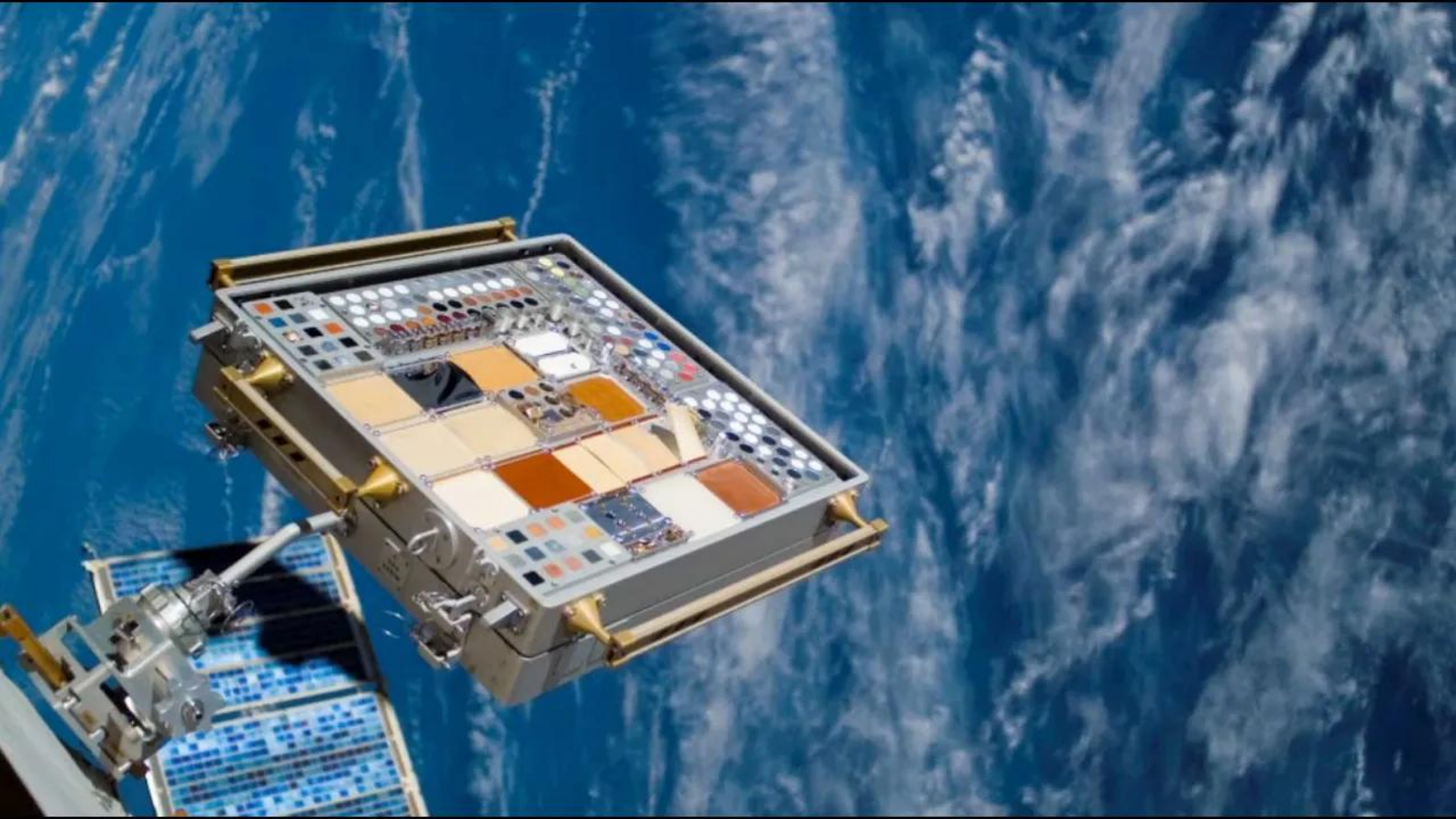

1
00:00:05,269 --> 00:00:03,189
we all know things behave differently in

2
00:00:07,670 --> 00:00:05,279
microgravity but knowing exactly how

3
00:00:09,910 --> 00:00:07,680
materials behave is vital to future

4
00:00:12,070 --> 00:00:09,920
space flight and it's already helping

5
00:00:14,070 --> 00:00:12,080
improve products here on earth let's

6
00:00:15,829 --> 00:00:14,080
head out now to the payload operations

7
00:00:18,470 --> 00:00:15,839
integration center at the marshall space

8
00:00:21,590 --> 00:00:18,480
flight center with lori mexis to tell us

9
00:00:23,189 --> 00:00:21,600
more about materials research laurie

10
00:00:25,509 --> 00:00:23,199
the missy or materials on the

11
00:00:27,189 --> 00:00:25,519
international space station experiment

12
00:00:28,950 --> 00:00:27,199
has been studying the way materials

13
00:00:31,750 --> 00:00:28,960

behave in the harsh microgravity

14
00:00:33,750 --> 00:00:31,760
environment since 2001 and much has been

15
00:00:35,670 --> 00:00:33,760
learned i recently spoke with one of its

16
00:00:38,630 --> 00:00:35,680
principal investigators kim degrow from

17
00:00:40,950 --> 00:00:38,640
the glim research center to learn more

18
00:00:42,869 --> 00:00:40,960
missy is the materials international

19
00:00:44,950 --> 00:00:42,879
space station experiment

20
00:00:46,389 --> 00:00:44,960
and it's a series of materials

21
00:00:49,190 --> 00:00:46,399
experiments that are flown on the

22
00:00:51,910 --> 00:00:49,200
outside of space station so we can study

23
00:00:54,389 --> 00:00:51,920
the uh durability of materials and

24
00:00:56,950 --> 00:00:54,399
devices in the space environment

25
00:01:00,470 --> 00:00:56,960
what number are we on now well missy

26
00:01:03,670 --> 00:01:00,480
eight is uh actually it's the tenth of a

27
00:01:06,550 --> 00:01:03,680
suitcase size tray that was flown and it

28
00:01:09,429 --> 00:01:06,560
was up in space for two years and it was

29
00:01:11,990 --> 00:01:09,439
recently returned during the space x3

30
00:01:13,910 --> 00:01:12,000
mission and returned to earth in the

31
00:01:16,550 --> 00:01:13,920
dragon capsules

32
00:01:18,469 --> 00:01:16,560
so we've done this for so many years

33
00:01:19,990 --> 00:01:18,479
what are some of the highlights and key

34
00:01:21,830 --> 00:01:20,000
points that we've learned of how

35
00:01:24,230 --> 00:01:21,840
materials behave in space

36
00:01:27,030 --> 00:01:24,240
the missy experiments have provided a

37
00:01:28,870 --> 00:01:27,040
very wide variety of

38
00:01:31,270 --> 00:01:28,880

information on the environmental

39
00:01:34,230 --> 00:01:31,280
degradation of materials in the space

40
00:01:36,149 --> 00:01:34,240
environment and also on devices and how

41
00:01:38,630 --> 00:01:36,159
they perform in the very harsh space

42
00:01:40,390 --> 00:01:38,640
environment and every mission we have

43
00:01:42,469 --> 00:01:40,400
flown different types of experiments

44
00:01:44,950 --> 00:01:42,479
with different kinds of samples

45
00:01:46,870 --> 00:01:44,960
and we learn different things each time

46
00:01:49,270 --> 00:01:46,880
