
NASA
SPACESTATION
LIVE

1
00:00:09,430 --> 00:00:07,829
the one year mission uh currently going

2
00:00:11,509 --> 00:00:09,440
on the international space station right

3
00:00:14,070 --> 00:00:11,519
now with scott kelly and mikhail

4
00:00:16,070 --> 00:00:14,080
kornienko is coming to a close in just

5
00:00:18,470 --> 00:00:16,080
about a week but that doesn't mean that

6
00:00:20,790 --> 00:00:18,480
the one-year mission is over there's

7
00:00:22,950 --> 00:00:20,800
plenty of work to do here on the ground

8
00:00:25,349 --> 00:00:22,960
to continue to monitor these experiments

9
00:00:27,269 --> 00:00:25,359
and with us today we have dr john

10
00:00:29,109 --> 00:00:27,279
charles the chief scientist of the human

11
00:00:30,790 --> 00:00:29,119
research program here to talk more about

12
00:00:32,630 --> 00:00:30,800
the one-year mission dr charles thanks

13
00:00:35,110 --> 00:00:32,640

for being with us today

14
00:00:37,270 --> 00:00:35,120
so let's talk a little bit about um what

15
00:00:38,790 --> 00:00:37,280
we were expecting uh from this

16
00:00:41,110 --> 00:00:38,800
experiment from a one-year mission is

17
00:00:43,670 --> 00:00:41,120
there anything that has been going on

18
00:00:45,110 --> 00:00:43,680
that you know

19
00:00:47,430 --> 00:00:45,120
that you were expecting something to

20
00:00:48,950 --> 00:00:47,440
happen and it actually did i was

21
00:00:51,350 --> 00:00:48,960
expecting great success and we've had

22
00:00:53,830 --> 00:00:51,360
great success uh the uh the one-year

23
00:00:55,350 --> 00:00:53,840
mission has gone surprisingly well in

24
00:00:56,869 --> 00:00:55,360
terms of the investigations that we've

25
00:00:57,590 --> 00:00:56,879
been doing on board

26
00:01:01,110 --> 00:00:57,600
the

27
00:01:02,549 --> 00:01:01,120
couple of a couple of major joint

28
00:01:04,310 --> 00:01:02,559
investigations which are really

29
00:01:06,390 --> 00:01:04,320
demonstrating how we can do much more

30
00:01:08,630 --> 00:01:06,400
collaborative work in the future

31
00:01:11,190 --> 00:01:08,640
have been surprisingly successful the

32
00:01:12,789 --> 00:01:11,200
astronauts have been very uh prompt and

33
00:01:14,230 --> 00:01:12,799
punctual in getting their work done

34
00:01:15,830 --> 00:01:14,240
following instructions and their

35
00:01:17,830 --> 00:01:15,840
training very well

36
00:01:20,550 --> 00:01:17,840
and we're we're anxious to get the

37
00:01:22,630 --> 00:01:20,560
astronauts and their samples back

38
00:01:24,149 --> 00:01:22,640

next week as you mentioned next week the

39
00:01:25,590 --> 00:01:24,159
astronauts land

40
00:01:27,510 --> 00:01:25,600
many of the blood samples don't come

41
00:01:29,190 --> 00:01:27,520
back until the next spacex landing which

42
00:01:30,550 --> 00:01:29,200
is in april so we're not really going to

43
00:01:33,670 --> 00:01:30,560
be able to start analyzing some of the

44
00:01:35,510 --> 00:01:33,680
data they've acquired until april but

45
00:01:37,510 --> 00:01:35,520
like you say the work does the work

46
00:01:38,870 --> 00:01:37,520
continues even after the mission seems

47
00:01:40,710 --> 00:01:38,880
to end there's a

48
00:01:41,670 --> 00:01:40,720
months and months of post-flight data

49
00:01:44,310 --> 00:01:41,680
collection

50
00:01:45,910 --> 00:01:44,320
uh in some cases up to nine months after

51
00:01:48,149 --> 00:01:45,920
landing we're still acquiring samples in

52
00:01:49,510 --> 00:01:48,159
the astronauts perhaps even longer as

53
00:01:50,710 --> 00:01:49,520
they return to their normal duties and

54
00:01:52,469 --> 00:01:50,720
we acquire data from their annual

