
esa
esa

1
00:00:06,550 --> 00:00:02,550
station this is houston are you ready

2
00:00:12,470 --> 00:00:09,910
station i am ready for the event

3
00:00:14,950 --> 00:00:12,480
sky news london this is mission control

4
00:00:17,510 --> 00:00:14,960
houston please call station for a voice

5
00:00:19,349 --> 00:00:17,520
check playing games

6
00:00:21,510 --> 00:00:19,359
but perhaps it is the view that he'll

7
00:00:23,429 --> 00:00:21,520
remember hello this is sky news sound

8
00:00:25,589 --> 00:00:23,439
calling for a voice check

9
00:00:28,950 --> 00:00:25,599
well there we can see tim peake on the

10
00:00:30,950 --> 00:00:28,960
big sky news and sky new sound this

11
00:00:37,910 --> 00:00:33,670
this is sky news london how do you hear

12
00:00:41,750 --> 00:00:40,470
hello sky news in london and uh hello to

13
00:00:43,270 --> 00:00:41,760

uh everybody at the national space

14
00:00:47,990 --> 00:00:43,280
center leicester i hear you loud and

15
00:00:51,830 --> 00:00:49,830
fantastic tim it's great to join you

16
00:00:53,750 --> 00:00:51,840
thank you so much for joining us uh

17
00:00:55,189 --> 00:00:53,760
thanks for giving sky news your first

18
00:00:56,869 --> 00:00:55,199
live broadcast interview we're

19
00:00:58,069 --> 00:00:56,879
absolutely delighted to speak to you

20
00:00:59,270 --> 00:00:58,079
we've got a lot of people here in the

21
00:01:01,270 --> 00:00:59,280
studio we've got our science

22
00:01:03,830 --> 00:01:01,280
correspondent thomas mall we've also got

23
00:01:05,350 --> 00:01:03,840
three space engineering students but our

24
00:01:07,510 --> 00:01:05,360
first question and i'm sure you'll be

25
00:01:09,270 --> 00:01:07,520
thrilled uh given part of the the aim of

26
00:01:11,590 --> 00:01:09,280
your mission is to engage children is

27
00:01:14,310 --> 00:01:11,600
from some children uh it's from neve

28
00:01:15,830 --> 00:01:14,320
who's seven and matthew who's nine and

29
00:01:17,990 --> 00:01:15,840
they would like to know

30
00:01:20,310 --> 00:01:18,000
what moment would you describe as as

31
00:01:21,830 --> 00:01:20,320
being out of this world since you've

32
00:01:26,789 --> 00:01:21,840
been in space you're just showing off

33
00:01:30,230 --> 00:01:28,870
uh hi yeah that are great questions

34
00:01:32,230 --> 00:01:30,240
what's out of this world you know the

35
00:01:35,270 --> 00:01:32,240
whole experience has been out of this

36
00:01:37,429 --> 00:01:35,280
world from the moment um i first saw

37
00:01:39,910 --> 00:01:37,439
planet earth from my soyuz window just

38
00:01:42,069 --> 00:01:39,920

after we'd been inserted into orbit

39
00:01:44,630 --> 00:01:42,079
but i have to say every time i go to the

40
00:01:46,310 --> 00:01:44,640
cupola and look out that's the most out

41
00:01:47,910 --> 00:01:46,320
of this out of this world moment it's

42
00:01:51,350 --> 00:01:47,920
always different whether it's a moon

43
00:01:53,429 --> 00:01:51,360
setting or a sunrise or crossing over

44
00:01:55,830 --> 00:01:53,439
and you know over the south america for

45
00:02:01,590 --> 00:01:55,840
example the magnificent views that's

46
00:02:05,830 --> 00:02:03,590
the views the views of the earth from

47
00:02:07,749 --> 00:02:05,840
space uh thomas moore has got another

48
00:02:10,150 --> 00:02:07,759
question for you thomas tim it's uh

49
00:02:12,229 --> 00:02:10,160
another question from the audience being

50
00:02:14,550 --> 00:02:12,239
british we're obsessed with the weather

51
00:02:17,350 --> 00:02:14,560
weather so this question is from peter

52
00:02:19,990 --> 00:02:17,360
stewart hunt i know it doesn't rain in

53
00:02:25,670 --> 00:02:20,000
space but do you get changeable weather

54
00:02:29,589 --> 00:02:27,430
well that's a very good question yeah we

55
00:02:32,229 --> 00:02:29,599
do get space weather we pass through

56
00:02:35,589 --> 00:02:32,239
space weather for example the aurora

57
00:02:37,830 --> 00:02:35,599
which can be extremely beautiful and

58
00:02:40,229 --> 00:02:37,840
amazingly bright at times actually

59
00:02:41,990 --> 00:02:40,239
inside the space station we maintain a

60
00:02:44,550 --> 00:02:42,000
pretty constant atmosphere it's about

61
00:02:47,270 --> 00:02:44,560
the same pressure as earth atmosphere

62
00:02:55,350 --> 00:02:47,280
and about 21 degrees celsius and a

63
00:02:59,830 --> 00:02:57,910

tim uh it's jane again i mean you you

64
00:03:01,190 --> 00:02:59,840
knew what you were getting into you

65
00:03:02,309 --> 00:03:01,200
talked to all the astronauts you did a

66
00:03:03,270 --> 00:03:02,319
lot of preparation you knew what you

67
00:03:05,830 --> 00:03:03,280
were going to miss the kind of things

68
00:03:07,990 --> 00:03:05,840
with all this are family or friends

69
00:03:09,670 --> 00:03:08,000
the routine but is there anything up

70
00:03:15,350 --> 00:03:09,680
there that you've missed that you

71
00:03:19,830 --> 00:03:17,910
do you know that's something that i

72
00:03:21,350 --> 00:03:19,840
thought about recently and it's it is

73
00:03:23,990 --> 00:03:21,360
the fresh air of course and being

74
00:03:25,750 --> 00:03:24,000
outdoors but it's also the color green

75
00:03:27,110 --> 00:03:25,760
