A Shuttle Full of Flags: Use of Flags in the Space Shuttle Program

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Abstract

The Space Shuttle Program was the longest-running human spaceflight program of the United States National Aeronautics and Space Administration (NASA). Spanning three decades (1981-2011), the program consisted of 135 flights using a fleet of orbiter spacecraft. Throughout the history of the program, flags were used in many different contexts. The most traditional was using a flag as a national identifier on spacecraft, payloads, and spacesuits. In addition, flag motifs were used on the mission emblems designed by shuttle crews to represent their flights. On the emblems, flags indicated the nationalities of individual crew members, the use of hardware contributed by various nations, and the increasingly international nature of the program as it evolved from an American space program to a collaborative program where many nations cooperated to conduct individual missions and to construct the International Space Station. The Space Shuttle Program also spawned new flags to represent each orbiter, specific payloads, or selected missions. Finally, the Space Shuttle was the largest spacecraft designed to ferry both astronauts and equipment into orbit. This provided a unique opportunity to carry large numbers of flags into orbit. This paper will discuss these varied uses of flags during the Space Shuttle Program, documenting specific flags and demonstrating the dynamic role of flags in human spaceflight.

Flags and Insignia on the Space Shuttle Orbiters

One of the most traditional uses of flags in NASA's human spaceflight program has been in the role of a "national identifier". Since the third flight of Project Mercury (launched February 1962) the external insignia on all US manned spacecraft have included an American flag. While earlier programs such as Project Mercury, Project Gemini, and the Apollo Program relied on single-use spacecraft, the Space Shuttle Program was designed so that key components could be reused for multiple flights. In NASA documents, the crewed vehicle was usually called the "Orbiter Vehicle" (OV) or simply the "Orbiter". This was to distinguish these vehicles from the other components of the Space Transportation System (STS). The full STS included not just the Space Shuttle orbiter, but also an external fuel tank (ET) and two solid rocket boosters (SRBs). When launched, the four components were assembled in a "stack" configuration with the nose of the orbiter pointing up, the external tank mounted to the underside of the orbiter, and one solid rocket booster attached to each side of the ET. On the first two shuttle missions the ET was painted white, but on all other flights it was left its original orange color to eliminate the excess weight of the paint. After launch, the solid rocket boosters provided over 80% of the lift-off thrust for the first two minutes of the flight. They were then jettisoned and returned under parachute for splash down in the Atlantic Ocean so that they could be recovered for reuse. The external tank provided fuel to the shuttle's main engines until main engine cut off (MECO), and

then the tank was jettisoned and broke up before entering the Indian Ocean. While technically "Space Shuttle" refers to the entire Space Transportation System, the term is more commonly used to refer to just the orbiters.[1]

Of all the components that made up the Space Transportation System, it was the orbiters which bore distinctive markings and insignia. When referring to American aircraft and spacecraft, the term "markings" is typically used to describe the general paint scheme such as nose decoration and accent coloring on the wings, tail, and fuselage. It also refers to instruction and warning labels on the craft. "Insignia", on the other hand, refers to the graphical elements that identify nationality, branch of service or agency, and the specific name of the aircraft or spacecraft. It is the insignia that are of interest to vexillologists, as national flags or flag motifs are often used in this context. On the Space Shuttle orbiters the insignia were placed in such a way that they were viewed correctly during the different stages of the mission. For example, when the shuttle was standing on the launch pad and ascending into orbit, the most prominent markings were those on the top side of the spacecraft wings. In addition, because the orbiter landed on a runway like an airplane, there were also side markings similar to those found on official US government winged aircraft. These markings and insignia varied throughout the duration of the program and across the six orbiters – Enterprise (NASA Designation OV-101), Columbia (OV-102), Challenger (OV-099), Discovery (OV-103), Atlantis (OV-104), and Endeavour (OV-105). There were three basic configurations for the insignia on the wings, and two configurations for the insignia on the sides of the spacecraft.[2]

The first wing configuration was used on two of the orbiter vehicles – Enterprise and Columbia. Enterprise was a prototype vehicle used for several approach and landing tests (ALT) in 1977, and in configuration testing of the Space Transportation System. While NASA originally planned to upgrade it for use in manned orbital flights, this work was never completed and Enterprise was only used as a test vehicle. Columbia was the first fully-operational orbiter, initially launched in 1981 and used for 28 missions until it was lost in a reentry accident in 2003. On both Enterprise and Columbia the first insignia configuration included a United States flag on the top of the port side (left) wing and the letters "USA" in black on the top of the starboard side (right) wing. The "USA" on Columbia was larger than that on Enterprise, and the letters were spaced farther apart. Enterprise was repainted in 1983, and its insignia was changed to match the second configuration. Columbia retained its unique insignia configuration for many years, but after a refit it appeared with its insignia in the third configuration for the launch of STS-109[3] in 2002.[4]

Figure 1: View of the Space Shuttle Enterprise during a test flight showing positions of the US flag on the port side fuselage and wing (NASA Photo ECN-8611, detail).

Figure 2: View of the Space Shuttle Columbia on the launch pad showing positions of the US flag and "USA" on the wings (NASA Photo, detail).

A second wing insignia configuration debuted in 1983 when NASA launched the orbiter Challenger into space for the STS-6 mission. Wing markings in the new configuration consisted of the letters "USA" (in black) over an American flag on the top of the portside wing, and the NASA Logotype (in gray) over the orbiter name (in black). This second configuration was the initial insignia design on Challenger, Discovery, Atlantis, and Endeavour, and the second configuration used on Enterprise. Columbia never bore this second insignia configuration. The NASA Logotype is a well-known graphic identifier created for the National Aeronautics and Space Administration in 1975 and used until 1992. "In the logotype, the letters 'N-A-S-A' are reduced to their most simplified form. The strokes are all of one width, evoking the qualities of unity and technical precision. Elimination of cross-strokes in the two 'A' letters imparts a vertical thrust to the logotype and lends it a quality of uniqueness and contemporary character." While popular with fans of NASA, it never gained popularity among NASA employees, who often referred to it by the not-so-affectionate nickname "The Worm". It was this dissatisfaction with the logotype that eventually led to the third insignia configuration.[5]

Figure 3: View of the Space Shuttle Discovery showing the 2nd wing configuration (NASA Photo 84PC470, detail).

The third and final configuration for the wing insignia was primarily the result of a policy change at NASA. As previously mentioned, the NASA Logotype was not popular among NASA employees. Most employees preferred the NASA Insignia (affectionately nicknamed "The Meatball"), described as having a "dark blue background; solid red wing configuration; white inner elliptical flight path, stars and letters NASA". In 1992, NASA officially retired the logotype and readopted the Insignia for official use. While this change did not result in the immediate repainting of the Space Shuttle orbiters, as they underwent planned renovation work each was repainted with a new configuration of insignia. On the third wing insignia configuration the portside wing displayed only the NASA Insignia, while the starboard wing featured the American flag over the orbiter name (in black). This was the final configuration used in the program. All space-flown shuttles continue to bear this configuration now that they have been retired and converted to museum exhibits, while Enterprise still bears the second configuration. It is important to note that the one element found in all three wing insignia configurations was the American flag, although in the first two versions it was on the left side, while in the third it was on the right.[6]

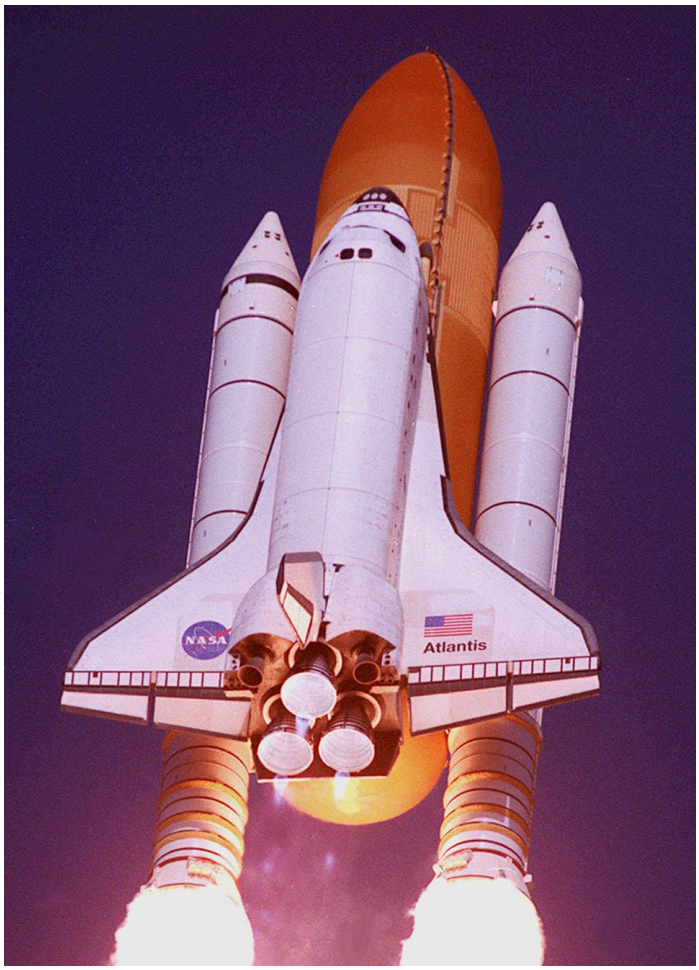


Figure 4: Third configuration of wing insignia as seen on the Space Shuttle Atlantis during the launch of STS-106 (NASA Photo KSC-00PP-1271, detail).

Insignia on the sides of the fuselage (the main body of the spacecraft) contained four basic elements: the orbiter name (in black *Helvetica* font), the US flag, the words "United States", and either the NASA Logotype or the NASA Insignia. All the shuttles in both side configurations displayed the orbiter name on both port and starboard, positioned forward on the spacecraft. On Columbia and initially on Enterprise it was painted on the payload bay doors, while on the other orbiters (and on the repainted orbiters) it was on the crew cabin just below and aft of the windows. In the first configuration, the NASA Logotype appeared aft (in gray) on both sides of the orbiters, painted on the payload bay doors near the tail of the spacecraft. In the second side-insignia configuration, the NASA Logotype was replaced by the NASA insignia which was positioned below the pods of the orbital maneuvering system (OMS) and above the wings. The words "United States" (in black) and an American flag were featured prominently on the aft portion of the fuselage, between the payload bay doors and the tops of the wings. These were positioned so that, on both sides, the flags preceded "United States" as the shuttles were landing. On the port side of the orbiters, the flag was positioned normally with the canton at upper left. The starboard side had the flag flipped, with the canton to the right of the stripes. This "reversed" flag is consistent with the display of the US flag on both governmental and commercial aircraft. NASA explained that "the star field precedes the stripes in the direction of aircraft movement. The flag is placed on the aircraft in this manner so as to appear to be flying."[7]

Figure 5: First configuration of insignia on the starboard side of the fuselage. Notice the "reversed" US flag (NASA Photo STS027-S-014, detail).

Figure 6: Final configuration of insignia on the port side (top) of the fuselage (NASA Photo STS122-S-076, detail).