55
00:01:55,510 --> 00:01:52,479
physicals and so forth

56
00:01:57,429 --> 00:01:55,520
and then the data analysis really begins

57
00:02:00,069 --> 00:01:57,439
so we're looking forward to seeing uh

58
00:02:02,069 --> 00:02:00,079
the results of this uh this

59
00:02:04,149 --> 00:02:02,079
first major collaborative work between

60
00:02:05,990 --> 00:02:04,159
the us and the russians on the iss with

61
00:02:07,109 --> 00:02:06,000
with one u.s and one russian astronaut

62
00:02:08,389 --> 00:02:07,119
involved

63
00:02:09,830 --> 00:02:08,399

over the course of the next several

64
00:02:12,309 --> 00:02:09,840
months see the story start to come

65
00:02:13,910 --> 00:02:12,319
together see the results become

66
00:02:15,510 --> 00:02:13,920
crystallized and then look forward to

67
00:02:17,510 --> 00:02:15,520
the publication of the results we hope

68
00:02:20,150 --> 00:02:17,520
starting about a year from now or so

69
00:02:22,790 --> 00:02:20,160
excellent and there seems to be a lot of

70
00:02:24,790 --> 00:02:22,800
data coming either now and later do you

71
00:02:26,710 --> 00:02:24,800
have a rough idea of how many

72
00:02:28,309 --> 00:02:26,720
experiments that uh have been conducted

73
00:02:30,150 --> 00:02:28,319
for the one-year mission

74
00:02:32,150 --> 00:02:30,160
well i should because i put together the

75
00:02:33,910 --> 00:02:32,160
list of investigations and as i recall

76
00:02:35,830 --> 00:02:33,920
it was on the order of 17 or so

77
00:02:37,270 --> 00:02:35,840
investigations really focused on the

78
00:02:39,190 --> 00:02:37,280
one-year mission that doesn't include

79
00:02:40,470 --> 00:02:39,200
the work that was being done in an

80
00:02:42,470 --> 00:02:40,480
independent of the one-year mission

81
00:02:44,710 --> 00:02:42,480
because don't forget scott and mark are

82
00:02:46,070 --> 00:02:44,720
scott and mike miguel are both crew

83
00:02:47,910 --> 00:02:46,080
members on the space station with other

84
00:02:48,949 --> 00:02:47,920
things to do besides our one-year

85
00:02:51,110 --> 00:02:48,959
program

86
00:02:53,190 --> 00:02:51,120
but they really really was the focus of

87
00:02:56,070 --> 00:02:53,200
the one-year mission and at least in

88
00:02:58,470 --> 00:02:56,080

terms of scott's work uh

89
00:02:59,990 --> 00:02:58,480
i recall the number was 17 because that

90
00:03:01,830 --> 00:03:00,000
was about twice as many as done

91
00:03:03,030 --> 00:03:01,840
routinely on astronauts in terms of

92
00:03:04,710 --> 00:03:03,040
medical research that we do in the

93
00:03:06,550 --> 00:03:04,720
astronauts we usually do

94
00:03:09,030 --> 00:03:06,560
seven or eight or nine investigations on

95
00:03:10,949 --> 00:03:09,040
astronauts on six-month flights i

96
00:03:12,710 --> 00:03:10,959
thought being twice as long we could do

97
00:03:13,830 --> 00:03:12,720
twice as much research i was told that's

98
00:03:15,110 --> 00:03:13,840
not really the way it works but it

99
00:03:17,350 --> 00:03:15,120
turned out that we got pretty close to

100
00:03:20,070 --> 00:03:17,360
doing that anyway seems like a nice even

101
00:03:22,869 --> 00:03:20,080
number to just double it um now tell me

102
00:03:23,910 --> 00:03:22,879
how have you ever or have you learned uh

103
00:03:26,149 --> 00:03:23,920
anything about the various

104
00:03:27,670 --> 00:03:26,159
countermeasures that have been uh

105
00:03:29,350 --> 00:03:27,680
trying to that you've been trying to

106
00:03:30,710 --> 00:03:29,360
work with for the one-year mission well

107
00:03:32,309 --> 00:03:30,720
this uh you make a very good point

108
00:03:34,070 --> 00:03:32,319
