

1981 through STS-121	SpaceCalc Shuttle Launch-and-Landing History	
STS #	Launch and Landing Notes	
STS-1 Columbia 1	<p>Launch: 4/12/81, 7 a.m. EST. Launch try on 4/10 postponed by GPC timing miscompare</p> <p>Landing: 04/14/81, 01:20:57 p.m. EST, Runway 23 (lakebed), EAFB. Landing orbit: 37. Rollout distance: 8,993 feet. Rollout time: 60 seconds. Touchdown speed: 190 knots.</p>	
STS-2 Columbia 2	<p>Launch: 11/12/81, 10:10 a.m. EST. Launch originally set for 10/9; delayed by forward RCS spill; launch try 11/4 scrubbed by fuel cell readings, then APU lube oil contamination; launch 11/12 delayed 2 hours, 40 minutes to replace MDM; launch delayed an additional 10 minutes for systems review.</p> <p>Landing: 11/14/81, 04:23:11 p.m. EDT, Runway 23 (lakebed), EAFB. Landing orbit: 37. Rollout distance: 7,711 feet. Rollout time: 50 seconds. Touchdown speed: 186 knots. Mission shortened by two days due to fuel cell failure.</p>	
STS-3 Columbia 3	<p>Launch: 3/22/82, 11 a.m. EST. Launch delayed 1 hour by GSE nitrogen heater.</p> <p>Landing: 03/30/82, 11:04:46 a.m. EST, Runway 17 (lakebed), White Sands. Landing orbit: 130. Rollout distance: 13,737 feet. Rollout time: 84 seconds. Touchdown speed: 233 knots. Columbia diverted to White Sands before launch due to wet runways at EAFB. Mission extended one day due to high winds at White Sands. Brake damage and major dust contamination.</p>	
STS-4 Columbia 4	<p>Launch: 6/27/82, 11 a.m. EDT. On time.</p> <p>Landing: 07/04/1982, 12:09:31 p.m. EDT, Runway 22 (concrete), EAFB. Landing orbit: 113. Rollout distance: 9,878 feet. Rollout time: 64 seconds. Touchdown speed: 196 knots. First landing on a concrete runway.</p>	
STS-5 Columbia 5	<p>Launch: 11/11/82, 7:19 a.m. EST. On time.</p>	

	Landing: 11/16/82, 09:33:26 a.m. EST, Runway 22 (concrete), EAFB. Landing orbit: 82. Rollout distance: 9,553 feet. Rollout time: 63 seconds. Touchdown speed: 201 knots.
STS-6 Challenger 6	Launch: 4/4/83, 1:30 p.m. EST. Launch originally set for 1/20; delayed by SSME No. 1 LH2 leak after 12/18/82 FRF; second FRF confirmed leaks, all three engines replaced; Additional delay due to contamination of TDRS-A satellite. Landing: 04/09/83, 01:53:42 p.m. EST, Runway 22 (concrete), EAFB. Landing orbit: 81. Rollout distance: 7,180 feet. Rollout time: 49 seconds. Touchdown speed: 180 knots.
STS-7 Challenger 7	Launch: 6/18/83, 7:33 a.m. EDT. On time Landing: 06/24/83, 09:56:59 a.m. EDT, Runway 15 (lakebed), EAFB. Landing orbit: 98. Rollout distance: 10,450 feet. Rollout time: 75 seconds. Touchdown speed: 200 knots. Bad weather blocks planned KSC landing. EAFB landing delayed by two revs.
STS-8 Challenger 8	Launch: 8/30/83, 2:32 a.m. EDT. Launch delayed 17 minutes by thunderstorms. Landing: 09/06/83, 03:40:43 a.m. EDT, Runway 22 (concrete), EAFB. Landing orbit: 98. Rollout distance: 9,371 feet. Rollout time: 50 seconds. Touchdown speed: 196 knots. First night landing.
STS-9 Columbia 9	Launch: 11/28/83, 11 a.m. EST. Launch originally set for 9/30; delayed 28 days to replace suspect SRB nozzle. Landing: 12/08/83, 06:47:24 p.m. EST, Runway 17 (lakebed), EAFB. Landing orbit: 167. Rollout distance: 8,456 feet. Rollout time: 53 seconds. Touchdown speed: 204 knots. One-day extension for bonus science. Landing delayed eight hours due to failures of GPC 1, GPC 2 and IMU 1. During touchdown, two APUs caught fire.
STS-41B Challenger 10	Launch: 2/3/84, 8 a.m. EST. Launch originally set for 1/29; delayed 5 days to replace APUs. Landing: 02/11/84, 07:15:55 a.m. EST, Runway 15, KSC (1). Landing orbit: 128. Rollout distance: 10,815 feet. Rollout time: 67 seconds. Touchdown speed: 198 knots. First KSC landing.

STS-41C Challenger 11	<p>Launch: 4/6/84, 8:58 a.m. EST. On time.</p> <p>Landing: 04/13/84, 08:38:07 a.m. EST, Runway 17 (lakebed), EAFB. Landing orbit: 108. Rollout distance: 8,716 feet. Rollout time: 48 seconds. Touchdown speed: 220 knots. Mission extended one day after initial failure to grapple Solar Max satellite. Planned KSC landing scrubbed. Flight extended two revs for EAFB.</p>
STS-41D Discovery 12	<p>Launch: 8/30/84, 8:42 a.m. EDT. Launch originally set for 6/25; scrubbed at T-9 by BFS failure. An RSLs abort 6/26 caused major manifest change (payload changed to include elements of 41D and 41F; 41F mission was canceled). Third launch try 8/29 delayed one day by MEC problem. Final countdown delayed 6 minutes, 50 seconds by private plane.</p> <p>Landing: 09/05/84, 09:37:54 a.m. EDT, Runway 17 (lakebed), EAFB. Landing orbit: 97. Rollout distance: 10,275. Rollout time: 60 seconds. Touchdown speed: 216 knots. First flight of Discovery.</p>
STS-41G Challenger 13	<p>Launch: 10/5/84, 7:03 a.m. EDT. On time.</p> <p>Landing: 10/13/84, 12:26:33 p.m. EDT, Runway 33, KSC (2). Landing orbit: 133. Rollout distance: 10,633 feet. Rollout time: 59 seconds. Touchdown speed: 209 knots.</p>
STS-51A Discovery 14	<p>Launch: 11/8/84, 7:15 a.m. EST. Launch originally set for 11/7; delayed one day by high wind shear.</p> <p>Landing: 11/16/84, 06:59:56 a.m. EST, Runway 15, KSC (3). Landing orbit: 127. Rollout distance: 9,461 feet. Rollout time: 58 seconds. Touchdown speed: 194 knots. Two communications satellites returned to Earth for repairs.</p>
STS-51C Discovery 15	<p>Launch: 1/24/85, 2:50 p.m. EST. Launch originally set for 1/23; delayed by freezing weather.</p> <p>Landing: 01/27/85, 04:23:23 p.m. EST, Runway 15, KSC (4). Landing orbit: 49. Rollout distance: 7,352 feet. Rollout time: 50 seconds. Touchdown speed: 179 knots. Flight shortened one day due to weather. DOD mission.</p>
STS-51D Discovery 16	<p>Launch: 4/12/85, 8:59 a.m. EST. Launch originally set for 3/19; delayed to 3/28 because of STS-51E remanifest. Delayed another 15 days to repair left payload bay door. Final countdown delayed 55 minutes by ship in SRB danger zone.</p>