Flags on Modules and Payloads

The American flag was not the only national flag to mark the hardware used on the Space Shuttle. There were a number of international elements used during the program. One of the most important was the Remote Manipulator System (RMS), commonly called the "Canadarm" or simply the "robot arm". This hardware was contributed by the Canadian Space Agency and bore the "Canada Wordmark" – a special national logo with the word "Canada" and the Canadian flag flying from the "staff" of the letter "d". Another notable international element used in the Space Shuttle Program was the European Space Agency's (ESA) Spacelab Module, which was used from 1983 to 1998. Spacelab was an add-on laboratory module that was mounted in the rear of the orbiter's cargo bay and connected to the airlock of the crew compartment via a tunnel. Spacelab's position at the far end of the bay made it easily visible from the aft windows in the crew compartment; therefore the module was decorated with distinctive emblems. The Spacelab emblem was included on every flight and showed the ESA emblem at the bottom below an image of the shuttle and the module in the center. Surrounding these symbols on the outside edge of much of the emblem were the national flags of twelve ESA member states (clockwise from lower left to lower right): Belgium, Denmark, France, Germany, Ireland, Italy, the Netherlands, Spain, Sweden, Switzerland, the United Kingdom, and Austria. Interesting, because the flags are aligned in the same direction relative to the center of the emblem, the end result is that the majority of the flags are displayed either upside down or with their hoist ends pointing down on the emblem.[8]

Figure 7: View of the Remote Manipulator System, or Canadarm, showing the Canadian Wordmark (NASA Photo, detail).

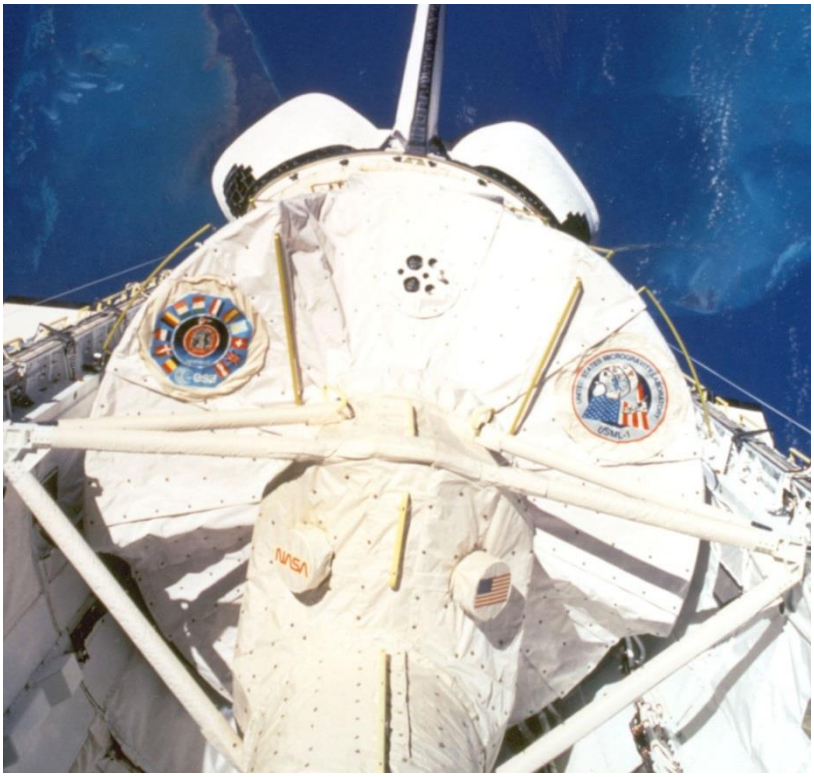


Figure 8: View of the European Space Agency's Spacelab Module in the cargo bay of the Space Shuttle showing flag-motif patches on the module (NASA Photo MSFC-9402313, detail).

Flags on Spacesuits and Patches

Much in the way flags have been used as national identifiers on spacecraft, they have also been used on spacesuits and clothing worn by crew members during their missions. In NASA's human space flight program this tradition dates back to 1965 when the crew of Gemini IV became the first to display the US flag on their spacesuits. This change was prompted by the fact that this mission included the first American extravehicular activity (EVA) or "spacewalk". The crew suggested that having a flag on the spacesuit would make for better photos during the EVA. In the case of the Gemini IV mission, actual 4 x 6 inch flags were used as patches on the spacesuits. On later missions the spacesuits had specially-made flag patches. American astronauts have continued the tradition, wearing a US flag on the left sleeve of their spacesuits and flight suits during the remainder of the Gemini missions, all Apollo missions, and those flown on the Space Shuttle and to the International Space Station.[9]

Figure 9: View of American astronaut F. Story Musgrave showing placement of flag patches on the spacesuit sleeve and on the Primary Life Support System (PLSS) backpack unit (NASA Photo STS061-98-050, detail).

It was during the Space Shuttle Program that astronauts from other countries first launched into space aboard American spacecraft. Many of these represented the European Space Agency, including the first international shuttle astronaut, a West German who flew on the shuttle as part of the STS-9 mission in 1983. Throughout the course of the program, astronauts from many nations flew aboard the Space Shuttles. Countries represented included Belgium, Canada, France, Germany, Israel, Italy, Japan, Mexico, the Netherlands, Russia, Saudi Arabia, Spain, Sweden, Switzerland, and Ukraine. These astronauts (or cosmonauts, as Russian spacefarers are called) typically wore patches of their nation's flags on their spacesuits and flight suits just as their American crewmates did.[10]

Figure 10: Japanese Mission Specialist Takao Doi in the shuttle payload bay wears the Japanese flag on his spacesuit (NASA Photo GPN-2000-001093, detail).

Figure 11: European Space Agency (ESA) astronaut Hans Schlegel displays the German flag on his spacesuit (NASA Photo S122-E-008211, detail).

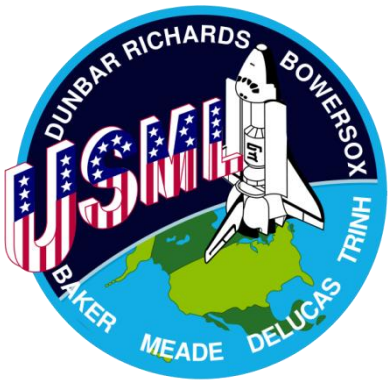
Yet another area where flags were used on clothing during the Space Shuttle Program was as a design element on the individual mission patches designed for each flight. These emblems were a continuation of another tradition started during Project Gemini. In 1965 the Gemini V crew became the first to design a unique patch for their flight (those which can be found for earlier missions were designed after the flights). By tradition, the mission patches for Space Shuttle flights were designed by the crews, typically working with an artist to produce the final version. Patch designs typically included the flight designation, surnames of the crew members, images of the shuttle or other symbols related to spaceflight, elements related to payloads and mission objectives, American symbols, flags, or elements from flags.[11]

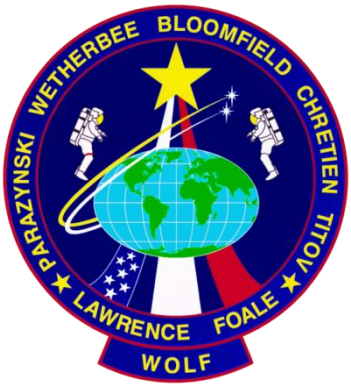
Throughout the Space Shuttle Program, flags and flag elements were used in a variety of ways on mission patches. Not surprisingly, the United States flag was the most common flag used in patch designs. In many cases the flag was used as an emblem of national pride and is prominently displayed as a background image in the design. Examples include the patches for flights STS-41-G, STS-61-B, STS-51-L, and STS-104. On the patch for STS-36 the dark blue canton and stars of the flag merge with the star-filled background of outer space, leaving the red and white stripes fluttering at the edge of the emblem. On other patches small segments of a flag are used to suggest the presence of a complete flag. In some cases, the flag has been used to substitute for the Earth in the patch design, with the Space Shuttle launching or orbiting above it. The patches for STS-51-B, STS-53, and STS-76 are examples of this type of flag usage. In other designs some elements of the flag were used to imply the presence of the national flag, such as in the patches for STS-50, STS-101, and STS-117. Sometimes a full flag or an implied flag was used to designate the flight path of the Space Shuttle as it orbited the Earth. Examples include the emblems used by STS-2, STS-51-D, STS-51-I, STS-44, STS-51, STS-98, STS-106, STS-118, and STS-119. There are also examples where the red and white stripes from the US flag are used as a flight path, or a combination of red, white, and blue stripes. On the patch for STS-73, the crew placed two US flags in the border of the patch along with their names.[12]

Figures 12-14: Space Shuttle mission patches with the American flag as a background image: STS-41-G, STS-61-B, and STS-51-L (Images from Wikipedia).

Figures 15-16: More Space Shuttle mission patches with the American flag as a background image: STS-36 and STS-104 (Images from Wikipedia).

Figures 17-19: Space Shuttle mission patches with the American flag substituting for the Earth: STS-51-B, STS-53, and STS-76 (Images from Wikipedia).





Figures 20-22: Space Shuttle mission patches with implied American flags: STS-50, STS-86, and STS-98 (Images from Wikipedia).

Figures 23-24: Space Shuttle mission patches with implied American flags as a flight paths: STS-51-I and STS-44 (Images from Wikipedia).

Figures 25-27: Space Shuttle mission patches with the American flag, or an implied flag, as a flight path: STS-51-D, STS-118, and STS-119 (Images from Wikipedia).

Once Space Shuttle missions became more international with payloads and crew members from various countries, other national flags (and elements thereof) were incorporated into mission patch designs. On many emblems a national flag was placed next to a specific crew member's name on the patch to indicate the astronaut's nationality. Examples of this type of flag placement can be found on the emblems for STS-41-G (Canada), STS-51-G (France and Saudi Arabia), STS-61-B (Mexico), STS-87 (Ukraine), STS-120 (Italy), STS-131 (Japan), and STS-107 (Israel). On other patch designs an element of a national flag is placed next to the name. Examples include the maple leaves found next to Canadian astronaut's names on the patches of STS-42, STS-118, and STS-127, as well as the red sun from the Japanese flag on the emblem for STS-114. On the patch for STS-52, the Canadarm holds a maple leaf. For other international missions the crews chose to place flags, or partial flags, on their patch for all the countries represented. Examples of this type of flag display include the patches for STS-46 (USA and Italy), STS-55 (USA and Germany), STS-68 (USA, Germany, and Italy), STS-63 (USA and Russia), STS-71 (USA and Russia), STS-74 (USA, Canada, and Russia), STS-81 (USA and Russia), STS-89 (USA and Russia), STS-91 (USA and Russia), STS-93 (USA and France), STS-102 (Russia, USA, and Italy), STS-100 (USA, Russia, Italy, and Canada), STS-113 (USA and Russia), and STS-128 (USA and Sweden).[13]

Figures 28-30: Space Shuttle mission patches using flags to designate nationality of crew members: STS-51-G, STS-87, and STS-107 (Images from Wikipedia).

Figures 31-33: Space Shuttle mission patches using flags to denote international missions: STS-46, STS-55, and STS-63 (Images from Wikipedia).

