1
00:00:06,539 --> 00:00:04,650
the International Space Station has been

2
00:00:09,209 --> 00:00:06,549
a working science laboratory and

3
00:00:11,700 --> 00:00:09,219
exploration outpost for more than 15

4
00:00:14,579 --> 00:00:11,710
years and fostered advances in science

5
00:00:16,470 --> 00:00:14,589
and technology in that time but it's the

6
00:00:18,900 --> 00:00:16,480
possibilities for future discoveries

7
00:00:21,390 --> 00:00:18,910
that have the crew members excited about

8
00:00:24,839 --> 00:00:21,400
this mission potential has huge of

9
00:00:27,060 --> 00:00:24,849
course for Space Station the idea on it

10
00:00:28,470 --> 00:00:27,070
is we're about discovery I don't really

11
00:00:29,759 --> 00:00:28,480
know what we're going to learn but we

12
00:00:31,290 --> 00:00:29,769
know they're the potential to learn many

13
00:00:33,600 --> 00:00:31,300

many different things and it's almost

14
00:00:35,580 --> 00:00:33,610
with basic science but mmm a real

15
00:00:38,640 --> 00:00:35,590
opportunity to do something useful

16
00:00:41,730 --> 00:00:38,650
something helpful for humankind so that

17
00:00:45,390 --> 00:00:41,740
humankind in the future would live

18
00:00:48,660 --> 00:00:45,400
better longer had hair that they develop

19
00:00:50,880 --> 00:00:48,670
it a bit more comfortable and not just

20
00:00:53,490 --> 00:00:50,890
here on earth deep space exploration

21
00:00:56,040 --> 00:00:53,500
missions at the future will take years

22
00:00:58,440 --> 00:00:56,050
to complete but the human body starts

23
00:01:01,170 --> 00:00:58,450
reacting to the space environment in far

24
00:01:04,109 --> 00:01:01,180
less time and it's not just the loss of

25
00:01:07,050 --> 00:01:04,119
bone strength and muscle mass which it

26
00:01:12,090 --> 00:01:07,060
is there are changes detected in the

27
00:01:15,480 --> 00:01:12,100
internal organs preschool skin reacts

28
00:01:17,460 --> 00:01:15,490
differently blood reacts differently so

29
00:01:20,430 --> 00:01:17,470
this crew will take part in a number of

30
00:01:22,950 --> 00:01:20,440
experiments as test subjects gathering

31
00:01:25,680 --> 00:01:22,960
data to quantify those physical changes

32
00:01:28,170 --> 00:01:25,690
while searching their causes they will

33
00:01:30,240 --> 00:01:28,180
also each have daily exercise that is

34
00:01:32,310 --> 00:01:30,250
proven to keep crew members strong and

35
00:01:35,460 --> 00:01:32,320
fit while countering some of the

36
00:01:37,050 --> 00:01:35,470
negative effects of zero-g it gives us a

37
00:01:40,950 --> 00:01:37,060
unique possibility of actually doing

38
00:01:44,850 --> 00:01:40,960

research on how how this this condition

39
00:01:46,680 --> 00:01:44,860
in the bone develops and how we can like

40
00:01:48,690 --> 00:01:46,690
think of countermeasures how we can

41
00:01:51,000 --> 00:01:48,700
treat it what medication works and what

42
00:01:53,490 --> 00:01:51,010
does not work another study I signed up

43
00:01:55,320 --> 00:01:53,500
for is called the sprint physical

44
00:01:58,740 --> 00:01:55,330
training and what that's trying to do is

45
00:02:01,200 --> 00:01:58,750
determine is it the amount of exercise

46
00:02:04,110 --> 00:02:01,210
that you do or is it the intensity of

47
00:02:06,210 --> 00:02:04,120
the exercise and so for sprint every one

48
00:02:08,339 --> 00:02:06,220
of my workouts will go to max intensity

49
00:02:11,070 --> 00:02:08,349
to see if one or the other is more

50
00:02:12,690 --> 00:02:11,080
valuable some research focuses on the

51
00:02:14,309 --> 00:02:12,700
psychological effects of long-term

52
00:02:17,699 --> 00:02:14,319
isolation on

53
00:02:20,550 --> 00:02:17,709
