1
00:00:00,460 --> 00:00:04,880
\h NARRATOR:Almost 10 years before the space shuttle first launched

2
00:00:04,880 --> 00:00:10,480
\h And 25 years before the first pieces of the International Space Station were connected

3
00:00:10,480 --> 00:00:13,700
\h NASA launched Skylab

4
00:00:13,700 --> 00:00:21,110
\h a home above our home planet

5
00:00:21,110 --> 00:00:26,350
\h JON COWART: Hello and welcome. I'm Jon Cowart. NASA has long focused on finding

6
00:00:26,350 --> 00:00:29,280
\h out how astronauts can live and work in space.

7
00:00:29,280 --> 00:00:32,750
\h Finding the answer to that was one of the many reasons behind building

8
00:00:32,750 --> 00:00:34,730
\h the International Space Station.

9
00:00:34,730 --> 00:00:38,910
\h But it was also the driving question meant to be solved by America's first space station,

10
00:00:38,910 --> 00:00:42,000
\h an orbital workshop called Skylab.

11
00:00:42,000 --> 00:00:47,700
\h By the time the last crew left in February 1974, astronauts spent more time in space than

12
00:00:47,700 --> 00:00:50,720
\h all of NASA's previous missions combined.

13
00:00:50,720 --> 00:00:54,020

\h Their research would set the stage for today's successes onboard

14
00:00:54,020 --> 00:00:55,990
\h the International Space Station.

15
00:00:55,990 --> 00:01:01,020
\h NASA and the United States had not yet landed on the moon when the idea of a

16
00:01:01,020 --> 00:01:03,500
\h space station started taking shape.

17
00:01:03,500 --> 00:01:06,370
\h BILL SCHNEIDER, SKYLAB PROGRAM MANAGER: "Our objective was in the first

18
00:01:06,370 --> 00:01:13,550
\h place to get a lot of medical information so that we could have enough data to allow the

19
00:01:13,550 --> 00:01:18,730
\h space station to have crews that could stay up there for six months."

20
00:01:18,730 --> 00:01:24,440
\h JON COWART: The result was Skylab, a workplace in space designed to host scientific

21
00:01:24,440 --> 00:01:27,310
\h discovery without forgetting the comforts of life on Earth.

22
00:01:27,310 --> 00:01:31,870
\h The workshop was built into an empty third stage from a Saturn V moon rocket.

23
00:01:31,870 --> 00:01:36,000
\h A pair of solar wings would fold out to provide electricity for the life support

24
00:01:36,000 --> 00:01:38,320
\h and research equipment inside.

25
00:01:38,320 --> 00:01:42,810
\h The three-man crew would arrive in an Apollo capsule launched aboard another rocket.

26
00:01:42,810 --> 00:01:47,900
\h A telescope to study the sun and other instruments were mounted atop the workshop,

27
00:01:47,900 --> 00:01:51,600
\h and they were powered by four separate solar arrays that gave the Skylab

28
00:01:51,600 --> 00:01:54,240
\h a windmill appearance.

29
00:01:54,240 --> 00:01:59,220
\h The finished complex was folded up, fit into a nosecone on top of a Saturn V rocket

30
00:01:59,220 --> 00:02:05,660
\h and launched into orbit from Kennedy Space Center in Florida on May 14, 1973.

31
00:02:05,660 --> 00:02:11,250
\h But the ascent soon grew too rough for the space station, and the air rushing over the

32
00:02:11,250 --> 00:02:16,680
\h outside of the Saturn V tore off one of the large solar panels and a crucial heat shield

33
00:02:16,680 --> 00:02:18,580
\h meant to protect the workshop.

34
00:02:18,580 --> 00:02:22,960
\h JON COWART: The second large solar panel was stuck in place, and Skylab reached

35
00:02:22,960 --> 00:02:25,700
\h orbit critically low on electricity.

36
00:02:25,700 --> 00:02:30,150
\h Engineers struggled to find a fix for the outpost, and it fell to the first Skylab

37
00:02:30,150 --> 00:02:32,280
\h crew to make it work.

38
00:02:32,280 --> 00:02:36,160

\h JOE KERWIN: The situation that faced our crew as we launched, of course,

39
00:02:36,160 --> 00:02:42,180
\h was the broke Skylab. It was hot, it lacked electrical power.

40
00:02:42,180 --> 00:02:47,240
\h The whole program might be lost and we launched with a command module full of

41
00:02:47,240 --> 00:02:49,650
\h instruments many of which we had never seen before.

42
00:02:49,650 --> 00:02:53,030
\h They handed us the checklist kind of on the way in and said, "Good luck, guys."