On some international mission patches the crews got more creative. Combinations of US and other flags were used as flight paths or orbital paths on the emblems for STS-61-A (USA and Germany), STS-47 (USA and Japan), STS-105 (USA and Russia), and STS-116 (USA and Sweden). On the patch for STS-51, the German flag has been incorporated to represent a payload deployed and later retrieved by the shuttle during the mission. The Japanese flag is similarly used on the STS-124 mission patch to represent a Japanese module which the shuttle delivered to the International Space Station. Perhaps one of the most interesting uses of international flags was a pair of wings formed from the US and Russian flags placed behind the Space Shuttle on the patch for STS-60. Examined as a set, the flag-inspired mission patches demonstrate a significant use of flags to express the patriotism of the crews, to represent the nationalities of international crew members, and to acknowledge the contributions of NASA's international partners to specific Space Shuttle missions and to the construction of the International Space Station.[14]

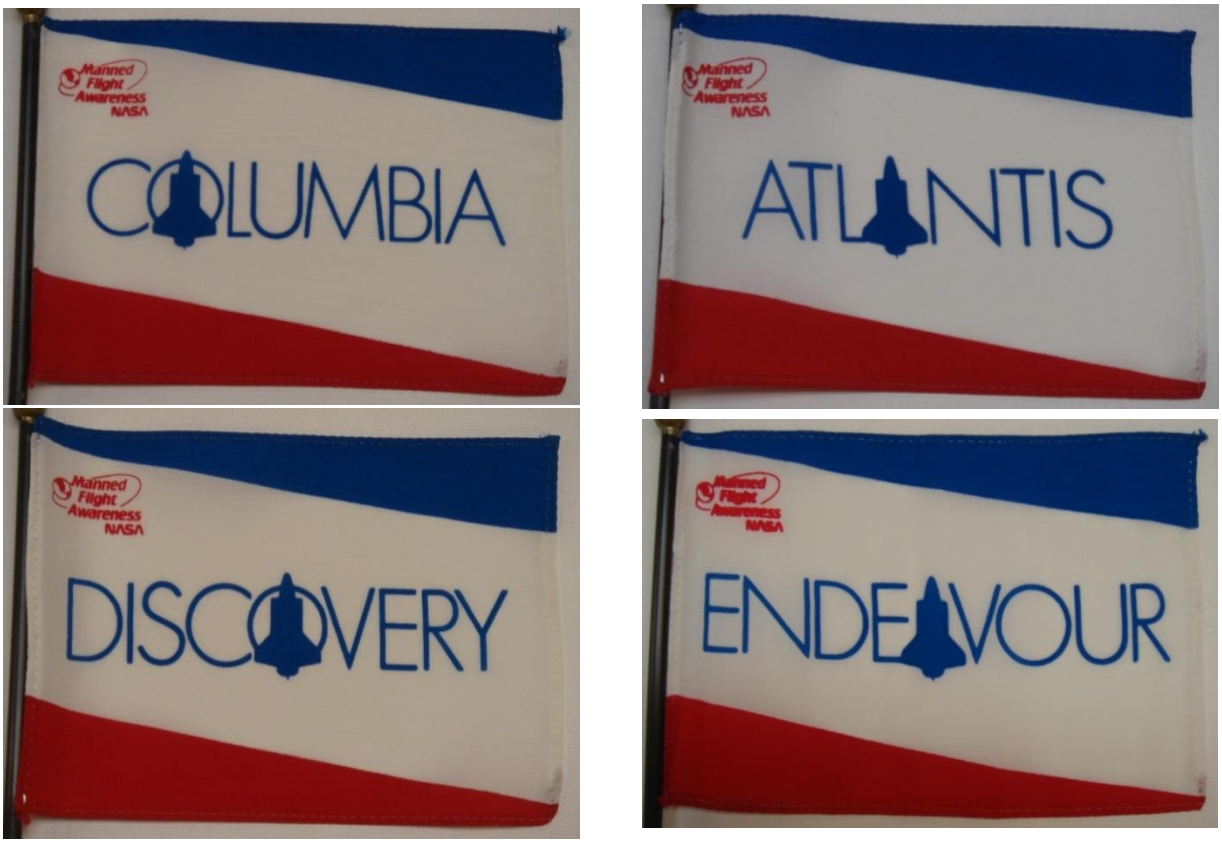
Figures 34-36: Space Shuttle mission patches showing multiple flags as a flight path: STS-61-A, STS-105, and STS-116 (Images from Wikipedia).

Figures 37-39: Space Shuttle mission patches with flags as spacecraft or flags as wings: STS-51, STS-124, and STS-60 (Images from Wikipedia).

Orbiter Flags

Perhaps the most interesting flags in the Space Shuttle Program, from the perspective of vexillologists, are the flags that were created during the history of the program. The first of these flags were those designed to represent the individual orbiters. They became a symbolic focal point of NASA's Space Flight Awareness (SFA) Motivation and Recognition Program. Originally referred to as "Manned Flight Awareness", this program was established after Gemini "to infuse the space program with a renewed and strengthened consciousness of quality and flight safety." During the shuttle era, NASA created a different flag for each orbiter. All Space Shuttle orbiter flags have a white field with a blue triangle on top and a red triangle on the bottom. Two sides of the blue triangle meet at the top of the hoist with one side forming the top of the flag and the other angling down toward the fly. The final side of the triangle forms one quarter of the fly end of the flag. At the bottom of the flag, the red triangle runs just the opposite

with one side running one quarter of the way up the hoist and the other two sides meeting at the lower corner at the fly. The combination of the triangles forms a large white stripe that angles down from the upper hoist to the lower fly of the flag. Each flag features the name of the orbiter in blue uppercase letters written horizontally across the white background. A silhouette of the orbiter substitutes for one letter in each shuttle name or is superimposed over it.[15]



Figures 40-43: Small versions of four orbiter flags such as those flown as souvenirs on various Space Shuttle missions (Photos of flags in the collection of the author).

The initial set of flags is believed to have been created sometime after the loss of the Space Shuttle Challenger in 1986. For this reason, only four orbiters were represented – Atlantis, Columbia, Discovery, and Endeavour. On all four of these flags, the shuttle silhouette shows the orbiter as it would appear in orbit, with the payload bay doors fully open. On the flag for Atlantis, the shuttle substitutes for the second "A" in "ATLANTIS" and on the flag for Endeavour it replaces the "A" in "ENDEAVOUR". On the flags for Columbia and Discovery the silhouette overlaps the "O" in each orbiter name. Later, as the Space Shuttle Program was coming to an end flags were created for the other two orbiters – Challenger and Enterprise. On the Challenger flag the shuttle replaces the letter "A" and on that for Enterprise it replaces the letter "I". The orbiter silhouette on the Challenger flag is shown with the payload bay doors in the open position, just as on the flags for the other four shuttles that had flown in space. However, since Enterprise was only used for suborbital testing and never reached orbit the silhouette on this flag varies from those for the space-flown orbiters. On the flag for Enterprise, the shuttle image reflects the configuration of the test shuttle during early approach and landing

tests – there is a spike on the nose of the orbiter, the payload bay doors remain closed, and there is an aerodynamic cone covering the location where the main engines would be.[16]

Figure 44: Full-size version of the flag for the Space Shuttle Enterprise. Notice how the image of the shuttle varies from that on the other orbiter flags (Photo of flag in the collection of the author).

Another area of variation in the orbiter flags over the course of the Space Shuttle Program was the emblem in the upper left-hand corner of each flag. On the first version of the flags there was a red logo that featured the Earth with an elliptical orbit. Mixed-case lettering in front of the orbit read "Manned Flight Awareness" above the NASA Logotype, which was at the lower-right of the emblem. Later variations showed the logo in red, with text reading "Space Flight Awareness" and the NASA Logotype had been replaced by the letters "NASA" in uppercase letters. On the flag for Enterprise, the Earth and orbital path are shown in blue, as is the NASA Logotype. On smaller versions of the flags flown on the final Space Shuttle flights the logo had been deleted completely from the flag design.[17]

Figure 45: Full-size version of the flag for the Space Shuttle Challenger. Notice that the logo in the upper left-hand corner has been changed to read "Space Flight Awareness" (Photo of flag in the collection of the author).

Figure 46: Variant of an orbiter flag (4 x 6 inches) without the Space Flight Awareness logo.

Full-sized versions of the orbiter flags were flown at various NASA installations throughout the duration of each Space Shuttle mission. At the Johnson Space Center (JSC) in Houston, Texas the flags were observed being flown on the flagpoles in front of Building 1 (the main Administration building) and exhibited in the lobby of Building 30 near the entrance to the Mission Control Center. The flags were also observed at the Kennedy Space Center (KSC) in Florida. At KSC they were flown near the launch pad when the Space Transportation System was readied for launch. There was usually one of these flags on display near the large countdown clock often shown on television before a launch. In addition the flags were frequently flown at the official visitor centers at different NASA centers. Numerous 4 x 6 inch (10 x 15 cm) versions of these flags were flown as souvenirs on Space Shuttle missions and then mounted on certificates to be awarded to NASA and contractor employees in recognition of their contributions to the program.[18]

Payload Flags

Payload flags are flags designed for specific payloads which flew on the Space Shuttle. To date the author has identified six different payload flag designs in the 4 x 6 inch (10 x 15 cm) size. These flags were observed on display at some of the workstations in the Mission Control Center (MCC) during some missions and have been flown as mementos during the relevant shuttle missions. Not every payload had a flag and it is difficult to determine exactly how many different flags were created. The examples documented by the author have been found on award certificates owned by acquaintances, have been seen for sale on E-Bay or other websites, or are represented by specimens in the collection of the author.

The earliest example found of a payload flag is that for the International Microgravity Laboratory (IML), a payload flow on the Space Shuttle Discovery during the STS-42 mission in January 1992. The flag features the payload emblem in the center of a white field. A blue border on the logo has white lettering reading “INTERNATIONAL MICROGRAVITY LABORATORY” with crossed leaves in white at the bottom. A symbol consisting of a disk with arrows projecting from the top and bottom has been substituted for the letter “O” in the word “microgravity”. The arrows could represent gravitation force (downward) and centrifugal force (upward) which have an equal influence on the disk, suggesting that it is in a state of dynamic equilibrium. On a black background in the center of the emblem is a 3-dimensional octagon shape, perhaps representing the Spacelab module which was a mobile lab carried in the payload bay of the shuttle. In the center of the octagon is a stylized human form. Letters below read “IML-1”. Outside the emblem at the hoist end of the flag in blue letters is the shuttle name “DISCOVERY” and at the fly end is the flight designation “STS-42”[19].

Figure 47: Flag for the International Microgravity Laboratory 1 (IML-1) payload (Image from an *eBay* auction).

The flag for the US Microgravity Laboratory 1 (USML-1) represents a payload flown on STS-50 in June 1992. It has a white field with the payload emblem at the hoist, showing an astronaut working in the Spacelab module and a Space Shuttle on the background consisting of a US flag. A white area extending from the Spacelab to the shuttle shows the position of the module in the payload bay during the mission. Lettering around the top of the emblem reads "UNITED STATES MICROGRAVITY LABORATORY" and at the bottom reads "USML-1". At the upper right are large letters filled with a "US flag" pattern reading "USML-1". The "Stars and Stripes" lettering is similar to that on the mission patch, except that the blue is lighter in color, the "-1" is omitted on the mission patch, and the writing on the payload flag runs straight on the flag rather than curving as it does on the mission patch. At lower fly in smaller light blue letters are the orbiter name and flight designation – "COLUMBIA" over "STS-50".[20]

Figure 48: Flag for the US Microgravity Laboratory 1 (USML-1) payload (Image of flag mounted on a certificate presented to Rich Drake).

