A Decade
On Board
America's
Space
Shuttle

Spectacular
Moments

From A Decade Of Shuttle Missions—
Captured On Film By The Astronauts
Who Flew Them.

The shuttle orbiter Challenger, photographed against the blackness of space by the Shuttle Pallet Satellite (SPAS-01), on June 22, 1983 during mission STS-7.
It's part airplane and part rocket, part satellite launcher, part bunkhouse, part laboratory and part locker room. Every so often, for a few days at a time—longer if the crew is lucky—it circles the Earth, a busy island of life in the still darkness of space. For a whole generation of astronauts, it's the only space vehicle they've ever known.

The world’s first flying spaceship debuted on April 12, 1981—ending, probably forever, the era of space capsules and ocean splashdowns. Paul Weitz, a veteran from those old days, recalls glancing out the window during his 1983 Challenger flight: “You look back, and you’re in orbit, and the damn thing has a wing and a tail...It’s more Star Wars than Star Wars.”

The shuttle has known glory and frustration, victory and loss. It’s not the best spacecraft we’ll ever have, but it’s probably the best that’s ever been. It brought a new versatility and diversity to space travel: Women, minorities and non-NASA scientists finally got their chance to fly, and in increasingly greater numbers—first two, then four, then seven at a time.

In 10 years the shuttle has ferried 204 people into orbit, along with monkeys, fruitflies, rats and bees. More than 40 satellites have been spun, craned and sprung from the cargo bay. Astronauts have wrestled seven-ton satellites by hand while skimming the Earth at 17,500 miles per hour. They’ve floated free in charlike magic carpets. And they’ve seen things none of the rest of us ever get to see.

For our salute to the shuttle’s tenth anniversary, we asked a dozen shuttle astronauts, past and present, to pick their own favorite shots from the last decade. Some of the photos they chose are dramatic, some have stories behind them, some are just plain pretty. Not surprisingly, all 12 astronauts included shots of the Earth on their list of favorites—proving once again that for all the wonders of the shuttle, it’s the blue planet out the window that really stirs the soul. Just ask anyone who’s been there.
Shannon Lucid

"Everybody who goes over Australia takes this picture because it’s so dramatic and has lots of colors in it. It was one picture that came out pretty close to what I actually remembered it looking like. But when I came back, and looked at all the pictures we took, none of them lived up to real life. It was almost to the point that you really didn’t want to look at the pictures, because they would destroy what you actually remembered. They weren’t as vivid."

Marsha Ivins

"Before I became an astronaut I had been a flight engineer [flying landing simulations] on the Shuttle Training Aircraft. In that airplane I’d seen this picture about 15,000 times. I’d seen it at night, at Edwards, on that runway, probably 400 or 500 times. But this was the first time in the orbiter. And the thought did in fact cross my mind: 'This is not a simulation.' And that thought kind of left a trail across my mind. I got little goose bumps on my neck. We rolled out on final, and we saw the lights of Los Angeles, and I thought, 'I’ve seen this picture before.' Then something in me said, 'Not this way you haven’t.' After 11 days, that was the moment I realized what I had been doing. It took me all 11 days to get there. [In space] I had been waiting for it to dawn on me what I was doing, and it didn’t. I didn’t make any major emotional leap until we rolled out on final, and I was looking out the window at night lights that I’d seen hundreds of times before on the STA, and I realized: This is no drill."
George "Pinky" Nelson

"Probably the most pleasant part of the whole mission was the time we spent out working on the satellite. We just had a ball, both of us. It was easy—we had trained just as hard for that as for the rendezvous. We'd done [the repair] who knows how many times already as we developed the procedures in the water tank. We'd done it every which way, at every which place. We had the whole repair down to a choreographed ballet, almost. We didn't have to communicate verbally all that much—I just knew where Ox was, and he knew where I was. It was fun. A spectacular view, things went well, and it was low stress. We really enjoyed it."
Steve Hawley

"Of all the photos of the Hubble Space Telescope I've seen, this is the one that's most memorable to me. It was the only shot of the release that was taken. We didn't get any stills, because Bruce and Kathy were locked up in the airlock, and they were the onboard photographers. It's a nice picture, but we had to cannibalize the IMAX movie to get it, because our own photographers were busy.