and it was scott kelly who prompted me

76
00:03:28,949 --> 00:03:27,120
to think about that because as soon as

77
00:03:30,710 --> 00:03:28,959
he got down to planet earth after his

78
00:03:33,110 --> 00:03:30,720
one year stay aboard the space station

79
00:03:34,710 --> 00:03:33,120
he posted a lovely photograph with lots

80
00:03:36,309 --> 00:03:34,720
of green in it and said we don't have

81
00:03:38,710 --> 00:03:36,319
the color green on the space station and

82
00:03:40,470 --> 00:03:38,720
that's very true so definitely the fresh

83
00:03:41,670 --> 00:03:40,480
air outdoors and the color green are

84
00:03:47,270 --> 00:03:41,680
things i'm looking forward to seeing

85
00:03:51,030 --> 00:03:49,350
and given that it's the greenery it's

86
00:03:52,390 --> 00:03:51,040
the it's the fresh air in space that

87
00:03:55,270 --> 00:03:52,400
you're missing what do you think has

88
00:03:57,350 --> 00:03:55,280

been harder has it been the physical

89
00:04:03,190 --> 00:03:57,360
challenges or the mental challenges what

90
00:04:08,710 --> 00:04:05,910
do you know our training is so good that

91
00:04:10,550 --> 00:04:08,720
it really prepares you for everything

92
00:04:12,149 --> 00:04:10,560
that you might encounter on board the

93
00:04:14,229 --> 00:04:12,159
space station

94
00:04:16,949 --> 00:04:14,239
and myself and my sawyer's crew we've

95
00:04:18,150 --> 00:04:16,959
just passed our 100 days in space mark

96
00:04:19,670 --> 00:04:18,160
and there have certainly been some

97
00:04:21,749 --> 00:04:19,680
mentally and physically challenging

98
00:04:24,469 --> 00:04:21,759
events during that time um uh the

99
00:04:25,350 --> 00:04:24,479
spacewalk certainly was was one of those

100
00:04:27,670 --> 00:04:25,360
um

101
00:04:29,510 --> 00:04:27,680
this weekend we also captured the cygnus

102
00:04:31,990 --> 00:04:29,520
cargo vehicle which is again another

103
00:04:33,749 --> 00:04:32,000
demanding task for astronauts to do

104
00:04:36,390 --> 00:04:33,759
but we're so well trained for these

105
00:04:37,590 --> 00:04:36,400
events that actually we just take them

106
00:04:45,189 --> 00:04:37,600
all in our stride and we let the

107
00:04:48,550 --> 00:04:46,870
okay tim we've got a question from space

108
00:04:50,950 --> 00:04:48,560
student richard in the studio now

109
00:04:53,430 --> 00:04:50,960
richard take it away hello tom i'm

110
00:04:58,469 --> 00:04:54,950
and here's my question you've been

111
00:05:01,189 --> 00:04:58,479
training for this mission for six years

112
00:05:03,590 --> 00:05:01,199
how did the reality of microgravity

113
00:05:09,590 --> 00:05:03,600

differ from your training experiences

114
00:05:14,070 --> 00:05:11,830
hello richard uh that's a great question

115
00:05:17,189 --> 00:05:14,080
and of course it's very hard to give us

116
00:05:19,110 --> 00:05:17,199
microgravity training on on planet earth

117
00:05:20,790 --> 00:05:19,120
um the way they do that is by letting us

118
00:05:23,029 --> 00:05:20,800
experience it for short periods of a

119
00:05:25,590 --> 00:05:23,039
time on parabolic flights but you only

120
00:05:27,670 --> 00:05:25,600
get about 30 seconds each parabola and

121
00:05:29,830 --> 00:05:27,680
so there's not much zero gravity time so

122
00:05:31,270 --> 00:05:29,840
really every everything that i've had to

123
00:05:33,510 --> 00:05:31,280
learn about living and working in

124
00:05:35,749 --> 00:05:33,520
microgravity has been on the job

125
00:05:38,469 --> 00:05:35,759
training and it's certainly a lot of fun

126
00:05:40,150 --> 00:05:38,479
it can be very frustrating at times

127
00:05:41,749 --> 00:05:40,160
i've certainly lost a few things

128
00:05:43,510 --> 00:05:41,759
thankfully most of them are found again

129
00:05:44,790 --> 00:05:43,520
but it's very easy to put things down

130
00:05:46,870 --> 00:05:44,800
and to turn around and then they're not

131
00:05:49,189 --> 00:05:46,880
there again everything floats away so

132
00:05:50,870 --> 00:05:49,199
you'll see velcro is everywhere on the

133
00:05:53,270 --> 00:05:50,880
space station to try and keep to keep

134
00:05:55,430 --> 00:05:53,280
control of things but after a couple of

135
00:05:57,270 --> 00:05:55,440
weeks up here you really do get used to

136
00:05:59,189 --> 00:05:57,280
living and working in microgravity and

137
00:06:01,029 --> 00:05:59,199
your brain also gets used to it as well

138
00:06:03,110 --> 00:06:01,039

you know you can i can work in any

139
00:06:05,350 --> 00:06:03,120
orientation i like really and it doesn't

140
00:06:07,270 --> 00:06:05,360
matter whether i talk to you upside down

141
00:06:14,309 --> 00:06:07,280
or or the right way up my brain just

142
00:06:17,510 --> 00:06:16,070
richard great question and just looking

143
00:06:18,790 --> 00:06:17,520
at your face glowing as he answered that

144
00:06:21,110 --> 00:06:18,800
you're thrilled to have had this chance

145
00:06:23,430 --> 00:06:21,120
to to ask how aren't you let's get

146
00:06:24,469 --> 00:06:23,440
another question uh from lester this

147
00:06:26,710 --> 00:06:24,479
time

148
00:06:29,909 --> 00:06:26,720
this is from lily this is the one from

149
00:06:34,710 --> 00:06:32,870
hi i'm lily and i'm 16.