	Landing: 04/19/85, 08:54:28 a.m., Runway 33, KSC (5). Landing orbit: 110. Rollout distance: 10,430 feet. Rollout time: 63 seconds. Touchdown speed: 209 knots. Extensive brake damage, blown main landing gear tire. Future flights baselined for EAFB. Two day extension for Syncom repair bid.
STS-51B Challenger 17	Launch: 04/29/85, 12:02:18 p.m. EDT. First manifested as STS-51E. After a timing problem with TDRS-B satellite, shuttle rolled back and 51E was canceled. Remanifested as STS-51B. Launch delayed two minutes 18 seconds by an LPS failure. Landing: 05/06/85, 12:11:04 p.m. EDT, Runway 17 (lakebed), EAFB. Landing orbit: 111. Rollout distance: 8,317 feet. Rollout time: 59 seconds. Touchdown speed: 207 knots.
STS-51G Discovery 18	Launch: 6/17/85, 7:33 a.m. EDT. On time. Landing: 06/24/85, 09:11:52 a.m. EDT, Runway 23 (lakebed), EAFB. Landing orbit: 112. Rollout distance: 7,433 feet. Rollout time: 42 seconds. Touchdown speed: 202 knots.
STS-51F Challenger 19	Launch: 7/29/85, 5 p.m. EDT. Launch originally set for 7/12; RSLs abort at T-3 seconds delayed liftoff 17 days. Final countdown was held up 1 hour, 37 minutes due to TMBU uplink problem. During ascent, SSME No. 1 shut down in first ATO. Landing: 08/06/85, 03:45:26 p.m. EDT, Runway 23 (lakebed), EAFB. Landing orbit: 127. Rollout distance: 8,569 feet. Rollout time: 55 seconds. Touchdown speed: 204 knots. Mission extended 17 orbits to gather additional Spacelab science data after ATO.
STS-51I Discovery 20	Launch: 8/27/85, 6:58 a.m. EDT. Launch originally set for 8/24; delayed at T-5 by thunderstorms. Landing: 09/03/85, 09:15:43 a.m. EDT, Runway 23 (lakebed), EAFB. Landing orbit: 112. Rollout distance: 6,100 feet. Rollout time: 42 seconds. Touchdown speed: 175 knots. Flight shortened one day due to earlier - than-planned launch of AUSSAT satellite (crew error).
STS-51J Atlantis 21	Launch: 10/3/85, 11:16 a.m. EDT. Launch delayed 22 minutes, 30 seconds by faulty "on" indication on SSME LH2 prevalue. Landing: 10/07/85, 01:00:08 p.m. EDT, Runway 23 (lakebed), EAFB. Landing orbit: 64. Rollout distance: 8,056 feet. Rollout time: 65 seconds. Touchdown speed: 187 knots. DOD mission.

STS-61A Challenger 22	<p>Launch: 10/30/85, noon EST. On time.</p> <p>Landing: 11/06/85, 12:44:51 p.m. EST, Runway 17 (lakebed), EAFB. Landing orbit: 112. Rollout distance: 8,304 feet. Rollout time: 49 seconds. Touchdown speed: 210 knots.</p>
STS-61B Atlantis 23	<p>Launch: 11/26/85, 7:29 p.m. EST. On time.</p> <p>Landing: 12/03/85, 04:33:49 p.m. EST, Runway 22 (concrete), EAFB. Landing orbit: 109. Rollout distance: 10,759 feet. Rollout time: 78 seconds. Touchdown speed: 201 knots. Flight shortened one orbit to improve lighting at EAFB. Diverted to concrete due to wet lakebed.</p>
STS-61C Columbia 24	<p>Launch: 1/12/86, 6:55 a.m. EST. Launch originally set for 12/18; delayed one day by work to close out the aft. 12/19 attempt failed at T-14 seconds by SRB HPU overspeed (later determined to be a false reading). Launch reset for 1/6; delayed at T-31 seconds by accidental draining of LO2; Launch try 1/7 failed at T-9 by TAL weather. Launch reset for 1/9, then delayed 24 hours by MLP LOX sensor lodged in SSME No. 2 pre valve. Launch attempt 1/10 delayed by heavy rain.</p> <p>Landing: 01/18/86, 08:58:51 a.m. EST, Runway 22 (concrete), EAFB. Landing orbit: 98. Rollout distance: 10,202 feet. Rollout time: 59 seconds. Touchdown speed: 217 knots. Planned KSC landing. Re-entry moved from 1/17 to 1/16 to improve orbiter turnaround after numerous launch delays. Entry attempts on 1/16 and 1/17 were scrubbed by weather. Third and final KSC attempt scrubbed on 1/18. Flight extended one orbit to reach EAFB.</p>
STS-51L Challenger 25	<p>Launch: 1/28/86, 11:38 a.m. EST. Launch originally set for 1/22, but slipped to 1/23 and 1/24 due to 61C problems. Launch then delayed to 1/25 by TAL weather. Launch team unable to accommodate a 1/25 morning launch, prompting another 24 hour delay. Before fueling, launch team ordered another 24 hour delay, to 1/27, due to expected bad weather (it didn't happen). Launch 1/27 delayed one day by problems closing the shuttle hatch. By the time it was closed, RTLS winds were out of limits. The final countdown was delayed 2 hours by MLP HIM replacement. Orbiter was destroyed 73 seconds after liftoff by right side SRB burn through.</p> <p>Landing: N/A</p>
STS-26 Discovery 26	<p>Launch: 9/29/88, 11:37 a.m. EDT. Launch delayed 1 hour, 38 minutes by blown fuses in spacesuit cooling fans and by lighter-than-expected winds aloft.</p> <p>Landing: 10/03/88, 12:37:11 p.m. EDT, Runway 17 (lakebed), EAFB. Landing orbit: 64. Rollout distance: 7,451 feet. Rollout time: 49 seconds. Touchdown speed: 195 knots.</p>

STS-27 Atlantis 27	<p>Launch: 12/2/88, 9:31 a.m. EST. Launch originally set for 12/1; postponed by high winds and cloud cover.</p> <p>Landing: 12/06/88, 06:36:11 p.m. EST, Runway 17 (lakebed), EAFB. Landing orbit: ??. Rollout distance: 7,123 feet. Rollout time: 43 seconds. Touchdown speed: 204 knots. DOD mission.</p>
STS-29 Discovery 28	<p>Launch: 3/13/89, 9:57 a.m. EST. Launch originally set for 2/18; delayed to replace suspect LOX turbopumps and a faulty MEC. Final countdown delayed 1 hour, 50 minutes by fog and high winds aloft.</p> <p>Landing: 03/18/89, 09:35:51 a.m. EST, Runway 22 (concrete), EAFB. Landing orbit: 80. Rollout distance: 9,339 feet. Rollout time: 53 seconds. Touchdown speed: 204 knots.</p>
STS-30 Atlantis 29	<p>Launch: 5/4/89, 2:47 p.m. EDT. Launch originally set for 4/28; delayed at T-31 by LH2 recirculation pump problem and a leak in a 4-inch hydrogen line. Final countdown delayed 59 minutes by clouds.</p> <p>Landing: 05/08/89, 03:43:27 p.m. EDT, Runway 22 (concrete), EAFB. Landing orbit: 65. Rollout distance: 10,295 feet. Rollout time: 64 seconds. Touchdown speed: 204 knots.</p>
STS-28 Columbia 30	<p>Launch: 8/8/89, 8:37 a.m. EDT. This was a classified countdown and details are not known. Some sources indicate this launch was on time.</p> <p>Landing: 08/13/89, 09:37:08 a.m. EDT, Runway 17 (lakebed), EAFB. Landing orbit: ??. Rollout distance: 6,015 feet. Rollout time: 46 seconds. Touchdown speed: 158 knots.</p>
STS-34 Atlantis 31	<p>Launch: 10/18/89, 12:54 p.m. EDT. Launch originally set for 10/12; delayed to 10/17 by SSME No. 2 controller; delayed to 10/18 by RTLS weather. Final countdown delayed 4 minutes by TAL weather.</p> <p>Landing: 10/23/89, 12:33 p.m. EDT, Runway 23 (lakebed), EAFB. Landing orbit: 80. Rollout distance: 9,677 feet. Rollout time: 60 seconds. Touchdown speed: 205 knots.</p>
STS-33 Discovery 32	<p>Launch: 11/22/89, 7:24 p.m. EST. Launch originally set for 11/20; delayed two days to replace a suspect SRB IEA.</p> <p>Landing: 11/27/89, 07:30:16 p.m. EST, Runway 4 (concrete), EAFB. Landing orbit: ??. Rollout distance: 7,764 feet. Rollout time: 46 seconds. Touchdown speed: 192 knots. Flight extended one day due to weather. DOD mission.</p>