Another example of a payload flag is that for the first flight of the Tethered Satellite System (TSS), which flew on STS-46 in July 1992. The TSS flag had a white field with the payload logo placed slightly to the right of the flag's center. Black lettering cites the name of the orbiter "ATLANTIS" and runs parallel to the hoist (from bottom to top). At the fly, similar lettering identifies the flight – "STS-46". The payload emblem shows the satellite deployed above the shuttle, with the Earth below and a view of the "boot" of Italy. Because this payload was a cooperative program between NASA and the Italian Space Agency, both the US and Italian flags appeared on the logo. Lettering around the border of the emblem reads "TETHERED SATELLITE SYSTEM" at the top and "NASA / ASI" at the bottom. The word "NASA" is formatted as the NASA Logotype. "ASI" stands for *Agenzia Spaziale Italiana* (Italian Space Agency).[21]

Figure 49: Flag for the Tethered Satellite System (TSS) payload (Image of flag in the collection of the author).

The flag for the United States Microgravity Payload 1 (USMP-1) represents a payload flown on STS-52 in October 1992. Like the previous examples, the flag had a white field with the payload emblem and wording identifying both the orbiter name and the mission designation. The USMP-1 logo is diamond-shaped with a blue background and black triangular points at top and bottom. In the center is an image of Earth, showing lines of latitude and the continents of North and South America. At the top of the diamond is the payload designation "USMP-1" and at the bottom are the lowercase Greek letter *mu* and the lowercase Latin letter *g*. Together the letters *μg* represent "microgravity". Below the Earth and above the microgravity symbol is the NASA Logotype in white. Surrounding the Earth is a black outline with the words "MEPHISTO", "SAMS", and "LAMBDA-POINT". These were the three experiments that made up the USMP-1 payload: MEPHISTO, an acronym for *Matériel Pour L'Etude des Phénomènes Intéressant la Solidification sur et en Orbite* (Materials for the Study of Interesting Phenomena of Solidification on Earth and in Orbit); SAMS, the acronym for Space Acceleration Measurement System; and the Lambda-Point experiment. A black Space Shuttle orbiter following a white orbital path is shown overlapping the globe. It is obviously not shown to scale relative to the size of the Earth. Light blue lettering running down the hoist reads "COLUMBIA" and that down the fly reads "STS 52".[22]

Figure 50: Flag for the United States Microgravity Payload 1 (USMP-1) payload (Image of flag in the collection of the author).

A similar flag is that of USMP-2 which was flown on STS-62 in March 1994. The flag was nearly identical to the one for the previous USMP mission, except that the USMP-2 logo was included and the flight name was updated to "STS-62". Experiment names on the border around the Earth include the previously-flown MEPHISTO and SAMS, as well as three additional experiments – AADSF (The Advanced Automated Directional Solidification Furnace); ZENO (The Critical Fluid Light Scattering Experiment); and IDGE (The Isothermal Dendritic Growth Experiment).[23]

Figure 51: Flag for the United States Microgravity Payload 2 (USMP-2) payload (Image from an *eBay* auction).

The flag for the International Microgravity Laboratory 2 (IML-2) flown on STS-65 in July 1994 featured a different emblem emphasizing the international nature of the payload. The emblem was oval and included a view of the Earth shown as a Goode homolosine projection map where the continents are emphasized. The microgravity symbol (μg) is shown below the Americas and the Space Shuttle orbiter overlaps the map, obscuring the continent of Australia. Behind the shuttle is a red flight path emanating from the launch site in Florida. At the bottom of the central portion of logo is the abbreviation of the payload name – IML-2. Around the edge of the emblem are the words "INTERNATIONAL MICROGRAVITY LABORATORY" and two crossed leaves are at the bottom. The letter "O" in the word "MICROGRAVITY" has been replaced by the same symbol found on the flag for the IML-1 payload. Black lettering running down the hoist reads "COLUMBIA" and down the fly reads "STS 65".[24]

Figure 52: Flag for the International Microgravity Laboratory 2 (IML-2) payload (Image from an *eBay* auction).

It is uncertain whether there were more payload flags than those illustrated here. These flags were used informally and were not widely distributed. Typically, an inventory of small (4 x 6 inches / 10 x 15 cm) versions of the flags were flown as souvenirs on the shuttle mission so that they could be later attached to certificates and presented to people who had worked on the payload or the mission. To date, only one example of a full-size payload flag has been found by the author. This flag was for the Life and Microgravity Spacelab (LMS) payload flown aboard the STS-78 mission in June and July 1996. The flag is similar to the smaller payload flag examples in that it has a white field, the payload emblem, and lettering for the orbiter name and flight designation. Symbols included in the payload emblem include seven starbursts, a double-helix, the symbol for microgravity (μg), the payload abbreviation – LMS, a stylized human, the Earth, and a Space Shuttle with a yellow flight path emanating at the launch site in Florida. Around the border of the emblem are the words "LIFE SCIENCES", "MICROGRAVITY SCIENCE" and "SPACELAB". At the hoist of the flag in black is the orbiter name "COLUMBIA" and at the fly is "STS 78".[25]

Figure 53: Flag for the Life and Microgravity Spacelab (LMS) payload (NASA Photo MSFC-9610508).

Mission Flags

In addition to payload flags, there were also unofficial flags created to represent specific shuttle missions. The three mission flags documented by the author were all used after the Columbia accident in 2003, in which the Space Shuttle Columbia disintegrated during reentry. It is impossible to document whether similar flags were used before the accident or if there have been flags for other missions than those described. The three flags found were purchased on e-Bay from a seller who received them from an employee at the Kennedy Space Center. They were distributed in celebration of the launches. The three documented flags represent consecutive missions flown in 2006.[26]

The first flight in this sequence was STS-121 (flown July 2006), the second mission after the Space Shuttles returned to flight after the Columbia accident. The flag had a blue field with the mission patch in the center. White lettering reading "National Aeronautics and Space Administration" ran along the top of the flag above the patch, starting at the hoist and ending just past the edge of the patch. At the bottom of the flag were the words "STS-121 LAUNCH", centered in yellow and running most of the length of the flag. At the upper fly between the patch and the edge of the flag was the NASA Insignia, with the Space Flight Awareness logo (in red, white, and blue) just underneath.[27]

Figure 54: Flag for the launch of STS-121 (Image of flag in collection of the author).

Next came the flag for STS-115, flown in September 2006 (shuttle flight designations did not represent the order of flight). The field of the flag is blue, which appears to lighten in shade at the bottom of the flag. At the hoist (extending from top to bottom) is the mission patch. At the lower fly portion in orange (which matches elements of the patch) are the letters "STS-115", extending from the patch over to the edge of the flag. Above that, also at the fly, are (top to bottom) the NASA Insignia and the Space Flight Awareness logo. Unlike the previous mission flag, this second logo is shown only in blue and white on this flag.[28]

Figure 55: Flag for the STS-115 mission (Image of flag in collection of the author).

The final flag that has been found from this period is the flag for STS-116, flown in December 2006. It is similar to the design for STS-115 except that it has the STS-116 mission patch. The lettering for the mission designation is in yellow, matching the outline of the flight emblem. As with the STS-115 flag, the Space Flight Awareness logo is shown only in blue and white. These three flags are perhaps just a sample of flags created for specific Space Shuttle missions. It is unknown if there are other examples that have yet to be discovered by the author.[29]

Figure 56: Flag for the STS-116 mission (Image of flag in collection of the author).

Shuttle-Mir Flag

With the inception of the International Space Station Program, new flags were created for that program. One of these was the "Phase 1 Flag" named for the preliminary program during which American astronauts served aboard the Russian space station "Mir" and the Space Shuttle made several flights to rendezvous and dock with that space station. That flag was slightly similar to the orbiter flags in that the field is white with red and blue "stripes". However, instead of triangles forming a modified horizontal tricolor, the red and blue portions are angled stripes at hoist and fly, giving the impression of a vertical tricolor. At the hoist, the red stripe begins at a point 1/6th of the length at the bottom of the flag and angles up to a point 1/4th of the length at the top. The blue stripe at the fly begins at a point 1/4th of the length at the bottom and angles up to a point 1/6th of the length from the fly above. On the angled white stripe was the complex Phase 1 insignia that featured the Space Shuttle docked to Mir in orbit above the Earth. Writing on the outside edge of the emblem was in both English and Russian. The English text at left reads "NASA SHUTTLE". Russian writing at right reads "РКА МИР". "РКА" are the Russian equivalents of RKA – the abbreviation for Российское космическое агентство ("*Rossiiskoe kosmicheskoe agentstvo*"), meaning "Russian Space Agency". МИР transliterated into the Latin alphabet is "MIR", the name of the space station. The Shuttle-Mir flag was flown at NASA installations during docking missions and while Americans were present on Mir. In addition, many small versions of the flag were carried aboard the orbiters on the docking missions for use on recognition certificates.[30]

Figure 57: Flag for Phase 1 (often called "Shuttle-Mir") of the International Space Station Program (Image of flag in collection of the author).

Flown Flags

Many of the flags designed for different aspects of the Space Shuttle Program were carried in large quantities as souvenirs. This was not surprising, as souvenir flags regularly have been flown aboard US space missions since the first American manned space flight in 1961. In the early days of Mercury and Gemini very few flags were flown. NASA occasionally flew flags on these missions for official presentation purposes, plus individual crew members would usually carry a few small flags on behalf of friends, family, or organizations. By the time of the Apollo Program the agency had formalized the procedures for flying mementos aboard spacecraft. Official presentation items were flown in the "Official Flight Kit" (OFK), and personal items flown by the astronauts were carried in their "Personal Preference Kit" (PPK), which was sometimes called an "Astronaut Preference Kit" (APK). These items were subject to approval by NASA officials before the flight. There was an unwritten understanding that items were not to be flown for profit. After an unfortunate incident on Apollo 15 where the crew carried 400 unauthorized first-day postal covers to the Moon, NASA began enforcing stricter policies and procedures governing PPK contents. During the Apollo Program each PPK carried in the lunar

module was limited to 0.5 pounds and those in the command module could not exceed 5 pounds.[31]

Space Shuttle Program astronauts were allowed to carry up to 20 items in their Personal Preference Kits. These items were required to fit in a bag 5 x 8 x 2 inches (13 x 20 x 5 cm) and the total weight had to be less than 1.5 pounds (just over 680 g). PPK contents were limited to items for the astronaut's own use or for their use as personal gifts. All contents were logged with the intended recipient's name and approved before the flight. While it is possible that shuttle astronauts may have occasionally carried flags in their PPKs, it is difficult to verify how many were flown in that matter because astronauts usually do not publically release the contents of their kit. During the shuttle era, most astronauts requested to have flags included in the Official Flight Kits for various organizations such as their schools, universities, home towns, and various organizations. To this date, NASA has not released the content lists of the Official Flight Kits for every Space Shuttle mission flown. A survey of those OFK content lists which have become available clearly indicate that the vast majority of flags flown during the Space Shuttle Program were part of the Official Flight Kits.[32]

As human space flight became more frequent with the introduction of the Space Shuttle, the number of flags flown in space increased dramatically. NASA regularly flew flags for organizations and stockpiled hundreds of flown flags to be used as presentation items and awards. On early flights the list of flags flown was fairly. For example, the OFK list for STS-1 (flown in April 1981) indicates that 10,000 small (4 x 6 inches / 10 x 15 cm) United States flags were flown on the flight. Additional small flags carried on the first shuttle mission included 5 full sets of flags for US states and territories (totaling 280 flags) and 5 sets of UN member flags (785 flags). The OFK for STS-1 included 1,000 medium-sized (8 x 12 inches / 20.32 x 30.48 cm) US flags, 2 large US flags, and 21 other large flags for local governments, universities, the military, and political offices. In all, 12,087 documented flags were flown on this mission. Space Shuttle mission STS-2 (November 1981) carried 10,171 documented flags including 10,164 small flags, 1 medium flag, and 6 large flags.[33]

The manifests for later missions show that fewer flags were flown per flight, but that they still numbered in the thousands. For example, the OFK manifest for STS-105, flown in August 2001, listed over 1,500 flags and banners including the following small flags – typically 4" x 6" / 10 x 15 cm flags or a similar size:

- 322 US flags;
- 2 sets of flags for US states and territories (112 flags total);
- 55 additional US state flags including: (10) Alabama, (22) California, (1) Delaware, (2) Georgia, (2) Hawaii, (5) Massachusetts, (6) Texas, (2) Vermont, and (5) Virginia;
- 3 sets of flags for UN members (567 flags total);
- 114 additional international flags including: (5) Russia, (15) Italy, and (5) Ukraine;
- 1 set of Russian federal subjects flags (89 flags total);
- 100 US military flags including (20) Air Force, (20) Army, (20) Marine Corps, (20) Navy, and (20) Coast Guard; and (3) US Army Space Command;
- 100 Discovery (orbiter) flags;
- 100 International Space Station flags.