150
00:06:42,629 --> 00:06:34,720
what would you do in case of an

151
00:06:46,469 --> 00:06:44,629
lily that's a great question and we

152
00:06:48,150 --> 00:06:46,479
train an awful lot for emergencies on

153
00:06:49,510 --> 00:06:48,160
board the space station you mentioned a

154
00:06:51,430 --> 00:06:49,520
fire there of course that would be a

155
00:06:53,350 --> 00:06:51,440
very dangerous situation

156
00:06:55,189 --> 00:06:53,360
also if a piece of debris were to strike

157
00:06:57,029 --> 00:06:55,199
the space station we could suffer a

158
00:06:59,430 --> 00:06:57,039
depressurization

159
00:07:00,629 --> 00:06:59,440
and also there's a risk of an ammonia

160
00:07:02,390 --> 00:07:00,639
getting into our atmosphere so they're

161
00:07:03,350 --> 00:07:02,400
the three big emergencies that we train

162
00:07:05,990 --> 00:07:03,360
for

163
00:07:07,670 --> 00:07:06,000

and we would fight the fire by firstly

164
00:07:08,950 --> 00:07:07,680
trying to remove any electrical power

165
00:07:10,550 --> 00:07:08,960
that's normally the source of any

166
00:07:12,309 --> 00:07:10,560
ignition and then we've got fire

167
00:07:15,110 --> 00:07:12,319
extinguishers and portable breathing

168
00:07:16,469 --> 00:07:15,120
apparatus we could wear up here and put

169
00:07:17,909 --> 00:07:16,479
the fire out and we've got lots of

170
00:07:19,350 --> 00:07:17,919
equipment that could then scrub and

171
00:07:20,950 --> 00:07:19,360
clean the atmosphere to get the space

172
00:07:23,350 --> 00:07:20,960
station back into a working

173
00:07:25,270 --> 00:07:23,360
configuration and if we really had to if

174
00:07:27,110 --> 00:07:25,280
it was a very serious situation of

175
00:07:28,870 --> 00:07:27,120
course we've got our sawyer spacecraft

176
00:07:30,710 --> 00:07:28,880
docked to the space station then that's

177
00:07:32,710 --> 00:07:30,720
our lifeboat for the six months we're up

178
00:07:38,790 --> 00:07:32,720
here we would evacuate the space station

179
00:07:42,230 --> 00:07:41,029
tim you spent a lot of your time in the

180
00:07:44,309 --> 00:07:42,240
columbus

181
00:07:46,469 --> 00:07:44,319
module there the european space agency's

182
00:07:48,230 --> 00:07:46,479
laboratory just explain to us the kind

183
00:07:50,150 --> 00:07:48,240
of experiments you're doing up there

184
00:07:55,350 --> 00:07:50,160
when we don't see you uh performing in

185
00:08:00,309 --> 00:07:58,309
yes we're working um you know 12 14 hour

186
00:08:03,029 --> 00:08:00,319
days monday through friday and also at

187
00:08:05,189 --> 00:08:03,039
the weekends as well and we're doing so

188
00:08:06,790 --> 00:08:05,199

much scientific activity

189
00:08:08,869 --> 00:08:06,800
we're also maintaining the space station

190
00:08:10,309 --> 00:08:08,879
of course keeping it operating

191
00:08:11,830 --> 00:08:10,319
and for example this morning i was

192
00:08:13,510 --> 00:08:11,840
working in a japanese laboratory all

193
00:08:15,270 --> 00:08:13,520
morning preparing for a payload that's

194
00:08:17,350 --> 00:08:15,280
going to go outside the space station so

195
00:08:18,710 --> 00:08:17,360
we're not just doing research inside the

196
00:08:20,790 --> 00:08:18,720
space station in the microgravity

197
00:08:22,150 --> 00:08:20,800
environment but we're also using the

198
00:08:24,309 --> 00:08:22,160
vacuum of space the temperature

199
00:08:25,830 --> 00:08:24,319
fluctuations of space investigating all

200
00:08:27,909 --> 00:08:25,840
sorts of things such as you know what

201
00:08:29,270 --> 00:08:27,919
microorganisms might be able to survive

202
00:08:30,950 --> 00:08:29,280
in space

203
00:08:32,870 --> 00:08:30,960
and we're doing plenty of other

204
00:08:40,310 --> 00:08:32,880
scientific research in areas such as

205
00:08:45,269 --> 00:08:42,790
now tim we also have a question from one

206
00:08:48,310 --> 00:08:45,279
of our students in the uh in the studio

207
00:08:49,990 --> 00:08:48,320
uh this is david

208
00:08:51,990 --> 00:08:50,000
hello tim my name's david and my

209
00:08:53,430 --> 00:08:52,000
