



1
00:00:07,829 --> 00:00:05,430
over 200 miles above the earth crews

2
00:00:11,509 --> 00:00:07,839
continually live and work aboard the

3
00:00:13,430 --> 00:00:11,519
international space station or iss

4
00:00:15,509 --> 00:00:13,440
a technological marvel the size of a

5
00:00:17,990 --> 00:00:15,519
football field the station is a

6
00:00:20,310 --> 00:00:18,000
world-class laboratory where scientific

7
00:00:21,910 --> 00:00:20,320
research is conducted free from earth's

8
00:00:23,990 --> 00:00:21,920
gravity

9
00:00:26,230 --> 00:00:24,000
but we would not be here if not for

10
00:00:27,349 --> 00:00:26,240
another space station from an earlier

11
00:00:31,029 --> 00:00:27,359
era

12
00:00:33,110 --> 00:00:31,039
skylab america's first space station

13
00:00:35,350 --> 00:00:33,120

launched in 1973

14

00:00:37,590 --> 00:00:35,360

skylab was a bold adventure taking

15

00:00:39,990 --> 00:00:37,600

research to new heights influencing how

16

00:00:41,510 --> 00:00:40,000

we live and work in space today and

17

00:00:44,470 --> 00:00:41,520

paving the way for our future

18

00:00:46,869 --> 00:00:44,480

explorations into the solar system three

19

00:00:48,869 --> 00:00:46,879

skylab crews completed about 300

20

00:00:51,510 --> 00:00:48,879

experiments to answer questions about

21

00:00:52,549 --> 00:00:51,520

our planet our universe and living in

22

00:00:55,350 --> 00:00:52,559

space

23

00:00:58,549 --> 00:00:55,360

the variety of disciplines included

24

00:00:59,990 --> 00:00:58,559

human physiology

25

00:01:04,310 --> 00:01:00,000

science

26

00:01:08,390 --> 00:01:04,320

technology demonstration

27

00:01:12,630 --> 00:01:10,830

skylab was america's first foray into

28

00:01:14,630 --> 00:01:12,640

microgravity-based scientific and

29

00:01:16,789 --> 00:01:14,640

technological research and was an

30

00:01:19,830 --> 00:01:16,799

important stepping stone for the design

31

00:01:24,070 --> 00:01:19,840

construction operation and utilization

32

00:01:29,270 --> 00:01:27,109

on board the iss scientists use more

33

00:01:32,230 --> 00:01:29,280

advanced technology a foundation of

34

00:01:36,550 --> 00:01:32,240

knowledge and more time to expand upon

35

00:01:41,910 --> 00:01:39,350

of all the questions asked on skylab one

36

00:01:44,950 --> 00:01:41,920

of the most important was how long can

37

00:01:47,749 --> 00:01:44,960

humans live in space

38

00:01:49,749 --> 00:01:47,759

the skylab astronauts lost body mass and

39

00:01:53,109 --> 00:01:49,759

bone mineral density due to the lack of

40

00:01:56,069 --> 00:01:53,119

loading in the microgravity environment

41

00:01:59,109 --> 00:01:56,079

today studies on iss have shown that

42

00:02:01,830 --> 00:01:59,119

sufficient resistive exercise and proper

43

00:02:04,389 --> 00:02:01,840

nutrition can maintain bone density on

44

00:02:06,789 --> 00:02:04,399

long duration space flights

45

00:02:07,670 --> 00:02:06,799

as medical technologies have advanced on

46

00:02:09,669 --> 00:02:07,680

earth

47

00:02:12,150 --> 00:02:09,679

so has our ability to understand the

48

00:02:15,750 --> 00:02:12,160

changes that occur in astronauts during

49

00:02:20,949 --> 00:02:18,790

skylab had its own factory on board

50

00:02:23,750 --> 00:02:20,959

proving materials processing experiments

51
00:02:25,750 --> 00:02:23,760
could be conducted in space