STS-32 Columbia 33	<p>Launch: 1/9/90, 7:35 a.m. EST. Launch originally set for 12/18; delayed to 1/8 by pad problems; Delayed to 1/9 by weather.</p> <p>Landing: 01/20/90, 04:35:37 a.m. EST, Runway 22 (concrete), EAFB. Landing orbit: 172. Rollout distance: 10,731 feet. Rollout time: 62 seconds. Touchdown speed: 209 knots. One-day extension due to weather. Longest shuttle flight to date.</p>
STS-36 Atlantis 34	<p>Launch: 2/28/90, 2:50 a.m. EST. Launch originally set for 2/22; delayed to 2/23, then 2/24 and finally, 2/25 because of crew illness (commander) and weather. 2/25 attempt scrubbed by RSO computer malfunction; weather delayed a 2/26 attempt.</p> <p>Landing: 03/04/90, 01:08:44 p.m. EST, Runway 23 (lakebed), EAFB. Landing orbit: ??. Rollout distance: 7,900 feet. Rollout time: 53 seconds. Touchdown speed: 188 knots. DOD mission.</p>
STS-31 Discovery 35	<p>Launch: 4/24/90, 8:34 a.m. EDT. Launch originally set for 4/18; moved up to 4/12 and then 4/10 after FRR. 4/10 launch try scrubbed at T-4 minutes due to faulty valve in APU No. 1. Final countdown delayed two minutes by concern about a fill and drain valve.</p> <p>Landing: 04/29/90, 09:49:57 a.m. EDT, Runway 22 (concrete), EAFB. Landing orbit: 80. Rollout distance: 8,874 feet. Rollout time: 61 seconds. 180 knots. First use of carbon-carbon brakes.</p>
STS-41 Discovery 36	<p>Launch: 10/6/90, 7:47 a.m. EDT. Launch was delayed 12 minutes by last-minute concern about the weather and a minor technical glitch.</p> <p>Landing: 10/10/90, 09:57:18 a.m. EDT, Runway 22 (concrete), EAFB. Landing orbit: 66. Rollout distance: 8,276 feet. Rollout time: 49 seconds. (braking test). Touchdown speed: 195 knots.</p>
STS-38 Atlantis 37	<p>Launch: 11/15/90, 6:48 p.m. EST. Launch originally set for July 1990. Delayed to 11/9 by multiple LH2 leaks that required four tanking tests. Launch delayed six more days due to payload problem.</p> <p>Landing: 11/20/90, 04:42:42 p.m. EST, Runway 33, KSC (6). Landing orbit: ??. Rollout distance: 9,032 feet. Rollout time: 57 seconds. Touchdown speed: 197 knots. Flight extended one day due to high cross winds at EAFB. Additional high winds diverted Atlantis to KSC.</p>
STS-35 Columbia 38	<p>Launch: 12/2/90, 1:49 a.m. EST. Launch originally set for 5/16; later reset to 5/30 due to work needed to change out a faulty Freon loop; launch scrubbed during tanking due to LH2 leak. Columbia fixed and hauled back to pad 39-A for a 9/1 liftoff. Two days before liftoff, BBXRT required service. Launch rest for 9/6 but LH2 leaks again cropped up. Tropical storm Klaus forced rollback 10/9. Vehicle back to pad on 10/14. Final countdown was held up 21 minutes by weather.</p>

	Landing: 12/10/90, 12:54:08 p.m. EST, Runway 22 (concrete), EAFB. Landing orbit: 144. Rollout distance: 10,447 feet. Rollout time: 58 seconds. Touchdown speed: 208 knots. One day early due to weather.
STS-37 Atlantis 39	<p>Launch: 4/5/91, 9:23 a.m. EST. Launch delayed 5 minutes due to low clouds.</p> <p>Landing: 04/11/91, 09:55:29 a.m. EDT, Runway 33 (lakebed), EAFB. Landing orbit: 93. Rollout distance: 6,364 feet. Rollout time: 56 seconds. Touchdown speed: 157 knots. Re-entry originally set for 4/10, but landing was delayed one day due to bad weather at EAFB and KSC.</p>
STS-39 Discovery 40	<p>Launch: 4/28/91, 7:33 a.m. EDT. Launch originally set for 3/9; delayed by cracks in ET door hinges. Vehicle rolled back to hangar, fixed and returned. Launch reset for 4/23 but postponed during fueling by LOX turbopump transducer showed out-of-limit readings. Launch reset for 4/28. Final countdown delayed 32 minutes when a data tape recorder started early.</p> <p>Landing: 05/06/91, 02:55:35 p.m. EDT, Runway 15, KSC (7). Landing orbit: 134. Rollout distance: 9,235 feet. Rollout time: 56 seconds. Touchdown speed: 210 knots. Discovery diverted to KSC due to high winds at EAFB. No extension.</p>
STS-40 Columbia 41	<p>Launch: 6/5/91, 9:25 a.m. EDT. Launch originally set for 5/22; delayed two days from liftoff by concern about the integrity of LH2 sensors in the MPS. In addition, a GPC failed along with an MDM; both were replaced. Six LH2 and LOX sensors were replaced and launch was rest for 6/1. Liftoff was delayed by IMU calibration problems; launch reset for 6/5.</p> <p>Landing: 06/14/91, 11:39:11 a.m. EDT, Runway 22 (concrete), EAFB. Landing orbit: 146. Rollout distance: 9,403 feet. Rollout time: 55 seconds. Touchdown speed: 200 knots.</p>
STS-43 Atlantis 42	<p>Launch: 8/2/91, 11:02 a.m. EDT. Launch originally set for 7/23; delayed to 7/24 to replace faulty IEA. Mission scrubbed again at T-5 hours by faulty SSME controller. Launch reset for 8/1, but delayed by cabin pressure reading and then by RTLS weather. Launch reset for 8/2. Final countdown was on time.</p> <p>Landing: 08/11/91, 08:23:25 a.m. EDT, Runway 15, KSC (8). Landing orbit: 142. Rollout distance: 9,890 feet. Rollout time: 60 seconds. Touchdown speed: 203 knots. First planned KSC landing since STS-51D.</p>
STS-48 Discovery 43	Launch: 9/12/91, 7:11 p.m. EDT. Launch was delayed 14 minutes by a communications problem.

	Landing: 09/18/91, 03:38:42 a.m. EDT, Runway 22 (concrete), EAFB. Landing orbit: 81. Rollout distance: 9,513 feet. Rollout time: 50 seconds. Touchdown speed: 216 knots. One rev late. Discovery diverted to EAFB due to bad weather.
STS-44 Atlantis 44	Launch: 11/24/91, 6:44 p.m. EST. Launch originally set for 11/19; delayed during tanking by IUS/IMU problem. Launch reset for 11/24; liftoff delayed 13 minutes by to condition LOX after work to fix an MLP LOX replenish valve. Landing: 12/01/91, 05:34:12 p.m. EST, Runway 5 (lakebed), EAFB. Landing orbit: 110. Rollout distance: 11,191 feet. Rollout time: 107 seconds (minimum braking test). Touchdown speed: 183 knots. Mission shortened by three days and diverted to EAFB due to IMU failure.
STS-42 Discovery 45	Launch: 1/22/92, 9:53 a.m. Launch delayed one hour by weather. Landing: 01/30/92, 11:07:17 a.m. EST, Runway 22 (concrete), EAFB. Landing orbit: 129. Rollout distance: 9,811 feet. Rollout time: 58 seconds. Touchdown speed: 200 knots. Mission extended one day for additional data collection.
STS-45 Atlantis 46	Launch: 3/24/92, 8:14 a.m. EST. Launch delayed one day by high LH2 levels in the aft. Final countdown 3/24 delayed 14 minutes by weather. Landing: 04/02/92, 06:23 a.m. EST, Runway 33, KSC (9). Landing orbit: 143. Rollout distance: 9,227 feet. Rollout time: 60 seconds. Touchdown speed: 188 knots. Mission extended one day for additional data collection.
STS-49 Endeavour 47	Launch: 5/7/92; 7:40 p.m. EDT. Launch delayed 34 minutes because of a MEC byte error, concern about low clouds for TAL, RTLS. Landing: 05/16/92, 09:57:38 p.m. EDT, Runway 22 (concrete), EAFB. Landing orbit: 141. Rollout distance: 9,490 feet (no braking). Rollout time: 58 seconds. Touchdown speed: 211 knots. Two-day extension for Intelsat repair. First use of drag chute.
STS-50 Columbia 48	Launch: 6/25/92; 12:12 p.m. EDT. Launch delayed 5 minutes because of low clouds.