though the one-year mission is really

109
00:03:35,270 --> 00:03:34,080
for from the purpose from the

110
00:03:37,350 --> 00:03:35,280
perspective of the human research

111
00:03:38,550 --> 00:03:37,360
program intended to validate and make

112
00:03:40,309 --> 00:03:38,560
sure that the countermeasures we

113
00:03:42,149 --> 00:03:40,319

developed up until now continue to be

114
00:03:44,070 --> 00:03:42,159
effective for missions longer than the

115
00:03:46,070 --> 00:03:44,080
typical six-month mission

116
00:03:47,509 --> 00:03:46,080
and that's because mars missions will be

117
00:03:49,270 --> 00:03:47,519
on the order of two to three years we

118
00:03:50,550 --> 00:03:49,280
say two and a half years 30 months for a

119
00:03:53,110 --> 00:03:50,560
mars mission and the work we're doing in

120
00:03:55,190 --> 00:03:53,120
the space station is intended to to

121
00:03:57,509 --> 00:03:55,200
really inform the countermeasures that

122
00:03:58,229 --> 00:03:57,519
need to be done on mars missions

123
00:04:01,670 --> 00:03:58,239
and

124
00:04:03,509 --> 00:04:01,680
so that by the end of the space station

125
00:04:04,789 --> 00:04:03,519
era they are validated and available for

126
00:04:06,149 --> 00:04:04,799
mars missions

127
00:04:07,830 --> 00:04:06,159
so we have uh we have the

128
00:04:09,509 --> 00:04:07,840
countermeasures in work and you already

129
00:04:12,949 --> 00:04:09,519
talked about them the a red device

130
00:04:14,869 --> 00:04:12,959
exercise devices other other uh kinds of

131
00:04:16,390 --> 00:04:14,879
of interventions if they're needed

132
00:04:18,629 --> 00:04:16,400
medical interventions psychological

133
00:04:20,550 --> 00:04:18,639
interventions if they're ever needed

134
00:04:22,069 --> 00:04:20,560
so the purpose of the of the one-year

135
00:04:23,510 --> 00:04:22,079
mission is to acquire the data to see

136
00:04:24,870 --> 00:04:23,520
whether those countermeasures continue

137
00:04:26,550 --> 00:04:24,880
to work effectively on long-duration

138
00:04:27,749 --> 00:04:26,560

flights beyond six months and again

139
00:04:29,270 --> 00:04:27,759
that's the data that we're going to be

140
00:04:31,189 --> 00:04:29,280
looking at as the mission comes to a

141
00:04:32,629 --> 00:04:31,199
close we get our post flight data we

142
00:04:34,790 --> 00:04:32,639
really won't be able to tell

143
00:04:36,150 --> 00:04:34,800
in some in some cases how well the

144
00:04:37,590 --> 00:04:36,160
countermeasure worked until we get the

145
00:04:39,270 --> 00:04:37,600
astronauts back on the ground post

146
00:04:41,110 --> 00:04:39,280
flight and make measurements and see how

147
00:04:42,870 --> 00:04:41,120
they compare to six month crew members

148
00:04:44,469 --> 00:04:42,880
and other crew members in the past now

149
00:04:46,150 --> 00:04:44,479
these counter measures that you are

150
00:04:47,909 --> 00:04:46,160
measuring do you have a sort of time

151
00:04:49,270 --> 00:04:47,919
frame in mind where you would be able to

152
00:04:51,909 --> 00:04:49,280
analyze and come up with conclusive

153
00:04:54,390 --> 00:04:51,919
results well the the post flight data

154
00:04:56,230 --> 00:04:54,400
collection and uh post flight data and

155
00:04:57,830 --> 00:04:56,240
sample collection are really front end

156
00:04:59,590 --> 00:04:57,840
loaded so that's really going to be as

157
00:05:01,590 --> 00:04:59,600
quickly as we can get it done

158
00:05:03,430 --> 00:05:01,600
immediately after landing and by quickly

159
00:05:05,270 --> 00:05:03,440
i mean within days to weeks of the

160
00:05:06,950 --> 00:05:05,280
landing so it's not going to be a one