individual as well as on the group the

54
00:02:23,520 --> 00:02:20,560
better they work together better as a

55
00:02:25,319 --> 00:02:23,530
team they are the more results and the

56
00:02:30,119 --> 00:02:25,329
more adventures we gain from that flight

57
00:02:34,170 --> 00:02:30,129
it is a psychological environment in the

58
00:02:37,530 --> 00:02:34,180
crew is a very important component of a

59
00:02:40,289 --> 00:02:37,540
successful flight the effects of being

60
00:02:42,720 --> 00:02:40,299
in space aren't just felt by the human

61
00:02:45,059 --> 00:02:42,730
bodies that are their station science is

62
00:02:47,149 --> 00:02:45,069
investigating other impacts that must be

63
00:02:49,800 --> 00:02:47,159

dealt with to support future exploration

64
00:02:52,589 --> 00:02:49,810
not only to the body change itself the

65
00:02:55,589 --> 00:02:52,599
actual cell itself of an organism will

66
00:02:57,449 --> 00:02:55,599
change when it senses zero gravity or

67
00:02:59,339 --> 00:02:57,459
microgravity but they don't know why

68
00:03:01,229 --> 00:02:59,349
it's changing or really kind of how it's

69
00:03:04,080 --> 00:03:01,239
all working so we're doing experiments

70
00:03:06,569 --> 00:03:04,090
using these plant cells and structures

71
00:03:09,270 --> 00:03:06,579
and finding out how they change and why

72
00:03:11,640 --> 00:03:09,280
they change on this mission the station

73
00:03:14,309 --> 00:03:11,650
also hosts dozens of experiments in

74
00:03:16,530 --> 00:03:14,319
physical sciences learning how fluids

75
00:03:18,839 --> 00:03:16,540
and materials and equipment cope with

76
00:03:20,939 --> 00:03:18,849
higher radiation and lower gravity than

77
00:03:23,159 --> 00:03:20,949
they encounter on earth and there are

78
00:03:24,990 --> 00:03:23,169
investigations into new technologies

79
00:03:27,929 --> 00:03:25,000
that will improve the chances of

80
00:03:30,059 --> 00:03:27,939
successful flights in the future if we

81
00:03:31,740 --> 00:03:30,069
are going to send humans to Mars you'll

82
00:03:33,599 --> 00:03:31,750
never know what will break and if we

83
00:03:35,580 --> 00:03:33,609
have a 3d printer where we could just

84
00:03:38,009 --> 00:03:35,590
boom print out apart throw it in the

85
00:03:41,129 --> 00:03:38,019
machine fix whatever's broken this

86
00:03:44,429 --> 00:03:41,139
really opens up a whole new dimension of

87
00:03:47,339 --> 00:03:44,439
long range space travel so we will have

88
00:03:50,309 --> 00:03:47,349

the first capability for 3d printing on

89
00:03:52,409 --> 00:03:50,319
our expedition a scientist that I

90
00:03:56,189 --> 00:03:52,419
recently met actually told me that they

91
00:03:58,170 --> 00:03:56,199
just recently implanted at raheja to a

92
00:04:00,830 --> 00:03:58,180
person that they generated from stem

93
00:04:03,030 --> 00:04:00,840
cells that came out of space research so

94
00:04:05,520 --> 00:04:03,040
some of these benefits you might not

95
00:04:07,439 --> 00:04:05,530
even actually hear about ever if you

96
00:04:10,229 --> 00:04:07,449
don't have one of these illnesses but if

97
00:04:13,110 --> 00:04:10,239
you do then and you're in the position

98
00:04:16,020 --> 00:04:13,120
to get a much better treatment than you

99
00:04:18,420 --> 00:04:16,030
would have without space research

100
00:04:21,300 --> 00:04:18,430
there's a lot of space walking in the

101
00:04:23,490 --> 00:04:21,310
plan from the Russian segment EV A's are

102
00:04:25,890 --> 00:04:23,500
being prepared for june august and

103
00:04:28,440 --> 00:04:25,900
october to refresh external science

104
00:04:30,210 --> 00:04:28,450
experiments and there are three u.s.

