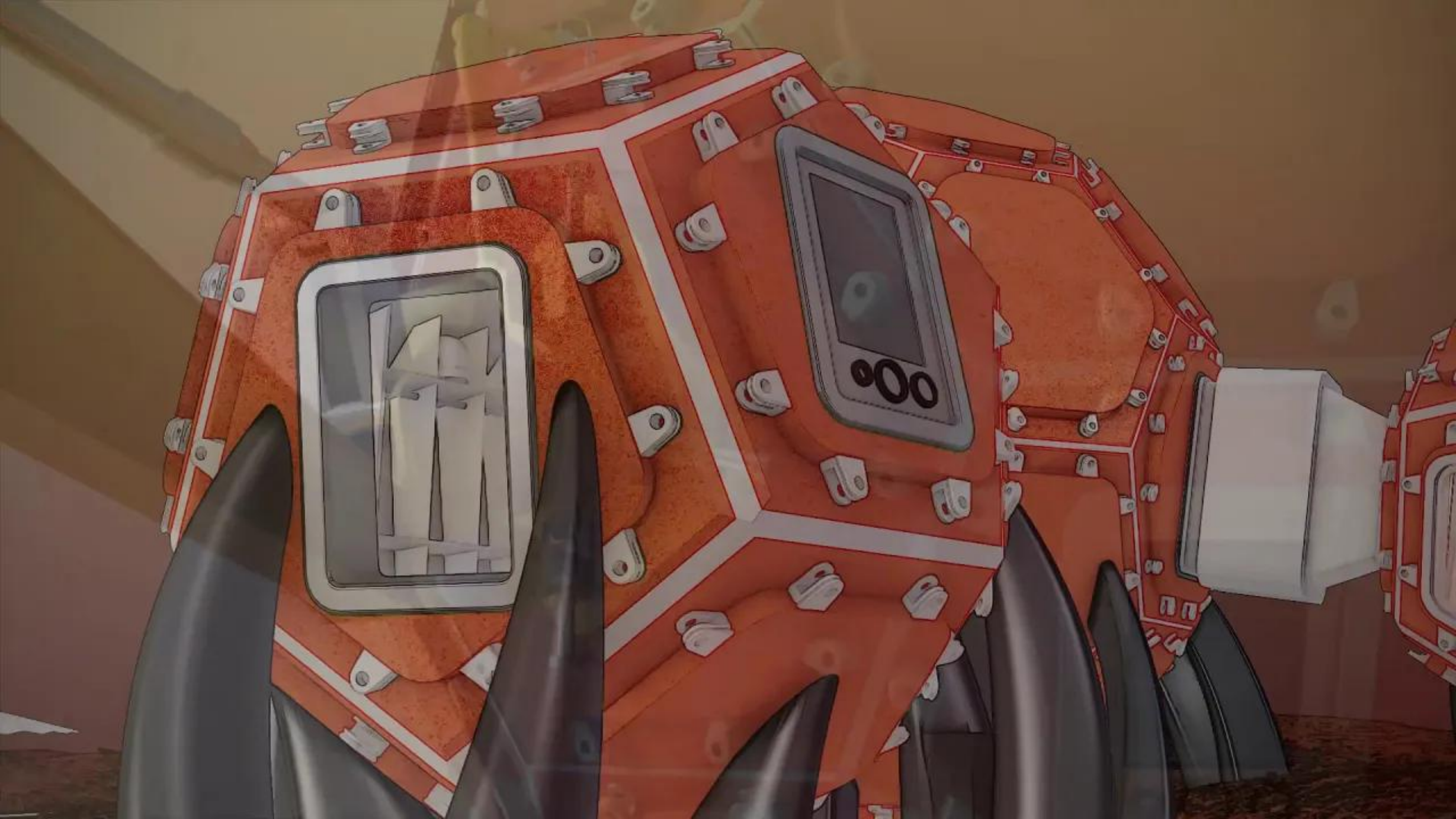

1
00:00:05,260 --> 00:00:03,669
welcome to the Mars incubator this

2
00:00:06,940 --> 00:00:05,270
habitat is created from in-situ

3
00:00:08,830 --> 00:00:06,950
materials for efficient construction and

4
00:00:10,180 --> 00:00:08,840
provides a safe and robust environment

5
00:00:12,100 --> 00:00:10,190
for human life on Mars

6
00:00:14,220 --> 00:00:12,110
it consists of four distinguished

7
00:00:16,720 --> 00:00:14,230
volumes separated into functional zones

8
00:00:18,610 --> 00:00:16,730
the first volume is a vestibule for

9
00:00:20,950 --> 00:00:18,620
surface deployment via suits and rovers

10
00:00:24,100 --> 00:00:20,960
the second and primary volume contains

11
00:00:25,930 --> 00:00:24,110
lab space eCos systems a sanitation

12
00:00:28,510 --> 00:00:25,940
facility a food prep area and

13
00:00:30,220 --> 00:00:28,520

accommodations for crew members the

14
00:00:31,840 --> 00:00:30,230
third volume is a flexible space for

15
00:00:33,549 --> 00:00:31,850
multiple activities and the fourth

16
00:00:35,680 --> 00:00:33,559
volume is the bio generation area

17
00:00:37,119 --> 00:00:35,690
designated for plant growth all of these

18
00:00:39,399 --> 00:00:37,129
are connected with adjustable bridges

19
00:00:41,590 --> 00:00:39,409
that are welded into place before any

20
00:00:42,880 --> 00:00:41,600
volumes are placed the external support

21
00:00:44,919 --> 00:00:42,890
structures are formed by adding

22
00:00:47,799 --> 00:00:44,929
successive layers of laser melted basalt

23
00:00:49,540 --> 00:00:47,809
fiber in a fused deposition next the

24
00:00:51,009 --> 00:00:49,550
lower panels of the habitats exterior

25
00:00:53,200 --> 00:00:51,019
are placed on the external supports

26
00:00:54,700 --> 00:00:53,210
these panels are made from regolith and

27
00:00:57,189 --> 00:00:54,710
polyethylene and are reinforced with

28
00:00:58,750 --> 00:00:57,199
impact resistant fibres the properties

29
00:01:00,309 --> 00:00:58,760
of these materials allow for effective

30
00:01:02,349 --> 00:01:00,319
pressure retention and protection from

31
00:01:03,969 --> 00:01:02,359
impacts and radiation this process

32
00:01:05,590 --> 00:01:03,979
allows for multiple configurations of

33
00:01:07,840 --> 00:01:05,600
the panels to be manufactured with the

34
00:01:09,580 --> 00:01:07,850
same process and equipment with the

35
00:01:12,789 --> 00:01:09,590