and we're also finding now that

47
00:01:51,590 --> 00:01:49,280
sometimes we'll refly the same material

48
00:01:54,149 --> 00:01:51,600
on different missions they get different

49
00:01:56,149 --> 00:01:54,159
environmental exposures and we see that

50
00:01:59,109 --> 00:01:56,159
the degradation rate of some of these

51
00:02:01,429 --> 00:01:59,119
materials is not constant over time in

52
00:02:03,510 --> 00:02:01,439
the space environment so actually flying

53
00:02:05,350 --> 00:02:03,520
the same sample again and again is very

54
00:02:06,870 --> 00:02:05,360
helpful because you may see that the

55
00:02:09,510 --> 00:02:06,880
degradation

56
00:02:11,990 --> 00:02:09,520
is is getting worse over time or is not

57
00:02:13,589 --> 00:02:12,000
as bad over a long time as you might

58
00:02:15,830 --> 00:02:13,599
initially think

59
00:02:17,589 --> 00:02:15,840
is two years an optimal amount of time

60
00:02:19,270 --> 00:02:17,599
to to have it there and see how it's

61
00:02:21,510 --> 00:02:19,280
going to behave two years is a good

62
00:02:23,270 --> 00:02:21,520
amount of time to have a space exposure

63
00:02:25,190 --> 00:02:23,280

experiment

64
00:02:27,589 --> 00:02:25,200
one year you can learn a lot still from

65
00:02:29,110 --> 00:02:27,599
one year it depends a lot on the

66
00:02:31,270 --> 00:02:29,120
experiment and what you're trying to

67
00:02:33,750 --> 00:02:31,280
find out about it but having an

68
00:02:35,350 --> 00:02:33,760
experiment up for one to two years is a

69
00:02:37,750 --> 00:02:35,360
good amount of time because it's long

70
00:02:39,589 --> 00:02:37,760
enough to see the degradation but it's

71
00:02:41,110 --> 00:02:39,599
not so long that you have to wait a

72
00:02:42,630 --> 00:02:41,120
really long time to get your data and

73
00:02:44,070 --> 00:02:42,640
know what's happening

74
00:02:45,430 --> 00:02:44,080
can you tell us about some of the things

75
00:02:47,430 --> 00:02:45,440
some of the materials that we've learned

76
00:02:49,910 --> 00:02:47,440
how they behave how they've been used

77
00:02:51,830 --> 00:02:49,920
now in spacecraft and other other things

78
00:02:53,430 --> 00:02:51,840
yeah um there have been a lot of

79
00:02:56,630 --> 00:02:53,440
different materials that we've learned

80
00:02:58,550 --> 00:02:56,640
about the degradation and durability and

81
00:03:00,390 --> 00:02:58,560
we have had missing data that have

82
00:03:02,869 --> 00:03:00,400
impacted a whole variety of different

83
00:03:05,350 --> 00:03:02,879
spacecraft programs everything from

84
00:03:07,589 --> 00:03:05,360
earth observing satellites

85
00:03:10,790 --> 00:03:07,599
communication satellites

86
00:03:14,149 --> 00:03:10,800
lunar spacecraft our missy data even

87
00:03:15,910 --> 00:03:14,159
impacted the one of the mars rovers and

88
00:03:17,990 --> 00:03:15,920

we've impacted

89
00:03:19,990 --> 00:03:18,000
material selection for the james webb

90
00:03:22,309 --> 00:03:20,000
space telescope and some other

91
00:03:24,229 --> 00:03:22,319
telescopes so the missy data has

92
00:03:25,830 --> 00:03:24,239
impacted a really wide variety of

