1
00:00:16,470 --> 00:00:14,390
[Music]

2
00:00:18,470 --> 00:00:16,480
when you look up at the night sky do you

3
00:00:19,429 --> 00:00:18,480
ever wonder how we might visit another

4
00:00:21,109 --> 00:00:19,439
planet

5
00:00:23,189 --> 00:00:21,119
like mars

6
00:00:25,109 --> 00:00:23,199
researchers at nasa have been working on

7
00:00:26,550 --> 00:00:25,119
humankind's journey to the red planet

8
00:00:28,470 --> 00:00:26,560
for decades

9
00:00:30,950 --> 00:00:28,480
over the years they've sent a number of

10
00:00:33,430 --> 00:00:30,960
spacecraft orbitals rovers and

11
00:00:36,950 --> 00:00:33,440
satellites into space giving us a look

12
00:00:38,709 --> 00:00:36,960
into what lies far far beyond our reach

13
00:00:40,869 --> 00:00:38,719

but the furthest humans have traveled is

14
00:00:43,110 --> 00:00:40,879
only to the other side of the moon

15
00:00:45,910 --> 00:00:43,120
venturing deeper into space has posed a

16
00:00:47,750 --> 00:00:45,920
number of new challenges

17
00:00:49,350 --> 00:00:47,760
how will nasa astronaut crew live in

18
00:00:51,910 --> 00:00:49,360
space

19
00:00:53,350 --> 00:00:51,920
will their health change

20
00:00:55,910 --> 00:00:53,360
what happens in the event of an

21
00:00:57,510 --> 00:00:55,920
emergency

22
00:00:59,270 --> 00:00:57,520
and what will they do when they get to

23
00:01:01,029 --> 00:00:59,280
mars anyway

24
00:01:03,029 --> 00:01:01,039
questions like these have made planning

25
00:01:04,869 --> 00:01:03,039
the trip a difficult task

26
00:01:06,870 --> 00:01:04,879
but it isn't impossible

27
00:01:09,109 --> 00:01:06,880
nasa has come up with a unique way to

28
00:01:12,310 --> 00:01:09,119
connect the dots between earth and mars

29
00:01:15,109 --> 00:01:12,320
through a series of stepping stones this

30
00:01:17,590 --> 00:01:15,119
special route to mars called ares

31
00:01:20,149 --> 00:01:17,600
arriving realistically to earth's sister

32
00:01:22,789 --> 00:01:20,159
details a complex celestial dance with

33
00:01:24,550 --> 00:01:22,799
nasa spacecraft technology and none of

34
00:01:26,630 --> 00:01:24,560
it would be possible without the main

35
00:01:28,149 --> 00:01:26,640
transportation vehicle

36
00:01:33,350 --> 00:01:28,159
orion

37
00:01:35,510 --> 00:01:33,360
designed to carry nasa astronaut crew to

38
00:01:38,310 --> 00:01:35,520

and from mars

39
00:01:41,350 --> 00:01:38,320
it is composed of three main parts the

40
00:01:43,510 --> 00:01:41,360
launch abort system the crew module and

41
00:01:44,950 --> 00:01:43,520
the service module

42
00:01:46,870 --> 00:01:44,960
astronauts will travel in the crew

43
00:01:48,950 --> 00:01:46,880
module when orion carries humans from

44
00:01:50,230 --> 00:01:48,960
earth and along the stepping stones to

45
00:01:52,230 --> 00:01:50,240
mars

46
00:01:54,550 --> 00:01:52,240
but it won't travel alone

47
00:01:58,149 --> 00:01:54,560
orion is lucky to have some help from a

48
00:02:01,990 --> 00:02:00,389
the space launch system is a heavy lift

49
00:02:04,310 --> 00:02:02,000
launch rocket that will help build the

50
00:02:07,670 --> 00:02:04,320
stepping stones for aries by carrying

51
00:02:10,070 --> 00:02:07,680
large quantities of materials into space

52
00:02:13,190 --> 00:02:10,080
eventually it will also launch orion off

53
00:02:15,190 --> 00:02:13,200
earth and beyond low earth orbit

54
00:02:17,110 --> 00:02:15,200
the lunar orbital platform gateway is a

55
00:02:18,309 --> 00:02:17,120
working space station that encircles the

56
00:02:20,150 --> 00:02:18,319
moon

57
00:02:22,229 --> 00:02:20,160
the lunar orbital platform gateway will

58
00:02:24,309 --> 00:02:22,239
provide a habitation system docking

59
00:02:27,110 --> 00:02:24,319
capabilities and technical support for

60
00:02:28,949 --> 00:02:27,120
future space missions for orion it will

61
00:02:32,070 --> 00:02:28,959
be where the crew module will join and

62
00:02:33,910 --> 00:02:32,080
connect with the deep space transport

63
00:02:35,509 --> 00:02:33,920

the deep space transport will carry

64
00:02:38,630 --> 00:02:35,519
orion and its passengers through the

65
00:02:41,110 --> 00:02:38,640
longest stretch between stepping stones

66
00:02:43,190 --> 00:02:41,120
design plans are still being researched

