959 and August 14, 1969, as listed in the Bibliography. Between these dates, 73 men were chosen to crew and support America's pioneering manned space missions under the Mercury, Gemini and Apollo programs. Several of them remained active long enough to crew missions in the first decade of Shuttle flight operations between 1981 and 1990. This current work focuses upon the selection, training and assignments of the final two purely pilot selections of the 1960s. NASA would not choose another astronaut group until the late 1970s and by then, a new set of criteria and objectives placed very different demands on the Astronaut Office than those of the decade before. Though mentioned in this title, detailed accounts of the missions flown by astronauts from the two selections are covered elsewhere and in companion volumes of the Springer-Praxis series, as detailed in the Bibliography. As this book was being researched and written, new information was released on the previously classified selections for the USAF MOL program (1963-1969). Although completely separate to the civilian NASA program, there were comparisons and links between the selection processes, and though this book is not a history of MOL, some information pertaining to the selection and training of MOL astronauts has been included for completeness.

Colin Burgess

Curiously enough, this new collaborative effort between Dave Shayler and I never began life as part of a series on the selection of NASA's astronauts prior to the Space Shuttle era. It had its origins in a friendship going back many years, a shared interest in the history of human space exploration – and in recording that history. I cannot recall who first mooted the idea (probably Dave), several years ago, of combining our talents and research to put together a book on NASA's 4th and 6th astronaut groups, known collectively as the scientist astronauts, but we found we worked well together, even though we happen to live on opposite sides of the globe. The result, published in 2007, was our first co-authored book for Springer-Praxis, *NASA's Scientist-Astronauts*.

And there it might have ended, but for a meeting we had in a restaurant one day when I was visiting England. During our conversation, we discussed the selection of the space agency's very first astronauts for the Mercury program. To our shared frustration, the names of five candidates for that role had eluded both of us for many years. Then, in a remarkable stroke of good fortune, I was contacted by a former military man, Walter ("Sully") Sullivan, who had acted as the liaison officer for the 32 Mercury astronaut finalists back in 1959 at Wright-Patterson Air Force Base, Ohio. He kindly offered to assist me if I wanted to write a book about this selection group. I agreed, and he subsequently sent me the names of the missing five candidates. Sadly, he is no longer with us, but with Sully working as a contact liaison and guarantor for me, I managed to locate all the Mercury candidates, or their surviving family members, and the result was the 2011 book, *Selecting the Mercury Seven: The Search for America's First Astronauts*.

I had no plans at the time to put together a follow-on book delving into the selection of the second NASA astronaut group. That is until Dave contacted me in a message filled with excitement, saying that in his latest search of NASA's treasure trove of historical records, he had unearthed documents giving the names of all the finalists for the second and third astronaut groups. With his own research for several books meaning he could not even look at this new project, he kindly offered those lists to me, and a whole new (and successful) hunt for these men or their family members began, culminating in a 2013 book on both groups for Springer-Praxis called *Moon Bound: Choosing and Preparing NASA's Lunar Astronauts*.

That same year, with the selection of NASA groups 1, 2, 3, 4 and 6 now covered in books, Dave and I began discussing the possibility of combining resources once again to produce another book detailing the process of choosing astronauts who became part of the two remaining pre-Shuttle classes: NASA Groups 5 and 7 (the latter also known as the MOL group). A contract was signed, and work began, albeit slowly at first. As we were both engaged in putting together other contracted books for Springer-Praxis over the next couple of years, our research and writing was necessarily spasmodic, but began to pick up steam once those other obligations had been cleared.

Both of us have interviewed several astronauts from Groups 5 and 7 to record their recollections and opinions, particularly the latter group of seven military test pilots who had formerly served and trained for the clandestine Manned Orbiting Laboratory (MOL) program before being transferred across to the civilian NASA space agency following the cancellation of MOL. While they arrived in the middle of Project Apollo and assisted in support crews and as capsule communicators (Capcoms) for the last few Apollo lunar missions – and later Skylab – none of the seven would fly into space until the Space Shuttle program began in 1981, some 12 years after they had joined NASA's astronaut cadre. Combine their stories with those of the largest astronaut group (19 in total) selected by NASA to that time and there are some truly riveting and intriguing tales to be told.

As the Chinese philosopher, Lao Tzu (better known as Confucius) once wrote: "A journey of a thousand miles begins with a single step," and the same applies to any book; it is usually sparked by a conversation or a suggestion made by a friend or space colleague. The only trick is in recognizing and acting on that suggestion, and I am delighted that Dave Shayler and I decided to act and take that first step together all those years ago. With the completion of this book, we feel we have finally recorded, separately and in partnership, the selection of seven groups of amazingly talented and bold men who pioneered

America's dynamic space program before the advent of the reusable Space Shuttle. I know we are both proud to have been able to record their stories, and to pass them on through their words and ours for hopefully many generations to come.

David Shayler

While following the first Apollo missions in 1968 and 1969, I began to learn more about the men who had been chosen for NASA astronaut training in the spring of 1966. These men had yet to fly in space, indeed several would not do so for many years, but they worked tirelessly on the ground, supporting the flights which culminated in the landings on the Moon by the crews of Apollo 11 and 12. It was during those magical months of 1969 that I also learned of future plans for Apollo; there were to be eight more landings before Apollo hardware would be used to orbit the first of a series of Orbital Workshops.

