3

The new Pilot astronauts

"My most compelling reasons for wanting to become an astronaut are a desire to extend and use the engineering and test pilot experience I have gained, to hopefully aid in the success of the space program"
Francis Richard "Dick" Scobee, comments written in his NASA application to become an astronaut. From *Silver Linings,* by June Scobee Rodgers.

By late 1977, out of a total of 8,079 submissions, NASA had received applications from 659 pilot candidate hopefuls, made up of 147 military applicants and 512 civilians. By December, the total number of candidates had been reduced to 208, of whom 128 were Mission Specialist (MS) applicants and 80 were pilots – 76 military and four civilian.

On January 16, 1978, the names of the 35 successful pilot and MS applicants were announced, with 15 of that number selected as future Space Shuttle pilots. Nine were graduates of the U.S. Naval Test Pilot School at Patuxent River, Maryland, although one (S. David Griggs) had then resigned from the U.S. Navy (USN) and was subsequently selected as a civilian pilot astronaut by NASA. A further six had graduated from the U.S. Air Force (USAF) Test Pilot School at Edwards Air Force Base (AFB), California.

The 15 pilot astronauts selected in NASA's Group 8 were:

DANIEL C. BRANDENSTEIN

In October 1971, Dan Brandenstein graduated from the U.S. Naval Test Pilot School at Patuxent River, Maryland. Another graduating member of Class 59 was Fred H. Hauck, who would also go on to become one of the Group 8 astronauts.

D. J. Shayler, C. Burgess, *NASA's First Space Shuttle Astronaut Selection*,
Springer Praxis Books, https://doi.org/10.1007/978-3-030-45742-6_3

Hauck would fly as Pilot (PLT) on STS-7 and Brandenstein as PLT on the following mission, STS-8.

Lieutenant Commander (LCdr.) Daniel Charles Brandenstein, USN, was born on January 17, 1943. He graduated from Watertown High School, Watertown, Wisconsin, in 1961, and four years later received a Bachelor of Science (BSc) degree in Mathematics and Physics from the University of Wisconsin. He subsequently entered active duty with the USN in September 1965 and was attached to the Naval Air Training Command for flight training. He was designated a naval aviator at Naval Air Station (NAS) Beeville, Texas, in May 1967, and was then assigned to Attack Squadron 128 (VA-128) for A-6 fleet replacement training. From 1968 to 1970, while attached to VA-196 flying A-6 *Intruders*, he participated in two combat deployments to Southeast Asia on board the USS *Constellation* (CV-64) and the USS *Ranger* (CVA-61), flying 192 combat missions. In subsequent assignments, he was attached to VX-5 to conduct operational tests of A-6 weapons systems and tactics, and to the Naval Air Test Center where he conducted tests of electronic warfare systems in various Navy aircraft following graduation from the U.S. Naval Test Pilot School in 1971. Brandenstein completed a nine-month deployment to the Western Pacific and Indian Ocean on board the USS *Ranger* while attached to VA-145, flying A-6 *Intruders* during the period March 1975 to September 1977. Prior to reporting for his selection as an astronaut candidate, he was attached to VA-128 as an A-6 flight instructor. He had logged 6,400 hours flying time in 24 different types of aircraft and had made around 400 carrier landings.

MICHAEL L. COATS

Mike Coats was another aviator who passed through the U.S. Naval Test Pilot School, graduating from the 25-strong Class 66 in November 1974. A fellow graduate from the class was another future astronaut, LCdr. Michael J. Smith (selected by NASA in Group 9, 1980), who was the PLT of the ill-fated flight of Shuttle *Challenger* in January 1986.

LCdr. Michael Lloyd Coats, USN, was born on January 16, 1946, in Sacramento, California, but has always considered Riverside, California, to be his hometown. Coats graduated from Ramona High School in Riverside in 1964. He received a BSc degree in Naval Science from the U.S. Naval Academy in 1968, a Master of Science (MSc) degree in Administration of Science and Technology from George Washington University in 1977, and an MSc degree in Aeronautical Engineering from the U.S. Naval Postgraduate School in 1979. He graduated from Annapolis in 1968 and was designated a naval aviator in September 1969. After training as an A-7E pilot, he was assigned to VA-192 aboard the USS *Kitty Hawk* (CV-63) from August 1970 to September 1972, with whom he flew 315 combat missions in the Vietnam War. He served as a Flight Instructor with the A-7E Readiness