43
00:02:53,030 --> 00:02:57,630
\h JON COWART: Moonwalker Pete Conrad and astronauts Joe Kerwin and Paul Weitz

44
00:02:57,630 --> 00:03:01,160
\h lifted off May 25 with a kit to save the mission.

45
00:03:01,160 --> 00:03:07,950
\h LAUNCH COMMENTATOR: The clock is running and Skylab has cleared the tower.

46
00:03:07,950 --> 00:03:12,370
\h JON COWART: The astronauts found the crippled Skylab as they expected and quickly

47
00:03:12,370 --> 00:03:16,170
\h deployed a sunshield over the exposed section of the laboratory.

48
00:03:16,170 --> 00:03:21,840
\h BILL SCHNEIDER: When we lost that heat shield, we proved that man was a very, very

49
00:03:21,840 --> 00:03:29,440
\h vital part of space exploration and that he could do a lot of repairs and fixes.

50
00:03:29,440 --> 00:03:33,600
\h NARRATOR: Repairs and improvements would follow throughout the Skylab program,

51
00:03:33,600 --> 00:03:37,740
\h including spacewalks that ultimately freed that stuck solar panel.

52
00:03:37,740 --> 00:03:43,020
\h With Skylab back in shape, three crews of astronauts would go on to prove they could

53
00:03:43,020 --> 00:03:47,220
\h handle weeks at a time in microgravity with few ill effects.

54
00:03:47,220 --> 00:03:53,190
\h They recorded brilliant images of the sun and took the first pictures of solar flares.

55
00:03:53,190 --> 00:03:57,920
\h And they turned sensitive instruments toward Earth, offering the first comprehensive

56
00:03:57,920 --> 00:04:00,840
\h studies of our home planet.

57
00:04:00,840 --> 00:04:04,550
\h Skylab was a pioneering home for astronauts in several ways.

58
00:04:04,550 --> 00:04:09,130
\h Astronauts set a record for spacewalks as they repaired the space station on the first

59
00:04:09,130 --> 00:04:12,480
\h flight, and then serviced Skylab's instruments throughout the missions.

60
00:04:12,480 --> 00:04:16,580
\h They also spent many hours simply learning how to live comfortably in space.

61
00:04:16,580 --> 00:04:21,420
\h So, NASA designed Skylab to include many of the features of home. Take a look . . .

62
00:04:21,420 --> 00:04:25,920
\h For the first time, astronauts were in orbit long enough to see their hair grow appreciably

63
00:04:25,920 --> 00:04:29,750

\h during a mission. So they learned barber skills that worked in space,

64
00:04:29,750 --> 00:04:32,950
\h notably using a vacuum to get the loose hairs.

65
00:04:32,950 --> 00:04:38,600
\h A vacuum came in handy again as the crews used one to pull water away in the shower

66
00:04:38,600 --> 00:04:40,840
\h designed to work in weightlessness.

67
00:04:40,840 --> 00:04:45,840
\h They adjusted to sleeping in an open space while floating. And they learned the value of exercise,

68
00:04:45,840 --> 00:04:50,790
\h an important lesson that is applied vigorously to the International Space Station crews.

69
00:04:50,790 --> 00:04:54,630
\h Of course, there were plenty of experiments, too.

70
00:04:54,630 --> 00:04:58,690
\h The Skylab medical experiments were perhaps one of the most important things nasa

71
00:04:58,690 --> 00:05:03,340
\h accomplished during Skylab missions. One of Kerwin's jobs was drawing blood from his

72
00:05:03,340 --> 00:05:06,270
\h Skylab 2 commander Pete Conrad and crewmate Paul Weitz . . .

73
00:05:06,270 --> 00:05:10,900
\h JOE KERWIN: His area of weakness that I already detected on the ground was that he

74
00:05:10,900 --> 00:05:13,370
\h does not like needles and he has a tendency to pass out

75
00:05:13,370 --> 00:05:15,450
\h when you stick him with a needle.

76
00:05:15,450 --> 00:05:20,370
\h You can't pass out in zero-g, you just can't, the blood doesn't rush to the feet, you know.

77
00:05:20,370 --> 00:05:24,230
\h JON COWART: The crews learned it took the body about 16 days to completely

78
00:05:24,230 --> 00:05:26,210
\h adapt to weightlessness.

79
00:05:26,210 --> 00:05:30,840
\h JOE KERWIN: It was a beautiful machine. It was clean, it was quiet, we had plenty of

80
00:05:30,840 --> 00:05:33,090
\h volume to do our thing.

81
00:05:33,090 --> 00:05:36,480
\h We'd go off after breakfast in the morning, somebody would go to do Earth resources,

82
00:05:36,480 --> 00:05:40,070
\h somebody would go do solar physics, somebody would be downstairs doing

83
00:05:40,070 --> 00:05:42,770
\h housekeeping and you couldn't even hear or see each other,

84
00:05:42,770 --> 00:05:44,830
\h you'd have to talk on the intercom.