	Landing: 07/09/92, 07:43 a.m. EDT, Runway 33, KSC (10). Landing orbit: 220. Rollout distance: 10,200 feet. Rollout time: 59 seconds. Touchdown speed: 209 knots. Drag chute used. Columbia diverted to KSC due to bad weather at EAFB (one day late, then one rev late). Longest shuttle flight to date.
STS-46 Atlantis 49	Launch: 7/31/92; 9:56:48 a.m. EDT. Launch delayed 48 seconds after co-pilot was late flipping APU prestart switches. Landing: 08/08/92, 09:11:50 a.m. EDT, Runway 33, KSC (11). Landing orbit: 127. Rollout distance: 10,860. Rollout time: 66 seconds. Touchdown speed: 204 knots. Mission extended one day for additional TSS operations. Then one rev late.
STS-47 Endeavour 50	Launch: 9/12/92; 10:23 a.m. EDT. Launch on time. This is the first on-time post-Challenger shuttle launch. Landing: 09/20/92, 08:53:24 a.m. EDT, Runway 33, KSC (12). Landing orbit: 127. Rollout distance: 8,567 feet. Rollout time: 58 seconds. Touchdown speed: 211 knots. Mission extended one day for additional data collection. Then one rev late.
STS-52 Columbia 51	Launch: 10/22/92; 1:09:39 p.m. EDT. Launch delayed one hour and 54 minutes by bad TAL weather and high RTLS crosswinds. MMT signs RTLS crosswind waiver because average wind speed is less than 15 knots. Flight director Jeff Bantle disagrees but goes along. Landing: 11/01/92, 09:05:53 a.m. EST, Runway 33, KSC (13). Landing orbit: 159. Rollout distance: 10,708 feet. Rollout time: 63 seconds. Touchdown speed: 220 knots.
STS-53 Discovery 52	Launch: 12/09/92; 8:24 a.m. EST. Launch delayed one hour and 25 minutes due to low temperature and ice on the external tank. Also: concern about wind shear. Landing: 12/09/92, 03:43:17 p.m. EST, Runway 22 (concrete), EAFB. Landing orbit: 115. Rollout distance: 10,165 feet. Rollout time: ??. Touchdown speed: ??. Discovery diverted to EAFB due to clouds at KSC. One rev late. Post landing fuel leak.
STS-54 Endeavour 53	Launch: 1/13/93; 8:59:30 a.m. EST. Launch delayed 7.5 minutes due to GLS downtime and clearance of a waiver on wing strut loading. Five waivers processed in all. Landing: 01/19/93, 08:37:47 a.m. EST, Runway 33, KSC (14). Landing orbit: 96. Rollout distance: 8,723 feet. Rollout time: ??. Touchdown speed: ??. Landing delayed one orbit due to fog.

<p>STS-56 Discovery 54</p>	<p>Launch: 04/08/93; 1:29 a.m. EST. Launch originally planned for 4/6, but delayed one hour by RTLS crosswinds and concern about SSME No. 1 anti-flood valve. Launch attempt at 2:32 a.m. scrubbed at T-11 seconds due to high-point bleed valve fail-to-close indication (valve was actually OK). Launch 4/8 on time.</p> <p>Landing: 04/17/93, 07:37:19 a.m. EDT, Runway 33, KSC (15). Landing orbit: 148. Rollout distance: 9,529 feet. Rollout time: 62 seconds. Touchdown speed: ??. Landing delayed one day due to weather.</p>
<p>STS-55 Columbia 55</p>	<p>Launch: 04/26/93; 10:50 a.m. EDT. Launch originally scheduled for 2/25; delaye to 3/16 due to SSME LOX pump replacement to make sure out-of-date parts not installed (they were not). On 3/2, launch delayed again due to busted hydraulic hoses in aft compartment; reset to 3/21 after Navy agrees to delay an Atlas-Centaur launch. Countdown began 3/18. Delta rocket delays on 3/18 and 3/19 delay Columbia to March 22. Launch attempt on 3/22 delayed at T-minus 3-second mark by RSLs abort (SSME No. 3 check valve failure to close). Launch reset for April 24 but a power supply problem with IMU No. 2 forced a scrub prior to fueling. The IMU was replaced and launch April 26 was on time.</p> <p>Landing: 05/06/93, 10:29:59 a.m. EDT, Runway 22 (concrete), EAFB. Landing orbit: 159. Rollout distance: ??. Rollout time: ??. Touchdown speed: ??. Mission extended one day for additional data collection. Then one rev late to EAFB.</p>
<p>STS-57 Endeavour 56</p>	<p>Launch: 6/21/93; 9:07 a.m. EDT. Launch originally scheduled for 6/3; delayed 5/27 to replace the LOX pump on SSME No. 2 due to concern about chemical etching in a high-stress area on a spring. Launch on 6/20 scrubbed due to clouds and rain in the launch area. Launch on 6/21 delayed 22 seconds by a ship in the SRB recovery zone.</p> <p>Landing: 07/01/93, 8:52:16 am., Runway 33, KSC (16). Landing orbit: 154. Mission extended one day as planned pre-flight for additional data collection. Landing originally planned for June 29, but low clouds prompted back-to-back waveoffs on consecutive orbits. Bad weather also delayed re-entry on June 30. Mission Management Team then elected to delay entry one more day. A possible landing opportunity on July 1 was ruled out the day before because of poor lighting for the weather pilot. Landing on orbit 154 was uneventful.</p>
<p>STS-51 Discovery 57</p>	<p>Launch: 9/12/93; 7:45 a.m. EDT. Launch attempt 7/17 ends at T-minus 20 minutes due to a faulty MLP transistor controlling the shuttle's hold-down posts and other pyro devices. Launch attempt No. 2 on 7/24 fails at T-minus 19 seconds when the right-side SRB's HPU failed to operate properly. Launch rescheduled for 8/4, but ultimately delayed to 8/12 to avoid the Persied meteor shower. Launch attempt No. 3 on 8/12 failed at T-minus 3 seconds due to a faulty fuel flow sensor in SSME No. 2 that triggered an RSLs abort. Launch reset for 9/10 and then delayed two days to 9/12 to make sure no faulty transistors were in place aboard the ACTS/TOS payload or other STS systems. This concern was triggered by the August failures of Mars Observer and NOAA-13. Launch on Sept. 12 on time.</p>

	Landing: 09/22/93, 3:56:07 a.m.; Runway 15, KSC (17). Landing orbit: 157. Rollout distance: ??. Rollout time: ??. Touchdown speed: ??. Flight officially scheduled to last nine days, but officials said before launch it would be extended one day, fuel permitting, to permit additional science. MMT, however, ruled out a mission extension after launch. Flight then extended one day anyway because of cloudy weather.
STS-58 Columbia 58	Launch: 10/18/93; 10:53 a.m. EST. Launch attempt on 10/14 delayed by weather, then by problems with an Air Force range computer that stopped the countdown at T-minus 31 seconds. A second attempt on 10/15 delayed by weather and, finally, by the failure of S-band transponder No. 2 aboard the shuttle. Launch on 10/18 came 10 seconds late due to an aircraft in the danger area. Landing: 11/01/93; 10:05:42 a.m. EST; Runway 22, EAFB (39). Landing orbit: 224. Rollout distance: ??. Rollout time: ??. Touchdown speed: ??. Landing was on time and uneventful.
STS-61 Endeavour 59	Launch: 12/02/93; 4:27 a.m. EST. Launch attempt on 12/1 delayed by high winds and clouds in the KSC area. Second attempt on 12/2 is on time and uneventful. Landing: 12/13/93; 12:25:33 a.m. EST; Runway 33, KSC (18). This was the second night landing at KSC and the seventh in shuttle history. Landing orbit: 162. Landing was a bit long, but otherwise uneventful.
STS-60 Discovery 60	Launch: 02/03/94; 7:10 a.m. EST. Launch on time. Landing: 02/11/94; 2:19:22 p.m. EST; Runway 15, KSC (19). Landing orbit: 131. Landing was delayed one orbit due to high winds and clouds. Actual touchdown occurred in fairly heavy cloud cover.
STS-62 Columbia 61	Launch: 03/04/94; 8:53 a.m. EST. Launch was delayed one day due to bad weather. The launch actually was called off the day before the planned 3/3 T-0 in an unusual departure from normal NASA operating procedure. As it turned out, the forecast was accurate. Launch on March 4 was on time and uneventful. Landing: 03/18/94; 8:09:41 a.m. EST; Runway 33, KSC (20). Landing orbit: 224. Landing was on time. After main gear touchdown, Casper steered to the centerline using Columbia's rudder. The vehicle appeared to swerve sharply back and forth. Landing otherwise was uneventful.
STS-59 Endeavour 62	Launch: 04/09/94; 7:05 a.m. EDT. Launch originally set for 4/8 but delayed to 4/9 on first day of countdown to inspect HPOT preburner vanes after problems reported during a teardown at Rocketdyne plant. No problems were found and launch reset for 4/8. Low clouds and high winds ultimately delayed launch 24 more hours. Launch on 4/9 was on time.