question is that as part of your mission

210
00:08:55,829 --> 00:08:53,440
you're doing a lot of

211
00:08:57,750 --> 00:08:55,839
experiments with up there with issa and

212
00:08:58,870 --> 00:08:57,760
with school which of these experiments

213
00:09:00,710 --> 00:08:58,880

do you think will have the greatest

214
00:09:06,070 --> 00:09:00,720
impact down on earth and which had the

215
00:09:11,110 --> 00:09:08,070
hello david um yeah another great

216
00:09:13,590 --> 00:09:11,120
question uh gosh we're doing about 250

217
00:09:16,310 --> 00:09:13,600
just over 250 experiments during my

218
00:09:18,550 --> 00:09:16,320
six-month mission so that's really hard

219
00:09:19,990 --> 00:09:18,560
to say which one will have the greatest

220
00:09:22,310 --> 00:09:20,000
impact i mean for example we're

221
00:09:24,389 --> 00:09:22,320
investigating metal alloys up here and

222
00:09:26,710 --> 00:09:24,399
how to make lighter stronger metal

223
00:09:28,550 --> 00:09:26,720
alloys which could have huge impacts to

224
00:09:30,870 --> 00:09:28,560
for example our aviation industry and

225
00:09:32,470 --> 00:09:30,880
into how we manufacture components for

226
00:09:34,870 --> 00:09:32,480
aircraft

227
00:09:36,470 --> 00:09:34,880
we're also investigating uh plenty of

228
00:09:38,310 --> 00:09:36,480
medical research as well i think that

229
00:09:40,949 --> 00:09:38,320
will probably potentially have the

230
00:09:42,790 --> 00:09:40,959
biggest impact back on earth for example

231
00:09:44,949 --> 00:09:42,800
we're looking into drugs and how protein

232
00:09:47,110 --> 00:09:44,959
crystals can be grown in microgravity

233
00:09:49,030 --> 00:09:47,120
which enable us to manufacture much

234
00:09:51,509 --> 00:09:49,040
better drugs that are much more

235
00:09:53,269 --> 00:09:51,519
effective with less

236
00:09:54,710 --> 00:09:53,279
with less side effects as well back down

237
00:09:56,470 --> 00:09:54,720
on planet earth and of course we're

238
00:09:58,470 --> 00:09:56,480

investigating our own human bodies as

239
00:10:01,110 --> 00:09:58,480
well up here looking into things such as

240
00:10:03,509 --> 00:10:01,120
the aging process in terms of our muscle

241
00:10:05,509 --> 00:10:03,519
atrophy and our bone density loss as

242
00:10:07,990 --> 00:10:05,519
well in terms of our eyesight and our

243
00:10:10,470 --> 00:10:08,000
increased intracranial pressure as well

244
00:10:12,150 --> 00:10:10,480
and our cardiovascular system not to

245
00:10:14,870 --> 00:10:12,160
mention our immune system which gets

246
00:10:16,710 --> 00:10:14,880
depleted up here and also questions such

247
00:10:18,870 --> 00:10:16,720
as why are viruses more virulent in

248
00:10:21,269 --> 00:10:18,880
microgravity and how we can use that to

249
00:10:23,430 --> 00:10:21,279
develop vaccines back on earth so i

250
00:10:24,790 --> 00:10:23,440
think personally the medical experiments

251
00:10:26,470 --> 00:10:24,800
are some of the most exciting and

252
00:10:28,550 --> 00:10:26,480
interesting ones that have the potential

253
00:10:33,110 --> 00:10:28,560
to benefit people back on planet earth

254
00:10:36,230 --> 00:10:34,630
now tim you've also been doing some

255
00:10:37,750 --> 00:10:36,240
demonstrations for science students and

256
00:10:39,509 --> 00:10:37,760
one of those science students is emily

257
00:10:41,670 --> 00:10:39,519
now you've got some some kit there that

258
00:10:43,350 --> 00:10:41,680
you actually designed for tim really to

259
00:10:45,670 --> 00:10:43,360
just show how difficult it is to

260
00:10:47,430 --> 00:10:45,680
demonstrate uh physics here on earth and

261
00:10:49,750 --> 00:10:47,440
it's a track and a ball just just show

262
00:10:51,590 --> 00:10:49,760
us what actually happens there

263
00:10:53,670 --> 00:10:51,600

and gravity is really just pulling that

264
00:10:55,430 --> 00:10:53,680
ball back down now

265
00:10:57,190 --> 00:10:55,440
tim has actually done the same

266
00:10:59,430 --> 00:10:57,200
experiment uh you weren't able to do it

267