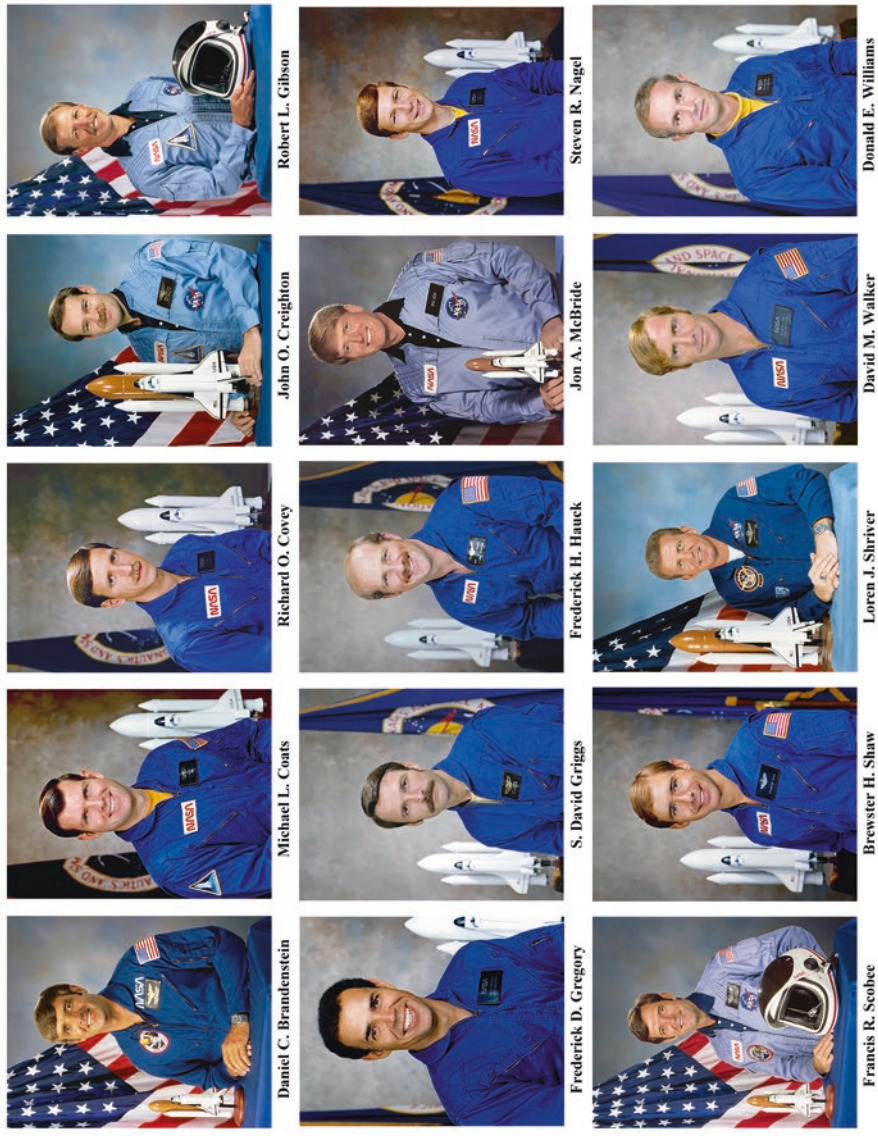

Fig. 3.1: The 15 new pilot candidates.

Training Squadron (VA-122) at NAS Lemoore, California, from September 1972 to December 1973, and was then selected to attend the U.S. Naval Test Pilot School in Maryland. Following test pilot training in 1974, he was Project Officer and test pilot for the A-7 and A-4 aircraft at the Strike Aircraft Test Directorate, then served as a Flight Instructor at the U.S. Naval Test Pilot School from April 1976 until May 1977. He then attended the U.S. Naval Postgraduate School at Monterey, California, from June 1977 until his selection for the astronaut candidate program on January 16, 1978, his 32nd birthday. At the time of his selection, he had logged more than 5,000 hours flying time in 28 different types of aircraft and had completed more than 400 carrier landings.

RICHARD O. COVEY

As a member of the USAF Test Pilot School Class 74B, Richard ("Dick") Covey was a classmate to two very prominent people. The first was Captain (Capt.) Jane Holley, the first female pilot to enter (and graduate from) the Test Pilot School, while the second, Capt. Ellison Onizuka, would become a fellow NASA Group 8 astronaut, later to perish in the loss of Shuttle *Challenger*.

Capt. Richard Oswalt Covey, USAF, was born on August 1, 1946, in Fayetteville, Arkansas, but calls Fort Walton Beach, Florida, his hometown. "My father was a World War II and Korea fighter pilot and then did flight tests for some period of time," he recalled for his NASA Oral History interview, "so I grew up in an environment with military aviators, and it was a logical thing for me to want to go do." He was 14 when Alan Shepard made his first flight. "I was enamored with the idea that men were riding atop rockets, and I consumed everything I could find about the early astronauts. They all turned out to be military test pilots, so I connected with that, because my father worked with the military test pilots and was a military pilot. So at that time I started thinking that would be something I would like to do." **[1]**

He graduated from Choctawhatchee High School, Shalimar, Florida, in 1964. He then received a BSc degree in Engineering Sciences with a Major in Astronautical Engineering from the USAF Academy in 1968, followed by an MSc degree in Aeronautics and Astronautics from Purdue University in 1969.

Between 1970 and 1974, Covey was an operational fighter pilot, flying the F-100, A-37, and A-7D. He flew 339 combat missions during two tours in Southeast Asia. At Eglin AFB, Florida, between 1975 and 1978, he was an F-4 and A-7D weapons systems test pilot and Joint Test Force Director for electronic warfare testing of the F-15 *Eagle*. At the time of his selection as a NASA pilot astronaut, he had flown over 5,700 hours in more than 30 different types of aircraft.

JOHN O. CREIGHTON

Class 57 of the U.S. Naval Test Pilot School, Patuxent River, graduated 22 aviators in February 1971, with the average number of aircraft assigned to them during their almost seven months of intensive training being 35. Only one of their number, John Creighton, would go on to become a NASA astronaut.

LCdr. John Oliver Creighton, USN, known as "John O," was born on April 28, 1943, in Orange, Texas, but considers Seattle in Washington State to be his hometown, graduating from Ballard High School there in 1961. He subsequently received a BSc degree from the U.S. Naval Academy in 1966 and an MSc in Administration of Science and Technology from George Washington University in 1978. He began flight training following his graduation from Annapolis and received his gold wings as a naval aviator in October 1967. He was then assigned to VF-154 from July 1968 to May 1970, flying F-4Js. He flew two combat deployments to Vietnam aboard the USS *Ranger* (CVA-61). From June 1970 to February 1971, he attended the U.S. Naval Test Pilot School at Patuxent River, Maryland, and upon graduation was assigned as a project test pilot with the Service Test Division at NAS Patuxent River. During this two-year tour of duty, he served as the F-14 engine development Project Officer.