	Landing: 04/20/04; 12:54:30 p.m. EDT, Runway 22, EAFB. Landing orbit:282. Landing originally set for 4/18; flight extended one day for additional science. Two KSC landing tries on 4/19 were blocked by low clouds. Third try for KSC on 4/20 again blocked by low clouds; Endeavour diverted to Edwards where landing was uneventful.
STS-65 Columbia 63	<p>Launch: 07/08/94; 12:43 p.m. EDT. Launch on time.</p> <p>Landing: 07/23/94; 6:38:01 a.m. EDT, Runway 33, KSC. Landing orbit: 236. Landing originally planned for 7/22, but clouds and rain in the area forced a one-day waveoff. Landing was uneventful.</p>
STS-64 Discovery 64	<p>Launch: 09/09/94; 6:22:55 p.m. EDT. Launch originally scheduled for 4:30 p.m., but the flight was delayed by heavy clouds over KSC. The countdown held at T-minus nine minutes and finally at T-minus five minutes when conditions appeared to be improving. Shortly thereafter the count resumed and ascent was normal.</p> <p>Landing: 09/20/94; 5:12:52 p.m. EDT, Runway 04, EAFB. Landing orbit 177. Landing originally set for 9/18; one day extension for science. Landing on 9/19 delayed one day by bad weather that blocked two attempts at KSC. Two attempts at KSC on 9/20 also failed; crew then landed at EAFB.</p>
STS-68 Endeavour 65	<p>Launch: 09/30/94; 7:16 a.m. EDT. Launch originally scheduled for 8/18, but the flight was delayed six weeks by an RSLs abort at the T-minus 1.9-second mark. The abort was blamed on higher-than-permitted temperatures in the high pressure liquid oxygen pump of SSME No. 3. The engine was removed and test fired at the Stennis Space Center on 9/2. Engineers concluded the abort was caused by a combination of unrelated factors and not by a generic problem. In the meantime, NASA proceeded with STS-64's launch on 9/9. All three of Endeavour's engines were replaced by SSMEs taken from the shuttle Atlantis. Launch on 9/30 was on time and uneventful.</p> <p>Landing: 10/11/94; 1:02:09 p.m. EDT, Runway 22, EAFB. Landing orbit 183. Landing originally set for 10/10, but the flight was extended one day for additional science. Landing at KSC on 10/11 was blocked by low clouds. Touchdown at EAFB was one orbit late and uneventful.</p>
STS-66 Atlantis 66	<p>Launch: 11/03/94; 11:59:43 a.m. EST. Launch was delayed three minutes and 43 seconds by TAL weather issues.</p> <p>Landing: 11/14/94; 10:33:45 a.m. EST, Runway 22, EAFB. Landing orbit: 175. Landing originally planned for KSC, but Atlantis was diverted to Edwards by high winds and clouds. Landing at EAFB was two orbits late but uneventful.</p>

<p>STS-63 Discovery 67</p>	<p>Launch: 02/03/95; 12:22:04 a.m. EST. Launch originally scheduled for Feb. 2, but the flight was delayed one day to replace a faulty IMU. Launch Feb. 3 was on time.</p> <p>Landing: 2/11/95; 6:50:19 a.m. EST, Runway 15, KSC. Landing orbit: 130. Landing was on time and uneventful.</p>
<p>STS-67 Endeavour 68</p>	<p>Launch: 03/02/95; 1:38:13 a.m. EST. Launch delayed one minute and 13 seconds due to problems with the orbiter's cooling systems. Ascent was uneventful.</p> <p>Landing: 03/18/95; 4:47:00 p.m. EST, Runway 22, EAFB. Landing orbit 262. Landing originally planned for 3/17 at KSC, but the crew was waved off due to stormy weather. A second attempt to land in Florida on 3/18 also was waved off and Endeavour landed at EAFB. This flight, the longest in shuttle history to this point, spanned 6.9 million miles and 262 orbits.</p>
<p>STS-71 Atlantis 69</p>	<p>Launch: 06/27/95; 3:32:19 p.m. EDT. 100th U.S. manned space flight. Launch originally scheduled for late May, but the flight was delayed due to problems launching the Spektr research module to Mir. The first actual launch attempt on June 23 was called off prior to the start of tanking by thunderstorms and heavy rain. A second launch attempt on June 24 was scrubbed at T-minus nine minutes due to more thunderstorms. Launch was delayed to June 27 to reservice PRSD. Liftoff on June 27 was on time and uneventful.</p> <p>Landing: 07/07/95; 10:54:36 a.m. EDT, Runway 15, KSC. Landing orbit 153. Landing on time and uneventful.</p>
<p>STS-70 Discovery 70</p>	<p>Launch: 07/13/95; 9:41:55 a.m. EDT. Launch originally set for late June, then moved up to June 8 after STS-70 slipped from late May to late June (see above). Launch delayed from June 8 to July 13 due to more than 200 holes in the shuttle's external tank drilled by a pair of nesting woodpeckers. STS-71 was launched in the interim. On July 13, STS-70's liftoff was delayed 55 seconds due to contingency procedures required to verify ET destruct system receiver was working properly. Ascent was uneventful.</p> <p>Landing: 07/22/95; 08:02:00 a.m. EDT, Runway 33, KSC. Landing orbit 143. Landing originally scheduled for 7/21; delayed one day by heavy ground fog at KSC. Landing on 7/22 delayed one orbit due to the threat of fog (conditions actually were "go"). Landing on orbit 143 was uneventful.</p>