00:11:01,670 --> 00:10:59,440
live but you have we got the video of

268
00:11:03,590 --> 00:11:01,680
you demonstrating what happens when

269
00:11:05,030 --> 00:11:03,600
you're in microgravity with exactly the

270
00:11:06,389 --> 00:11:05,040
same kit

271
00:11:08,389 --> 00:11:06,399
we don't seem to have a video

272
00:11:10,790 --> 00:11:08,399
unfortunately but the ball can

273
00:11:12,550 --> 00:11:10,800
the the ball does continue all the way

274
00:11:16,790 --> 00:11:12,560
around quite just explain to him what's

275
00:11:19,910 --> 00:11:18,710
yes again is one of the phenomena of

276
00:11:21,670 --> 00:11:19,920
microgravity it's a wonderful

277
00:11:24,310 --> 00:11:21,680
environment to demonstrate some of those

278
00:11:26,310 --> 00:11:24,320
basic scientific principles and it was a

279
00:11:28,310 --> 00:11:26,320
great opportunity to be able to do some

280
00:11:30,790 --> 00:11:28,320
videos of this kind of thing that can be

281
00:11:32,310 --> 00:11:30,800
used by school teachers in classrooms

282
00:11:34,230 --> 00:11:32,320
all around the uk

283
00:11:35,670 --> 00:11:34,240
and across europe to try and demonstrate

284
00:11:37,670 --> 00:11:35,680
some of the the physics that are

285
00:11:40,069 --> 00:11:37,680
involved and for example the kinetic

286
00:11:42,550 --> 00:11:40,079
theory of gases we can demonstrate that

287
00:11:44,710 --> 00:11:42,560
really well up here with a clear ball

288
00:11:46,550 --> 00:11:44,720

and lots of marbles inside and the

289
00:11:49,190 --> 00:11:46,560
particular ball going around the tube is

290
00:11:50,870 --> 00:11:49,200
just uh you can demonstrate a concept

291
00:11:52,949 --> 00:11:50,880
such of angular momentum and

292
00:11:55,350 --> 00:11:52,959
conservation of angular momentum

293
00:11:57,590 --> 00:11:55,360
so i spent a great afternoon doing some

294
00:12:04,069 --> 00:11:57,600
fun videos that will hopefully be seen

295
00:12:08,150 --> 00:12:06,629
and a question tim from uh the national

296
00:12:14,230 --> 00:12:08,160
space center in leicester again this is

297
00:12:17,509 --> 00:12:15,190
nine

298
00:12:24,150 --> 00:12:17,519
my question is how many galaxies do you

299
00:12:27,990 --> 00:12:26,150
kevin goodness me what a wonderful

300
00:12:30,550 --> 00:12:28,000
question when i look outside the cooper

301
00:12:32,230 --> 00:12:30,560
at night time uh you know even to try

302
00:12:34,310 --> 00:12:32,240
and count them all would it would be a

303
00:12:36,470 --> 00:12:34,320
task that will be way too difficult but

304
00:12:38,870 --> 00:12:36,480
the best scientists and astronomers have

305
00:12:41,590 --> 00:12:38,880
estimated that there might be at least a

306
00:12:43,910 --> 00:12:41,600
hundred billion galaxies in the universe

307
00:12:46,710 --> 00:12:43,920
each one containing a hundred billion

308
00:12:49,030 --> 00:12:46,720
stars uh which is just mind-boggling

309
00:12:50,790 --> 00:12:49,040
that kind of figure um and uh you know

310
00:12:52,710 --> 00:12:50,800
there's a fact out there that there are

311
00:12:55,590 --> 00:12:52,720
more stars in the universe than there

312
00:12:57,750 --> 00:12:55,600
are grains of sand on planet earth which

313
00:12:59,829 --> 00:12:57,760

uh seems too mind-boggling to even

314
00:13:02,150 --> 00:12:59,839
comprehend but being up here and looking

315
00:13:07,990 --> 00:13:02,160
outside the cupola at night time i can

316
00:13:11,750 --> 00:13:09,829
fantastic thing thanks for that i don't

317
00:13:13,190 --> 00:13:11,760
know if you know that kevin i don't know

318
00:13:14,790 --> 00:13:13,200
if kevin was more stunned that you were

319
00:13:16,389 --> 00:13:14,800
answering his question or that he was on

320
00:13:17,590 --> 00:13:16,399
the big screen as the science said he

321
00:13:19,430 --> 00:13:17,600
was absolutely thrilled to get that

322
00:13:21,430 --> 00:13:19,440
response a couple of tougher questions

323
00:13:23,110 --> 00:13:21,440
for you though tim um

324
00:13:25,110 --> 00:13:23,120
you're obviously having a fantastic time

325