161
00:05:07,909 --> 00:05:06,960
stop a one shot kind of thing and then

162
00:05:09,749 --> 00:05:07,919
done

163
00:05:10,950 --> 00:05:09,759

but they're going to peter out along

164
00:05:12,710 --> 00:05:10,960
about 30 days but there are some

165
00:05:15,510 --> 00:05:12,720
measurements that take place at 30 days

166
00:05:17,029 --> 00:05:15,520
and 45 days and 60 days and even up to

167
00:05:18,469 --> 00:05:17,039
nine months after landing for some of

168
00:05:20,469 --> 00:05:18,479
the the genetic measurements we're

169
00:05:22,550 --> 00:05:20,479
making on on scott and on his twin

170
00:05:24,390 --> 00:05:22,560
brother mark so we're really talking

171
00:05:26,310 --> 00:05:24,400
about a lot of data collection

172
00:05:28,150 --> 00:05:26,320
very soon after landing

173
00:05:29,670 --> 00:05:28,160
ongoing data collection at a lower level

174
00:05:31,590 --> 00:05:29,680
of intensity for several months after

175
00:05:33,670 --> 00:05:31,600
that and then about six or eight months

176
00:05:34,870 --> 00:05:33,680
after landing most of the scientists

177
00:05:36,629 --> 00:05:34,880
should have most of the data they're

178
00:05:38,070 --> 00:05:36,639
going to get and they can be and they

179
00:05:40,150 --> 00:05:38,080
will have already started analyzing the

180
00:05:41,590 --> 00:05:40,160
samples and crunching the numbers and

181
00:05:44,230 --> 00:05:41,600
coming up with some preliminary

182
00:05:47,029 --> 00:05:44,240
conclusions and dr charles last question

183
00:05:48,790 --> 00:05:47,039
um any thoughts about the benefits of

184
00:05:50,790 --> 00:05:48,800
doing joint research with the russians

185
00:05:53,110 --> 00:05:50,800
since the one year mission did include

186
00:05:54,710 --> 00:05:53,120
both scott kelly and mikhail kornienko

187
00:05:56,150 --> 00:05:54,720
well gary that's that's really the

188
00:05:57,590 --> 00:05:56,160

important part of this one-year mission

189
00:05:59,189 --> 00:05:57,600
the one-year mission is not just a

190
00:06:01,270 --> 00:05:59,199
one-year mission but it is a one-year

191
00:06:02,629 --> 00:06:01,280
collaborative mission between all the

192
00:06:04,070 --> 00:06:02,639
partners on the international space

193
00:06:05,510 --> 00:06:04,080
station primarily the us and the

194
00:06:07,110 --> 00:06:05,520
russians which each contributed a crew

195
00:06:08,710 --> 00:06:07,120
member and substantial numbers of

196
00:06:11,110 --> 00:06:08,720
investigations

197
00:06:12,710 --> 00:06:11,120
that was my primary purpose in getting

198
00:06:14,390 --> 00:06:12,720
involved was figuring out a good way to

199
00:06:15,990 --> 00:06:14,400
do that so we could do that then on

200
00:06:17,830 --> 00:06:16,000
subsequent space station missions

201
00:06:19,110 --> 00:06:17,840
whether they're one-year missions or not

202
00:06:21,749 --> 00:06:19,120
the idea being to increase the

203
00:06:23,430 --> 00:06:21,759
efficiency to make sure that we have uh

204
00:06:25,990 --> 00:06:23,440
efficient use of the resources on board

205
00:06:27,270 --> 00:06:26,000
the crew time answering questions for

206
00:06:28,710 --> 00:06:27,280
all of the partners that need to be

207
00:06:30,469 --> 00:06:28,720
answered using astronauts and space

208
00:06:32,629 --> 00:06:30,479
flight and that part of it has been

209
00:06:34,950 --> 00:06:32,639
remarkably successful surprisingly

210
00:06:37,029 --> 00:06:34,960
successful i did not expect it to go as

211
00:06:38,629 --> 00:06:37,039
well as it has done now that's not to

212
00:06:40,230 --> 00:06:38,639
say it was not without a great deal of

213