NASA would then return to the Moon, using adapted Apollo hardware for extended missions designed to create a lunar research station. These missions, I learned, could be crewed by astronauts of the 1966 selection, together with scientists from the groups chosen in 1965 and 1967. Shortly after the Apollo 11 mission, NASA transferred seven astronauts from the cancelled MOL program, adding to the pool of available astronauts for such bold plans. For an enthusiastic 14-year-old space fan, the new decade looked promising, and when the crews for Apollo 13 and 14 were named, members of the 1966 selection were included. It was pleasing to see some of the more recently selected astronauts finally get their chance to fly in space.

However, 1970 proved to be a low year for space exploration, with Apollo 13's explosion and abandoned lunar landing, but the safe return of the crew. Shortly afterwards came the cancellation of three Apollo lunar missions and rumors of not flying the second or third orbital workshop, now called Skylab. Sadly, I filed away, for what became nearly 30 years, the cuttings and reports on those plans and abandoned missions that Apollo might have achieved. With the final four Apollo missions, Skylab and the joint Apollo-Soyuz (ASTP) mission with the Soviets, there was still plenty for a budding space historian to follow and research, but then came the long wait between ASTP and STS-1. In those six years, I had gathered a useful reference archive on the NASA missions, astronauts and plans for the Space Shuttle. I had also become fascinated by what astronauts did in between training for, or flying, missions. These activities did not attract the coverage I would have liked, so I started my own research into these topics, together with gathering data on Skylab and the abandoned plans for Apollo.

Little did I realize that, some thirty years later, this early research would generate several book titles following the career paths of astronauts who were closely linked to both stories. Communications from former astronauts are among the prized possessions in my collection. Letters, interviews and emails, over many years, with astronauts Ed Gibson, Owen Garriott, Vance Brand, Jerry Carr, Jack Lousma, Bill Pogue, PJ Weitz, Tony England, Karl Henize, Bill Thornton, Bob Crippen, Story Musgrave and Joe Allen have provided an insight into the workings of the Astronaut Office, the era during which they were at NASA, and the missions on which they flew.

For me, it is important to ensure that the information presented within my books is as accurate and detailed as it can be. That I have portrayed a fair interpretation of what I have been told or have researched. If those who fly the missions are happy with my work, it is

a job well done. Sometimes, the results of this research are quickly received, sometimes not, and occasionally a project from conception to publication can take a while. In the case of Jerry Carr's authorized biography *Around the World in 84 Days*, that 'journey' took 20 years from suggestion of the idea in 1988 to the publication of the book in 2008. This current project is, as Colin has mentioned, a similar 'expedition', over several years of cooperative work and built upon decades of personal research.

In this book, we have tried to blend the various stories, facts and background of those who were selected to NASA's astronaut program in 1966 and in 1969. We have also included stories from those who came very close to selection to that program. What this book could not include within the confines of a single volume are in-depth biographical accounts of each member of those two astronaut groups; nor could it offer detailed accounts of each of their missions. What this project presents, however, is a detailed overview of the backgrounds, selection, training and assignments of each group, and what happened to each of them when they finally hung up their spacesuits. Though this book is by no means the complete picture, we believe we have placed an important piece in the puzzle from which further research and publications are encouraged to add more color and depth to the overall story. This has been a long and very personal journey for both authors, and a project close to our hearts. We hope you enjoy the accounts in these pages as much as we have in creating it.

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Assembling a volume such as this requires access to a wealth of documentation, previously published works, and contact with key players in the story. It also depends upon *a lot* of personal research, which usually raises more questions than answers. The fulfilment of those queries depends upon a network of valued contacts across the world to finally piece together the account you read here.

In this particular case, the authors wish to thank the generous help, guidance and support of former members of the 1966 and 1969 NASA astronaut selections over many years, namely Vance Brand, Jerry Carr, Bob Crippen, Charles Duke, Fred Haise, Don Lind, Jack Lousma, Bruce McCandless, the late Bill Pogue, Richard Truly, Paul Weitz and Al Worden. We are also indebted to Fred Haise and Bob Crippen and to Vance Brand for their contributions in opening and closing the story we wished to tell.

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xiv Acknowledgements

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The majority of the images used in this book originate from NASA, various military service organizations and the authors' own collections, unless otherwise specifically stated. However, despite extensive searches we have been unable to determine the origins of some of the images. The authors would welcome any input to enable us to credit the appropriate sources.

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Over many years of writing numerous books, individually and in collaboration, both of us know all too well the value of an astute and erudite editor, whose experience, diligence and expertise can transform any rough-hewn manuscript into a far more polished and presentable publication. We are therefore indebted to Mike Shayler, who took on the task of working on this book and did a truly superb job, right through to the production process. We thank him for his patience, persistence and good humor, and agree that he consistently proves the enduring power of a skilled and subject-knowledgeable copy editor.