93
00:03:27,190 --> 00:03:25,840
spacecraft

94
00:03:29,350 --> 00:03:27,200
there are a lot of different earth

95
00:03:31,509 --> 00:03:29,360
applications from the missy flight data

96
00:03:33,350 --> 00:03:31,519
for example

97
00:03:36,309 --> 00:03:33,360
we learn about the

98
00:03:37,750 --> 00:03:36,319
uv radiation durability materials and we

99
00:03:39,509 --> 00:03:37,760
know down on earth

100
00:03:42,309 --> 00:03:39,519
sunlight comes down and can damage

101
00:03:45,030 --> 00:03:42,319
materials we also learn about more

102
00:03:47,030 --> 00:03:45,040
efficient and durable solar cells and we

103
00:03:49,750 --> 00:03:47,040
can use that technology for building

104
00:03:51,750 --> 00:03:49,760
more durable solar cells here on earth

105
00:03:53,110 --> 00:03:51,760
also so there are a lot of different

106
00:03:54,869 --> 00:03:53,120
applications

107
00:03:57,270 --> 00:03:54,879
from the missy experiments that we can

108
00:03:59,110 --> 00:03:57,280
use down here on earth in the entire

109
00:04:01,750 --> 00:03:59,120
missy program where we've had 10

110
00:04:03,990 --> 00:04:01,760
different suitcases we have had hundreds

111
00:04:05,270 --> 00:04:04,000
of principal investigators flying

112
00:04:08,550 --> 00:04:05,280
samples

113
00:04:11,270 --> 00:04:08,560

on these packs from 85 different

114
00:04:14,390 --> 00:04:11,280
organizations we have investigators from

115
00:04:16,390 --> 00:04:14,400
nasa department of defense academia and

116
00:04:18,310 --> 00:04:16,400
industry so many many different

117
00:04:22,069 --> 00:04:18,320
participants in the missy program which

118
00:04:24,070 --> 00:04:22,079
is really wonderful and very unique too

119
00:04:25,909 --> 00:04:24,080
and as kim mentioned hundreds of

120
00:04:28,150 --> 00:04:25,919
scientists and engineers have had

121
00:04:29,350 --> 00:04:28,160
experiments on missy and joining me now

122
00:04:30,550 --> 00:04:29,360
is one of them our principal

123
00:04:31,909 --> 00:04:30,560
investigator from here at marshall

124
00:04:33,189 --> 00:04:31,919
miriam thinking our mary thanks for

125
00:04:35,189 --> 00:04:33,199
joining us tell us about your

126
00:04:35,990 --> 00:04:35,199
involvement with missy well missy has

127
00:04:38,870 --> 00:04:36,000
flown

128
00:04:41,110 --> 00:04:38,880
almost four thousand materials samples

129
00:04:42,950 --> 00:04:41,120
in since 2001

130
00:04:45,030 --> 00:04:42,960
and some of those are pure research like

131
00:04:46,950 --> 00:04:45,040
from langley and from glenn but the ones

132
00:04:49,030 --> 00:04:46,960
here from marshall are ones directly

133
00:04:51,670 --> 00:04:49,040
applicable to spacecraft especially

134
00:04:53,510 --> 00:04:51,680
space station itself as we look at life

135
00:04:55,350 --> 00:04:53,520
extension for space station we look at

136
00:04:56,550 --> 00:04:55,360
the radiator materials the window

137
00:04:59,030 --> 00:04:56,560
materials

138
00:05:00,790 --> 00:04:59,040

the space debris shielding and we look

139
00:05:02,310 --> 00:05:00,800
not only to see how those are holding up

140
00:05:04,150 --> 00:05:02,320