A lot of people who knew I was going to do the deploy were excited that it was going to be an astronomer who would do it. I always thought that was sort of irrelevant. What we really wanted was a good arm operator, not necessarily a good astronomer.

For the first several hours [after the deploy] I was interested in watching the telescope through binoculars just to see how far away I could make out details. I remember being able to convince myself I could see the solar arrays as distinct from the tube at a distance of 12 miles through binoculars. Once it got out to 40 miles, you knew it was the telescope—it was the brightest object there except for the Sun and the Moon—but you couldn't make out details."


Woody Spring

"On that entire mission, from launch to landing, there was only twice when I had any real anxiety, and one of them was the first time I got on the end of that arm. There you are, 200 miles high, going 17,000 miles an hour. Those are all 'gee-whiz' numbers that don't mean anything when you're oriented to the shuttle. Then you step onto the arm from the sill of the payload bay, release your tether, and tie another little tether to your ankle.

The first job I had to do was to go to the top of this 45-foot structure. And I said, 'Mary, go ahead and take me up.' Well, she'd already been working with Jerry, so she was used to going full speed. She knew she had 45 feet to go, and she put the thing up to the max—0.7 feet per second. That's a pretty good clip.

So there I am, with no handhold in front of me, being held on by my ankles, watching everything that was safe and secure—my entire reference frame—moving away from me very, very fast. I just reached around behind me, grabbed hold and held on tight. The momentary panic only lasted about ten feet or so, but the first sensation was 'Oh, my God.'"

James "Ox" van Hoften

"This is me on the end of the RMS, ready to try and grab onto LEASAT manually, wondering what in the hell I was doing out there. This was more hair-raising than releasing it into space [later in the mission]. The shuttle was very active, with 44 reaction control jets shooting out fireballs every which way, and I’m standing on the end of a 50-foot diving board, getting moved around, while approaching a 15,000-pound satellite, then trying to get hold of it with my hands. It was very colorful.

The problem was, the remote manipulator was disabled so it could only move in 'singles' mode—one joint at a time. Mike Lounge was trying to drive me around on the manipulator, and it was a real challenge. Trying to hold onto this thing and lower it down into the payload bay would have been a lot easier if the arm had been working right."

Don Peterson

"Karol Bobko and I were talking as we were watching the sun set. The atmosphere, when you see it from this vantage point, looks very small, like a shell of air around the Earth. And the thought hit both of us that when you looked out in the other direction, away from the Earth, you couldn’t see anything as far as you looked. The only light we could see was that little strip of colors. We started out saying how pretty and colorful it was to watch. Then we said ‘Boy, that kind of makes you feel lonesome out here.’ By the time we finished the conversation, the sunset was gone."

Charles Bolden

"Usually you try to sneak up on somebody and take a photo that shows a genuine view of what it's really like, and I think this one was successful. I was up on the flight deck, curled up on the left-hand aft panel, shooting into the cabin. We were trying to get set up to start our Earth observations.

As a general rule, people like to be up on the flight deck as much as possible, so there are times when everybody's up there. And then you just kind of jockey for position to see who can get the best window.

On both my flights, I've slept on the flight deck, just because I prefer it. I usually just float over my seat. In the photo, you can see that my seat [near the window] and Steve Hawley's seat in back are folded down, to make them like a table."

Kathy Sullivan

"I had studied this area as a geologist and a reader of the professional literature. It's a huge region, and it's geologically and tectonically complex. Until I flew over it, I still felt sort of bewildered by some of the details I'd been trying to assimilate. Somehow, seeing it all together--in the way that you take something in visually and comprehend it--really was like someone brought the camera into focus, and it went 'Pop!' And I said, 'Yeah, okay.'

We all had flown before, at something like a third to a half of this altitude. We all found [the view] dramatically different. Flying on 41-G had been like flying over this gently curved endless dish. I don't recall any time on 41-G where I really saw such complete a curvature on the Earth. But on STS-31 there were a couple of instances where it really struck you forcibly that this was a beachball out there."
Steve Hawley

"During ascent, there's not much to see. It's straight up. If you're sitting in front, and you look out the side window during the roll, you'd see the landscape go by, but most of the guys upstairs are pretty busy all the time. If you're sitting downstairs, you're not too busy, but you don't have much of a view.