105
00:04:32,520 --> 00:04:30,220
space walks in the plan for the summer

106
00:04:35,159 --> 00:04:32,530
to begin configuring the station for its

107
00:04:37,170 --> 00:04:35,169
extended mission on orbit you'll see an

108
00:04:39,080 --> 00:04:37,180
expedition 40 and 41 we're just going to

109
00:04:41,670 --> 00:04:39,090
start to lay the groundwork for

110
00:04:43,379 --> 00:04:41,680
extension of the space station so we'll

111
00:04:45,480 --> 00:04:43,389
be doing a little bit of management both

112
00:04:48,630 --> 00:04:45,490
inside and outside getting things moved

113
00:04:52,860 --> 00:04:48,640

around and prepared for this this

114
00:04:55,050 --> 00:04:52,870
further exploration into the 2020s over

115
00:04:56,970 --> 00:04:55,060
the next six months most of the cargo

116
00:04:59,520 --> 00:04:56,980
ships that supply the station with food

117
00:05:01,830 --> 00:04:59,530
fuel clothing and scientific supplies

118
00:05:04,170 --> 00:05:01,840
will make a call the russian progress

119
00:05:06,990 --> 00:05:04,180
freighter American commercial ships

120
00:05:08,940 --> 00:05:07,000
dragon and sickness and in August the

121
00:05:11,340 --> 00:05:08,950
fifth of the european space agency's

122
00:05:14,879 --> 00:05:11,350
automated transfer vehicles which will

123
00:05:17,400 --> 00:05:14,889
be the final atv to fly a TV has been a

124
00:05:20,070 --> 00:05:17,410
big success and not just for the tons of

125
00:05:22,230 --> 00:05:20,080
supplies it is delivered to orbit atv

126
00:05:24,870 --> 00:05:22,240
gave the european space industry a

127
00:05:27,150 --> 00:05:24,880
chance to develop new technologies that

128
00:05:30,240 --> 00:05:27,160
are already being applied to the future

129
00:05:31,680 --> 00:05:30,250
the technologies that we use for atv are

130
00:05:34,680 --> 00:05:31,690
actually being used for the future

131
00:05:38,250 --> 00:05:34,690
vehicles so the service module of the

132
00:05:40,500 --> 00:05:38,260
MPCV orion module that nasa bills will

133
00:05:44,909 --> 00:05:40,510
be actually an ISA development that is

134
00:05:47,010 --> 00:05:44,919
based on the ATV technology expedition

135
00:05:48,870 --> 00:05:47,020
40 ends when Swanson and his Russian

136
00:05:51,540 --> 00:05:48,880
crewmates head for home in early

137
00:05:54,270 --> 00:05:51,550
September Soraya becomes commander for

138
00:05:55,800 --> 00:05:54,280

expedition 41 which will greet three new

139
00:05:59,010 --> 00:05:55,810
crew members near the end of the month

140
00:06:01,380 --> 00:05:59,020
NASA astronaut butch Wilmore veteran

141
00:06:04,230 --> 00:06:01,390
cosmonaut alexander samokutyaev and

142
00:06:06,390 --> 00:06:04,240
first-time flyer elena serova who will

143
00:06:08,159 --> 00:06:06,400
be the first female cosmonaut to serve

144
00:06:10,440 --> 00:06:08,169
as an international space station crew

145
00:06:12,570 --> 00:06:10,450
member that group will press ahead with

146
00:06:15,390 --> 00:06:12,580
the ongoing mission of the international

147
00:06:17,279 --> 00:06:15,400
partners really just looking at getting

148
00:06:20,279 --> 00:06:17,289
the space station into its best possible

149
00:06:22,380 --> 00:06:20,289
configuration for extension into 2024

150
00:06:24,120 --> 00:06:22,390
and really starting to lay some of the

151
00:06:25,830 --> 00:06:24,130
groundwork for bringing up Commercial

152
00:06:28,590 --> 00:06:25,840
Crew vehicles to the Americans

153
00:06:31,140 --> 00:06:28,600
here in in the next few years to help