



1  
00:00:04,400 --> 00:00:22,490  
1:49 ago welcome to the so for sabit at

2  
00:00:28,740 --> 00:00:25,530  
the so first one mission set out to

3  
00:00:31,679 --> 00:00:28,750  
create a dwelling a habitat inspired by

4  
00:00:35,010 --> 00:00:31,689  
biology and designed with an easily

5  
00:00:37,229 --> 00:00:35,020  
expandable modular footprint prior to

6  
00:00:39,180 --> 00:00:37,239  
construction tremendous preparation is

7  
00:00:41,880 --> 00:00:39,190  
necessary for the astronauts arrival

8  
00:00:43,770 --> 00:00:41,890  
after the lander touches down Rover

9  
00:00:46,500 --> 00:00:43,780  
robots are deployed for regolith

10  
00:00:48,840 --> 00:00:46,510  
collection following optimal site

11  
00:00:51,420 --> 00:00:48,850  
selection the lander seals to the ground

12  
00:00:53,460 --> 00:00:51,430  
to create a pressurized environment for

13  
00:00:56,399 --> 00:00:53,470

printing protecting the print process

14

00:00:58,770 --> 00:00:56,409  
from the harsh Martian atmosphere during

15

00:01:01,799 --> 00:00:58,780  
Rover material harvesting Martian

16

00:01:05,610 --> 00:01:01,809  
aggregate ice and minerals are collected

17

00:01:07,830 --> 00:01:05,620  
tested and processed aggregate mixed

18

00:01:10,110 --> 00:01:07,840  
with cement derived from Martian

19

00:01:13,380 --> 00:01:10,120  
carbonates and water create concrete

20

00:01:15,630 --> 00:01:13,390  
suitable for habitat construction the

21

00:01:19,890 --> 00:01:15,640  
lander then prepares for the printing

22

00:01:22,410 --> 00:01:19,900  
phase beginning with HDPE a highly

23

00:01:24,990 --> 00:01:22,420  
recyclable thermoplastic the nozzle

24

00:01:27,480 --> 00:01:25,000  
prints slightly ahead of a second nozzle

25

00:01:29,550 --> 00:01:27,490  
printing Martian concrete this method

26  
00:01:32,399 --> 00:01:29,560  
provides the necessary support structure

27  
00:01:35,730 --> 00:01:32,409  
for the 3d print which enables printing

28  
00:01:38,520 --> 00:01:35,740  
of highly sloped overhangs the lander

29  
00:01:40,560 --> 00:01:38,530  
printer also contains robotic arms that

30  
00:01:43,499 --> 00:01:40,570  
maneuver to place prefabricated parts

31  
00:01:45,870 --> 00:01:43,509  
throughout the printing process the

32  
00:01:48,179 --> 00:01:45,880  
shell of the habitat is composed of a

33  
00:01:50,910 --> 00:01:48,189  
structural outer shell and an airtight

34  
00:01:53,639 --> 00:01:50,920  
inner layer much like a bicycle tire and

35  
00:01:56,399 --> 00:01:53,649  
tube the thick and firm outer Martian

36  
00:01:58,529 --> 00:01:56,409  
concrete shell structurally confines and

37  
00:02:02,190 --> 00:01:58,539  
protects the thin and flexible inner

38  
00:02:04,130 --> 00:02:02,200

layer of HDPE because Mars experiences

39

00:02:06,630 --> 00:02:04,140

tremendous daily temperature swings

40

00:02:08,400 --> 00:02:06,640

thermal cycling causes concrete to

41

00:02:11,460 --> 00:02:08,410

expand and contract which ultimately

42

00:02:13,890 --> 00:02:11,470

leads to fractures in the concrete to

43

00:02:16,590 --> 00:02:13,900

mitigate cracking the outer surface of

44

00:02:19,680 --> 00:02:16,600

the habitat includes a solar oriented

45

00:02:21,390 --> 00:02:19,690

HDPE shading system that shields

46

00:02:23,490 --> 00:02:21,400

portions of the concrete shell that are

47

00:02:26,340 --> 00:02:23,500

exposed to the longest duration of

48

00:02:28,470 --> 00:02:26,350

direct sunlight significantly reducing

49

00:02:31,680 --> 00:02:28,480

the magnitude of thermal stress while

50

00:02:34,390 --> 00:02:31,690

minimizing material use

51  