In addition there were other flags and flag-related souvenirs flown aboard the flight. These items were typically flown for presentation by partner agencies or by NASA to specific organizations. Additional flags and flag-related items carried on the flight included:

- 5 Canadian flag patches;
- 30 Italian flags – 5 x 8 in. / 12.7 x 20.32 cm;
- 15 Italian Space Agency (ASI) flags – 3.5 x 5 in. / 8.89 x 12.7 cm;
- a banner for Hawaiian Airlines – 2 x 3 ft. / .61 x .91 m;
- a banner for Acacia Elementary School (Thousand Oaks, CA) – 2 x 3 ft. / .61 x .91 m;
- an Instructor's flag for the Hawaii Lifeguard Surf Instructors – 12 x19.5 in. / .30 x .50 m;
- a United States flag for Ventura County Discovery Center (Thousand Oaks, CA) – 3 x 5 ft. / .91 x 1.52 m;
- a banner of the United States Tennis Association – 3 x 5 ft. / .91 x 1.52 m;
- an American Legion banner for the South Hadley (Massachusetts) American Legion – 2 x 3 ft. / .61 x .91 m;
- a university banner for Princeton University – 3 x 5 ft. / .91 x 1.52 m;
- a banner for the Sylvan Rodriguez Foundation (Houston, TX) – 3 x 5 ft. / .91 x 1.52 m;
- a guidon for the USA Aviation Technical Test Center (Fort Rucker, Alabama) – 3 x4.5 ft. / .91 x 1.22 m;
- a school banner for Keene Mill Elementary School (Springfield, Virginia) – 18 x 24 in. / .46 x .61 m;
- a guidon for Company A-2 at West Point (US Military Academy) – 20 x 26 in. / .51 x .66 m;
- a US Military Academy bicentennial flag – 24 x 40.5 in. / .61 x 1.03 m;
- and an International Space Station banner that was launched on STS-104 and returned to Earth on STS-105 – 2.5 x 3.5 ft. / .76 x 1.07 m.

Manifests for other shuttle flights have included a similar collection of flags and banners.[34]

Later that year in December 2001, the STS-108 included a special lot of flags flown in recognition of those affected by the terrorist attacks of 11 September 2001 (commonly referred to as "9/11"). In addition to the normal horde of flags flown on board the shuttle there were an additional 6,000 US flags (4 x 6 inches / 10 x 15 cm) intended for presentation to families of the victims and to members of emergency response teams as part of the "Flags for Heroes and Families" program. Following the flight, the flags were assembled into commemorative packages that were sent to the New York Mayor's office for distribution. This unprecedented distribution of flown flags was not NASA's only recognition of the events of 9/11. In addition to patches and badges representing New York's emergency services agencies, a damaged full-sized flag recovered from the debris of the World Trade Center was flown on the mission. Mission Commander Dom Gorie described the flag and what it meant to fly it on the shuttle:

> This was found among the rubble and it has a few tears in it. You can still smell the ashes. It is a tremendous symbol of our country…Just like our country, it was a little battered and bruised and torn, but with a little bit of repair it is going to fly as high and as beautiful as it ever did. And that is just what our country is doing.

After the mission, this flag was presented to the city of New York in a special ceremony held on Flag Day, 14 June 2002, at the American Museum of Natural History.[35]

As the Space Shuttle Program drew to a close in 2010 and 2011, the number of souvenir items flown aboard the final flights increased significantly. Among the manifested items were numerous patches, decals, pins, medallions, bookmarks, and thousands of flags. A special load of small space-related flags was included in the Official Flight Kit for STS-132. These included 500 Atlantis orbiter flags, 3,600 assorted orbiter flags, 1,200 Space Shuttle Program flags, and 1,315 International Space Station (ISS) flags. Other flags among the 9,687 small flags on the flight were 978 US flags, 420 flags for US states and territories, 1,753 flags of other countries, and 50 US military flags. In addition, 14 larger flags were also flown. During the STS-133 mission there were 2,823 flags in the OFK including 2,821 small flags. These small flags included 904 US flags, 545 US states and territory flags, 1,000 international flags, 500 Discovery orbiter flags, and 110 US military flags. There were also 2 larger flags among the OFK contents for this flight. On the STS-134 flight there were 8,227 small flags including 4,577 US flags, 415 flags for US states and territories, 1,165 international flags, 2,000 orbiter flags, and 110 US military flags. The OFK also included 15 larger flags. On the final Space Shuttle flight, STS-135, the number of small flags flown increased to 24,760. These included 20,860 small US flags, 425 US state and territory flags, 1,450 flags of other countries, 195 space agency flags, and 150 US military flags. This final Space Shuttle Official Flight Kit also included 20 larger flags. Once the final shuttle landed, this chapter in the history of space-flown flags had rolled to a halt.[36]

As previously mentioned, it has not been possible to obtain copies of all Official Flight Kit contents for every Space Shuttle flight. However, a summary of the OFK lists and partial lists which have been found give an indication of the sheer number of flags flown in space during the Space Shuttle missions (see Appendices 1 and 2). These numbers show how many flags were flown on 32 (23%) of the 135 missions. On these 32 missions over 100,000 flags were carried into space as souvenirs. And this is just a fraction of the total flags flown during the program. Not surprisingly, the majority of these were United States flags and flags of US states and territories. However, there were also thousands of international flags flown, as well as flags for a variety of organizations and institutions. These flags are lasting reminders of this stage in mankind's exploration of space. They serve not just as flags, but also as tokens of appreciation and markers of human achievement.[37]

Conclusion

Non-vexillologists may wonder why flag usage in the Space Shuttle Program is a worthwhile topic of study. However, to the vexillologist the varied uses of flags are a clear illustration of the importance of flags in contemporary society and the many ways in which flags can be used. It is not surprising that new flags were created to represent a government program of the magnitude of the Space Shuttle Program. However, it is interesting to see the variety of flags created during this era – those for the individual orbiters, flags for specific payloads, and even flags for several of the missions. While these flags may not be the most creative in terms of design and symbolism, they are significant because they became part of NASA's program of employee recognitions and souvenirs of mankind's trips into orbit. They were seen as a tool to commemorate the program and its achievements.

Flags have long played a role in human exploration both on Earth and then in space. Taking flags into orbit on the Space Shuttle was clearly an extension of that tradition. It is also important to remember the context of early Space Shuttle missions and to recognize how the program evolved over time. When the shuttle was first developed, the United States was still engaged in a Cold War with the Soviet Union. Both nations' space programs owed their existence to this competition for international prestige in science and engineering. The prominent display of the United States flag on the wing insignia on the shuttles not only identified the spacecraft as American, but also served as an emblem of national pride. Likewise, the use of the American flag on space suits and as an element in crew mission patch designs served not just as an identification of nationality, but also as an expression of patriotism. Obviously, the "showing of the flag" was not the primary purpose of the American space program, but flags were clearly incorporated into various aspects of the program to demonstrate the continued presence of the United States in the region of Earth's orbit.

As international elements were integrated into the Space Shuttle Program and other nations partnered with the United States for different payloads and missions, it was logical that other flags would become more prominent in the program. When examining shuttle mission patches, it is interesting to see how the flags of other nations became more integrated into the patch designs as the shuttle program became more international in nature. With the end of the Cold War and the independence of the Russian Federation, the program shifted from a challenge to the Soviet presence in orbit to a partnership with the Russians and other nations to create the International Space Station. The use of flags in all areas of the Space Shuttle program also changed to reflect the spirit of international teamwork and the importance of viewing space as a place, not for international competition, but rather for international cooperation.[38]

Figure 58: The crew of STS-60 poses in front of the US and Russian flags during their mission. Left to right (front row) are N. Jan Davis (US), Charles F. Bolden Jr. (US), and Franklin R. Chang-Diaz (Costa Rica-US); and (back row) Ronald M. Sega (US), Sergei K. Krikalev (Russia), and Kenneth S. Reightler Jr. (US) (NASA Photo STS060-31-009).

Figure 59: European Space Agency astronauts Paolo Nespoli (left) and Roberto Vittori (right) display their nation's flag as they pose in the Japanese Kibo Lab on the International Space Station (ISS) during the STS-134 mission. The flags of the many nations that have contributed to the ISS Program are displayed in the background (NASA Photo, detail).

Appendix A: Shuttle-Flown Flags Documented by the Author

Flight Number	Year / Month**	Total Flags	Small Flags	Medium Flags	Large Flags	Banners†	Pennants†
STS-1	1981/04	12,087	11,065	1000	22	0	0
STS-2	1981/11	10,171	10,164	1	6	0	0
STS-3*	1982/03	116	100	1	15	0	0
STS-4*	1982/06	24	20	0	4	0	0
STS-6*	1983/04	575	575	0	0	0	0
STS-8*	1983/08	2	2	0	0	0	0
STS-9*	1983/11	203	203	0	0	0	0
STS-41-C*	1984/04	2,001	2,000	0	1	0	0
STS-51-C*	1985/01	25	25	0	0	0	0
STS-51-J*	1985/10	1	0	0	1	0	0
STS-51-L*	1986/01	812	798	13	1	1	0
STS-28*	1989/8	1,664	1,659	1	4	0	0
STS-105	2001/08	1,509	1,485	15	9	9	0
STS-107	2003/01	2,132	2,071	0	61	5	1
STS-108	2001/12	8,233	8,202	17	14	17	2
STS-110	2002/04	1,516	1,496	0	20	12	0
STS-111	2002/06	2,519	2,517	0	2	0	0
STS-114	2005/07	2,729	2,713	0	16	14	1
STS-116	2006/12	2,261	2,243	1	17	8	3
STS-117	2007/06	1,519	1,496	0	23	5	1
STS-119	2009/03	2,256	2,242	2	12	8	4
STS-120	2007/10	2,276	2,265	1	10	26	1
STS-122	2008/02	1,834	1,805	20	9	6	1
STS-123	2008/03	2,237	2,229	2	6	3	1
STS-124	2008/05	2,161	2,152	2	7	4	3
STS-125	2009/05	2,983	2,975	1	7	13	2
STS-130	2010/02	2,342	2,336	0	6	2	2
STS-131	2010/04	3,101	3,090	1	10	5	3
STS-132	2010/05	9,701	9,687	1	13	1	0
STS-133	2011/02	2,823	2,821	0	2	3	2
STS-134	2011/05	8,242	8,227	2	13	6	4
STS-135	2011/07	24,780	24,760	1	19	7	2
Totals		**114,835**	**113,423**	**1,082**	**330**	**155**	**33**

Table Notes

* Numbers based on partial lists; complete OFK content lists not available.