52
00:02:27,110 --> 00:02:25,760
in the microgravity environment aboard

53
00:02:29,030 --> 00:02:27,120
the iss

54
00:02:31,670 --> 00:02:29,040
scientists study crystal growth and

55
00:02:33,990 --> 00:02:31,680
fluid physics processes without buoyancy

56
00:02:36,550 --> 00:02:34,000
driven convection or sedimentation to

57
00:02:38,790 --> 00:02:36,560
distort structures

58
00:02:41,830 --> 00:02:38,800
these studies lead to lighter stronger

59
00:02:45,670 --> 00:02:41,840
alloys better medications and longer

60
00:02:50,309 --> 00:02:47,990
one of the greatest scientific legacies

61
00:02:51,830 --> 00:02:50,319
of skylab were the astronomical

62
00:02:55,750 --> 00:02:51,840
observations

63
00:02:58,309 --> 00:02:55,760

made from the apollo telescope mount

64

00:03:00,470 --> 00:02:58,319

this instrument rack kept skylab's array

65

00:03:02,710 --> 00:03:00,480

of eight solar telescopes pointed at the

66

00:03:04,710 --> 00:03:02,720

sun during a period of extraordinary

67

00:03:07,030 --> 00:03:04,720

high activity

68

00:03:09,270 --> 00:03:07,040

skylab studies of our sun gave us new

69

00:03:11,910 --> 00:03:09,280

insights into the basic processes of

70

00:03:14,229 --> 00:03:11,920

solar behavior changing the course of

71

00:03:17,030 --> 00:03:14,239

modern solar physics

72

00:03:19,830 --> 00:03:17,040

skylab astronaut ed gibson even filmed

73

00:03:23,110 --> 00:03:19,840

the birth of a solar flare from space

74

00:03:25,030 --> 00:03:23,120

the first such recording in history

75

00:03:26,949 --> 00:03:25,040

the ability of the skylab crew and

76

00:03:29,350 --> 00:03:26,959

scientists on the ground to react

77

00:03:31,509 --> 00:03:29,360

quickly to unexpected occurrences

78

00:03:34,309 --> 00:03:31,519

greatly enhanced the scientific bounty

79

00:03:37,190 --> 00:03:34,319

from skylab and was powerful evidence of

80

00:03:39,430 --> 00:03:37,200

the value of humans and machines working

81

00:03:41,910 --> 00:03:39,440

together in space

82

00:03:45,270 --> 00:03:41,920

today spectrophotometers mounted on the

83

00:03:47,430 --> 00:03:45,280

outside of iss measure solar irradiance

84

00:03:48,710 --> 00:03:47,440

the energy from the sun that reaches

85

00:03:50,229 --> 00:03:48,720

earth

86

00:03:52,149 --> 00:03:50,239

this is of importance to both

87

00:03:54,789 --> 00:03:52,159

earth-based and space-borne

88

00:03:57,990 --> 00:03:54,799

communication systems as well as to our

89

00:04:02,949 --> 00:04:00,550

the skylab crew took more than 40 000

90

00:04:04,710 --> 00:04:02,959

photographs of the earth of value to

91

00:04:07,350 --> 00:04:04,720

those involved in improvements of

92

00:04:08,789 --> 00:04:07,360

agriculture and forestry geological

93

00:04:10,550 --> 00:04:08,799

applications

94

00:04:12,710 --> 00:04:10,560

studies of the oceans

95

00:04:15,589 --> 00:04:12,720

coastal zones continental water

96

00:04:17,590 --> 00:04:15,599

resources investigations of atmospheric

97

00:04:18,789 --> 00:04:17,600

phenomena regional planning and

98

00:04:22,870 --> 00:04:18,799

development

99

00:04:25,030 --> 00:04:22,880

sensing techniques

100

00:04:27,590 --> 00:04:25,040

since the first mission to the iss over

101
00:04:30,150 --> 00:04:27,600
12 years ago over 1 million photographs

102
00:04:32,629 --> 00:04:30,160
have been taken of our home planet