Normally what happens is you launch to the East. And normally you launch at dawn, so you're flying into the sun. The windows get fogged pretty easily, particularly at SRB separation. Pretty much all you can see coming through the windows is glary sunlight. You don't really get to see the Earth fall away from you.

On my first flight, every time I was tempted to take my eyes off what I was doing to look out the window, I would think about all this training I'd had, what people were counting on me to do, and what if in that instant, something happened and I missed it. So I just didn't let myself be distracted."

First launch of Discovery, photographed by astronaut John Young from the Shuttle Training Aircraft, Mission 41-D, 1984.

Dave Leestma

"I was sitting in the seat right behind the pilot. I had a 35-millimeter camera with high-speed film in it—you don't want to flash in anybody's eyes during re-entry, so this is taken with ambient light. I thought it would be neat to show, if you could, the displays on the CRT, and to get Crip and the glow out the window. I didn't know it would turn out, but it did.

As the orbiter streaks down back through the atmosphere, it causes a tremendous shock wave that condenses and heats up all the molecules on the other side of the shock behind the orbiter. The glow out the front and side windows starts out pinkish, then gets brighter pink, then white, then down to orange. Once you come into daylight, it disappears. The whole thing usually lasts 10 to 15 minutes.

Overhead, you see an incredible light show. I mean, it's a dancing, weaving, bobbing streak that goes out the back end of the orbiter. We call it 'angry ions,' or 'that thing we carry behind us.' Inside, you're nice and comfortable, but you know it's hot outside just by looking. You're glad you have the tiles on. The still pictures don't really do it justice. You've got to see it in action."

Robert Crippen guides Challenger back through a fiery atmospheric re-entry, Mission 41-G, 1984.
Woody Spring

"We launched this small satellite [a target for testing precision pointing with the orbiter] at the end of our first spacewalk. Our hands were tired [from the construction work]. It weighed 80 pounds [on Earth], and you had to control it pretty well. The objective was just to let it go in orbit with essentially no velocity, or as close as I could. Had I given it a shove, we would have been chasing it. Jerry and I had flipped a coin back in Houston to see who was going to get to launch it, and he lost...

It stayed up in orbit much longer than anybody thought it would—I think it was two and a half years. Over the years, we’ve let wrenches and gloves and other things go, but I think this was the first thing dropped into orbit on purpose."


Joe Allen

"When we got into space we had to do the OMS-2 burn to get in a circular orbit, and I was looking out the back window. There was this enormous flash, like a person taking a flash picture, and a sound like a cannon going off. It absolutely scared me to death. I thought the back of the orbiter had blown up. Then, even though the burn continued for as long as a minute, you could see absolutely nothing. No sign of heat, light or anything. I realized what I’d seen was the fuel-rich start of the burn—it’s not totally colorless to begin with. So for every OMS burn we did on that flight, I sat at the window and snapped a picture. When I got back and looked at the photos, lo and behold, I’d gotten it—but only once. All the other pictures were completely blank. From the video, we could tell that the flash lasts only about a tenth of a second. So what I’d done, by total good luck, was to time the 1/250th of a second when the camera shutter opened in that tenth of a second gap. It’s only been done once since—by Sally Ride."

John Fabian

"I think this is a great shot. It shows that you really can get a workout in space—Rick's built up a pretty good sweat.... I exercised on my first flight, but not on my second, because we had seven people in the cabin instead of five. It made it so crowded that you really didn't have a lot of capability to exercise because you were getting in people's way. That treadmill takes up a lot of room. When we landed I could tell the difference between having exercised and not having exercised.... Even with a five-person crew, you have to find time when you won't get in people's way. Most people tend to try to get their exercise midday. Someone will just say 'I'm not busy for the next hour' and go down to get some exercise."