00:13:26,870 --> 00:13:25,120
watching you playing with the microphone

326
00:13:28,230 --> 00:13:26,880
you're answering tweets from children

327
00:13:30,949 --> 00:13:28,240
all the time but

328
00:13:36,470 --> 00:13:30,959
the cost of this mission it is billions

329
00:13:41,269 --> 00:13:38,629
that's a very good question and i

330
00:13:42,949 --> 00:13:41,279
absolutely do think it's worth it i mean

331
00:13:45,350 --> 00:13:42,959
not not forgetting that up here of

332
00:13:47,030 --> 00:13:45,360
course it's not just one country that's

333
00:13:49,110 --> 00:13:47,040
involved in this this is multiple

334
00:13:51,829 --> 00:13:49,120
country countries across the world it's

335
00:13:54,790 --> 00:13:51,839
a huge international collaboration

336
00:13:56,949 --> 00:13:54,800
between the u.s between russia canada

337
00:13:58,629 --> 00:13:56,959
japan and all the member states of

338
00:14:00,550 --> 00:13:58,639

europe as well

339
00:14:02,790 --> 00:14:00,560
and we've been doing research up here

340
00:14:04,470 --> 00:14:02,800
since the year 2000 when the

341
00:14:06,949 --> 00:14:04,480
international space station was first

342
00:14:09,590 --> 00:14:06,959
occupied it now has a life extension

343
00:14:12,069 --> 00:14:09,600
until 2024

344
00:14:14,389 --> 00:14:12,079
so that's a fantastic working laboratory

345
00:14:16,389 --> 00:14:14,399
doing great research and of course money

346
00:14:18,790 --> 00:14:16,399
that's spent in space is not spent in

347
00:14:20,870 --> 00:14:18,800
space it's spent back on earth it's jobs

348
00:14:22,790 --> 00:14:20,880
uh for the economy it's pushing the

349
00:14:24,550 --> 00:14:22,800
space industry to its limits the space

350
00:14:27,350 --> 00:14:24,560
industry in the uk alone is one of the

351
00:14:29,269 --> 00:14:27,360
fastest growing in growing sectors

352
00:14:34,949 --> 00:14:29,279
so it's it's worth it for so many

353
00:14:38,310 --> 00:14:36,310
we've got another question from a viewer

354
00:14:40,870 --> 00:14:38,320
now this one is from jonathan parry it's

355
00:14:42,550 --> 00:14:40,880
about space equipment space junk

356
00:14:44,470 --> 00:14:42,560
hundreds of redundant satellites and

357
00:14:46,870 --> 00:14:44,480
equipment in space would you say that

358
00:14:48,710 --> 00:14:46,880
we're now disrespecting the environment

359
00:14:54,150 --> 00:14:48,720
of space as we are doing so on our own

360
00:14:58,230 --> 00:14:56,069
yeah that's a really important question

361
00:14:59,990 --> 00:14:58,240
from jonathan and rachel and actually i

362
00:15:01,750 --> 00:15:00,000
think in the early years of space

363
00:15:03,750 --> 00:15:01,760

exploration yes we were perhaps a bit

364
00:15:06,389 --> 00:15:03,760
naive in terms of what we were doing and

365
00:15:08,629 --> 00:15:06,399
what we were putting into space but um

366
00:15:11,829 --> 00:15:08,639
more recently we're actually really

367
00:15:12,710 --> 00:15:11,839
making huge efforts to clean up space

368
00:15:14,949 --> 00:15:12,720
every

369
00:15:16,790 --> 00:15:14,959
satellite that is launched today has to

370
00:15:18,790 --> 00:15:16,800
have a means of either re-entering

371
00:15:21,829 --> 00:15:18,800
earth's atmosphere and burning up or

372
00:15:24,230 --> 00:15:21,839
being able to take it away from planet

373
00:15:27,110 --> 00:15:24,240
earth into safe orbits that aren't going

374
00:15:28,550 --> 00:15:27,120
to cause any problems with debris

375
00:15:30,389 --> 00:15:28,560
the international space station of

376
00:15:32,949 --> 00:15:30,399
course has to do debris avoidance

377
00:15:34,310 --> 00:15:32,959
maneuvers uh a few of them every year

378
00:15:36,710 --> 00:15:34,320
and it's something that we take

379
00:15:37,990 --> 00:15:36,720
extremely seriously so great you know

380
00:15:39,910 --> 00:15:38,000
i'm very grateful for the fact that

381
00:15:42,069 --> 00:15:39,920
we've now acknowledged the fact that

382
00:15:44,710 --> 00:15:42,079
space debris is a huge problem and that

383
00:15:46,629 --> 00:15:44,720
everybody on earth is making uh huge uh