lower panels in place the internal

36
00:01:14,260 --> 00:01:12,799
components can be assembled on top these

37
00:01:16,810 --> 00:01:14,270
parts are comprised of long fiber

38
00:01:18,039 --> 00:01:16,820

reinforced polyethylene molded cut and

39
00:01:20,380 --> 00:01:18,049
thermal formed into the appropriate

40
00:01:22,719 --> 00:01:20,390
shapes using a heated press this results

41
00:01:24,370 --> 00:01:22,729
in a rigid yet versatile material the

42
00:01:26,109 --> 00:01:24,380
habitat is designed to be modular both

43
00:01:28,389 --> 00:01:26,119
inside and out to fit the needs of the

44
00:01:29,889 --> 00:01:28,399
facility once all the external panels

45
00:01:31,209 --> 00:01:29,899
have been placed attention a device

46
00:01:33,639 --> 00:01:31,219
cinches the anchor points of the

47
00:01:36,039 --> 00:01:33,649
adjacent panels together let's take a

48
00:01:37,539 --> 00:01:36,049
look inside in the vestibule there are

49
00:01:39,940 --> 00:01:37,549
entry ports for both hatch and suit

50
00:01:41,590 --> 00:01:39,950
deployment this volume was designed with

51
00:01:43,270 --> 00:01:41,600
standalone pressurization equipment to

52
00:01:45,639 --> 00:01:43,280
enable direct deployment to the surface

53
00:01:47,560 --> 00:01:45,649
as we lost secondary volumes an

54
00:01:49,450 --> 00:01:47,570
emergency supply of pressurization gas

55
00:01:51,880 --> 00:01:49,460
is located below the floor in case of a

56
00:01:53,499 --> 00:01:51,890
primary system failure moving into the

57
00:01:55,779 --> 00:01:53,509
primary volume to our left we have a

58
00:01:56,950 --> 00:01:55,789
sample processing area this wet lab

59
00:01:58,419 --> 00:01:56,960
space can be used to conduct

60
00:02:01,059 --> 00:01:58,429
experimentation on the samples

61
00:02:02,649 --> 00:02:01,069
geologists collect behind us on the

62
00:02:04,300 --> 00:02:02,659
opposite side of the entrance is the dry

63
00:02:06,999 --> 00:02:04,310

lab outfitted with computers and other

64
00:02:08,499 --> 00:02:07,009
analysis equipment ahead of us we enter

65
00:02:11,050 --> 00:02:08,509
the primary storage area with space for

66
00:02:12,850 --> 00:02:11,060
food and other items the room over is

67
00:02:14,320 --> 00:02:12,860
the Sanitation facility where occupants

68
00:02:17,130 --> 00:02:14,330
can maintain personal hygiene

69
00:02:19,750 --> 00:02:17,140
on the other side is a food prep area

70
00:02:21,090 --> 00:02:19,760