67
00:02:46,550 --> 00:02:43,200
but an onboard habitation module will

68
00:02:48,710 --> 00:02:46,560
help normalize the long journey to mars

69
00:02:50,790 --> 00:02:48,720
and finally the martian orbital

70
00:02:52,630 --> 00:02:50,800
observatory is the planned deep space

71
00:02:54,869 --> 00:02:52,640
workstation that will receive the deep

72
00:02:58,550 --> 00:02:54,879
space transport and serve as the primary

73
00:03:00,550 --> 00:02:58,560
living quarters for astronauts at mars

74
00:03:03,110 --> 00:03:00,560
taking the aries pathway to mars is

75
00:03:05,190 --> 00:03:03,120
similar to a baton race

76
00:03:07,509 --> 00:03:05,200
but the real challenge lies in surviving

77
00:03:08,869 --> 00:03:07,519
the journey researchers predict that a

78
00:03:11,509 --> 00:03:08,879
single mars mission can take

79
00:03:13,589 --> 00:03:11,519
approximately three years which poses a

80
00:03:16,710 --> 00:03:13,599
number of stressors for nasa astronaut

81
00:03:18,470 --> 00:03:16,720
crew they include health risks like

82
00:03:20,710 --> 00:03:18,480
exposure to cosmic radiation or

83
00:03:22,710 --> 00:03:20,720
prolonged weightlessness psychological

84
00:03:24,630 --> 00:03:22,720
effects from isolation especially in

85
00:03:26,550 --> 00:03:24,640
being disconnected from real-life earth

86
00:03:28,229 --> 00:03:26,560
events and interactions

87
00:03:29,990 --> 00:03:28,239
social effects of living with a small

88
00:03:32,630 --> 00:03:30,000

group of people in cramped conditions

89
00:03:34,949 --> 00:03:32,640
for a long period of time and technical

90
00:03:37,110 --> 00:03:34,959
issues like spacecraft repair or medical

91
00:03:38,949 --> 00:03:37,120
emergencies

92
00:03:41,270 --> 00:03:38,959
nasa plans to solve these issues by

93
00:03:43,270 --> 00:03:41,280
using sls rockets to stock food and

94
00:03:46,949 --> 00:03:43,280
supplies at each stepping stone of the

95
00:03:48,710 --> 00:03:46,959
aries pathway before orion arrives

96
00:03:51,110 --> 00:03:48,720
both the deep space transport and

97
00:03:53,110 --> 00:03:51,120
martian orbital observatory will provide

98
00:03:54,470 --> 00:03:53,120
ample space to facilitate spacecraft

99
00:03:56,710 --> 00:03:54,480
maintenance

100
00:03:58,229 --> 00:03:56,720
mission communications

101
00:04:00,710 --> 00:03:58,239
exercise

102
00:04:03,589 --> 00:04:00,720
and room for personal recreation

103
00:04:05,270 --> 00:04:03,599
to stay down to earth mars explorers may

104
00:04:08,949 --> 00:04:05,280
even do things to

105
00:04:11,509 --> 00:04:08,959
normalize their time away from home

106
00:04:12,710 --> 00:04:11,519
but once on mars there is so much to

107
00:04:15,110 --> 00:04:12,720
explore

108
00:04:16,870 --> 00:04:15,120
nasa astronaut crew can use a variety of

109
00:04:19,110 --> 00:04:16,880
exploration vehicles on the martian

110
00:04:21,349 --> 00:04:19,120
orbital observatory to travel to an

111
00:04:23,670 --> 00:04:21,359
ideal mars landing site for their next

112
00:04:25,030 --> 00:04:23,680
research steps

113
00:04:26,150 --> 00:04:25,040

whether it's to investigate the

114
00:04:28,150 --> 00:04:26,160
environment

115
00:04:29,830 --> 00:04:28,160
to explore possibilities for building a

116
00:04:31,270 --> 00:04:29,840
society on mars

117
00:04:33,270 --> 00:04:31,280
or to search for signs of

118
00:04:37,350 --> 00:04:33,280
extraterrestrial life

119
00:04:39,830 --> 00:04:37,360
the opportunities on mars are endless

120
00:04:42,469 --> 00:04:39,840
our desire to explore the universe has

121
00:04:44,550 --> 00:04:42,479
always been built on a dream

122
00:04:46,790 --> 00:04:44,560
we've taken big steps before

123
00:04:48,629 --> 00:04:46,800
everything we have and enjoy today is

124
00:04:50,629 --> 00:04:48,639
the result of the thousands of steps

125
00:04:54,469 --> 00:04:50,639
humankind has taken over the years to

126
00:04:57,350 --> 00:04:54,479
discover the wonderful world around us

127
00:04:59,270 --> 00:04:57,360
so where do we go next next time you

128
00:05:02,070 --> 00:04:59,280
look up at the night sky consider where

129
00:05:07,330 --> 00:05:02,080
we've gone and where we're going and ask

130
00:05:17,980 --> 00:05:07,340
yourself how big can you dream