In July 1973, Creighton began a four-year assignment with VF-2 and became a member of the first F-14 operational squadrons, completing two deployments aboard the USS *Enterprise* (CVN-65) to the Western Pacific. He returned to the U.S. in July 1977 and was assigned to the Naval Air Test Center's Strike Directorate as Operations Officer and F-14 Program Manager. Prior to his selection by NASA, he had logged over 6,000 hours flying time, the majority in jet fighters, and had completed 500 carrier landings and 175 combat missions.

ROBERT L. GIBSON

Class 71 at the U.S. Naval Test Pilot School knew they were in for a tough few months, so their class motto was *Illegitimi non Carborundum*, or "*Don't Let the Bastards Grind You Down.*" Nevertheless, all 27 trainees graduated in June 1977, including future Shuttle astronaut Robert Gibson, who goes by the nickname "Hoot," after the famed cowboy movie star. "I'm very fond of saying I got it because of the expression 'not worth a hoot', but it was from the cowboy star of the 1930s." When Gibson arrived at his first Navy fighter squadron, the nickname ended up on his airplane, his name tag, and even his coffee mug, and has stuck ever since. **[2]**

Lieutenant (Lt.) Robert Lee Gibson, USN, was born on October 30, 1946, in Cooperstown, New York (home of the National Baseball Hall of Fame), but regards Lakewood, California, as his hometown. Gibson graduated from Huntington High

School, New York, in 1964. He then attained an Associate degree in Engineering Science from Suffolk County Community College in 1966 and a BSc degree in Aeronautical Engineering from California Polytechnic State University in 1969. He entered active duty with the Navy in 1969, and in July that year was in Officer Candidate School watching the first Moon landing, with three other candidates, on a black-and-white TV in a motel room they had rented for the night just to watch the moonwalk. He was fascinated by the event, but as an aviator, he had no more than a casual interest in the space program – since Apollo had no wings on it – until a few years later when he saw a picture in *Aviation Week* of the future Shuttle, coming in to land like an aircraft. This rekindled childhood memories of science fiction images of future space planes. "I was interested in a space ship that had wings on it and flew a gliding re-entry and landing on a runway," and he recalled saying at the time, "Oh man, I have got to get me one of those."

Hoot Gibson received primary and basic flight training at NAS Saufley Field, Pensacola, Florida, and NAS Meridian, Mississippi, before completing advanced flight training at NAS Kingsville, Texas.

From April 1972 to September 1975, he was assigned to Fighter Squadrons 111 and 1, and saw duty aboard the USS *Coral Sea* (CVA-43) and USS *Enterprise* (CVN-65), flying combat missions over Southeast Asia. He is a graduate of the Naval Fighter Weapons School, known as "Top Gun." On May 10, 1972, Gibson was engaged in a large combat mission at the same time as two of his future NASA classmates: "We had a number of Space Shuttle astronauts that were involved in the Vietnam War, and even specifically May 10 [1972]." Gibson was part of a big strike group from the *Coral Sea*, while Mike Coats was flying in a strike group from USS *Constellation* and Brewster Shaw was involved in the same action as an Air Force F-4 pilot. During Gibson's tour on the USS *Enterprise*, another Group 8 astronaut, Rick Hauck, was serving as Air Wing Operations Officer. On his return to the United States, Gibson received an assignment as an F-14A instructor pilot with Fighter Squadron 124. He graduated from the U.S. Naval Test Pilot School in June 1977, and later became involved in the test and evaluation of F-14A aircraft while assigned to the Naval Air Test Center's Strike Aircraft Test Directorate. His flight experience includes in excess of 6,000 hours in over 50 types of civil and military aircraft, with more than 300 carrier landings.

FREDERICK D. GREGORY

A number of different services were represented in the U.S. Naval Test Pilot School Class 58 at Patuxent River. As well as two pilots from the U.S. Army, there were two from the civil service, two from the U.S. Marine Corps (USMC), and one each from the air forces of Australia, Italy and Japan. A solitary pilot from the USAF was also undergoing the naval aviation training: Fred Gregory.

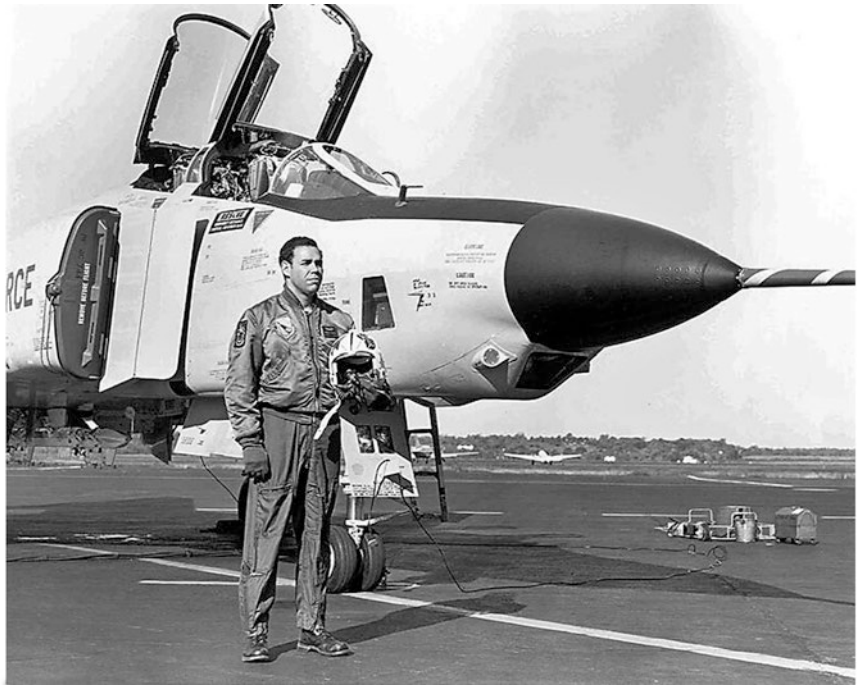

Fig. 3.2: Fred Gregory stands next to an F-4 *Phantom*.