in the space environment but also how

141
00:05:06,150 --> 00:05:04,160
well we simulate the space environment

142
00:05:08,230 --> 00:05:06,160
on the ground that if we do tests on the

143
00:05:10,469 --> 00:05:08,240
ground with new materials how well are

144
00:05:12,310 --> 00:05:10,479
we replicating that tell us specifically

145
00:05:14,790 --> 00:05:12,320
about what you've been studying okay

146
00:05:15,749 --> 00:05:14,800
this is the trailing umbilical system

147
00:05:17,749 --> 00:05:15,759
cable

148
00:05:20,710 --> 00:05:17,759
and this was flown for four years on

149
00:05:22,550 --> 00:05:20,720
missy 2 so we looked at how well that

150
00:05:23,990 --> 00:05:22,560
held up and we

151
00:05:26,310 --> 00:05:24,000
want to make sure that the astronauts

152
00:05:29,110 --> 00:05:26,320
are safe when they're out on eva

153
00:05:31,189 --> 00:05:29,120
and one of the nicer points

154
00:05:34,150 --> 00:05:31,199
we had last year was with don pettit

155
00:05:36,150 --> 00:05:34,160
when the dragon came in to dock he made

156
00:05:37,590 --> 00:05:36,160
a comment about the snow white coating

157
00:05:40,390 --> 00:05:37,600
on the dragon and that was actually a

158
00:05:42,070 --> 00:05:40,400
coating that we qualified on missy 2 for

159
00:05:43,990 --> 00:05:42,080
that mission so

160
00:05:45,189 --> 00:05:44,000
it's good to make make sure that what

161
00:05:47,510 --> 00:05:45,199
we're doing actually helps the

162
00:05:49,510 --> 00:05:47,520
astronauts as well as keep the space

163
00:05:51,270 --> 00:05:49,520

station operating smoothly tell us about

164
00:05:53,189 --> 00:05:51,280
some other things you've looked at well

165
00:05:55,029 --> 00:05:53,199
this is uh nomex this is one of the

166
00:05:58,629 --> 00:05:55,039
materials that can be

167
00:06:02,710 --> 00:06:00,790
the tool bags and we know now that we

168
00:06:04,629 --> 00:06:02,720
need coatings for that yeah that didn't

169
00:06:06,469 --> 00:06:04,639
that didn't hold up very well

170
00:06:08,629 --> 00:06:06,479
wow that's very interesting so how long

171
00:06:09,670 --> 00:06:08,639
was that on station that was four years

172
00:06:11,590 --> 00:06:09,680
four years

173
00:06:13,270 --> 00:06:11,600
wow and then we're also looking at some

174
00:06:15,430 --> 00:06:13,280
of the new programs especially

175
00:06:16,790 --> 00:06:15,440
supporting orion and the multi-purpose

176
00:06:18,950 --> 00:06:16,800
crew vehicle

177
00:06:21,430 --> 00:06:18,960
james webb telescope the missions to

178
00:06:24,950 --> 00:06:21,440
mars and to lunar environment

179
00:06:27,029 --> 00:06:24,960
some of the other missions to l1 and l2

180
00:06:28,469 --> 00:06:27,039
so and you were also involved in missy

181
00:06:30,309 --> 00:06:28,479
eight the last one that she talked about

182
00:06:31,830 --> 00:06:30,319
it just came back yes what a few months

183
00:06:33,830 --> 00:06:31,840
ago and i bet you're anxious to get your

184
00:06:36,230 --> 00:06:33,840
hands on yes i am all right when will

185
00:06:38,230 --> 00:06:36,240
you do that um in this week

186
00:06:39,990 --> 00:06:38,240
after i leave here oh