384
00:15:52,150 --> 00:15:46,639
efforts to try and resolve this now and

385
00:15:54,870 --> 00:15:53,670
i think we've only got four minutes left

386
00:15:56,790 --> 00:15:54,880
on our call to you so we're gonna rattle

387
00:15:58,230 --> 00:15:56,800
through as fast as we can emily another

388
00:16:01,350 --> 00:15:58,240

space student here in the studio your

389
00:16:04,230 --> 00:16:01,360
turn for the question hi tim i'm emily

390
00:16:06,550 --> 00:16:04,240
um my question for you is with your

391
00:16:08,710 --> 00:16:06,560
experiences on the iss what do you think

392
00:16:10,389 --> 00:16:08,720
the challenges would be of establishing

393
00:16:12,150 --> 00:16:10,399
a moon colony and do you think what

394
00:16:16,629 --> 00:16:12,160
would be necessary in our mission to

395
00:16:21,110 --> 00:16:19,509
hi emily yes well a moon colony that's a

396
00:16:23,110 --> 00:16:21,120
great ambition to have and again it'd be

397
00:16:24,710 --> 00:16:23,120
wonderful to see that uh

398
00:16:26,790 --> 00:16:24,720
thought going forward as another

399
00:16:28,230 --> 00:16:26,800
international collaboration using what

400
00:16:30,790 --> 00:16:28,240
we've done here as the international

401
00:16:33,110 --> 00:16:30,800
space station is really a benchmark for

402
00:16:35,350 --> 00:16:33,120
how we can continue to explore the solar

403
00:16:37,829 --> 00:16:35,360
system i think a moon base is a very

404
00:16:40,310 --> 00:16:37,839
logical step on the way to mars it

405
00:16:42,069 --> 00:16:40,320
enables us to investigate many of the

406
00:16:44,150 --> 00:16:42,079
challenges we're going to face in terms

407
00:16:45,670 --> 00:16:44,160
of radiation exposure

408
00:16:47,509 --> 00:16:45,680
energy production

409
00:16:48,949 --> 00:16:47,519
and yet it's about the kind of safer

410
00:16:50,629 --> 00:16:48,959
distance if you like in the safer

411
00:16:52,550 --> 00:16:50,639
environment of the moon

412
00:16:55,110 --> 00:16:52,560
however the moon in itself is a

413
00:16:57,030 --> 00:16:55,120

wonderful place to set up a location for

414
00:16:58,629 --> 00:16:57,040
research uh there's a huge amount that

415
00:17:00,550 --> 00:16:58,639
we've still yet to discover about the

416
00:17:02,389 --> 00:17:00,560
moon it can tell us many a lot of things

417
00:17:04,630 --> 00:17:02,399
about the origins of our own planet

418
00:17:07,270 --> 00:17:04,640
after all it was part of our own planet

419
00:17:08,789 --> 00:17:07,280
at one time before it was uh struck

420
00:17:10,710 --> 00:17:08,799
also the dark side of the moon for

421
00:17:13,669 --> 00:17:10,720
example is a great place to have a space

422
00:17:15,909 --> 00:17:13,679
observation laboratory or telescope into

423
00:17:17,829 --> 00:17:15,919
into the rest of the solar system so the

424
00:17:19,990 --> 00:17:17,839
moon is a very exciting place i hope

425
00:17:22,309 --> 00:17:20,000
that we will see that as a next

426
00:17:29,190 --> 00:17:22,319
destination in itself and also as a

427
00:17:32,870 --> 00:17:30,630
tim there's a lot of interest in

428
00:17:34,710 --> 00:17:32,880
microgravity of course and this is a

429
00:17:37,669 --> 00:17:34,720
tweet from simon miller if you hit a

430
00:17:43,830 --> 00:17:37,679
golf ball theoretically on the iss how

431
00:17:48,230 --> 00:17:45,990
well that's a good question inside the

432
00:17:51,430 --> 00:17:48,240
space station uh we could probably get

433
00:17:53,029 --> 00:17:51,440
it about or maybe 75 meters before it

434
00:17:55,110 --> 00:17:53,039
bumped into it and end to end from the

435
00:17:56,789 --> 00:17:55,120
space station but uh

436
00:17:59,029 --> 00:17:56,799
you know of course we're in a fairly

437
00:18:00,470 --> 00:17:59,039
confined environment up here

438
00:18:01,909 --> 00:18:00,480

it would be great to do that experiment

439
00:18:07,190 --> 00:18:01,919
outside on the space walk and see how

440
00:18:11,190 --> 00:18:09,270
i've got a ball there i can see it

441
00:18:12,710 --> 00:18:11,200
floating next to your right shoulder