Major (Maj.) Frederick Drew Gregory, USAF, was born on January 7, 1941, in Washington, D.C., and graduated from Anacostia High School in 1958. He then attained a BSc degree from the USAF Academy in 1964, and an MSc degree in Information Systems from George Washington University in 1977. After graduating from the Air Force Academy, he entered pilot training and attended undergraduate helicopter training at Stead AFB, Nevada. He received his wings in 1965 and was subsequently assigned as an H-43 helicopter rescue pilot at Vance AFB, Oklahoma, from October 1965 until May 1966. In June 1966, he was assigned as an H-43 combat rescue pilot at Danang Air Base, Vietnam. When he returned to the United States in July 1967, he was assigned as a missile support helicopter pilot, flying the UH-1F at Whiteman AFB, Missouri. In January 1968, Gregory was retrained as a fixed-wing pilot, flying the T-38 at Randolph AFB, Texas. He was then assigned to the F-4 *Phantom* Combat Crew Training Wing at Davis-Monthan AFB, Arizona. He attended the U.S. Naval Test Pilot School at Patuxent River, Maryland, from September 1970 to June 1971. Following completion of this training, he was sent to the 4950th Test Wing, Wright-Patterson AFB, Ohio, as an operational test pilot flying fighters and helicopters. In June 1974, he was detailed to the NASA Langley Research Center in Hampton, Virginia. There, he

served as a research test pilot until selected for the astronaut program in January 1978. By this time, Gregory had logged more than 6,976 hours flying time in over 50 types of aircraft, including 550 combat missions in Vietnam.

S. DAVID GRIGGS

On his first space flight, STS-51D in April 1985, Dave Griggs carried out the first unscheduled and unrehearsed spacewalk in the American space program. He had subsequently been assigned to a second mission for the Department of Defense, STS-33, but was killed in an off-duty airplane crash, his vintage T-6 crashing into a field in Arkansas while he was rehearsing aerobatics for an airshow.

Stanley David ("Dave") Griggs was born on September 7, 1939, in Portland, Oregon. He graduated from Lincoln High School, Portland, in 1957 and later from Annapolis in 1962 with a BSc degree. He entered naval pilot training shortly thereafter. In 1964, he received his wings as a naval aviator and was attached to VA-72, flying A-4 *Skyhawks*. He completed one Mediterranean cruise and two Southeast Asia combat cruises aboard the aircraft carriers USS *Independence* (CV-62) and USS *Franklin Roosevelt* (CV-42). In 1967, he entered the U.S. Naval Test Pilot School at Patuxent River, Maryland and, upon completion of test pilot training, was assigned to the Flying Qualities and Performance Branch, Flight Test Division, where he flew various test projects on fighter and attack-type aircraft. In 1970, he received an MSc in Administration from George Washington University, and resigned his regular U.S. Navy commission before affiliating with the Naval Air Reserve, in which he achieved the rank of rear admiral.

As a naval reservist, Rear Admiral Griggs was assigned to several fighter and attack squadrons, flying A-4 *Skyhawk*, A-7 *Corsair II* and F-8 *Crusader* aircraft while based at NAS in New Orleans, Louisiana and Miramar, California. He logged 9,500 hours flying time, 7,800 hours in jet aircraft, and flew over 45 different types of aircraft, including single- and multi-engine prop, turboprop and jet aircraft, helicopters, gliders, and hot air balloons. He made over 300 aircraft carrier landings and was a certified flight instructor.

In July 1970, Griggs was employed at the Johnson Space Center (JSC) as a research pilot, working on various flights test and research projects in support of NASA programs. In 1974, he was assigned duties as the Project Pilot for the Space Shuttle trainer aircraft, and participated in the design, development and testing of those aircraft pending their operational deployment in 1976. He was appointed Chief of the Shuttle Training Aircraft Operations Office in January 1976, with responsibility for the operational use of the Shuttle trainer. He held that position until his selection as an astronaut candidate by NASA in January 1978.

Fig. 3.3: TFNG Mission Specialist Ascan Ron McNair receives instruction in T-38 back seat procedures from instructor and fellow TFNG Dave Griggs.

FREDERICK H. HAUCK

Rick Hauck was one of two future astronauts, together with Dan Brandenstein, who graduated from the 20-strong Class 59 that attended the U.S. Naval Test Pilot School from February to October 1971.

LCdr. Frederick ("Rick") Hamilton Hauck, USN, was born on April 11, 1941, in Long Beach, California, and graduated from St. Albans School in Washington, D.C. in 1958. He received a BSc in Physics from Tufts University in 1962 and an MSc in Nuclear Engineering from the Massachusetts Institute of Technology (MIT) in 1966. A Navy Reserve Officer Training Corps (ROTC) student at Tufts University, Hauck was commissioned upon graduation in 1962 and reported to the USS *Warrington* (DD-843) where he served for 20 months, qualifying as Underway Officer-of-the-Deck. In 1964, he attended the U.S. Naval Postgraduate School in Monterey, California, to study mathematics and physics, and for a brief time in 1965 he studied Russian at the Defense Language Institute, also in Monterey. It was while at Monterey during 1965 that Hauck learned that NASA was recruiting scientists to become astronauts, and as he had avidly followed the Mercury and Gemini flights, he wrote off to NASA, saying "I am in graduate school. You could tailor my education however you saw fit to optimize my benefit to the program,

and I'd be very interested in becoming an astronaut." The reply he received back from NASA thanked him for his letter, but was essentially worded as "Don't call us; we'll call you." Twelve years later, he was accepted for astronaut training. **[3]**

Selected for the Navy's Advanced Science Program, Hauck received his MSc in Nuclear Engineering from MIT the next year. He began flight training at NAS Pensacola, Florida, in 1966, and received his wings as a naval aviator in 1968. As a pilot with VA-35, he was deployed to the Western Pacific with Air Wing 15 aboard the USS *Coral Sea* (CVA-43), where he flew 114 combat and combat support missions.