Shannon Lucid

"This was actually taken several days after the Galileo deploy. It was kind of a joke. When I flew on STS-1, John Fabian had taught me how to do deploys. He told me you never want to get in front of the TV with your headphones on, because the customer would think you're not giving full attention to the deploy. So I told Ellen we would take this picture with the headphones and sunglasses on, and send it to John and tell him he didn't have to worry—I was teaching deploy protocol to the younger generation just as he taught me. Anyway, it turned out to be a pretty good picture. We sort of looked like California Valley Girls."

Mission specialists Ellen Baker (left) and Shannon Lucid onboard Atlantis, Mission STS-34, 1989.

Marsha Ivins

"David hates it when I show this picture, but it's a great picture. The reason for the expression is that he's sealed at the waist, and he's sitting on a bicycle seat—your regular, hard, narrow, pointed bicycle seat—while this neutral pressure device is sucking his body into it for four hours. David's very slim, so sitting on a bicycle seat for four hours in itself would be bad enough. Then you've got all the cables, wires, blood pressure cuffs and electrodes stuck to him. I mean, this is your space hero."

### Space Shuttle Mission Chronology

**1981-1991**

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<th>FLIGHT</th>
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<th>LAUNCH</th>
<th>LANDING</th>
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<tr>
<td>STS-1</td>
<td>Columbia</td>
<td>Cmdr: John Young&lt;br&gt;Pilot: Robert Crippen</td>
<td>April 12 1981</td>
<td>April 14 1981</td>
<td>First launch of the space shuttle and first landing from space.</td>
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<tr>
<td>STS-3</td>
<td>Columbia</td>
<td>Cmdr: Jack Lousma&lt;br&gt;Pilot: Charles Fullerton</td>
<td>March 22 1982</td>
<td>March 30 1982</td>
<td>First student experiment. First (and only) landing at White Sands, NM</td>
</tr>
<tr>
<td>STS-7</td>
<td>Challenger</td>
<td>Cmdr: Robert Crippen&lt;br&gt;Pilot: Frederick Hauck&lt;br&gt;Mission Specialists: John Fabian&lt;br&gt;Dr. Sally Ride&lt;br&gt;Dr. Norman Thagard</td>
<td>June 18 1983</td>
<td>June 24 1983</td>
<td>First American woman in space (Ride). First five-person crew.</td>
</tr>
<tr>
<td>STS-9</td>
<td>Columbia</td>
<td>Cmdr: John Young&lt;br&gt;Pilot: Brewster Shaw&lt;br&gt;Mission Specialists: Owen Garriott&lt;br&gt;Dr. Robert Parker&lt;br&gt;Dr. Byron Lichtenburg&lt;br&gt;Dr. Ulf Merbold</td>
<td>November 28 1983</td>
<td>December 8 1983</td>
<td>First Spacelab mission.</td>
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"Space Shuttle Columbia’s First Landing," by Robert McCall, celebrates the approach of the orbiter Columbia at the first shuttle landing in the California Desert on April 14, 1981. NASA Art Program

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</table>
| 41-C   | Challenger | Cmdr: Robert Crippen  
Pilot: Francis Scobee  
Mission Specialists:  
Dr. George Nelson  
Dr. James Van Hoften  
Terry Hart | April 6  
1984 | April 13  
1984 | First in-orbit capture, repair and redeploy of a satellite, Solar Max. |
| 41-G   | Challenger | Cmdr: Robert Crippen  
Pilot: Jon McBride  
Mission Specialists:  
David Leestma  
Sally Ride  
Kathryn Sullivan  
Paul Scully-Power  
Mark Garneau | October 5  
1984 | October 13  
1984 | First American woman to walk in space (Sullivan). First Canadian in space (Garneau). Deployed ERBS satellite. |
| 51-C   | Discovery  | Cmdr: Thomas Mattingly  
Pilot: Loren Shriver  
Mission Specialists:  
James Buchli  
Ellison Onizuka  
Gary Payton | January 24  
1985 | January 27  
1985 | First Dept. of Defense mission (dedicated). |
| 51-B   | Challenger | Cmdr: Robert Overmyer  
Pilot: Frederick Gregory  
Mission Specialists:  
Don Lind  
Norman Thagard  
William Thornton  
Lodewijk van den Berg  
Taylor Wang | April 29  
1985 | May 6  
1985 | First operational Spacelab flight. |
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<tr>
<td>51-I</td>
<td>Discovery</td>
<td>Cmdr: Joe Engle, Pilot: Richard Covey, Mission Specialists: James Van Hoften, John Lounge, William Fisher</td>
<td>August 27 1985</td>
<td>September 3 1985</td>
<td>Deployed three communications satellites. Fisher &amp; Van Hoften perform longest spacewalk (seven hours, 20 minutes), repairing and redeploying the Leasat 3 satellite.</td>
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"When Thoughts Turn Inward," by Henry Cassel, depicts a reflective astronaut John Young during suit-up for the first launch of America's Space Shuttle, Columbia. NASA Art Program.