00:02:36,340 --> 00:02:34,400  
additionally the reflective shading

52  
00:02:38,770 --> 00:02:36,350  
layer is integrated into the

53  
00:02:40,810 --> 00:02:38,780  
thermoplastic reinforcement this

54  
00:02:41,470 --> 00:02:40,820  
reinforcement is used in two different

55  
00:02:44,560 --> 00:02:41,480  
ways

56  
00:02:46,510 --> 00:02:44,570  
first the solid thermoplastic strands

57  
00:02:49,720 --> 00:02:46,520  
provide primary structural resistance

58  
00:02:53,710 --> 00:02:49,730  
then the secondary strands web inside

59  
00:02:56,980 --> 00:02:53,720  
the shell for binding through the main

60  
00:02:59,320 --> 00:02:56,990  
suit hatch is the communal unit the hats

61  
00:03:01,300 --> 00:02:59,330  
leads to an interior suit airlock to

62  
00:03:04,060 --> 00:03:01,310  
protect the Eevee a suits from the

63  
00:03:06,280 --> 00:03:04,070

Martian environment this unit is the

64

00:03:08,770 --> 00:03:06,290

largest space and the zou phorus habitat

65

00:03:11,890 --> 00:03:08,780

and is the primary hub that connects to

66

00:03:14,470 --> 00:03:11,900

the other modules the communal module

67

00:03:17,350 --> 00:03:14,480

also serves as the dock for the Mars

68

00:03:19,720 --> 00:03:17,360

rover the mezzanine level with its

69

00:03:22,390 --> 00:03:19,730

natural lighting expansive views and

70

00:03:24,220 --> 00:03:22,400

surrounding vegetation provides the crew

71

00:03:26,320 --> 00:03:24,230

with an ideal space for social

72

00:03:29,830 --> 00:03:26,330

interactions and remote operations

73

00:03:31,810 --> 00:03:29,840

control the hydroponic gardens assist

74

00:03:35,260 --> 00:03:31,820

with oxygen production and co2

75

00:03:37,540 --> 00:03:35,270

absorption in addition the external

76  
00:03:39,490 --> 00:03:37,550  
translucent radiation shield can be

77  
00:03:43,030 --> 00:03:39,500  
activated to protect the crew during

78  
00:03:45,400 --> 00:03:43,040  
peak radiation exposure hours the crew

79  
00:03:49,120 --> 00:03:45,410  
quarters contain four bedrooms four rest

80  
00:03:51,580 --> 00:03:49,130  
leisure and privacy each space contains

81  
00:03:54,850 --> 00:03:51,590  
storage for personal items emergency

82  
00:03:57,070 --> 00:03:54,860  
pressure suits and a viewport the crew

83  
00:04:00,100 --> 00:03:57,080  
unit also contains a sanitation room

84  
00:04:01,960 --> 00:04:00,110  
equipped with plumbing facilities the

85  
00:04:04,720 --> 00:04:01,970  
laboratory module provides a flexible

86  
00:04:07,330 --> 00:04:04,730  
space for studying Mars complete with

87  
00:04:10,290 --> 00:04:07,340  
work surfaces computer stations lab

88  
00:04:12,340 --> 00:04:10,300

equipment and communications technology

89

00:04:15,490 --> 00:04:12,350

electrical and plumbing systems are

90

00:04:17,650 --> 00:04:15,500

centrally located for easy routing the

91

00:04:20,470 --> 00:04:17,660

lab also features a second Rover hatch

92

00:04:24,220 --> 00:04:20,480

to enable quick loading and unloading of

93

00:04:26,350 --> 00:04:24,230

field samples the zou phorus habitat has

94

00:04:29,350 --> 00:04:26,360

the unique ability to grow with the

95

00:04:31,480 --> 00:04:29,360

demands of research and crew the Mobile

96

00:04:34,120 --> 00:04:31,490

Printer is equipped to build and make

97

00:04:36,250 --> 00:04:34,130

repairs on-site while also serving as a

98

00:04:37,559 --> 00:04:36,260

backup pressure vessel in case of an

99

00:04:41,350 --> 00:04:37,569

emergency

100

00:04:44,379 --> 00:04:41,360

the sofa is habitat building a new way

101

00:04:48,630 --> 00:04:44,389

forward for space exploration and human