In August 1970, Hauck joined VA-42 as a visual weapons delivery instructor in the A-6. Selected for test pilot training, he reported to the U.S. Naval Test Pilot School at Patuxent River in 1971. Following his graduation, he began a three-year tour in the Naval Air Test Center's Carrier Suitability Branch of the Flight Test Division. During this period, Hauck served as a project test pilot for automatic carrier landing systems in the A-6 *Intruder*, A-7 *Corsair II*, F-4 *Phantom* and F-14 *Tomcat* aircraft, and was Team Leader for the Navy Board of Inspection and Survey aircraft carrier trials of the F-14. During a test flight in 1973, he was forced to eject from an RA-5C *Vigilante* at low altitude when its fuel tank exploded. In 1974, he reported as Operations Officer to Commander Carrier Air Wing 14 aboard USS *Enterprise* (CVN-65). On two cruises, he flew the A-6, A-7, and F-14 during both day and night carrier operations. He learned of the call from NASA for new astronauts to fly the Space Shuttle during his second cruise on *Enterprise*, and on that ship with him were three others who were also selected in the 1978 class: Hoot Gibson, Dale Gardner and John Creighton. Three of the 15 pilots selected were from Air Wing 14 and Dale Gardner was chosen as an MS, Hauck recalled in his NASA Oral History. He found it interesting that three of 15 pilots chosen in the group had served in the same Air Wing. "Three of 15… What's that? Twenty percent came from that ship," Hauck realized. In February 1977 he reported to Attack Squadron 145 as Executive Officer, and in January 1978, NASA selected Hauck as a pilot astronaut candidate.

JON A. MCBRIDE

Unlike the other Group 8 Navy pilots, Jon McBride did not attend the Naval Test Pilot School, instead joining Class 75A at the USAF Test Pilot School at Edwards AFB, California. He graduated in 1975, along with fellow future astronauts Guy Gardner (selected by NASA for Group 9, 1980), Loren Shriver and Steve Nagel – the latter two joining him as Group 8 astronauts in 1978.

LCdr. Jon Andrew ("Big Jon") McBride, USN, was born on August 14, 1943, in Charleston, West Virginia, but considers Beckley, West Virginia, to be his hometown. He graduated from Woodrow High School in Beckley in 1960, before undertaking further studies at West Virginia University from 1960 to 1964. He

received his BSc in Aeronautical Engineering from the U.S. Naval Postgraduate School in 1971. McBride's naval service began in 1965 with flight training at Pensacola, Florida. A fan of the space program since Sputnik in 1957, he and his friends would design, build and launch model rockets, and he later became fascinated with the careers and achievements of the USN astronauts chosen in the 1960s. **[4]** After winning his wings as a naval aviator, McBride was assigned to Fighter Squadron 101 based at NAS Oceana, Virginia, for training in the F-4 *Phantom II* aircraft. He was subsequently assigned to Fighter Squadron 41, where he served for three years as a fighter pilot and Division Officer. He has also served tours with Fighter Squadrons 11 and 103. While deployed to Southeast Asia, McBride flew 64 combat missions. In 1975, he attended the USAF Test Pilot School at Edwards AFB, prior to reporting to Air Test and Development Squadron Four at Point Mugu, California, where he served as Maintenance Officer and Sidewinder Project Officer. He has flown over 40 different types of military and civilian aircraft and piloted the Navy's bicentennial-painted "Spirit of '76" F-4J *Phantom* at various air shows during 1976, 1977, and 1978. He has logged more than 8,800 hours flying time, including 4,700 hours in jet aircraft.

STEVEN R. NAGEL

Although he would have preferred to fly in the capacity he was selected for, as a pilot astronaut, Steve Nagel accepted the role of MS when he flew into space for the first time on STS-51G in June 1985. This flight carried an interesting Payload Specialist (PS) in the form of Sultan Salman Al Saud from Saudi Arabia, the first Arab, the first Muslim and the first member of a royal family to fly into space. However, Nagel did achieve his goal on his second mission just five months later, when he flew as PLT on STS-61A in November 1985, the last successful mission of Shuttle *Challenger*, which carried the NASA/European Space Agency (ESA) Spacelab module into orbit with more than 75 experiments. On his final two missions (STS-37, April 1991, and STS-55, April 1993) he flew as mission Commander (CDR).

Steven Ray Nagel was born on October 27, 1946, in Canton, Illinois. He graduated from Canton Senior High School in 1964, and received a BSc in Aerospace Engineering (high honors) from the University of Illinois in 1969. Nagel received his commission in 1969 through the Air Force Reserve Officer Training Corps (AFROTC) program at the University of Illinois. He completed undergraduate pilot training at Laredo AFB, Texas, in February 1970, and subsequently reported to Luke AFB, Arizona, for F-100 training.