<p>STS-69 Endeavour 71</p>	<p>Launch: 09/07/95; 11:09 a.m. EDT. Launch originally scheduled for late July, delayed to Aug. 5 to provide more time for crew/ground controller training. Later in July, flight was delayed indefinitely due to suspect O-ring nozzle joints. In early August, Hurricane Erin forced shuttle rollback to VAB. After return to pad 39A, SRB nozzle joint repairs were made. Launch attempt on Aug. 31 called off prior to fueling because of faulty Fuel Cell No. 2. Fuel cell replaced. Launch on Sept. 7 was on time and uneventful.</p> <p>Landing: 09/18/95; 7:37:56 a.m. EDT, Runway 33, KSC. Landing on orbit 171. Landing was on time and uneventful.</p>
<p>STS-73 Columbia 72</p>	<p>Launch: 10/20/95; 9:53 a.m. EDT. Launch originally scheduled for Sept. 28, but delayed to Oct. 5 to replace leaking main fuel valve on SSME No. 1; then delayed to Oct. 6 by Hurricane Opal; Oct. 6 passed up due to hydraulic system problems; Oct. 7 launch try scrubbed due to faulty master events controller; Oct. 14 launch date missed due to unplanned main engine weld inspections; Oct. 15 missed due to low clouds. Launch rescheduled for Oct. 20, after two attempts to launch Atlas-2/UHF rocket. Launch on Oct. 20 on time and uneventful.</p> <p>Landing: 11/05/95; 6:45:22 a.m. EST, Runway 33, KSC. Landing on orbit 256. Landing was on time and uneventful.</p>
<p>STS-74 Atlantis 73</p>	<p>Launch: 11/12/95; 7:30:42 a.m. EST. Launch originally scheduled for Nov. 11, but the flight was delayed 24 hours by high winds, low clouds and rain at all three TAL runways in Spain and Africa. Ascent on Nov. 12 was on time and uneventful.</p> <p>Landing: 11/20/95; 12:01:56 p.m. EST, Runway 33, KSC. Landing on orbit 128. Landing was on time and uneventful.</p>
<p>STS-72 Endeavour 74</p>	<p>Launch: 1/11/96; 4:41 a.m. EST. Launch originally scheduled for 4:18 a.m., but liftoff was delayed 23 minutes due to a communications problem in Houston. Ascent was uneventful.</p> <p>Landing: 01/20/96; 2:41:40 a.m. EST, Runway 15, KSC. Landing on orbit 142. Landing was on time and uneventful.</p>
<p>STS-75 Columbia 75</p>	<p>Launch: 02/22/96; 3:18 p.m. EST. Launched on time.</p> <p>Landing: 03/09/96; 8:58:21 a.m. EST, Runway 33, KSC. Landing originally scheduled for 3/7, but flight extended one day when TSS-1R deploy slipped 24 hours, from 2/24 to 2/25. TSS-1R was lost on 2/25; mission reverted to original duration. Flight then extended one day for additional science. Flight extended one more day, to 3/9, due to bad weather at KSC. First 3/9 opportunity waved off. Landed on second deorbit rev.</p>

<p>STS-76 Atlantis 76</p>	<p>Launch: 03/22/96; 3:13:04 a.m. EST. Launch originally scheduled for 3/21, but NASA's Mission Management Team called off the attempt the day before based on a dismal forecast. Launch on 3/22 was on time. The only anomaly was a hydraulic leak in system No. 3 that had no impact on the mission.</p> <p>Landing: 03/31/96; 8:28:57 a.m. EST, Runway 22, EAFB. During the mission, flight director Jeff Bantle shortened Atlantis' flight by one day to take advantage of expected good weather at KSC. This decision was made in part because of a hydraulic leak during launch. As it turned out, the weather precluded a March 30 landing at KSC and the flight was extended one day to March 31. Atlantis was diverted to Edwards because of uncertain weather at KSC.</p>
<p>STS-77 Endeavour 77</p>	<p>Launch: 05/19/96; 6:30 a.m. EDT. Launched on time.</p> <p>Landing: 05/29/96; 7:09:18 a.m. EDT, Runway 33, KSC. Landing on orbit 161. Landing was on time and uneventful.</p>
<p>STS-78 Columbia 78</p>	<p>Launch: 06/20/96; 10:49 a.m. EDT. Launched on time.</p> <p>Landing: 07/07/96; 8:37:30 a.m. EDT, Runway 33, KSC. Landing on orbit 271. The mission was extended one day for additional science operations. Entry and touchdown were uneventful.</p>
<p>STS-79 Atlantis 79</p>	<p>Launch: 09/16/96; 4:54:49 a.m. EDT. Launch on time. NOTE: Launch originally scheduled for July 31, but the flight was delayed because of 1) Hurricane Bertha, which required a rollback from the pad; 2) work to replace both SRBs due to concern about damage found in Columbia's boosters the preceding June; 3) Hurricane Fran, which required a second rollback.</p> <p>Landing: 09/26/96; 8:13:15 a.m. EDT, Runway 15, KSC. Landing on orbit 160. Landing was on time and uneventful despite the failure earlier in the mission of APU-2.</p>
<p>STS-80 Columbia 80</p>	<p>Launch: 11/19/96, 2:55:47 p.m. EST. Launch delayed two minutes and 47 seconds at the T-minus 31-second mark due to hydrogen in aft compartment. Launch originally scheduled for Oct. 30, but the flight was repeatedly delayed due to concern about booster nozzle erosion discovered after STS-79. On Nov. 13, the flight was delayed from Nov. 15 to 19 because of a bad forecast.</p> <p>Landing: 12/07/96, 6:49:05 a.m. EST, Runway 33, KSC. Landing on orbit 279. Mission was extended two days due to bad weather at the Kennedy Space Center. Touchdown on 12/7 was on time and uneventful. Record flight duration.</p>

<p>STS-81 Atlantis 81</p>	<p>Launch: 01/12/97, 4:27:23 a.m. EST. Launch on time after a virtually problem free countdown.</p> <p>Landing: 01/22/97, 9:22:44 a.m. EST, Runway 33, KSC. Landing on orbit 161. Mission extended one orbit due to low clouds over the landing site.</p>
<p>STS-82 Discovery 82</p>	<p>Launch: 02/11/97, 3:55:17 a.m. EST. Launch on time.</p> <p>Landing: 02/21/97, 03:32:26 a.m. EST, Runway 15, KSC. Mission extended one day due to clouds over the landing site.</p>
<p>STS-83 Columbia 83</p>	<p>Launch: 04/04/97, 02:20:31 p.m. EDT. Launch originally scheduled for April 3, but on April 1, mission managers delayed the flight one day to insulate water coolant lines servicing Columbia's Spacelab research module. Launch on April 4 was delayed 20 minutes by work to close the shuttle's hatch and because of last-minute concern about oxygen concentrations in the fuselage and engine compartment.</p> <p>Landing: 04/08/97, 01:30:45 p.m. EDT, Runway 33, KSC. Planned 16-day mission cut short because of concern about possible fuel cell problem. Heavyweight landing uneventful.</p>
<p>STS-84 Atlantis 84</p>	<p>Launch: 05/15/97, 4:07:48 a.m. EDT. Launch on time.</p> <p>Landing: 05/24/98, 09:27:44 a.m. EDT, Runway 33, KSC. Landing on orbit 145. Re-entry delayed one orbit by weather.</p>
<p>STS-94 Columbia 85</p>	<p>Launch: 07/01/97, 02:02 p.m. EDT. Launch originally scheduled for 2:37 p.m., but it was moved up 47 minutes, to 1:50 p.m., due to threatening weather. Actual liftoff delayed 12 minutes due to rain showers north of the pad.</p> <p>Landing: 07/17/97, 06:46:34 a.m. EDT, Runway 33, KSC. On time.</p>
<p>STS-85 Discovery 86</p>	<p>Launch: 08/07/97, 10:41 a.m. EDT. Launch on time.</p> <p>Landing: 08/19/97, 07:07:59 a.m. EDT, Runway 33, KSC. Landing on orbit 190. Re-entry delayed one day by ground fog at the Kennedy Space Center.</p>

STS-86 Atlantis 87	<p>Launch: 09/25/97, 10:34:19 p.m. EDT. Launch on time.</p> <p>Landing: 10/07/97, 05:55:09 p.m. EST, Runway 15, KSC. Landing on orbit 170. Mission extended one day due to high winds.</p>
STS-87 Columbia 88	<p>Launch: 11/19/97, 02:46 p.m. EST. Launch on time.</p> <p>Landing: 12/05/97, 07:20:04 a.m. EST, Runway 33, KSC. Landing on orbit 252. On time.</p>
STS-89 Endeavour 89	<p>Launch: 01/22/98, 09:48:15 p.m. EST. Launch on time.</p> <p>Landing: 01/31/98, 05:35:09 p.m. EST, Runway 15, KSC. On time.</p>
STS-90 Columbia 90	<p>Launch: 04/17/98, 2:19:00 p.m. EDT. Launch originally scheduled for 4/16 but flight delayed one day to replace a network signal processor (one of two) that formats data to and from the orbiter. The suspect unit would not switch to high data rate mode. Replacement was ordered before fueling began so launch was delayed just one day. Liftoff on April 17 was on time and uneventful.</p> <p>Landing: 05/03/98, 12:08:59 p.m. EDT, Runway 33, KSC. On time. APU-3 was not activated until Mach 2.5 due to failure of water spray boiler cooling system. Entry was uneventful and all three APUs ran normally.</p>
STS-91 Discovery 91	<p>Launch: 06/02/98, 06:06:24 p.m. EDT. Launch on time.</p> <p>Landing: 06/12/98, 02:00:00 p.m. EDT, Runway 15, KSC. On time.</p>
STS-95 Discovery 92	<p>Launch: 10/29/98, 02:19:34 p.m. EST. Launch delayed 19 minutes and 34 seconds by multiple private aircraft in the launch danger zone, presumably to view John Glenn's launch.</p> <p>Landing: 11/07/98, 12:03:31 p.m. EST, Runway 33, KSC. On time.</p>