Both authors also wish to express our love and appreciation to our wives, Bel Shayler and Pat Burgess, and our families for, once again, allowing us to indulge in the challenge of turning an idea discussed over a good beer into what you see here.

To everyone who helped on this final project in the series of titles, by both authors, on the first decade of NASA Astronaut Selections, a very large Thank You.

Foreword

This is the story of two remarkable groups of pilots who were considered for very different American human space programs. Many made it into space, some did not. A few journeyed to the Moon, others returned to orbit several times. They all came from very different aviation backgrounds, but their individual stories were entwined when budget restrictions affected both programs and the fates of all involved. The varied paths to space for these two selections are recalled in the following comments from the first of each group to finally reach orbit.

Fred W. Haise, NASA Class of 1966, became, in April 1970 as LMP on Apollo 13, together with the late Jack Swigert as CMP, the first of their selection to fly in space.

My entry into the Astronaut Office as a member of the “Original 19” group, chosen in 1966, was carried out with some reluctance, leaving the best flying job that I ever had at the NASA Dryden Flight Research Center (now Armstrong Flight Research Center), at Edwards Air Force Base, California. I had followed Neil Armstrong in a NASA career path through the Lewis Research Center (now Glenn Research Center) and into the astronaut program. I followed Neil by about 2½ years. Being a NASA employee, it was just another transfer, with the same GS civil service pay grade and title as an Aerospace Research Pilot & Engineer. There was no “Astronaut” position title on the civil service registry at that time.

While at the Dryden Flight Research Center, I’d hoped to fly the X-15 rocket ship, like Neil Armstrong, but such an assignment was clearly based on seniority within that office. When I left Dryden to join NASA’s astronaut program, I was still two people away from having my turn at flying the X-15. As it turned out, I made the right decision in leaving the Center, as the X-15 program ended before I would have had a chance to fly.

I’d been working at NASA before, so for me it was just another transfer from one NASA center to another. I knew that the astronaut day-to-day activity consisted of lots of time in meetings and training, with actual flying being conducted mostly for travel to contractor facilities, other NASA centers, and so forth. But the thought of possibly flying a lunar mission was the reason that I applied.

xvi **Foreword**

Ed Mitchell, as the oldest and most senior, became the designated leader for our “Original 19”. Once we’d settled in and completed our training, we received initial assignments related to our particular area of specialty, and everyone in our group just went to the winds during this early part of Apollo.

When I arrived at NASA, I didn’t think of myself as a person of particular renown at the time; I was just a test pilot. But, in the way these things go, I arrived at the right time, with the right experience and the right background for Apollo. I feel lucky to have had the chance.

Fred W. Haise,
NASA Astronaut (1966–1979)
Lunar Module Pilot Apollo 13
Commander ALT Crew 1 (OV-101 Enterprise)
Commander OFT-3 (1978–1979)



Fred W. Haise



Robert L. Crippen (Courtesy Robert L. Crippen)

Robert L. Crippen, NASA Class of 1969, was one of the former MOL astronauts who transferred to NASA shortly after the first lunar landing. In April 1981, as Pilot on STS-1, he became the first of his selection to reach orbit, and just over a decade later became the first former astronaut to direct a NASA field center.

In 1965, I was a Naval Aviator attending the Air Force test pilot school, renamed as the Aerospace Research Pilot School (ARPS). That year, both NASA and the Department of Defense (DOD) put out an announcement for Astronaut applications. Like almost every student I submitted my application. I took the option of submitting my name for both programs.

Later in the evaluation process, the Navy informed me that I was still in the running, but I would have to choose between NASA and DOD. That year, DOD had named the first group to a new program called the Manned Orbiting Laboratory (MOL). I thought that NASA had plenty of Astronauts and my best chance was with the MOL Program. Plus, I thought the idea of military Astronauts was a good one. Out of that selection process, I was lucky enough to be one of the five who was selected for MOL. The NASA process selected nineteen in their Astronaut Group 5; many were my contemporaries from ARPS.

However, on what was one of the low points of my life, June 10, 1969, the MOL Program was cancelled. There had been a third MOL selection which had added four more crew members. With a death and some crew departures, we were down to fourteen Astronauts at the time of cancellation.

After several days of wondering what the future would bring for us, Karol (Bo) Bobko, one of the fourteen, asked if NASA would take us into the Astronaut Office. The rest of us thought that wasn't going to happen. We hadn't got to the Moon yet and some of the planned flights were already being cancelled. That meant NASA already had too many Astronauts. Still, the question was asked and we were all invited to Houston's Manned Spacecraft Center (MSC), now JSC, for interviews.

We arrived during the Apollo 11 flight. Deke Slayton, head of Flight Crew Operations, talked to us. He told us what we had expected to hear. They didn't need any more Astronauts. However, one of the big bosses at NASA Headquarters, George Mueller, told Deke that he had to take some of us. Deke decided to take all who were 35 and under. That was the age NASA used in the selection process. It split the fourteen in half. Seven of us, including myself, were reassigned to the NASA Astronaut Office. Deke was quite frank with us. He said that he didn't have any flights for us, but he had lots of work. He did mention that our first flight opportunity wouldn't probably be until a non-approved Program called the Shuttle came on line, and that wouldn't be before 1980. That still sounded like an opportunity to us. We became Astronaut Group 7.