103
00:04:34,469 --> 00:04:32,639
there are also specialized cameras such

104
00:04:37,030 --> 00:04:34,479
as the hyperspectral imager for the

105
00:04:38,950 --> 00:04:37,040
coastal ocean which separates light into

106
00:04:40,390 --> 00:04:38,960
hundreds of wavelength channels

107
00:04:42,870 --> 00:04:40,400
revealing information about the

108
00:04:47,350 --> 00:04:42,880
composition and quality of water and

109
00:04:51,990 --> 00:04:49,350
if we are going to live long term in

110
00:04:53,590 --> 00:04:52,000
space we need to maintain astronaut

111
00:04:55,909 --> 00:04:53,600
health

112
00:04:58,790 --> 00:04:55,919
studies begun on sky lab led to more

113
00:05:00,870 --> 00:04:58,800

advanced investigations today

114

00:05:03,430 --> 00:05:00,880

ultrasound training methods developed

115

00:05:05,909 --> 00:05:03,440

for use on iss have been used by the

116

00:05:08,469 --> 00:05:05,919

american college of surgeons to teach

117

00:05:10,790 --> 00:05:08,479

imaging techniques to doctors

118

00:05:13,189 --> 00:05:10,800

these techniques have applications for

119

00:05:15,430 --> 00:05:13,199

diagnosis of injuries and illness in

120

00:05:19,749 --> 00:05:15,440

remote locations on earth

121

00:05:21,749 --> 00:05:19,759

including disaster areas and war zones

122

00:05:24,629 --> 00:05:21,759

in an experiment proposed by a high

123

00:05:27,110 --> 00:05:24,639

school student spiders named arabella

124

00:05:29,350 --> 00:05:27,120

and anita were brought to skylab at

125

00:05:31,189 --> 00:05:29,360

first they had difficulty spinning webs

126

00:05:33,670 --> 00:05:31,199

but when they became acclimated to the

127

00:05:35,510 --> 00:05:33,680

space environment they spun webs closely

128

00:05:36,550 --> 00:05:35,520

resembling those that they had spun on

129

00:05:38,870 --> 00:05:36,560

earth

130

00:05:40,870 --> 00:05:38,880

this prompted scientist astronaut owen

131

00:05:43,110 --> 00:05:40,880

garriott to observe that the spiders had

132

00:05:44,790 --> 00:05:43,120

learned very rapidly in microgravity

133

00:05:46,469 --> 00:05:44,800

without the benefit of any previous

134

00:05:48,230 --> 00:05:46,479

experience

135

00:05:50,950 --> 00:05:48,240

recently a high school student

136

00:05:52,950 --> 00:05:50,960

experiment on iss demonstrated that

137

00:05:55,430 --> 00:05:52,960

jumping spiders could also adapt to the

138

00:05:59,830 --> 00:05:55,440

microgravity environment and continue to

139

00:06:04,950 --> 00:06:02,550

the pioneering crews the operations

140

00:06:07,350 --> 00:06:04,960

teams on the ground and the scientists

141

00:06:09,510 --> 00:06:07,360

of skylab set the stage for the work

142

00:06:10,320 --> 00:06:09,520

conducted today on the international

143

00:06:12,550 --> 00:06:10,330

space station

144

00:06:15,270 --> 00:06:12,560

[Music]

145

00:06:17,749 --> 00:06:15,280

on board scientific research continues

146

00:06:21,590 --> 00:06:17,759

to benefit all of humanity and prepares

147

00:06:23,670 --> 00:06:21,600

us for further exploration in space

148

00:06:26,469 --> 00:06:23,680

but all future journeys will harken back

149

00:06:29,270 --> 00:06:26,479

to skylab when we first took that long

150

00:06:31,749 --> 00:06:29,280

voyage off our planet seeking answers

151

00:06:33,560 --> 00:06:31,759

and overcoming the challenges of space