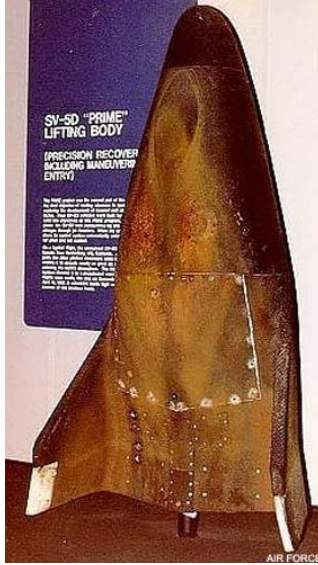


# Total history of the X-24B

From the SV-5P to X-24B in two easy steps

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## Before the X24



The US Air Force SV-5 Project and indeed NASA's involvement in it, predates the manned X-24A and X-24B. Initially the SV5 project involved flight models and the precursor to the X-24A was the X-23, which looks aerodynamically similar to its X series successor

The picture shows the recovered X-23 (SV-5D) on display after its Flight test

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## SV-5P equals X-24A

The X-24 project started out as a U.S. Air Force-only initiative called the SV-5P, but the air force and NASA had already co-operated on the M2-F2 and HL-10 manned lifting bodies and it was agreed that the SV-5P should join the testing at Dryden Flight Research Centre as the: X-24A.

Martin, the contractors for the X-24A, rolled out their aircraft on 11th July 1967, and it joined testing in October that year.



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The stubby X-24A had a curved upper surface and flat bottom, with a span of 4.1m and length of 7.5m. It was powered, in later stages of testing, by a Thiokol XLR-II 8,000lb thrust rocket engine, with two supplementary 500lb thrust hydrogen peroxide rockets to flatten the landing approach. At take off it weighed in at 2850kg.

The first assignment for the X-24A was wind tunnel testing at Ames research laboratories and it only got to Dryden in 1969, making its maiden glide flight after being dropped from the wing of a B-52. The landing at Edwards Air Force Base went smoothly and the craft went on to make nine more un-powered flights before being fitted with the rockets.

Powered flights commenced on 19th March 1970 and the X-24A had been through the sound barrier to Mach 1.16 on 14th October 1970. On 29th March 1971, the X-24A achieved its fastest ever speed at Mach 1.6, and then on 12th May, the highest flight at 21,610m.

The only glitch in the program occurred when one of the rockets shut down early and a small fire started in the engine bay, but the pilot, Capt. Jerauld Gentry made a safe landing. The damage to the aircraft did, however, ground it for two months.

By the end of the program, the pilots were convinced that the X-24A could land on a normal runway, a vital ability for the Space Shuttle orbiter, being designed at the time.

## From X-24A to X-24B

In the late 1960s, the Flight Dynamics Laboratory had designed several aircraft shapes which they believed would have good handling characteristics from Mach 4 up to orbital velocities, but particularly in the range of Mach 8 to Mach 12. They designated these shapes FDL-5,6 and 7. The shapes were important because their lift to drag ratios were around 2.5, compared with 1.5 for some of the earlier lifting bodies.

Instead of building the new shapes from scratch, it was decided to modify an existing lifting body to one of the shapes to save money. Originally this was going to be one of Martin's unused SV-5J bodies, retaining the three vertical fins and calling the new shape FDL-8. In January 1969 the FDL proposed development of a jet powered aircraft along these lines, but rocket propulsion offered more advantages, so the plan was changed to use a currently unused aircraft, the X-24A.

The air force and NASA were both consulted and the project got underway in March 1971 when NASA paid \$550,000 to the USAF to begin acquiring the X-24A. In April, the air force also ratified the plan and pledged the same amount to the program. On 4th June 1971, the X-24A landed from its last flight and on 1st January 1972, the air force awarded the contract to rebuild the craft to Martin Marietta for a price of \$1.1 million. The price of building the FDL-8 shape from scratch could have been \$5 million.

Martin Marietta delivered the newly christened X-24B in late 1972, which had grown to a span of 7.1m and a length of 11.9m and now weighed 6250kg at take off. It had a 78° "double delta" shape for good centre of gravity control, a boat tail, flat bottom (like the X-24A) and a 3° nose ramp for hypersonic trim.

The first glide test on 1st August 1973 confirmed the wind tunnel tests of the shape and the new lifting body performed a perfect landing at 320km/h on the lake-bed runway at Edwards AFB.

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The first powered flight was on 15<sup>th</sup> November 1973 and the fastest flight came just under a year later on 24<sup>th</sup> October 1974, at Mach 1.76. The highest flight was at 29,500m on 22<sup>nd</sup> May 1975 and the first runway landing of a lifting body came later that year on 5<sup>th</sup> August.