That group played a major role in the development of the Space Shuttle when it was approved. All seven flew on the first six flights of the Shuttle.

This book will be a mandatory read, for those interested in the space program. It is about Groups 5 & 7 and the roles they played in the years following their selection and their participation in the space program.

Captain Robert L. ('Crip') Crippen, USN Retired.
USAF MOL Astronaut (1966-1969)
NASA Astronaut (1969-1992)
Pilot STS-1
Commander STS-7, STS-41C and STS-41G
Commander (planned), STS-62A (1984-1986)

This book is dedicated to all members
of the 1965, 1966, 1967 and 1969
MOL and NASA pilot astronaut classes

Especially to the memory of:

Michael J. Adams
John S. Bull
Ronald E. Evans
John L. Finley
Charles Gordon Fullerton
Edward G. Givens Jr.
Henry W. Hartsfield Jr.
Robert T. Herres
James B. Irwin
Robert H. Lawrence Jr.
Richard E. Lawyer
Robert F. Overmyer
William R. Pogue
Stuart A. Roosa
John L. Swigert Jr.
James M. Taylor

We also dedicate this work to those who came so close to selection but who, in the end, were unsuccessful in their personal quest for space. They, too, deserve to be recognized for their contribution to the program. Together with all the families who supported those who made it to space, and those who almost did; this is their story too.

This book is also dedicated to a true American legend; a man who inspired millions of people in his homeland and around the globe as a Mercury astronaut and the first American to orbit the Earth, and 36 years later was launched on a Space Shuttle mission. A man who served his nation as a Marine fighter pilot and U.S. Senator and continued to be an inspiration and role model throughout his life. Godspeed, John Glenn (1921-2016).

During the final preparation of this book, the authors also learned of the passing of Capt. Eugene A. ('Gene') Cernan (1934-2017), the NASA Group 3 astronaut who performed America's second spacewalk and travelled twice to the Moon, walking on its surface as commander of the Apollo 17 mission and earning the lifelong title of Last Man on the Moon in December 1972. A great man, sadly missed.

Abbreviations and Acronyms

Informal Military Designations

USAF:

“FS” stands for Fighter Squadron; “RS” for Reconnaissance Squadron; “BS” for Bomber Squadron

US Navy:

“V” stands for fixed wing; “F” for fighter wing; “A” for attack; “Q” for electronic; “R” stands for Reserve but can also stand for Reconnaissance; “W” for early Warning; “T” for training, “X” for test and evaluation (as in eXperimental)

USMC:

Marine air units use the suffix “M” within the US Naval designation coding, such as VMFA for fixed, with AW added for “All Weather” squadrons

2TV-1	CSM thermal vacuum chamber test vehicle
AAP	Apollo Applications Program (Skylab)
ACTS	Attitude Control and Stabilization System (MOL)
AFB	Air Force Base
AFTPS	Air Force Test Pilot School
AFFTPS	Air Force Flight Test Pilot School
AFIT	Air Force Institute of Technology
AFSC	Air Force Systems Command
AFSSC	Air Force Space Systems Command
ALSEP	Apollo Lunar Surface Experiment Package (Apollo 12–17)
ALT	Approach and Landing Tests (Space Shuttle)
AMU	Astronaut Maneuvering Unit (Gemini)
ANG	Air National Guard
AOCS	Aviation Officer Candidate School (USN)
ARPS	Aerospace Research Pilot School

AS	Apollo-Saturn
ASTP	Apollo Soyuz Test Project
ATDA	Augmented Target Docking Adapter (Gemini)
ATS	Acquisition and Tracking Scope (MOL)
AW	Air Wing
BOQ	Bachelor Officers Quarters
BSc	Bachelor of Science degree
BU _p	Back Up (crewmember)
Capcom	Capsule Communicator (Mission Control)
CB	Astronaut Office, MSC/JSC (Mail Code)
CDR	Commander (Apollo/Skylab/ASTP & Space Shuttle)
CM	Command Module (Apollo)
CMP	Command Module Pilot (Apollo)
CO	Commanding Officer (DOD)
CSD	Crew Systems Division (MSC/JSC)
CSM	Command and Service Module (Apollo)
CSNR	Center for the Study of National Reconnaissance
DMP	Docking Module Pilot (ASTP)
DOD	Department of Defense
EAFB	Edwards Air Force Base (California)
EASEP	Early Apollo Science Experiment Package (Apollo 11 only)
EDCTU	Electronic Development Component Test Unit (MOL)
EDS	Engineering Development Simulator (MOL)
EO	Executive Officer (also known as XO)
EVA	Extra Vehicular Activity (spacewalk)
FD	Flight Director (Mission Control)
FCOD	Flight Crew Operations Directorate (MSC/JSC)
FOD	Flight Operations Directorate (MSC/JSC)
GBPS	Gemini B Procedures Simulator (MOL)
ISS	International Space Station
IVA	Intra Vehicular Activity
JSC	(Lyndon B.) Johnson Space Center (from 1973), Houston (Texas) (formerly MSC)
KIA	Killed in Action
KSC	(John F.) Kennedy Space Center (Florida)
KSU	Kansas State University
LC	Launch Complex
LCC	Launch Control Center (KSC, Florida)
LM	Laboratory Module (MOL)
LM	Lunar Module (Apollo)
LMP	Lunar Module Pilot (Apollo)
LMSE	Laboratory Module Simulation Equipment (MOL)
LEM	Lunar Excursion Module (early name for Apollo LM)
LLRV	Lunar Landing Research Facility (Langley Research Center, Virginia)
LLTV	Lunar Landing Training Vehicle (Apollo)