** Shuttle flights were not always flown in order of the flight number.

† Banners and pennants are not counted in the "Total Flags" number. As these terms are typically used in the United States, most items in these categories were not actual flags.

Small flags were typically 4 x 6 inches / 10 x 15 cm, or similar sizes.

Medium flags were typically 8 inches / 20.32 cm or 12 inches / 30.48 cm at the hoist.

Large flags included all other flags listed in the OFK contents.

Appendix B: Small Shuttle-Flown Flags by Category

Small flags were typically 4 x 6 inches / 10 x 15 cm, or similar sizes

Flight Number	Total Small Flags	US Flags	US State & Territory Flags	Flags of Other Countries	Space Flags	Military Flags	Misc. Flags
STS-1	11,065	10,000	280	785	0	0	0
STS-2	10,164	10,000	55	98	10	0	1
STS-3*	100	0	0	0	0	100	0
STS-4*	20	0	0	0	0	0	20
STS-6*	575	0	0	0	575	0	0
STS-8*	2	2	0	0	0	0	0
STS-9*	203	103	0	100	0	0	0
STS-41-C*	2,000	2,000	0	0	0	0	0
STS-51-C*	25	0	0	0	0	1	24
STS-51-J*	0	0	0	0	0	0	0
STS-51-L*	798	300	180	318	0	0	0
STS-28*	1,659	1113	202	318	5	20	1
STS-105	1,485	322	167	681	200	100	15
STS-107	2,071	503	112	923	410	90	33
STS-108	8,202	6829	112	886	305	70	0
STS-110	1,496	327	112	672	310	75	0
STS-111	2,517	427	112	1369	449	50	110
STS-114	2,713	752	168	853	880	60	0
STS-116	2,243	745	168	791	455	80	4
STS-117	1,496	645	168	576	55	50	2
STS-119	2,242	937	280	965	10	50	
STS-120	2,265	635	224	1188	114	104	
STS-122	1,805	637	224	829	10	104	1
STS-123	2,229	647	224	1044	210	104	0
STS-124	2,152	637	224	924	260	105	2
STS-125	2,975	637	224	792	10	55	1257
STS-130	2,336	830	280	1045	10	60	111
STS-131	3,090	829	280	1093	837	50	1
STS-132	9,687	978	280	1753	6625	50	1
STS-133	2,821	904	280	1000	527	110	0
STS-134	8,227	4577	280	1165	2095	110	0
STS-135	24,760	20860	280	2355	195	150	920
Totals	**113,423**	**67,176**	**4,916**	**22,523**	**14,577**	**1,748**	**2503**

Table Notes

* Numbers based on partial lists; complete OFK content lists not available

** Shuttle flights were not always flown in order of the flight number

Small flags were typically 4 x 6 inches / 10 x 15 cm, or similar sizes

Notes

Previous Papers and Publications on Flags in the US Space Program: Since 1992, the author has been actively engaged in research on the use of flags in the US human spaceflight program. This research has been continuously evolving, so that each presentation or paper on the topic has presented new details, building upon the foundation of previously-reported information. Some of the material in this paper was first documented in the author's paper "Flags in Space", presented at NAVA 36 (Denver, Colorado 2002) and then later updated and published as "Flags in Space: NASA Symbols and Flags in the U.S. Manned Space Program," *The Flag Bulletin: The International Journal of Vexillology* #230, vol. 46, #5-6 (September-December 2007); actually published in 2010. The author also has published a short article about the flags designed for the Space Shuttle Program as "Flags in Space: Flags of the Space Shuttle Program", *Gerb i Zastava*, 5 #10 (November 2011): p. 5-7 (article published in English and Croatian translation). The author's other papers about the use of flags in the US space program include "Where No Flag Has Gone Before: Political and Technical Aspects of Placing a Flag on the Moon", presented to NAVA 26 and published as NASA CR-188251 in 1992 and in *Raven: A Journal of Vexillology*, vol. 1 (1994): p. 3-10; and "Six Flags Over Luna: The Role of Flags in Moon Landing Conspiracy Theories", presented to NAVA 45/ICV 24 and published in the *Proceedings of the 24th International Congress of Vexillology*, (NAVA, 2011), p. 820-881.

[1] "Space Shuttle: Overview", http://www.nasa.gov/mission_pages/shuttle/vehicle/index.html, accessed 9 March 2013; "Space Shuttle System: Shuttle Basics", http://www.nasa.gov/returntoflight/system/system_STS.html, accessed 9 March 2013; Space Shuttle System: The Orbiter", http://www.nasa.gov/returntoflight/system/system_Orbiter.html, accessed 9 March 2013; "Space Shuttle", *Wikipedia: The Free Encyclopedia*", http://en.wikipedia.org/wiki/Space_shuttle, accessed 9 March 2013; Dennis R. Jenkins, *Space Shuttle: The History of Developing the National Space Transportation System, The Beginning Through STS-50* (Melbourne Beach, Fla.: Broadfield Pub., 1992), p. 169-177; David M. Harland, *The Story of the Space Shuttle* (New York: Praxis Publishing, 2004), p. 7-9; Anne M. Platoff, "Flags in Space: NASA Symbols and Flags in the U.S. Manned Space Program," *The Flag Bulletin: The International Journal of Vexillology* #230, vol. 46, #5-6 (September-December 2007), p. 154-162.

It should be noted that the names of the orbiters, like many other US spacecraft, were frequently based on the names of sea-faring ships. The name "Enterprise" was actually selected specifically to honor the spaceship "USS Enterprise" from the television and movie franchise "Star Trek", but the name of that spaceship was itself based on the name of several historic naval vessels. Jenkins, *Space Shuttle: The History of Developing the National Space Transportation System,* p. 169-177.

[2] "Military Aircraft Insignia", *Wikipedia: The Free Encyclopedia*, http://en.wikipedia.org/wiki/Military_aircraft_insignia, accessed 9 March 2013; Eric Boehm, curator, Intrepid Air & Space Museum, personal communications, 4-5 March 2013; "Space Shuttle: Orbiter Markings and Insignia", *Wikipedia: The Free Encyclopedia*, http://en.wikipedia.org/wiki/Space_shuttle#Orbiter_markings_and_insignia; accessed 9 March 2013; Platoff, "Flags in Space: NASA Symbols and Flags in the U.S. Manned Space Program,", p. 154-162.

[3] Space Shuttle mission designations all started with the letters "STS" (for Space Transportation System). There were two basic schemas for numbering missions. Initially the flights were numbered sequentially (STS-1 through STS-9) in order of launch. However, beginning in 1984 each mission was given a more complex flight number. For example, the tenth Space Shuttle mission was STS-41-B. The first digit indicated the US federal fiscal year for which the flight was originally scheduled (in this case the "4" stands for 1984). The second digit indicated the launch facility that would be used ("1" stood for the Kennedy Space Center in Florida). A launch facility planned for Vandenberg Air Force Base in California was never completed, so the digit "2" was never used for flight designations. Following the loss of the Space Shuttle Challenger with the launch of STS-51-L in 1986, NASA returned to a simpler method of flight designations. The first flight after the Challenger accident was STS-26, the 26th launch of the system (in 1988). It is also important to note that, because of flight delays and rescheduling,

shuttle missions after STS-9 did not always launch in flight-number order. "List of Space Shuttle Missions", *Wikipedia*, http://en.wikipedia.org/wiki/Space_Shuttle_Missions, accessed 21 May 2013.

[4] Platoff, "Flags in Space: NASA Symbols and Flags in the U.S. Manned Space Program", p. 151-154, 158-162; "Space Shuttle: Orbiter Markings and Insignia", *Wikipedia: The Free Encyclopedia*; Boehm, personal communications; Jenkins, p. 169-177; Justin Ray, "Midlife Makeover," *Spaceflight Now* (14 April 2000), web page, http://spaceflightnow.com/shuttle/features/000414overhaul/makeover.html, accessed 21 June 2002; image of Enterprise in flight, NASA Photo ECN-8611, http://www.dfrc.nasa.gov/gallery/photo/ALT/HTML/ECN-8611.html, accessed 9 May 2013; image of Columbia on launch pad from http://www.nasa.gov/images/content/741008main_columbia_sts1_full_full.jpg, accessed 9 May 2013.

[5] Platoff, "Flags in Space: NASA Symbols and Flags in the U.S. Manned Space Program", p. 151-154, 158-162; "Space Shuttle: Orbiter Markings and Insignia", *Wikipedia: The Free Encyclopedia*; Jenkins, p. 169-177. Image of Space Shuttle Discovery launch is from http://www.nasa.gov/mission_pages/shuttle/flyout/multimedia/discovery/1984-08-30.html, accessed 5 May 2013.

[6] Platoff, "Flags in Space: NASA Symbols and Flags in the U.S. Manned Space Program", p. 151-154, 158-162; "Space Shuttle: Orbiter Markings and Insignia", *Wikipedia: The Free Encyclopedia*; Boehm, personal communications; "Graphic Markings on Space Transportation Vehicles, U.S. Components of the International Space Station Component Systems, and Payloads," NASA Policy Directive NPD 8610.6D; Justin Ray, "Midlife Makeover," *Spaceflight Now*; "Flag Displayed Properly," *Spaceport News* (Kennedy Space Center), vol. 20 no. 14, p. 2? (from the files of the JSC PAO Information Services Office); "Space Shuttle Orbiter Systems: Flags and Letters," web page, http://science.ksc.nasa.gov/shuttle/technology/sts-newsref/sts_sys.html, accessed 21 May 2013; Steve Garber, "NASA "Meatball" Logo" (1 December 1997), http://history.nasa.gov/meatball.htm, accessed 28 March 2013; Space Shuttle Atlantis launch image, NASA Photo KSC-00PP-1271, http://science.ksc.nasa.gov/shuttle/missions/sts-106/images/captions/KSC-00PP-1271.html, retrieved 24 April 2013.

[7] Platoff, "Flags in Space: NASA Symbols and Flags in the U.S. Manned Space Program,", p. 158-162; Jenkins, p. 169-177; "Graphic Markings on Space Transportation Vehicles, U.S. Components of the International Space Station Component Systems, and Payloads," NASA Policy Directive NPD 8610.6D; Justin Ray, "Midlife Makeover," *Spaceflight Now*; "Flag Displayed Properly," *Spaceport News* (Kennedy Space Center), vol. 20 no. 14, p. 2? (from the files of the JSC PAO Information Services Office); "Space Shuttle Orbiter Systems: Flags and Letters," web page, http://science.ksc.nasa.gov/shuttle/technology/sts-newsref/sts_sys.html, accessed 21 May 2013; Paul Dye, Flight Director for the Planning Team, response to Mark Filetti, "Mission Control Answers Your Questions," http://web.archive.org/web/20080305212137/http://spaceflight.nasa.gov/feedback/expert/answer/mcc/sts-102/03_14_10_19_19.html, accessed 21 May 2013; Atlantis landing photo showing first fuselage insignia configuration, NASA Photo STS027-S-014, http://spaceflight.nasa.gov/gallery/images/shuttle/sts-27/html/s27-s-014.html, accessed 9 May 2013; Atlantis landing photo showing final insignia configuration, NASA Photo STS122-S-076, http://spaceflight.nasa.gov/gallery/images/shuttle/sts-122/html/sts122-s-076.html, accessed 9 May 2013.