From October 1970 to July 1971, Nagel was an F-100 pilot with the 68th Tactical Fighter Squadron at England AFB, Louisiana. He served a one-year tour of duty as a T-28 instructor for the Laotian Air Force at Udorn Royal Thai Air Force Base (RTAFB) in Thailand, prior to returning to the United States in October

1972 to assume A-7D instructor pilot and flight examiner duties at England AFB. He then attended the USAF Test Pilot School at Edwards AFB, California, from February to December 1975 as a member of Class 75A. In January 1976, he was assigned to the 6512th Test Squadron located at Edwards. As a test pilot, he worked on various projects, including flying the F-4 and A-7D. He would later receive his MSc in Mechanical Engineering from California State University in 1978. When selected by NASA, he had logged 12,600 hours flying time, 9,640 hours of which was in jet aircraft.

With ambitions to become a Shuttle Pilot, Nagel was pleased that the qualification requirements for applicants had been liberalized. "In the old days, I wouldn't be here," he commented following his selection. At 6 feet 2 inches (1.88 meters), he would have been rejected as being too tall in previous astronaut applications. "I'm here now because the Shuttle cockpit is bigger. The flight deck's the same size as an airliner." **[5]**

FRANCIS R. SCOBEE

If Air Force Maj. Dick Scobee ("Scobe") was looking for someone to inspire him as a future NASA astronaut while attending Class 71B of the Aerospace Research Pilot School (ARPS, previously the USAF Test Pilot School, TPS) at Edwards AFB in 1971, he needed to look no further than the school's commandant at that time, Col. Edwin E. ("Buzz") Aldrin, who had walked on the Moon two years earlier. In fact, Scobee would be the only member of Class 71B to become a NASA astronaut[1].

Maj. Francis Richard ("Dick") Scobee, USAF, was born on May 19, 1939, in Cle Elum, Washington, and graduated from Auburn Senior High School, Washington, in 1957. He subsequently enlisted in the USAF in 1957, and trained as a reciprocating engine mechanic. He was later stationed at Kelly AFB, Texas, where he attended night school and acquired two years of college credit which led to his selection for the Airman's Education and Commissioning Program. He graduated from the University of Arizona with a BSc in Aerospace Engineering in 1965 and was commissioned that same year. After receiving his wings in 1966, Scobee completed a number of assignments, including a combat tour in Vietnam. He returned to the United States and attended the Air Force ARPS at Edwards AFB, California. After graduating in 1972, he participated in various test

[1] In 1961, the USAF Test Pilot School at Edwards AFB in California expanded its operations to include the Aerospace Research Pilot Course at which military test pilots received preparatory training for operational or managerial assignments in the nation's space programs. Between 1961 and 1972, when the course was eliminated, 37 TPS graduates were selected for the U.S. space program under the civilian NASA or USAF Manned Orbiting Laboratory (MOL) programs. Of these, 26 would earn their Astronaut Wings participating in missions flown under the X-15, Gemini, Apollo and Space Shuttle programs.

programs, flying aircraft such as the Boeing 747, the X-24B (see sidebar: *The X-24*), the transonic aircraft technology (TACT) F-111, and the C-5. At the time of his selection by NASA in January 1978, he had logged more than 6,500 hours flying time in 45 types of aircraft.

Fig. 3.4: X-24B lifting body pilots (l-r): Einar Enevoldson, John Manke, Dick Scobee, Tom McMurtry, Bill Dana and Mike Love.

The X-24

The X-24 was an experimental aircraft developed from a joint USAF/NASA program called PILOT (PIloted LOw speed Test), part of the Lifting Body research program which ran from 1963 until 1975. The objective was to design and build lifting-body concepts for unpowered re-entry and landing, a technique later used by the Space Shuttle. The test flight began with an air drop from a carrier aircraft at high altitudes before igniting its rocket motor. After expending the on-board fuel, the pilot would glide the X-24 to an unpowered landing. The original X-24 was rebuilt as the X-24B. In 1975, towards the end of the program. Captain Dick Scobee, the only member of any post-1970 selection to have flown a lifting body aircraft, logged two unpowered familiarization glide flights in X-24B #1:

1. October 21, 1975; 32nd flight of X-24B; 0.700 Mach/463 mph (745 kph); 45,000 ft. (13,716 m); glide flight.
2. November 19, 1975: 35th & penultimate X-24B flight; 0.714 Mach/471 mph (757.8 kph); 45,000 ft. (13,716 m); glide flight. **[6]**

Fig. 3.5: During a 1982 refueling stopover at Ellington AFB, the crew of the Shuttle Carrier Aircraft (SCA 747) NASA 905 are seen at their stations inside the aircraft. (l-r) Joe Algranti, pilot; Dick Scobee, co-pilot; Louis E. Gidry, flight engineer.

BREWSTER H. SHAW

Two of the pilots assigned to Class 75B at the USAF Test Pilot School at Edwards AFB in July 1975 were destined for selection in NASA's Group 8. But while Capt. Mike Mullane entered the astronaut corps as an MS, Brewster Shaw was named as a pilot astronaut. Yet another classmate, Capt. Jerry Ross, would be selected as an MS astronaut in Group 9 in 1980.

Capt. Brewster Hopkins Shaw Jr., USAF, was born on May 16, 1945, and grew up in Cass City, Michigan. He graduated from Cass City High School in 1963 and received a BSc in Engineering Mechanics from the University of Wisconsin-Madison in 1968. The following year, he completed his MSc in Engineering Mechanics, also at UW-Madison. Shaw entered the USAF in 1969 after completing Officer Training School, and attended undergraduate pilot training at Craig AFB, Alabama. He received his pilot wings in 1970 and was then assigned to the F-100 Replacement Training Unit at Luke AFB, Arizona. In April 1973, Shaw reported to George AFB, California, for F-4 *Phantom* instructor duties with the 20th Tactical Fighter Squadron. He then attended the USAF Test Pilot School at Edwards AFB, beginning in July 1975. On completion of this intensive training

period, he remained at Edwards as an operational test pilot with the 6512th Test Squadron. He subsequently served as an instructor at the Test Pilot School from August 1977 until his selection by NASA. By this time, Shaw had accumulated more than 5,000 flying hours in more than 30 different aircraft types, including 644 hours of combat flying in F-100 and F-4 aircraft.