xxii **Abbreviations and Acronyms**

LRV	Lunar Roving Vehicle (Apollo 15–17)
LTA	Lunar (Module) Test Article
LTV	Ling-Temco-Vought
LVPS	Laboratory Vehicle Procedures Simulator (MOL)
MAW	Marine Air Wing
MCAS	Marine Corps Air Station
MCC	Mission Control Center (MSC/JSC, Houston, Texas)
MDS	Mission Development Simulator (MOL)
MET	Mobile Equipment Transporter (Apollo 14)
MIA	Missing In Action
MIT	Massachusetts Institute of Technology
MM	Mission Module (MOL)
MMP	Mission Module Pilot (AAP)
MMU	Manned Maneuvering Unit (Space Shuttle)
MOCR	Mission Operations Control Room (MSC/JSC)
MOL	Manned Orbiting Laboratory (USAF)
MPSE	Mission Payload Simulation Equipment (MOL)
MS	Mission Specialist (Space Shuttle)
MSc	Master of Science degree
MSC	Manned Spacecraft Center, Houston (Texas); from 1973 JSC
MSE	Manned Spaceflight Engineer (USAF, Space Shuttle)
MSFC	(George C.) Marshall Space Flight Center, Huntsville (Alabama)
NAAS	Naval Auxiliary Air Station
NAPS	Naval Academy Preparatory School
NAS	Naval Air Station
NASA	National Aeronautics and Space Administration
NRO	National Reconnaissance Office
OFT	Orbital Flight Test (Space Shuttle)
OV	Orbital Vehicle (Space Shuttle)
OWS	Orbital Work Shop (AAP/Skylab)
PhD	Doctorate degree
PLSS	Portable Life Support System
PLT	Pilot (Skylab; Space Shuttle)
POW	Prisoner Of War
PS	Payload Specialist (Space Shuttle)
PSAC	President's Science Advisory Committee
RADM	Rear Admiral
RIO	Radio Intercept Officer
RMS	Remote Manipulator System (Space Shuttle)
ROTC	Reserve Officer Training Corps
SA	Saturn-Apollo
SAC	Strategic Air Command (USAF)
SAIC	Science Applications International Corporation
SAS	Space Adaption Syndrome
ScPLT	Science Pilot (Skylab)

SDIO	Strategic Defense Initiative Organization
SESL	Space Environment Simulation Laboratory
SETP	Society of Experimental Test Pilots
SIM	Scientific Instrument Module (Apollo)
S-IVB	Saturn 1B second stage; Saturn V third stage, Skylab converted into OWS
SL	Skylab
SLM	Simulated Laboratory Module (MOL)
SM	Service Module (Apollo)
SMEAT	Skylab Medical Experiment Altitude Test
SPS	Service Propulsion Systems (Apollo)
STOL	Short Take Off & Landing
STS	Space Transportation System (Space Shuttle)
TPS	Test Pilot School
UCLA	University of California at Los Angeles
USAF	United States Air Force
USAFA	United States Air Force Academy
USC	University of Southern California
USMA	United States Military Academy (West Point)
USMC	United States Marine Corps
USN	United States Navy
USNA	United States Naval Academy (Annapolis)
USSR	Union of Soviet Socialist Republics (1917–1991) now Russia
VAB	Vehicle Assembly Building (KSC, Florida)
XO	Executive Officer (also known as EO)

Prologue

It was a Monday afternoon that should have been filled with optimism and a tantalizing glimpse into an exciting future. Instead, Maj. Jack Lousma of the U.S. Marine Corps sat quietly in a sparsely-furnished waiting room, contemplating the calendar on the opposite wall and the decision that had brought him to this renowned space center in Houston. For him, on the eve of his leap-year birthday, it was a day filled with a terrible irony. The date he noted on the calendar was the 28th – the last day of February 1965 – and he was one of several test pilots, many of them known to him, who were now undergoing daunting and extensive interviews with a panel of real astronauts at NASA’s Manned Spacecraft Center.

A reconnaissance and attack pilot with the 2nd Marine Air Wing based at Cherry Point, North Carolina, Lousma had taken up the challenge of applying for the role of pilot astronaut, after NASA had announced it was seeking suitably-qualified candidates for a fifth intake of men who would one day – they hoped – fly into space. Just a month earlier, they had undergone a battery of thorough physical examinations at the School of Aviation Medicine in San Antonio, and now he faced this final, crucial hurdle in the selection process.