past that is a multipurpose volume which

71
00:02:23,380 --> 00:02:21,100
can be arranged for communal dining

72
00:02:26,200 --> 00:02:23,390
communication recreation and other

73
00:02:28,270 --> 00:02:26,210
activities progressing up stairs grants

74
00:02:30,100 --> 00:02:28,280
access to the bio generation lab where

75
00:02:33,010 --> 00:02:30,110
we can observe the first plants on Mars

76
00:02:34,870 --> 00:02:33,020
it has extra Maps capacity to sustain an

77
00:02:37,870 --> 00:02:34,880
independent hydrologic cycle for a

78
00:02:39,310 --> 00:02:37,880
botanical life at the top of the stairs

79
00:02:41,950 --> 00:02:39,320
we find the crew accommodations and

80
00:02:43,420 --> 00:02:41,960
ample room for more storage back

81
00:02:46,450 --> 00:02:43,430
downstairs we can take a look at perhaps

82
00:02:48,310 --> 00:02:46,460
the most important space the heart of

83
00:02:49,780 --> 00:02:48,320
the habitat is the EC LS system housed

84
00:02:51,820 --> 00:02:49,790
on the bottom third of the primary

85
00:02:53,290 --> 00:02:51,830
volume the space below the deck is

86
00:02:55,870 --> 00:02:53,300
divided into sections for each of the

87
00:02:58,540 --> 00:02:55,880
required operations HVAC water

88
00:03:00,460 --> 00:02:58,550

management oxygen generation and Power

89
00:03:02,770 --> 00:03:00,470
Distribution the heating and cooling

90
00:03:04,930 --> 00:03:02,780
unit pushes air through the habitat and

91
00:03:06,610 --> 00:03:04,940
connects to a Maps port exposing a heat

92
00:03:08,650 --> 00:03:06,620
exchanger to the external environment

93
00:03:10,450 --> 00:03:08,660
the water system to occupy the most

94
00:03:12,640 --> 00:03:10,460
space with a fresh water reservoir a

95
00:03:15,040 --> 00:03:12,650
treatment system and a waste containment

96
00:03:17,410 --> 00:03:15,050
volume the oxygen generation system

97
00:03:19,090 --> 00:03:17,420
breathes co2 and siphons water from the

98
00:03:21,790 --> 00:03:19,100
reservoir to produce oxygen for the crew

99
00:03:23,110 --> 00:03:21,800
and methane for fuel power for the

100
00:03:24,729 --> 00:03:23,120
habitat will be drawn from a key low

101
00:03:26,350 --> 00:03:24,739
power insulation connected through a

102
00:03:28,810 --> 00:03:26,360
MEPs unit and distributed throughout the

103
00:03:31,030 --> 00:03:28,820
volume the Mars incubator offers a

104
00:03:32,740 --> 00:03:31,040
modular design efficient construction in