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</table>
| 51-L   | Challenger | Cmdr: Francis Scobee  
Pilot: Michael Smith  
Mission Specialists:  
Judith Resnik  
Ellison Onizuka  
Ronald McNair  
Christa McAuliffe  
Gregory Jarvis | January 28  
1986 |       | First launch failure of the shuttle program, 73 seconds after liftoff; vehicle and crew lost. |
| STS-27 | Atlantis | Cmdr: Robert Gibson  
Pilot: Guy Gardner  
Mission Specialists:  
Mike Mullane  
Jerry Ross  
Bill Shepherd | December 2  
1988 | December 6  
| STS-30 | Atlantis | Cmdr: David Walker  
Pilot: Ronald Grabe  
Mission Specialists:  
Norman Thagard  
Mary Cleave  
Mark Lee | May 4  
1989 | May 8  
1989 | Magellan radar mapping probe launched toward Venus. |
| STS-34 | Atlantis | Cmdr: Donald Williams  
Pilot: Michael McCulley  
Mission Specialists:  
Franklin Chang-Diaz  
Shannon Lucid  
Ellen Baker | October 18  
1989 | October 23  
1989 | Galileo spacecraft launched from shuttle for Jupiter. |
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</table>
| STS-32 | Columbia | Cmdr: Dan Brandenstein  
Pilot: James Wetherbee  
Mission Specialists:  
Bonnie Dunbar  
Marsha Ivins  
David Low | January 9  
1990 | January 20  
1990 | Long Duration Exposure Facility (LDEF) retrieved from orbit. Longest shuttle flight to date. |
| STS-36 | Atlantis | Cmdr: John Creighton  
Pilot: John Casper  
Mission Specialists:  
David Hilmers  
Richard Mullane  
Pierre Thuot | February 28  
1990 | March 4  
1990 | Department of Defense Mission. |
| STS-31 | Discovery | Cmdr: Loren Shriver  
Pilot: Charles Bolden  
Mission Specialists:  
Bruce McCandless  
Steven Hawley  
Kathryn Sullivan | April 24  
1990 | April 29  
1990 | Hubble Space Telescope delivered to orbit. |
| STS-41 | Discovery | Cmdr: Richard Richards  
Pilot: Robert Cabana  
Mission Specialists:  
Bill Shepherd  
Bruce Melnick  
Thomas Akers | October 6  
1990 | October 10  
1990 | Ulysses solar probe launched on interplanetary trajectory to the Sun. |
| STS-38 | Atlantis | Cmdr: Richard Covey  
Pilot: Frank Culbertson  
Mission Specialists:  
Robert Springer  
Carl Meade  
Charles D. (Sam) Gemar | November 15  
1990 | November 20  
1990 | Department of Defense Mission. |
| STS-35 | Discovery | Cmdr: Vance Brand  
Pilot: Guy Gardner  
Mission Specialists:  
Jeffrey Hoffman  
Mike Lounge  
Robert Parker  
Payload Specialists:  
Ronald Parise  
Samuel Durrance | December 2  
1990 | December 10  
1990 | Astronomy experiments conducted using the Astro-1 ultraviolet observatory. |
| STS-37 | Atlantis | Cmdr: Steven Nagel  
Pilot: Kenneth Cameron  
Mission Specialists:  
Linda Godwin  
Jerry Ross  
Jay Apt | April 5  
1991 | April 11  