On that day, however, he and a number of other candidates were coping with the shocking news that the prime crew for the upcoming Gemini IX mission, astronauts Elliot See and Charlie Bassett, had been killed only hours before. Their T-38 jet had encountered filthy, blinding weather on approach to Lambert Field in St. Louis, Missouri, and had slammed into the roof of the McDonnell plant where their spacecraft was being readied, before plummeting into a nearby car park and exploding. It was sobering news for the 29-year-old Marine Corps officer. Like so many other combat and test pilots, Lousma had become somewhat inured to hearing of fellow officers being killed, but now he was wondering how his wife Gratia would receive the tragic news, and if she would still support his astronaut application. It was a time for serious contemplation, but he shook off any doubts and accepted that, if successful, he would undoubtedly be entering into yet another highly dangerous occupation. He resolved to press ahead regardless, become an astronaut, and one day fly into space – perhaps even on a journey to the Moon.

Less than two months later, on April 4, 1966, Maj. Jack Lousma and 18 other men were officially announced as members of NASA's latest cadre of astronauts – Group 5 officially, but (in homage to the earlier Mercury astronauts) they also came to be wryly known as the “Original Nineteen.”

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On the first day of 1958, nine months before civilian space agency NASA became operational, the U.S. Air Force established a bold program to develop a winged vehicle capable of placing specially-selected and trained USAF pilots into Earth orbit, where they would link up with and enter a station already circling the globe. Their task would be to conduct covert reconnaissance and test operations, satellite maintenance, and perhaps even intercept and sabotage enemy satellites while orbiting aboard the station. All this and more before re-entering aboard an innovative space plane, equipped with retrorockets for the return journey. After retrofire, the pilot would control the re-entry glide at a precise descent angle through the atmosphere and touch down at Edwards Air Force Base on the all-skid landing gear, similar to that used by the X-15.

As with earlier programs, this USAF man-in-space project was given a contingency X designation, and was known thereafter as the X-20 program. Alternatively, it became known as Project Dyna Soar (a contraction of Dynamic Soaring), with the program based on the solid principle that an object can achieve extremely high altitudes through a combination of rocket propulsion and aerodynamic lift capability.

In November 1959, the Boeing Corporation was selected as the prime contractor for the design and construction of the Dyna Soar vehicle, which would be launched atop the (later selected) Titan III booster. Essentially, the heavily-insulated X-20 was to be fabricated from advanced metal alloys, including molybdenum, in order to combat the extreme heat of re-entry through the atmosphere. When compared to the later Space Shuttle, it was a relatively small vehicle. Only 45 feet long, it boasted tiny delta wings, a flat lower surface, twin vertical tail fins, and a blunt, rounded nose.

Although the X-20 development program continued, future funding became even more monumentally difficult by 1961, when Secretary of Defense Robert S. McNamara declined to give the Air Force any further financial backing for the project. Despite this setback, plans carried on as usual.

The need for highly-skilled pilots to man the X-20 had resulted in 10 active USAF and NASA test pilots undergoing secret physical examinations in August 1959, ready to train for the military missions that were expected to begin within four years. On April 1, 1960, seven prospective pilot-astronauts were secretly chosen for the program.

- Mr. Neil A. Armstrong (NASA)
- Mr. William H. ‘Bill’ Dana (NASA)
- Capt. Henry C. Gordon (Air Force)
- Capt. William J. ‘Pete’ Knight (Air Force)
- Capt. Russell L. Rogers (Air Force)
- Mr. Milton O. ‘Milt’ Thompson (NASA) and
- Maj. James W. Wood (Air Force)

In the summer of 1962, Neil Armstrong and Bill Dana left the program and were replaced by USAF test pilot Capt. Albert H. Crews Jr. On September 19, 1962, Crews, Gordon, Knight, Rogers, Thompson and Wood (nominated as “pilot engineers”) were announced to the public, with Air Force General Bernard A. Schriever presiding. Along with the announcement came a public unveiling of a full-size wooden mock-up of the space plane. The six began training at Edwards and Wright-Patterson AFBs, but the program – already slowed by budget cuts and developmental problems, and well behind schedule – would never achieve operational status. On December 10, 1963, Robert McNamara officially cancelled the X-20 Dyna Soar program.

In the meantime, and since 1960, the Air Force had been conducting feasibility studies into the development of a highly-classified manned military space station program. On December 10, 1963, the same day as the official cancellation of the X-20 program, Robert McNamara announced that the U.S. Air Force had been assigned to the development of an Earth-orbiting space “laboratory.” The first of these USAF stations was scheduled to be placed into polar orbit by a Titan IIM space booster sometime in 1971, providing a shirt-sleeve environment in which two military astronauts could live and work for a planned 10-day period, using a Gemini-style spacecraft as their launch and re-entry vehicle. However, specific details of the role the laboratory and astronauts would play were withheld from the public, as it was always planned to be a functioning spy platform in space, with sophisticated cameras and other surveillance equipment included. This Cold War program was to be given the unpretentious name of Manned Orbiting Laboratory, better known by the brief acronym MOL. Shrouded in secrecy for decades, it would also be given the later tag of “Blue Gemini.”