# Total history of the X-24B

## From the SV-5P to X-24B in two easy steps

However, the X-24B program was coming to an end, and NASA's last powered test flight came on the 9th September 1975. The four chase planes for that flight, two T-38s and two F-104s, closed into tight formation and performed a flypast marking the end of the X-24B era. The X-24B did make six more glides, but they were familiarisation flights for the air force, and no experiments were done.

The X-24B remained at Dryden/Edwards for a while before going to Kennedy Space Centre as part of an exhibition in 1976. From there it was taken to the air force museum in Ohio, where it still resides today.

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### Flight history of the X-24

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In flight number, the first letter refers to the aircraft (X = X-24A, B = X-24B), the middle number refers to the aircraft free flight and the last number refers to the B-52 flight number.  
X-24A flight log

Date	Flight No.	Max. Height (m)	Max. Speed (Mach no.)	Flight time (s)
17 Apr 69	X-1-2	13,720	0.72	217
08 May 69	X-2-3	13,720	0.69	253
21 Aug 69	X-3-5	12,190	0.58	270
09 Sep 69	X-4-7	12,190	0.59	232
24 Sep 69	X-5-8	12,190	0.59	257
22 Oct 69	X-6-10	12,190	0.59	417
13 Nov 69	X-7-11	13,720	0.65	270
25 Nov 69	X-8-12	13,720	0.69	266
24 Feb 70	X-9-14	14,326	0.77	258
19 Mar 70	X-10-15	13,533	0.87	424
02 Apr 70	X-11-17	17,892	0.87	435
22 Apr 70	X-12-17	17,587	0.93	408
14 May 70	X-13-18	13,594	0.75	513
17 Jun 70	X-14-19	18,593	0.99	432
28 Jul 70	X-15-20	17,678	0.94	388
11 Aug 70	X-16-21	19,477	0.99	413
26 Aug 70	X-17-22	12,649	0.69	479
14 Oct 70	X-18-23	20,696	1.19	411
27 Oct 70	X-19-24	21,763	1.36	417
20 Nov 70	X-20-25	20,604	1.37	432
21 Jan 71	X-21-26	15,819	1.03	462
04 Feb 71	X-22-27	13,716	0.66	235
18 Feb 71	X-23-28	20,544	1.51	447
01 Mar 71	X-24-29	17,343	1.00	437
29 Mar 71	X-25-30	21,488	1.60	446
12 May 71	X-26-32	21,610	1.39	423
25 May 71	X-27-33	19,903	1.19	548
04 Jun 71	X-28-34	16,581	0.82	517

# Total history of the X-24B

From the SV-5P to X-24B in two easy steps

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X-24B flight log

Date	Flight No.	Max. Height (m)	Max. Speed (Mach no.)	Flight time (s)
01 Aug 73	B-1-2	12,190	0.65	252
17 Aug 73	B-2-4	13,720	0.66	267
31 Aug 73	B-3-5	13,720	0.73	277
18 Sep 73	B-4-6	13,720	0.69	271
04 Oct 73	B-5-9	13,720	0.69	279
15 Nov 73	B-6-13	16,080	0.92	404
12 Dec 73	B-7-14	19,080	0.99	434
15 Feb 74	B-8-15	13,720	0.68	307
05 May 74	B-9-16	18,390	1.09	437
30 Apr 74	B-10-21	15,860	0.88	419
24 May 74	B-11-22	17,060	1.14	448
14 Jun 74	B-12-23	19,970	1.23	405
28 Jun 74	B-13-24	20,770	1.39	427
08 Aug 74	B-14-25	22,370	1.54	395
29 Aug 74	B-15-26	22,080	1.10	467
25 Oct 74	B-16-27	21,990	1.76	417
15 Nov 74	B-17-28	21,960	1.62	481
17 Dec 74	B-18-29	20,960	1.59	420
14 Jan 75	B-19-30	22,180	1.75	477
20 Mar 75	B-20-32	21,450	1.44	409
18 Apr 75	B-21-33	17,650	1.20	450
06 May 75	B-22-34	22,370	1.44	448
22 May 75	B-23-35	22,580	1.63	461
06 Jun 75	B-24-36	21,980	1.68	474
25 Jun 75	B-25-38	17,680	1.34	426
15 Jul 75	B-26-39	21,180	1.58	415
05 Aug 75	B-27-40	18,290	1.23	420
20 Aug 75	B-28-41	21,950	1.58	420
09 Sep 75	B-29-42	21,640	1.50	435
23 Sep 75	B-30-43	17,680	1.20	438

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