LOREN J. SHRIVER

Class 75A at the USAF Test Pilot School, Edwards AFB, produced three graduates who would become NASA pilot astronaut candidates in January 1978: Jon McBride, Steven Nagel, and Loren Shriver. As mentioned earlier, a fourth graduate, Guy Gardner, became a pilot astronaut in the Group 9 selection in 1980.

Capt. Loren James Shriver, USAF, was born on September 23, 1944, in Jefferson, Iowa. He received a BSc in Aeronautical Engineering from the USAF Academy in Colorado Springs, Colorado in 1967, and an MSc in Astronautical Engineering from Purdue University, Indiana, in 1968. He was commissioned in 1967 upon graduation from the Air Force Academy, and from 1969 to 1973 served as a T-38 academic instructor pilot at Vance AFB, Oklahoma. Shriver completed F-4 *Phantom* combat crew training at Homestead AFB, Florida, in 1973, and was then assigned to an overseas tour in Thailand until October 1974. In 1975, he attended the USAF Test Pilot School at Edwards AFB, and upon completion of this training program was assigned to the 6512th Test Squadron at Edwards, participating in the Air Force development test and evaluation of the T-38 lead-in fighter. In 1976, he began serving as a test pilot for the F-15 Joint Test Force at Edwards.

Loren Shriver has flown in 30 different types of single- and multi-engine civilian and military fixed-wing aircraft and helicopters, and has logged over 6,200 hours in jet aircraft.

DAVID M. WALKER

It was not unusual to find officer pilots from the other services involved in the USAF ARPS based at Edwards AFB. This was the case in Class 71A, where Lt. David Walker was one of two naval aviators undertaking an exhaustive six-month program. The school placed heavy demands on the technical competence, ingenuity and managerial skills of the students, while they learned about performance and flying qualities of a number of aircraft, in order to conduct an effective overall evaluation on them. Under the guidance of school commandant Edwin "Buzz" Aldrin, David Walker would successfully graduate with the rest of Class 71A, and was assigned as a test pilot to the Naval Air Test Center in Patuxent River, Maryland.

LCdr. David Mathieson Walker, USN, was born on May 20, 1944, in Columbus, Georgia. He graduated from Eustis High School, Florida, in 1962. He then attended the U.S. Naval Academy, receiving his BSc on June 8, 1966. Following his graduation from Annapolis, he received flight training from the Naval Aviation Training Command at bases in Florida, Mississippi, and Texas, and was designated a naval aviator in December 1967. He then proceeded to NAS Miramar, California, for assignment to F-4 *Phantoms* aboard the carriers USS *Enterprise* (CVN-65) and USS *America* (CV-66). From December 1970 to 1971, he attended the USAF ARPS at Edwards AFB, California, and was subsequently assigned in January 1972 as an experimental and engineering test pilot in the Flight Test Division at the Naval Air Test Center, Patuxent River, Maryland. While there, he participated in the Navy's preliminary evaluation and Board of Inspection and Survey trials of the F-14 *Tomcat* and tested a leading edge slat modification to the F-4 *Phantom*. He then attended the U.S. Navy Safety Officer School at Monterey, California, and completed replacement pilot training in the F-14 *Tomcat* at NAS Miramar.

In 1975, Walker was assigned as a fighter pilot to Fighter Squadron 142, stationed at NAS Oceana, Virginia, and was deployed to the Mediterranean Sea twice aboard the USS *America*. At the time of his selection by NASA, he had logged in excess of 5,500 flying hours, including 5,000 hours in jet aircraft, primarily the F-4, F-14 and T-38.

DONALD E. WILLIAMS

On average, each student in Class 65 at the U.S. Naval Test Pilot School was assigned to 36 different aircraft types between July 1973 and May 1974. One of those pilots – and the only one who would join the ranks of NASA astronauts – was Don Williams.

LCdr. Donald Edward Williams, USN, was born on February 13, 1942, in Lafayette, Indiana, and raised in the nearby town of Green Hill. He graduated from Otterbein High School in Otterbein, Indiana in 1960. Williams then went on to earn a BSc in Mechanical Engineering from Purdue University in 1964, and also received his commission through the university's Naval ROTC program. He completed flight training at Pensacola, Florida, Meridian, Mississippi and Kingsville, Texas, receiving his wings as a naval aviator in May 1966. After A-4 *Skyhawk* training, he completed two Vietnam War deployments aboard the aircraft carrier USS *Enterprise* (CVN-65) with VA-113. He subsequently served as a flight instructor with VA-125 at NAS Lemoore, California, for two years and transitioned to the A-7 *Corsair II* aircraft. He made two additional Vietnam deployments aboard the USS *Enterprise* with Carrier Air Wing 14 staff and VA-97. He completed a total of 330 combat missions.

Williams attended the Armed Forces Staff College in 1973, and graduated from the U.S. Naval Test Pilot School in Maryland in June 1974. He was then assigned

to the Naval Air Test Center's Carrier Suitability Branch of the Flight Test Division. From August 1976 to June 1977, following reorganization of the Naval Air Test Center, he was head of the Carrier Systems Branch Strike Aircraft Test Directorate. He reported next for A-7 refresher training, and was assigned to VA-94 at the time of his selection as an astronaut candidate by NASA. By then, he had accumulated over 5,700 hours of flying time, including 5,400 hours in jet aircraft, and had completed 745 carrier landings.