In issuing a call for prospective MOL pilots, the USAF set out some basic qualifications. The applicant had to be a U.S. citizen, no more than six feet tall, born after December 1, 1931, and a graduate of a service academy – or have achieved a bachelor’s degree in engineering, natural science, physical science, or biological science. In addition, the applicant had to have passed the appropriate military physical examination. No civilians were permitted to apply. As it turned out, all 17 officers later selected in three groups (eight in November 1965, five in June 1966 and four more in June 1967) were graduates of the Aerospace Research Pilot School (ARPS) at Edwards AFB, California. Upon selection, they were immediately dispatched back to the ARPS for advanced training specifically designed for their new assignment. This included special courses in advanced astrodynamics and many hours spent flying simulated spaceflight profiles.

The genesis of the ARPS can be traced back to 1959. With several military and civilian space programs on the drawing board, it was determined that some crucial changes needed to be made to the curriculum at the U.S. Air Force Test Pilot School at Edwards AFB. The X-15 rocket plane was already undergoing flight performance testing at Edwards and it became apparent that the USAF would soon have a need for a dedicated manned spaceflight operation. That year, future NASA Group 5 astronaut Capt. Edward Givens and his civilian instructor colleague, William Schweickhard, took the concept of a full aerospace course to the school’s commandant, Maj. Richard Lathrop. After much deliberation, he decided there was considerable merit in the idea and in turn asked his special assistant Maj. Thomas McElmurry to get the project up and running.

On June 5, 1961, the proposal became a reality, with an initial Class I comprising five student aerospace pilots, all graduates of the Test Pilot School. On October 12 that year, the Experimental Flight Test Pilot School was officially redesignated the USAF Aerospace Research Pilot School, or ARPS, which was designed to help Air Force pilots gain the qualifications to become astronauts, or USAF astronaut-designees as they became known.

The second ARPS class was announced on April 20, 1962, and the eight nominated pilots began their studies two months later. Several of the graduates from the ARPS classes would subsequently become involved in projects such as the X-15, X-20 and Lifting Body program, while many went on to become NASA astronauts.

On October 22, 1962, while NASA was concentrating its efforts on Project Gemini, the third ARPS class was selected, comprising 11 Air Force officers. This class received specific X-20 (Dyna Soar) training as part of their course. The fourth and final ARPS class began in May 1963, made up of fourteen USAF officers and a solitary representative each from the U.S. Navy and U.S. Marine Corps.

Eventually, however, the 17 officers destined for MOL who underwent extensive training through the ARPS were in for a severe disappointment. When the development of MOL hardware began in 1965, the anticipated cost through to 1974 was an estimated \$1.5 billion. Four years later, however, this had ballooned to double that amount. It was a perilous time for any technology-based program in the United States, given the inflationary increase attached to the project and the mounting, massive cost of the war in Vietnam.

On June 10, 1969, after the MOL program had been under development for five-and-a-half years, it was abruptly cancelled. By this time, it had consumed over a billion dollars of a greatly-tightened U.S. defense budget.

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In the meantime, NASA was on a roll. In late 1965, following the unqualified success of Projects Mercury and Gemini to that time, and with planning for the first Apollo missions now well advanced, it was time to look beyond the Moon landings and initiate human space flight programs for the future. Accordingly, a new office was set up at the Manned Spacecraft Center (MSC) in Houston. This office was tasked with researching and developing a series of extended Apollo missions and the hardware that would be needed to carry them out. Several astronauts were assigned to assist in carrying out initial work studies.

Subsequently, on February 3, 1966, Alan Shepard – then Chief of the Astronaut Office – announced the creation of a new branch office, known as the Advanced Programs Office. In those days within NASA, things moved rapidly. Just seven weeks later, on March 23, NASA unveiled details of a new program for the future. It boldly forecast a total of 45 human-tended space missions, utilizing some 26 Saturn IB and 19 Saturn V launches in both Earth and lunar orbit phases of the program – all to take place by the mid-1970s. With the unglamorous title of Apollo Applications Program, or AAP, one facet of this audacious plan involved utilizing three Saturn S-IVB Spent Stage Experiment Support Modules, otherwise known as habitable “wet” orbital workshops, three Saturn-launched orbital laboratories, and four Apollo Telescope Mount missions. The first AAP launch – assuming all went well with the companion lunar landing program – was envisaged to take place in April 1968.

This impressive schedule gave a reassuring boost in confidence to the space agency's astronauts, who had earlier harbored concerns about a dire lack of seats on future space missions, particularly the scientist-astronaut brigade, and the soon-to-be-announced 19 members of NASA's Group 5 astronauts.

The ranks of NASA astronauts were swelled even more following the cancellation of the MOL program on June 10, 1969, just a month prior to the historic mission of Apollo 11. While there were calls for NASA to integrate these 14 trained pilots (two of the original 17 had since resigned and one had been killed) into the astronaut ranks, Director of Flight Crew Operations Deke Slayton argued that there were simply no flights for them, as he already had too many astronauts on the mission waiting list. Under pressure from above to take at least some of the men, Slayton worked out that half of them were still under the age limit that had been set for NASA's pilot-astronauts, and he agreed to take those seven on board. As it turned out, none of the seven transferred MOL astronauts would fly until the Space Shuttle program began in 1981, some 12 years later, although a few supported several missions.