[8] "The 'Canada' wordmark is the global symbol of the Government of Canada. As such, it is the dominant FIP symbol and appears on all communications materials the government produces. The 'Canada' wordmark consists of the word 'Canada' with the flag symbol set over the final a…" "Canada Wordmark," web page, http://www.ic.gc.ca/eic/site/pt-te.nsf/eng/00128.html, accessed 24 March 2013. For examples of the Canada wordmark, see http://www.ic.gc.ca/eic/site/pt-te.nsf/eng/00055.html.

NASA Photo STS087-341-004 (Canadarm); "Spacelab", *Wikipedia: The Free Encyclopedia*, http://en.wikipedia.org/wiki/Spacelab, accessed 24 March 2013; photo of the Canadarm from *collectSpace* website, http://collectspace.com/review/canadarm.jpg, accessed 5 May 2013; photo of Spacelab, NASA Photo MSFC-9402313, http://archive.org/details/MSFC-9402313, accessed 21 May 2013.

[9] Dick Lattimer, *All We Did Was Fly to the Moon* (Gainesville, FL: Whispering Eagle Press, 1983), p. 23; "Stars & Stripes Flew High on Gemini 4," *Dispatch: a Newsletter for Members of the Space Patch Collectors Club*, vol. 1, no. 8 (June 1986), p. 1; Buzz Aldrin, *Men From Earth* (New York: Bantam Books, 1989), p. 129; corroborated by Robert Spann, 1964-66 Project Engineer for the Gemini Support Office of the Space Suit Office at the Manned

Spacecraft Center (MSC), personal communication, 10 September 1992. Photo of US astronaut Story Musgrave, NASA Photo STS061-98-050, http://images.jsc.nasa.gov/luceneweb/caption.jsp?searchpage=true&photoId=STS061-98-050, accessed 9 May 2013.

[10] Astronaut Fact Book, http://spaceflight.nasa.gov/spacenews/factsheets/pdfs/astro.pdf, accessed 7 April 2013; "International Astronauts", http://www.jsc.nasa.gov/Bios/astrobio_international.html, accessed 7 April 2013; "Astronaut", *Wikipedia: The Free Encyclopedia*, http://en.wikipedia.org/wiki/Astronaut, accessed 7 April 2013. Photo of Japanese astronaut Takao Doi, NASA Photo GPN-2000-001093, http://archive.org/details/GPN-2000-001093, accessed 9 May 2013; photo of European Space Agency (ESA) astronaut Hans Schlegel, NASA Photo S122-E-008211, http://spaceflight.nasa.gov/gallery/images/shuttle/sts-122/html/s122e008211.html, accessed 9 May 2013.

[11] "Mission Patch", *Wikipedia: The Free Encyclopedia*, http://en.wikipedia.org/wiki/Mission_patch, accessed 3 April 2013; "About Patches", http://genedorr.com/patches/About.html, accessed 3 April 2013; "History of Patches", http://genedorr.com/patches/History.html, accessed 3 April 2013; Travis K. Kircher, "More Than Just a Merit Badge", *Ad Astra magazine* (Nov/Dec 2000), pp. 23-25, available online at http://www.collectspace.com/resources/patches_astronauts.html, accessed 3 April 2013; Judith Kaplan and Robert Muniz, *Space Patches: From Mercury to the Space Shuttle* (New York: Sterling Publishing Co., 1986), p. 42-43, 69-102.

[12] Kaplan and Muniz, p. 13-17, 69-102; Platoff, "Flags in Space: NASA Symbols and Flags in the U.S. Manned Space Program," p. 163-164. Space Shuttle mission patches are taken from Wikipedia. The easiest way to view patches for various missions is to start at the article for "List of Space Shuttle Missions" page, http://en.wikipedia.org/wiki/Space_Shuttle_Missions, and then click on the patches for each mission to see larger images.

[13] Platoff, "Flags in Space: NASA Symbols and Flags in the U.S. Manned Space Program," p. 163-164. Space Shuttle mission patches are taken from Wikipedia. The easiest way to view patches for various missions is to start at the article for "List of Space Shuttle Missions" page, http://en.wikipedia.org/wiki/Space_Shuttle_Missions, and then click on the patches for each mission to see larger images.

[14] Platoff, "Flags in Space: NASA Symbols and Flags in the U.S. Manned Space Program," p. 163-164. Space Shuttle mission patches are taken from Wikipedia. The easiest way to view patches for various missions is to start at the article for "List of Space Shuttle Missions" page, http://en.wikipedia.org/wiki/Space_Shuttle_Missions, and then click on the patches for each mission to see larger images.

[15] Platoff, "Flags in Space: NASA Symbols and Flags in the U.S. Manned Space Program," p. 182-186. "Space Flight Awareness Awards – History," web page, http://web.archive.org/web/20021218103012/http://www.hq.nasa.gov/osf/sfa/history.html, accessed 21 May 2013; "Space Flight Awareness Awards – AWARENESS," http://www.hq.nasa.gov/osf/awareness.html, accessed 29 May 2002, URL no longer valid; photo of Endeavour flag, NASA photo KSC-02PD-0592 and caption, 29 April 2002, http://images.ksc.nasa.gov/photos/2002/captions/KSC-02PD-0592.html, accessed 23 June 2010; photo of Discovery flag, NASA photo KSC-00PP-1415 and caption, 14 September 2000, http://images.ksc.nasa.gov/photos/2000/captions/KSC-00PP-1415.html, accessed 23 June 2010; photo of Endeavour flag, NASA photo KSC-98PC-1359 and caption, 21 October 1998, http://mediaarchive.ksc.nasa.gov/detail.cfm?mediaid=1807, accessed 23 June 2010; photo of flag near countdown clock, NASA photo KSC-01PADIG-265 and caption, 10 August 2001, http://mediaarchive.ksc.nasa.gov/detail.cfm?mediaid=7789, accessed 23 June 2010; 4 x 6 inch flags for "Columbia", "Discovery", "Atlantis" and "Endeavour"; and 4 x 6 foot flags for all six orbiters in the collection of the author.

[16] Platoff, "Flags in Space: NASA Symbols and Flags in the U.S. Manned Space Program," p. 182-186. Descriptions are based on observations of flags in the author's collection and of flags in NASA photographs.

[17] Platoff, "Flags in Space: NASA Symbols and Flags in the U.S. Manned Space Program," p. 182-186. Descriptions are based on observations of flags in the author's collection and of flags in NASA photographs.

[18] Platoff, "Flags in Space: NASA Symbols and Flags in the U.S. Manned Space Program," p. 182-186. During her employment at NASA Johnson Space Center (Houston, Texas) the author observed these flags flying on the main flagpoles in front of Building 1, the main administrative building. They were also exhibited in the lobby of Building 30 near the entrance to the Mission Control Center and at official visitor centers. She also saw them when watching launch footage from the Kennedy Space Center. There was usually one of these flags on display near the large countdown clock shown on television before a launch. The website at KSC also includes photographs that show the shuttle flags on poles near the launch pads with the Space Transportation System (the NASA name for the combined orbiter, external tank, and solid rocket boosters) in the background – see note 15 for URLs.

[19] "Flown STS-42 IML Flag on Presentation Certificate", *eBay* Item number: 130643657880, accessed 12 February 2012.

[20] USML-1 flag flown aboard STS-50 mission (June 1992), mounted on certificate presented to Rich Drake.

[21] Small payload flag for TSS in the collection of the author.

[22] USMP-1 flag flown aboard STS-52 mission (October 1992), mounted on certificate presented to Michael S. Platoff.

[23] The USMP-2 flag was found in an auction at *eBay*. "NASA Space Shuttle Columbia STS 62 Mission Flown Flag," *eBay* Item number: 130158783780, accessed 1 October 2007.

[24] "STS-65 Columbia Flown Flag", *eBay* Item number: 140753206257, accessed 21 May 2012; "International Microgravity Laboratory (IML-2)," *Space Patch Database*, http://www.spacepatchdatabase.com/patches/space-shuttle/international-microgravity-laboratory-iml-2, accessed 5 May 2013.

[25] Life and Microgravity Spacelab (LMS) flag, NASA photo number MSFC-9610508, http://mix.msfc.nasa.gov/abstracts.php?p=3648 and http://mix.msfc.nasa.gov/IMAGES/HIGH/9610508.jpg, accessed 5 May 2013.

[26] Space Shuttle Mission Flags, *eBay* Item number: 140158787702, Purchased 23 September 2007; "Popular Pennant," *collectSPACE*, http://www.collectspace.com/archive/archive-0706.html, accessed 15 November 2007; three mission flags in the collection of the author.

[27] Space Shuttle Mission Flags, *eBay* Item number: 140158787702, Purchased 23 September 2007; three mission flags in the collection of the author.

[28] Space Shuttle Mission Flags, *eBay* Item number: 140158787702, Purchased 23 September 2007; three mission flags in the collection of the author.

[29] Space Shuttle Mission Flags, *eBay* Item number: 140158787702, Purchased 23 September 2007; three mission flags in the collection of the author.

[30] Author's observations of the Phase 1 (Shuttle-Mir) flag at the Johnson Space Center; Alida Andrews, contractor employee at JSC, personal communications, 7 June 2002; Shuttle-Mir flags on American and Russian certificates purchased by the author on E-Bay. On 31 October 1997, Johnson Space Center put out a combined synopsis/solicitation for commercial items concerning the Phase 1 flags. The solicitation was for 70,000 4 x 6 inch polyester flags. Solicitation from http://www.reston.com/nasa/iss/10.31.97.iss.flags.html, accessed 28 June 2002, URL no longer valid.

In Russian, the word "мир" (transliterated into the Latin alphabet as "mir") means both "peace" and "Earth". Because Russians typically write the names of spacecraft using all upper case letters, many non-Russian speakers

have misinterpreted the name of the space station to be an acronym and it is often written in other languages using all capital letters. It English is more correct to write the name as "Mir" using mixed-cased letters, as would be used with other spacecraft names.

[31] Platoff, "Flags in Space: NASA Symbols and Flags in the U.S. Manned Space Program," p. 166-168; 179-181. William David Compton, *Where No Man Has Gone Before: A History of Apollo Lunar Exploration Missions* (Washington, D.C.: 1989), p. 307-308, available online at http://www.hq.nasa.gov/office/pao/History/SP-4214/ch13-4.html, accessed 22 June 2010; Ivan D. Ertel and Roland W. Newkirk, *Apollo Spacecraft: A Chronology*, vol. 4, p. 352, available online as vol. 4 pt. 3 (1972-1974), http://www.hq.nasa.gov/office/pao/History/SP-4009/v4p3i.htm, accessed 18 July 2002. Dale D. Myers, Associate Administrator for Manned Space Flight, "Astronaut Preference Kits – Apollo Missions," memorandum to the Apollo Program Director (with attached policy), 19 January 1972; Donald K. Slayton, Director of Flight Crew Operations, "Astronaut PPK's (Personal Preference Kits)," memorandum to Julian Scheer, NASA Headquarters, 22 October 1968; Donald K. Slayton, Director of Flight Crew Operations, "Apollo 7 Personal Preference Kits (PPK's)," memorandum to William C. Schneider, NASA Headquarters, 14 October 1968; all on file in the JSC History Collection.