85
00:05:44,830 --> 00:05:49,930
\h AL BEAN: Skylab, later on in the mission, although I loved the mission, a lot of the days

86
00:05:49,930 --> 00:05:58,300
\h were repetitive and you had to have good self-discipline to really do well. I felt it took a

87
00:05:58,300 --> 00:06:05,250
\h lot more self-discipline to fly a good Skylab mission than it did to fly a good lunar

88
00:06:05,250 --> 00:06:09,200

\h mission because of this one psychological thing.

89
00:06:09,200 --> 00:06:13,490
\h JON COWART: The work on Skylab gave NASA fundamental information that would

90
00:06:13,490 --> 00:06:16,950
\h later be used to design and build the International Space Station.

91
00:06:16,950 --> 00:06:20,380
\h Living and working in space brought about completely unexpected

92
00:06:20,380 --> 00:06:22,320
\h challenges and solutions.

93
00:06:22,320 --> 00:06:26,820
\h Even something as simple as moving around inside the large orbiting workshop

94
00:06:26,820 --> 00:06:29,990
\h was not done the way astronauts expected.

95
00:06:29,990 --> 00:06:33,250
\h PETE CONRAD: Tell you one thing, the four Conrad boys would sure have a blast up

96
00:06:33,250 --> 00:06:36,260
\h here, along with every other kid in the United States if they could ever get inside.

97
00:06:36,260 --> 00:06:38,760
\h It'd be Disneyland and everything else.

98
00:06:38,760 --> 00:06:44,540
\h AL BEAN: But mostly we said you'd just crawl along or move along and after the very first

99
00:06:44,540 --> 00:06:49,650
\h day of watching you, nobody crawled anywhere, everybody flew everywhere.

100
00:06:49,650 --> 00:06:53,770
\h JON COWART: There were other, more complex problems to solve, too, and the

101
00:06:53,770 --> 00:06:57,990
\h solutions would become an encyclopedia for the International Space Station.

102
00:06:57,990 --> 00:07:02,690
\h AL BEAN: So many things were learned on Skylab are going to be needed in space

103
00:07:02,690 --> 00:07:05,570
\h station and there's no way to figure them out on the ground.

104
00:07:05,570 --> 00:07:09,230
\h JON COWART: Before astronauts learned how to live and work inside the

105
00:07:09,230 --> 00:07:12,390
\h International Space Station, designers pored over the lessons of Skylab.

106
00:07:12,390 --> 00:07:16,730
\h They considered the kind of accommodations astronauts would want, judging them

107
00:07:16,730 --> 00:07:19,510
\h against what worked 35 years earlier.

108
00:07:19,510 --> 00:07:25,260
\h Skylab also contributed to parts of the space shuttle program, notably the jetpack called

109
00:07:25,260 --> 00:07:29,180
\h the Manned Maneuvering Unit used by spacewalkers to float free of the shuttle

110
00:07:29,180 --> 00:07:31,070
\h to retrieve satellites.

111
00:07:31,070 --> 00:07:36,120
\h Skylab astronauts flew the prototype jet pack in the expansive workshop area.

112
00:07:36,120 --> 00:07:40,620
\h They proved they could keep control in weightlessness and refined what kind of control

113
00:07:40,620 --> 00:07:42,800

\h system would be used.

114
00:07:42,800 --> 00:07:47,670
\h About 10 years after the last Skylab crew left space, Bruce McCandless used the Manned

115
00:07:47,670 --> 00:07:52,090
\h Maneuvering Unit to fly far from the space shuttle Challenger and back safely.

116
00:07:52,090 --> 00:07:56,280
\h The jet packs would be used again on later flights to catch satellites and bring them back

117
00:07:56,280 --> 00:07:59,230
\h to the shuttle so they could be repaired and returned to service.

118
00:07:59,230 --> 00:08:02,230
\h JON COWART: From what it set out to do to what it ultimately accomplished,

119
00:08:02,230 --> 00:08:06,880
\h Skylab has remained a fascinating element of NASA's history, and an important map

120
00:08:06,880 --> 00:08:08,330
\h for its future.

121
00:08:08,330 --> 00:08:13,580
\h One day astronauts may fly inside vehicles inspired by Skylab and its crews for months

122
00:08:13,580 --> 00:08:17,460
\h on end as they traverse the millions of miles on the way to Mars.

123
00:08:17,460 --> 00:08:22,260
\h On future missions, astronauts will likely be called on to improvise repairs and make

124
00:08:22,260 --> 00:08:25,630
\h other changes to their spacecraft by conducting unplanned spacewalks.