This is the story of the Group 5 and Group 7 (MOL) astronauts, which will conclude both authors' cooperative books on the history of NASA's astronaut selection program prior to 1978, when 35 additional astronauts were chosen. That selection came about specifically to operate missions aboard the reusable winged Space Shuttle and the 1978 group would comprise pilots, engineers and scientists, and include the recruitment of women and minorities into the astronaut corps.

In the momentous decade between 1959 and 1969, NASA selected a total of 73 astronauts over seven groups of candidates. We trust that you will not only enjoy reading the story behind the selection of the Group 5 and 7 astronauts, but also learn a little about those who were ultimately chosen. It is a compelling (and now complete) history associated with the NASA space agency, during the most dynamic and enthralling period of the 20th Century.

1

The selections

*“You can apply for NASA, you can apply for MOL,
and you can apply for both. But if you apply for both,
I guarantee you we are going to pick you for MOL
and not let NASA have y’all.”*

Buck Buchanan,
Deputy Commandant, USAF Test Pilot School,
Edwards AFB, California.
From Charles M. Duke, NASA Oral History, 1999.

During the middle years of the 1960s, over a period of 19 months, 36 American pilots were selected for the nation’s human space program, divided almost equally between the ‘civilian’ NASA astronaut program and the classified ‘military’ Air Force space station program.

These men, together with those who had missed out in the final selection, were the cream of American aerospace in the mid-1960s. True, they were not the legends of Edwards Air Force Base; those with the ‘Right Stuff’ who challenged the limits of rocket planes and, usually, lived to tell the tale. Neither were they the vanguard of American manned spaceflight, the gladiators who had taken up the Soviet gauntlet and run the early race for the Moon. But these three dozen men would become the lynch-pin between those heady days of the early 1960s, when the ‘new ocean’ of space was still an unknown, and that of the new millennium, where eyes were once again looking to new goals even deeper in that ‘ocean’.

On November 12, 1965, the USAF named the first class of eight pilots to train as astronauts for the military Manned Orbiting Laboratory (MOL) program. Less than six months later, on April 4, 1966, NASA announced 19 new astronauts to prepare for missions within the Apollo program. Two further Air Force announcements followed; on June 17, 1966 (five candidates) and a year later, on June 30, 1967 (four candidates), completing the selections for MOL astronauts. Within three years, members of the NASA Class of ‘66 were fulfilling assignments in support of the first Apollo missions and preparing for their own initial flights into space. Meanwhile, the group of MOL astronauts remained firmly on the ground, with the prospect of any flight still several years away.

2 The selections

In June 1969, just a month prior to the Apollo 11 lunar landing mission, the MOL program was cancelled. A few weeks later in August, seven former MOL astronauts transferred to the NASA program, creating the seventh and final NASA astronaut class of the decade. It would be more than eight years before the next NASA astronaut class was named, chosen to support the emerging Space Shuttle program. It would be sixteen years from the cancellation of MOL before a serving military officer who had not been seconded to NASA finally reached orbit, as a Military Payload Specialist (officially known as a Manned Spaceflight Engineer, or MSE) on the Space Shuttle.

The path to space for any crewmember is strewn with danger, setbacks, disappointment, and personal sacrifice. The road to space for the MOL astronauts and members of NASA's Class of '66 was also a long and involved one, which began in the closing days of 1963 and ended 27 years later towards the end of 1990, as the last member of those selections completed their final flight into space.

SELECTING THE RIGHT MEN WITH THE "RIGHT STUFF"

Due to the secretive nature of the program, the announcements of the three groups of MOL astronauts in 1965, 1966 and 1967 gave little insight into the process of selecting the final candidates. Indeed, little was learned in the fifty years following the first selection, though some snippets of information did emerge over that time. It was not until the formal release of declassified MOL documents in October 2015 that the process could finally be pieced together, though some gaps in the story remained. The selection of the fifth NASA group – conducted in the same time frame as the second MOL selection – was different to previous selections, in that military applicants could apply for NASA, MOL, or both. For years, uncovering the identities of those who had reached the final stage but had not been selected has been a challenge, due in part to this military connection with MOL. Although each selection was devised to staff completely different programs, there were remarkable similarities between them. The former MOL astronauts who formed the NASA Class of '69, together with their colleagues from the Class of '66, fulfilled key positions during the later Apollo and early Shuttle years. In fact, pilot members from all the MOL and NASA selections chosen between November 1965 and June 1967 successfully attained significant positions both inside and outside of the space program, long after many had hung up their space boots.

Men for MOL

When the X-20 Dyna Soar program was officially cancelled in December 1963, the Manned Orbiting Laboratory was announced as its replacement. Though it still lacked formal program authorization, due to negotiations between Air Force Systems Command (AFSC) and the Pentagon, it soon became clear that the formal go-ahead was imminent and the selection of astronauts for the program would have to be instigated.

The process of choosing suitable personnel for classified programs was not new to the USAF, who used the X-20 model as a reference for choosing pilots. This process pre-dated the famous Aerospace Research Pilot School (ARPS) course at Edwards Air Force Base