STS-88 Endeavour 93	<p>Launch: 12/04/98, 03:35:34 a.m. EST. Launch originally set for 12/03, but the flight was delayed 24 hours when the launch team failed to resolve questions about an APU pressure spike at startup before LOX drainback time expired. Later determined to be result of normal startup transient. Launch on 12/04 was on time and uneventful.</p> <p>Landing: 12/15/98, 10:53:29 p.m. EST, Runway 15, KSC. On time.</p>
STS-96 Discovery 94	<p>Launch: 05/27/99, 06:49:42 a.m. EDT. Launch on time.</p> <p>Landing: 06/06/99, 02:02:43 a.m. EDT, Runway 15, KSC. On time.</p>
STS-93 Columbia 95	<p>Launch: 07/23/99, 12:31 a.m. EDT. Launch originally scheduled for 07/20/99, but countdown stopped at T-minus seven seconds when high levels of hydrogen were detected in Columbia's aft compartment; later determined to be a false reading and launch was rescheduled for 07/22/99. Launch scrubbed at T-minus five minutes due to lightning in launch area. Launch on 07/23/99 was on time.</p> <p>Landing: 07/23/99, 11:20:35 a.m. EDT, Runway 33, KSC. On time.</p>
STS-103 Discovery 96	<p>Launch: 12/19/99, 7:50 p.m. EST. Launch originally scheduled for Oct. 14, but the flight was repeatedly delayed to fix extensive shuttle wiring problems discovered in the wake of a short circuit during the STS-93 launch July 23. STS-103 launch retargeted for Oct. 28, then Nov. 19, Dec. 2, Dec. 6, Dec. 9, Dec. 11. Along with frayed wiring, engineers also had to A) replace a main engine due to a drill bit lodged inside; B) repair electrical wiring between the external tank and boosters; C) replace a dented hydrogen recirculation line in the engine compartment. The countdown finally began for a launch attempt Dec. 16 but before fueling began, launch was delayed one day to review the quality of MPS propellant line welds. Launch Dec. 17 was called off due to low clouds and rain. NASA did not bother to tank on Dec. 18 because of continuing bad weather. Discovery finally took off on Dec. 19, the final day possible in 1999 because of a Y2K landing deadline. Discovery's nine target launch dates was a shuttle record. Liftoff Dec. 19 was on time.</p> <p>Landing: 12/27/99, 7:00:47 p.m. EST, Runway 33, KSC. Landing delayed one orbit by high crosswinds. Landing on orbit 120 was uneventful.</p>

<p>STS-99 Endeavour 97</p>	<p>Launch: 02/11/00, 12:43:40 p.m. EST. Launch originally scheduled for Sept. 16, but the flight was repeatedly delayed because of wiring problems (see previous entry). Endeavour was given a clean bill of health in early January and last-minute concern about potential tile problems was resolved by the middle of the month. But low clouds and rain forced NASA to scrub a Jan. 31 launch attempt. And even if the weather had been acceptable, the flight would have been delayed because of concern about the health of a master events controller, or MEC, aboard Endeavour. One of the two aboard Endeavour - MEC-2 - failed a health check at T-minus 29 minutes on Jan. 31. After troubleshooting the problem overnight, NASA managers decided to replace the unit, delaying launch to at least Feb. 9. Due to conflicts with other rocket launches, the flight ultimately slipped to Feb. 11. Liftoff was delayed 13 minutes and 40 seconds by a trio of minor technical problems.</p> <p>Landing: 02/22/00, 06:22:23 p.m. EST, Runway 33, KSC. Landing delayed one orbit due to high crosswinds.</p>
<p>STS-101 Atlantis 98</p>	<p>Launch: 05/99/00, 06:11:09 a.m. EDT. NASA decided in February to break mission STS-106 - ISS 2A.1 - into two missions in order to repair failing batteries aboard the Russian Zarya module as soon as possible. After numerous delays because of technical problems, launch attempts on April 24 and 25 were scrubbed due to high winds at the Kennedy Space Center's emergency runway. An attempt on April 26 was scrubbed because of bad weather at NASA's overseas TAL landing sites. This was the first campaign in shuttle history to attempt three back-to-back launch attempts. Because of conflicts with other rockets on the Air Force Eastern Range, Atlantis ultimately was rescheduled for a launch attempt on May 18. Because of problems launching a new Lockheed Martin Atlas 3R rocket, the shuttle launch slipped to May 19. Launch on May 19 was on time after an uneventful countdown.</p> <p>Landing: 05/29/00, 02:20:17 a.m. EDT, Runway 15, KSC. On time.</p>
<p>STS-106 Atlantis 99</p>	<p>Launch: 09/08/00, 08:45:47 a.m. EDT. On time.</p> <p>Landing: 09/20/00, 03:56:48 a.m. EDT, Runway 15, KSC. Mission extended one day to give astronauts more time to outfit and activate the international space station. Landing on 09/20 was on time.</p>
<p>STS-92 Discovery 100</p>	<p>Launch: 10/11/00, 7:17:00 p.m. EDT. Launch originally set for Oct. 5, but the flight was delayed, first by 24 hours to resolve questions about bolts in the external tank aft attachment system and then to Monday, Oct. 9, because of work to replace a suspect POGO valve in the engine compartment. High winds Oct. 9 prevented engineers from completing fueling preparations and launch was delayed another 24 hours. A launch attempt on Oct. 10 was delayed yet another 24 hours after engineers noticed a metal pip pin lodged on the external tank oxygen feed line system. The final launch attempt on Oct. 11 was on time.</p>

	Landing: 10/24/00, 4:59:41 p.m. EDT, Runway 22, Edwards Air Force Base, Calif. Landing originally planned for Oct. 22, but the flight was extended one day because of high crosswinds at the Kennedy Space Center. More high winds in Florida and bad weather in California forced a second extension. The weather remained unacceptable in Florida on Oct. 24, but conditions were ideal at Edwards Air Force Base, Calif., where the shuttle landed on its first California landing opportunity.
STS-97 Endeavour 101	Launch: 11/30/00, 10:06:01 p.m. EST. On time. Landing: 12/11/00, 6:03:25 p.m. EST, Runway 15, KSC. On time.
STS-98 Atlantis 102	Launch: 02/07/01, 6:13:02 p.m. EST. Launch originally targeted for Jan. 18, but rollout to the pad in December was delayed until after Christmas to inspect suspect wiring in the shuttle's booster separation system. Atlantis was hauled to the pad on Jan. 3 for a launch attempt on Jan. 19. But on Jan. 15, a rollback to the Vehicle Assembly Building for additional booster cable inspections. On Jan. 25, launch was retargeted for Feb. 7. Launch on Feb. 7 was on time. Landing: 02/20/01, 3:33:05 p.m. EST, Runway 22, Edwards Air Force Base, Calif. Landing originally planned for Feb. 18 at the Kennedy Space Center, but landing was delayed to Feb. 19 by high crosswinds at the Florida spaceport. More high winds on Feb. 19 forced an additional on-day delay, to Feb. 20. Atlantis then was diverted to Edwards because of a low deck of clouds that violated NASA's safety limits. Touchdown at Edwards was uneventful.
STS-102 Discovery 103	Launch: 03/08/01, 06:42:09 a.m. EST. On time. Landing: 03/21/01, 02:31:41 a.m. EST, Runway 15, KSC. Landing delayed one orbit because of expected high crosswinds, possible showers. Touchdown was uneventful.
STS-100 Endeavour 104	Launch: 04/19/01, 02:40:42 p.m. EDT. On time. Landing: 05/01/01, 12:10:42 p.m. EDT, Runway 22, Edwards Air Force Base. Mission extended one day to permit additional computer troubleshooting on space station Alpha. Two back-to-back landing opportunities at the Kennedy Space Center were blocked by high winds, low clouds and rain. The forecast was the same the next day, so Endeavour was diverted to Edwards. Landing there was uneventful.