Fig. 3.6: Class of 1978 pilot astronaut hopefuls (clockwise from top left) Capt. Jane L. Holley, USAF; Maj. Gen Claude M. Bolton Jr., USAF; Col. Richard S. Couch, USAF: Capt. William V. Cross II, USN.

SOME NOTABLE BUT UNSUCCESSFUL PILOT APPLICANTS

The undeniable quality associated with the backgrounds and suitability of the 208 finalists probably made the task of reducing this number down to the final 35 a source of intense debate for the selection board. Many candidates held (or would hold) prodigious qualifications and were unfortunate to have missed the cut. Here are just a select few of the military pilots who failed to make the final number.

Capt. Jane Leslie Holley, USAF

On March 17, 1971, Second Lieutenant Jane Holley from Shreveport, Louisiana, became the first woman to be commissioned through the Air Force ROTC scheme, graduating through Auburn University, Alabama, where she also received a BSc degree in Aerospace Engineering. Twenty-two months after entering the Air Force, Capt. Holley applied for admission to the USAF TPS and was accepted early in 1974. As a Flight Test Engineering student in Class 74B at Edwards AFB, she gained the distinction of being the first woman to graduate from the TPS. By the end of the 44-week course, Capt. Holley had logged more than 600 hours in the classroom and more than 100 hours in the air.

At the heart of the TPS course was the aim of establishing cooperation and understanding between pilot and engineer. "In the past," she said at the time, "when a test pilot returned from a mission, he sometimes had difficulty conveying to the engineer the problems he encountered during certain tests. They really had no basis for a common language. As a flight test engineer, I am given the opportunity to ride in the back seat during a mission. I know what tasks the pilot is required to perform and through observation I'll know exactly what he means when he says he experienced a 'slight' vibration: we will have a common point of reference."

At the time of her astronaut application (the only Air Force female nominated), Capt. Holley was working with the USAF Tactical Fighter weapons center at Nellis AFB, Nevada.

Capt. Claude Milburn Bolton Jr., USAF

Capt. Bolton was born in 1945 in Sioux City, Iowa, joining the USAF in June 1969. During the Vietnam War, he flew 232 combat missions in the F-4 *Phantom*, 40 of them over North Vietnam, for the 497th Tactical Fighter Squadron ("*Nite Owls*"). After the Vietnam War, he transitioned to the F-111 at Cannon AFB, New Mexico, and RAF Upper Heyford in Oxfordshire, England. In 1977, he attended the USAF TPS. While undertaking testing from Eglin AFB, Florida, he set a low altitude, high speed record.

After attending the Defense Systems Management College in 1982, Bolton transitioned to program management. He became the first program manager for the Advanced Tactical Fighter Technologies Program, which evolved into the F-22 *Raptor* System Program Office. Following his distinguished military career, Maj. Gen. Bolton was nominated by President George W. Bush for the position of Assistant Secretary of the Army for Acquisition, Logistics and Technology, and served in that eminent position from 2002–2008. A veteran of more than 32 years of active military service, Maj. Gen. Bolton died unexpectedly at home on July 28, 2015. At the time of his death, following a highly decorated career as a test pilot and an acquisition officer, he was serving as the Executive-in-Residence for the

Defense Acquisition University (DAU), assisting in supporting the Congressional mandate to recruit, train and educate the Department of Defense acquisition workforce.

Capt. Richard S. (Rick) Couch, USAF

Rick Couch entered the Air Force in 1968 and flew 199 combat missions in Southeast Asia as a forward air controller. After graduating from the USAF TPS in Class 75A, he was assigned to the 4950th Test Wing at Wright-Patterson AFB, where he flew test missions developing the all-weather landing system for the C-141 and other research and development programs. In 1978, following his unsuccessful bid to become an astronaut, Couch returned to Edwards AFB as a TPS Instructor.

In 1985, he became the first commander of the B-2 Combined Test Force at Edwards, and would later be the pilot on the maiden flight of the B-2 stealth bomber, which was first revealed to the public on November 22, 1988 when AV-1 (82-1066) was unveiled at Palmdale, California. Taxi tests began on July 10, 1989 and the first flight of the B-2 took place on July 17 from Palmdale, crewed by chief test pilot Bruce J. Hinds and Col. Couch. The flight lasted 112 minutes and ended with a landing at Edwards AFB. Couch also participated in early development activities of the B-2.

In 1990, he was presented with the Iven C. Kincheloe Award, which recognizes outstanding professional accomplishment in the conduct of flight testing. He later became Test Wing Vice Commander at Edwards, then served as Deputy Director of the Tri-service Standoff Attack Missile System Program Office at Wright-Patterson. After retiring from the USAF in 1992, Col. Couch joined Martin Marietta (now Lockheed Martin).

LCdr William V. (Bill) Cross II, USN

Bill Cross, from Omaha, Nebraska, enjoyed an active duty U.S. Naval career for 33 years, retiring as a two-star Rear Admiral on February 1, 2000. His military experience included combat tours in Vietnam and Operation Desert Storm, and four operational commands including an F-14 fighter squadron, an amphibious assault ship, a nuclear aircraft carrier (USS *Dwight D. Eisenhower*) and an aircraft carrier strike group. When he applied for astronaut training in 1977, he was 31 years old and serving on the USS *Nimitz*.

Cross became the Navy's first Program Executive Officer for Aircraft Carriers, leading the initial design of the advanced command and control system for the Navy's newest class of aircraft carriers. His other military positions included Navy test pilot, TPS flight instructor, engineering manager for the Navy's F-14 programs, Director of Plans and Policy for the U.S. Transportation Command, and

Director of Operations for the U.S. European Command. As Commander of Carrier Group Six in 1995/96, Cross directed numerous carrier air strikes against targets in Serbia and Bosnia from the flagship USS *America*, flying from the Adriatic Sea.

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