[32] Platoff, "Flags in Space: NASA Symbols and Flags in the U.S. Manned Space Program," p. 166-168; 179-181. Frank Kuznik, "Personal Effects," *Air & Space/Smithsonian* (December 1994/January 1995), available online at http://www.airspacemag.com/ASM/Mag/Index/1995/DJ/prfx.html, accessed 4 June 2002, URL no longer valid; "Student Reading: Personal Preference Kit," web page, http://quest.nasa.gov/space/frontiers/activities/collins/box.html, accessed 4 June 2002; "Mementos Aboard Space Shuttle Flights," Code of Federal Regulations, Title 14 Chapter 5, part 1214.6, available online at http://www.access.gpo.gov/nara/cfr/waisidx_02/14cfr1214_02.html, accessed 7 June 2002.

[33] STS-1 OFK list and STS-2 OFK list, from the files of NASA Headquarters History Office; "STS-1 Artifacts, 25 Years Later, *collectSpace*, http://www.collectspace.com/news/news-041206a.html, accessed 20 Feb 2013.

[34] Platoff, "Flags in Space: NASA Symbols and Flags in the U.S. Manned Space Program," p. 179-181; "Discovery's On-Board Souvenir Shop," *collectSpace*, http://www.collectspace.com/ news/news-080901a.html, accessed 18 June 2002; "STS-108 Official Flight Kit," *collectSpace*, http://www.collectspace.com/ news/news-112801a.html, accessed 18 June 2002; "STS-109 Official Flight Kit," *collectSpace*, http://www.collectspace.com/ news/news-030202a.html, accessed 18 June 2002; "STS-110 Official Flight Kit," *collectSpace*, http://www.collectspace.com/ news/news-040402a.html, accessed 18 June 2002; "STS-111 Official Flight Kit," *collectSpace*, http://www.collectspace.com/ news/news-053002a.html, accessed 18 June 2002.

[35] Platoff, "Flags in Space: NASA Symbols and Flags in the U.S. Manned Space Program," p. 179-181; "NASA Administrator Launches 'Flags for Heroes and Families' Campaign," NASA News Release 01-195 (11 October 2001), http://spaceflight.nasa.gov/spacenews/releases/2001/01-195.html, accessed 22 June 2010; Todd Halvorson, "Next Shuttle to Carry Flags for Victims, Survivors of Sept. 11 Terrorist Attacks," *Space.com* (11 October 22001), http://www.space.com/missionlaunches/sts108_flags_011011.html, accessed 21 May 2002; "6,000 Flags Aboard Shuttle Endeavour Honor Those Lost September 11, 2001," *Space Today Online*, http://www.spacetoday.org/SpcShtls/Endeavour6000flags.html, accessed 4 June 2002; "NASA Administrator, Astronauts Honor Flag Day With Special Presentation of Old Glory," NASA News Release 02-112, http://spaceflight.nasa.gov/spacenews/releases/2002/02-112.html, accessed 18 June 2002; "Students Lend a Hand for NASA's 'Flags for Heroes and Families'," NASA News Release J02-66, http://www.nasa.gov/centers/johnson/news/releases/2002/j02-66.html, accessed 22 June 2010; "STS-108, Mission Control Center Status Report #09," 9 December 2001, http://spaceflight.nasa.gov/spacenews/reports/sts108/STS-108-09.html, accessed 10 July 2002; "News: Flags for Heroes and Families," http://www.jsc.nasa.gov/news/flags/, accessed 10 July 2002; "STS-108 Official Flight Kit," *collectSpace*, http://www.collectspace.com/ news/news-112801a.html, accessed 18 June 2002; "Flag Day: NASA Returns Old Glory to NY," *collectSpace*, http://www.collectspace.com/news/news-061402a.html, accessed 18 June 2002.

[36] "Official Flight Kit: STS-132", *NASA website*, http://www.nasa.gov/pdf/450571main_132_flight_kit.pdf, accessed 12 May 2013; "Shuttle Atlantis Flying its Flag for Final Flight", http://www.collectspace.com/news/news-051210a.html, accessed 12 May 2013; "Space Shuttle Discovery's Final Delivery", *collectSpace*,

http://www.collectspace.com/news/news-030911a.html, accessed 12 May 2013; "Space Shuttle Endeavour's Final Flight Kit: Merit Badges, Mission Patches and More", *collectSpace*, http://www.collectspace.com/news/news-053111a.html, accessed 12 May 2013; "Final Space Shuttle Flight's Secret (And Not So Secret) Souvenir Stash", *collectSpace*, http://www.collectspace.com/news/news-070611a.html, accessed 12 May 2013; "Illustrated Inventory: STS-135/Atlantis Official Flight Kit (OFK)", *collectSpace*, http://www.collectspace.com/news/news-070611b.html, accessed 12 May 2013.

[37] OFK lists cited in notes 33-36; partial OFK lists from the files of NASA Headquarters History Office; "The STS-107 Official Flight Kit (OFK)" *collectSpace*, http://www.collectspace.com/news/news-011603a.html, accessed 18 Feb 2013; "The STS-111 Official Flight Kit", *collectSpace*, http://www.collectspace.com/news/news-053002a.html, accessed 18 Feb 2013; "Full Coverage: STS-114 Official Flight Kit", STS-114 OFK list, *collectSpace*, http://www.collectspace.com/news/news-071305a.html, accessed 18 Feb 2013; "Shuttle and Souvenirs at Space Station", STS-116 OFK list, *collectSpace*, http://www.collectspace.com/news/news-121106a.html, accessed 18 Feb 2013; "The STS-117 Official Flight Kit Manifest", STS-117 OFK list, *collectSpace*, http://www.collectspace.com/news/news-061207a.html#ofk, accessed 18 Feb 2013; "Space Mission Mementos: What Goes Up, is Also Coming Down", STS-119 OFK list, *collectSpace*, http://www.collectspace.com/news/news-032709a.html, accessed 18 Feb 2013; "The STS-120 Official Flight Kit Manifest", *collectSpace*, http://www.collectspace.com/news/news-102607a.html#ofk, accessed 18 Feb 2013; "'Columbus' Compass' and Crew Mementos on-Board Space Shuttle Atlantis", STS-122 OFK list, *collectSpace*, http://www.collectspace.com/news/news-021108a.html, accessed 18 Feb 2013; "Space Shuttle to Return Pallet Full of History", STS-123 OFK list, *collectSpace*, http://www.collectspace.com/news/news-031808a.html, accessed 18 Feb 2013; "Astronauts share space through souvenirs", STS-124 OFK list, *collectSpace*, http://www.collectspace.com/news/news-060408a.html, accessed 18 Feb 2013; "Unpacking Atlantis: Hubble Artifacts and Astronaut Mementos" STS-125 OFK list, *collectSpace*, http://www.collectspace.com/news/news-060409a.html, accessed 18 Feb 2013; "The STS-130 Official Flight Kit Manifest", *collectSpace*, http://www.collectspace.com/news/news-020410a.html#ofk, accessed 18 Feb 2013; "Official Flight Kit: STS-131", www.nasa.gov/pdf/436501main_sts131_official_flight_kit.pdf, accessed 18 Feb 2013.

[38] "Official STS-60 Crew in-Flight Portrait", NASA STS060-31-009, http://images.jsc.nasa.gov/luceneweb/caption_direct.jsp?photoId=STS060-31-009, accessed 21 May 2013; Photo of European Space Agency astronauts Paolo Nespoli (left) and Roberto Vittori from NASA website, http://www.nasa.gov/mission_pages/shuttle/shuttlemissions/sts134/multimedia/gallery/2011-05-23.html, accessed 19 May 2013.

About the Author

Anne "Annie" Platoff is a science librarian at the University of California, Santa Barbara Library. Her formal education includes a Bachelor of Arts degree in political science and history from Kansas State University, a Master of Science degree in library science from the University of North Texas, a Master of Arts degree in historical studies from the University of Houston—Clear Lake, and a graduate certificate in museum studies from Arizona State University. Her master's thesis, a history of NASA's early planning for manned Mars missions, was published by NASA in 2001 (NASA CR-2001-208928). Before working in academic libraries, she worked as a librarian for the New Initiatives Office and the Exploration Programs Office at the National Aeronautics and Space Administration's (NASA) Johnson Space Center in Houston, Texas. In this capacity, she provided research services to scientists, engineers, and program managers who were planning future missions to the Moon and to Mars.

As a vexillologist Annie has conducted research on a variety of topics. A native of the state of Kansas, she presented her first paper to NAVA in 1989, reporting on proposed designs for the state flag of Kansas. She also presented and published a paper on the Pike-Pawnee Flag Incident—an event during which some believed that Zebulon Pike had planted the first American flag in Kansas, but which Annie demonstrated had actually occurred in Nebraska (published in *Raven: A Journal of Vexillology*, vol. 6). Annie has also written several works on space vexillology including a thorough history of the symbols of NASA and the use of flags in the U.S. manned space program ("Flags in Space", published as a special double issue of *The Flag Bulletin*, No. 230, vol. 46, # 5–6). Other space-related works include a paper titled "Where No Flag Has Gone Before: Political and Technical Aspects of Placing a Flag on the Moon (published in volume 1 of *Raven* and as a NASA Contractor Report NASA-CR-188251), and a follow-up work – "Six Flags Over Luna: The Role of Flags in Moon Landing Conspiracy Theories" (presented to the 24th International Congress of Vexillology and published in the conference proceedings). A long-time student of the Russian language, Annie is also interested in the vexillology of the Russian Federation and the Soviet Union. She has published a book on the flags of Russia's federal subjects (*Russian Regional Flags*, published as vol. 16 of *Raven*) and several articles on Russian and Soviet topics including "Soviet Children's Flags" (in *Raven*, vol. 17), "The 'Forward Russia' Flag: Examining the Changing Use of the Bear as a Symbol of Russia" (in *Raven*, vol. 19), and "Of Tablecloths and Soviet Relics: A Study of the Banner of Victory (Znamia Pobedy)" (to be published in *Raven*, vol. 20). She also authored an article for the *NAVA News* on the World Flag of the Girl Guides and Girl Scouts. Annie has twice been awarded the Captain William Driver award for the best paper presented at a NAVA meeting, and received FIAV's Vexillon for her book *Russian Regional Flags*.

Annie has served several terms as NAVA's second vice president. She oversaw the creation of the NAVA Digital Library, a project designed to provide all issues of *NAVA News* and *Raven: A Journal of Vexillology* online. Her current project is a revamp of NAVA's online

publications index which will serve as a starting point in the creation of an International Vexillological Index (IVI). Her plan is that the IVI will become a community-created index of the world's vexillological literature. Work on this project is still in progress.

At the 24th International Congress of Vexillology, FIAV President Michel Lupant and Secretary-General Charles Spain present the *Vexillon* to Anne M. Platoff for her 2009 work *Russian Regional Flags*.