STS-104 Atlantis 105	<p>Launch: 07/12/01, 05:03:59 a.m. EDT. On time.</p> <p>Landing: 07/24/01, 11:38:55 p.m. EDT, Runway 15, KSC. Landing delayed one day due to approaching rain showers. Landing on July 24 was on time and uneventful.</p>
STS-105 Discovery 106	<p>Launch: 08/10/01, 05:10:14 p.m. EDT. Launch originally set for Aug. 9, but the flight was delayed 24 hours by thunderstorms in the Kennedy Space Center area. Launch on Aug. 10 was moved up five minutes, from the preferred time to the opening of the planar window, because of the threat of approaching clouds. Liftoff was uneventful.</p> <p>Landing: 08/22/01, 2:22:58 p.m. EDT, Runway 15, KSC. Landing was delayed one orbit because of rain clouds near the southern end of the runway. The clouds dissipated and entry one orbit later was uneventful.</p>
STS-108 Endeavour 107	<p>Launch: 12/05/01, 5:19:28 p.m. EST. Launch originally set for 11/29, but the flight was put on hold after Russian flight controllers reported problems hard docking a Progress supply ship that arrived at the space station earlier in the week. Launch initially was delayed one day, to Nov. 30, and later to Tuesday, Dec. 4, one day after a spacewalk by the station crew to clear a rubber O-ring seal lodged in the Progress docking interface. The spacewalk was successful. But bad weather on Dec. 4 forced another 24-hour delay. Launch on Dec. 5 as on time and uneventful.</p> <p>Landing: 12/17/01, 12:55:10 p.m. EST, Runway 15, KSC. On time.</p>
STS-109 Columbia 108	<p>Launch: 03/01/02, 6:22:02 a.m. EST. Launch originally targeted for Feb. 28, but the flight was delayed one day because of expected low temperatures. Launch on March 1 was on time and uneventful.</p> <p>Landing: 03/12/02, 4:31:52 a.m., Runway 33, KSC. On time.</p>
STS-110 Atlantis 109	<p>Launch: 04/08/02, 04:44:19 p.m. EDT. Launch originally set for April 4, but the flight was delayed during fueling when a hydrogen vent line on MLP-3 ruptured. Launch on April 8 was delayed at the T-minus 5:30 point because of RF glitches in a backup telemetry channel on the ground. The computer was rebooted in time for a launch just 11 seconds before the window closed.</p> <p>Landing: 04/19/02, 12:26:57 p.m., Runway 33, KSC. On time.</p>

<p>STS-111 Endeavour 110</p>	<p>Launch: 06/05/02, 05:22:49 p.m. EDT. Launch originally was scheduled for May 30, but the flight was scrubbed and recycled for May 31 due to approaching storms. Before fueling began on Friday ,May 31, the flight was delayed to June 3 because of a dismal forecast calling for afternoon and evening thunderstorms through the weekend. Then on June 1, launch was delayed an additional day, to June 4, to give engineers time to replace a suspect nitrogen valve in the ship's left-side OMS pod. The R&R eventually forced NASA to delay the flight yet another day, to June 5, because of problems getting test equipment in place. Launch on June 5 was on time and uneventful.</p> <p>Landing: 06/19/02, 1:57:41 p.m. EDT, Runway 22, EAFB. Landing originally planned for June 17, but two KSC opportunities were waved off due to showers and thunderstorms near the runway. Two more KSC opportunities were waved off June 18 because of similar weather.</p>
<p>STS-112 Atlantis 111</p>	<p>Launch: 10/07/02, 3:45:51 p.m. EDT. Launch originally set for Aug. 22, but the shuttle fleet was grounded in July because of SSME flow liner cracks. STS-112 ultimately slipped to Sept. 28 to accommodate repairs. Launch then slipped to Oct. 2 because of problems with NASA's crawler-transporters. Then, the approach of Hurricane Lili toward the Johnson Space Center prompted a delay to Oct. 7. Launch on Oct. 7 was on time. During ascent, foam from the bipod ramp hit a booster IEA.</p> <p>Landing: 10/18/02, 11:43:40 a.m. EDT, Runway 33, KSC. On time.</p>
<p>STS-113 Endeavour 112</p>	<p>Launch: 11/23/02, 7:49:47 p.m. EST. Launch originally planned for mid October, but the shuttle fleet was grounded in July because of cracks found in hydrogen fuel lines. Launch slipped from Oct. 6 to Nov. 2 and then to Nov. 11 to accommodate the delayed launch of a Soyuz taxi craft to the space station. The shuttle was grounded again on Nov. 10 because of a leak in an oxygen flex hose below the forward payload bay liner. The leak was quickly fixed but in doing so, an access platform bumped Endeavour's robot arm. Engineers eventually declared the arm healthy enough for flight. A launch attempt Nov. 22 was scrubbed due to rain at both Spanish TAL sites. Launch on Nov. 23 was on time and uneventful.</p> <p>Landing: 12/07/02, 2:37:12 p.m. EST, Runway 33, KSC. Landing originally scheduled for 12/4, but predicted clouds and rain showers blocked two attempts in a row. More bad weather blocked landing attempts 12/5 and 12/6. Landing on 12/7 was on time and uneventful.</p>
<p>STS-107 Columbia 113</p>	<p>Launch: 01/16/03, 10:39 a.m. EST. Launch on time. 81.7 seconds after liftoff, a 1.67-pound piece of foam insulation from the ET left bipod ramp broke free and impacted the left wing leading edge around RCC panel No. 8. The foam was seen in video, but the impact site was out of view. Mission managers concluded the shuttle could safely return to Earth as is.</p> <p>Landing: Scheduled for 2/1/03, 9:16 a.m. Sixteen minutes before touchdown, Columbia broke apart at an altitude of 37 miles and a velocity of Mach 12 due to plasma intrusion through a leading edge breach into the interior of the left wing. The breach was caused by the impact of foam debris during ascent 16 days earlier. The left wing melted from the inside out, resulting in loss of control and destruction of the vehicle. All seven astronauts were killed and the shuttle fleet was grounded.</p>

<p>STS-114 Discovery 114</p>	<p>Launch: 07/26/05, 10:39:00 a.m. EDT. Launch originally targeted for July 13, but the countdown was called off two-and-a-half hours before liftoff because of suspect data from one of four hydrogen engine cutoff sensors in the external tank. The cause was never conclusively determined, but all relevant hardware was replaced/inspected. Launch on 7/26 was on time and ECO sensors worked normally. During ascent, however, large pieces of foam insulation fell away from the external tank hydrogen PAL ramp, intertank flange, bipod area and acreage foam.</p> <p>Landing: 08/09/05, 8:11:22 a.m. EDT. Landing originally was planned for 8/8 at the Kennedy Space Center, but cloudy weather blocked two deorbit revs and the flight was extended one day. After waving off the first rev on 8/9, again because of clouds, flight director LeRoy Cain diverted the crew to Edwards. Landing was uneventful.</p>
<p>STS-121 Discovery 115</p>	<p>Launch: 07/04/06, 07:37:55 a.m. EDT. Launch originally targeted for July 1, but launch was scrubbed during the T-9 hold due to rain showers and anvil clouds. A launch attempt July 2 was called off shortly after crew boarding because of showers and cloud cover. NASA stood down July 3 to top of PRSD. After resolution of questions about lost foam insulation on an ET LO2 feedline support bracket, Discovery was cleared for launch July 4. Ascent was on time and uneventful.</p> <p>Landing: 7/19/06, 9:14:43 a.m. EDT, Runway 15, KSC. On time. Starboard air data probe did not initially deploy, but ultimately did. Concern about a small N2 or hydrazine leak in APU 1 caused no problems and no hydrazine was detected on the runway.</p>
<p style="text-align: right;">Compiled by William Harwood</p>	