442
00:18:14,549 --> 00:18:12,720
when you give it throw towards the

443
00:18:20,390 --> 00:18:14,559
camera see what happens will it dip or

444
00:18:24,390 --> 00:18:22,070
you know

445
00:18:26,390 --> 00:18:24,400
everything up here just carries on going

446
00:18:28,150 --> 00:18:26,400
until it either bumps into something or

447
00:18:31,110 --> 00:18:28,160
if it's very light then we do actually

448
00:18:32,870 --> 00:18:31,120
have air circulation and so the airflow

449
00:18:35,350 --> 00:18:32,880
throughout the space station will keep

450
00:18:36,789 --> 00:18:35,360
things moving um which is always a good

451
00:18:38,710 --> 00:18:36,799
thing if we lose something we always

452
00:18:40,549 --> 00:18:38,720
know where to go we go to the vents the

453
00:18:46,950 --> 00:18:40,559
uh air ducts and that's where we find

454
00:18:51,750 --> 00:18:49,190
tim just time for one final question for

455
00:18:53,590 --> 00:18:51,760
you obviously your first time in space

456
00:18:55,190 --> 00:18:53,600
is it like a drug are you going to have

457
00:18:56,390 --> 00:18:55,200
to go back i mean this may be something

458
00:18:58,150 --> 00:18:56,400
you want to talk to your wife rebecca

459
00:19:00,150 --> 00:18:58,160
about before you announce it live on sky

460
00:19:05,590 --> 00:19:00,160
news but do you think this is this is

461
00:19:09,990 --> 00:19:07,669
it certainly is uh very addictive you

462
00:19:11,830 --> 00:19:10,000
know the the view from the cupola taking

463
00:19:13,750 --> 00:19:11,840

photographs um

464
00:19:15,270 --> 00:19:13,760
it is it's great to be up here it's a

465
00:19:17,110 --> 00:19:15,280
wonderful experience it's a huge

466
00:19:18,150 --> 00:19:17,120
privilege to be able to experience this

467
00:19:20,230 --> 00:19:18,160
as well

468
00:19:22,070 --> 00:19:20,240
i'm really happy the european space

469
00:19:24,390 --> 00:19:22,080
agency has got an excellent track record

470
00:19:26,230 --> 00:19:24,400
of flying its astronauts and after me

471
00:19:27,669 --> 00:19:26,240
later this year will be tom arpesque

472
00:19:29,350 --> 00:19:27,679
will be the last of my class of

473
00:19:31,750 --> 00:19:29,360
astronauts to fly and there are

474
00:19:34,310 --> 00:19:31,760
certainly plenty of other opportunities

475
00:19:36,710 --> 00:19:34,320
going into the 2020s with further space

476
00:19:38,390 --> 00:19:36,720
station research but also

477
00:19:40,390 --> 00:19:38,400
space flights into other areas as well

478
00:19:42,150 --> 00:19:40,400
so it's a very exciting time for a human

479
00:19:44,070 --> 00:19:42,160
space flight so i certainly hope that

480
00:19:49,430 --> 00:19:44,080
there's a there are a few more flights

481
00:19:53,669 --> 00:19:51,350
very best of luck to you tim and thank

482
00:19:55,669 --> 00:19:53,679
you so much for agreeing to talk to us

483
00:19:57,350 --> 00:19:55,679
and for asking answering all of our

484
00:19:59,110 --> 00:19:57,360
students questions here in the studio

485
00:20:00,470 --> 00:19:59,120
the questions from the children up at

486
00:20:02,310 --> 00:20:00,480
leicester space station and the

487
00:20:04,950 --> 00:20:02,320
questions from all the sky news viewers

488
00:20:06,630 --> 00:20:04,960

who've been tweeting in and emailing in

489
00:20:08,230 --> 00:20:06,640
over the last few days

490
00:20:10,549 --> 00:20:08,240
we've got to let you go now there's only

491
00:20:11,990 --> 00:20:10,559
15 seconds left on the satellite but

492
00:20:16,390 --> 00:20:12,000
thanks again from all of us here at the

493
00:20:19,270 --> 00:20:17,990
you're welcome it's a huge honor to

494
00:20:20,710 --> 00:20:19,280
speak to you and it's been great thank

495
00:20:22,390 --> 00:20:20,720
you for the wonderful questions and to

496
00:20:29,350 --> 00:20:22,400
everyone in london at the national space

497
00:20:35,750 --> 00:20:32,310
station this is houston acr thank you

498
00:20:37,669 --> 00:20:35,760
that concludes our event

499
00:20:39,510 --> 00:20:37,679
thank you sky news london station we are