00:06:43,189 --> 00:06:40,240

effort by a lot of people to make sure

214
00:06:45,749 --> 00:06:43,199
that that happened and uh my hat is off

215
00:06:47,270 --> 00:06:45,759
to to all all the people us russian and

216
00:06:49,350 --> 00:06:47,280
others who made sure that we were

217
00:06:51,189 --> 00:06:49,360
successful but we've had two major

218
00:06:52,710 --> 00:06:51,199
flagship investigations you've talked a

219
00:06:55,110 --> 00:06:52,720
little bit about one of them fluid shift

220
00:06:56,790 --> 00:06:55,120
study fluid shifting involves moving a

221
00:06:58,230 --> 00:06:56,800
lot of monitoring equipment from the us

222
00:06:59,909 --> 00:06:58,240
segment into the russian segment and

223
00:07:01,510 --> 00:06:59,919
converting the service module

224
00:07:03,430 --> 00:07:01,520
essentially into a cardiovascular lab

225
00:07:04,950 --> 00:07:03,440
for a couple of days at a time three

226
00:07:06,710 --> 00:07:04,960
times in a mission

227
00:07:08,390 --> 00:07:06,720
it took a tremendous amount of

228
00:07:10,550 --> 00:07:08,400
coordination between the u.s and russian

229
00:07:12,070 --> 00:07:10,560
sides procedures and engineering-wise

230
00:07:12,790 --> 00:07:12,080
and safety assurance and things like

231
00:07:15,430 --> 00:07:12,800
that

232
00:07:17,510 --> 00:07:15,440
and it worked beautifully all three

233
00:07:19,110 --> 00:07:17,520
times it was tried and then post flight

234
00:07:20,790 --> 00:07:19,120
we have the post landing measurements

235
00:07:22,710 --> 00:07:20,800
and a study that we call field tests

236
00:07:24,629 --> 00:07:22,720
again a joint u.s russian investigation

237
00:07:27,350 --> 00:07:24,639
where measurements are made on the crew

238
00:07:29,589 --> 00:07:27,360

members after they land in kazakhstan

239
00:07:31,670 --> 00:07:29,599
after a six month or in this case a

240
00:07:33,749 --> 00:07:31,680
one-year mission to understand how their

241
00:07:35,990 --> 00:07:33,759
human body responds to returning to a

242
00:07:38,230 --> 00:07:36,000
planetary surface in this case earth it

243
00:07:40,150 --> 00:07:38,240
could be mars after a period of time in

244
00:07:42,469 --> 00:07:40,160
space equivalent to the transit of

245
00:07:45,589 --> 00:07:42,479
astronauts from the earth to mars for

246
00:07:47,270 --> 00:07:45,599
mars mission that has gone uh very well

247
00:07:49,350 --> 00:07:47,280
in preliminary versions in the pilot

248
00:07:50,950 --> 00:07:49,360
study just last september with gennady

249
00:07:52,869 --> 00:07:50,960
padalka we started doing the full up

250
00:07:55,749 --> 00:07:52,879
field test and this will be the first

251
00:07:57,589 --> 00:07:55,759
time we get full up field test data on

252
00:08:00,710 --> 00:07:57,599
two people one american one russian at

253
00:08:02,390 --> 00:08:00,720
the landing site which will inform us of

254
00:08:04,230 --> 00:08:02,400
of the new i mean give us new

255
00:08:06,550 --> 00:08:04,240
information essentially on the aspects

256
00:08:08,550 --> 00:08:06,560
of of human uh capabilities and

257
00:08:10,070 --> 00:08:08,560
performance after a very long space

258
00:08:11,909 --> 00:08:10,080
flight upon landing on a planetary

259
00:08:13,270 --> 00:08:11,919
surface all that is relevant like the

260
00:08:13,990 --> 00:08:13,280
fluid shift study like the other work we

261
00:08:15,830 --> 00:08:14,000
do

262
00:08:17,350 --> 00:08:15,840
it's preparing for astronauts preparing

263
00:08:19,830 --> 00:08:17,360

astronauts for longer flights beyond

264
00:08:21,990 --> 00:08:19,840
north orbit like say to mars

265
00:08:23,430 --> 00:08:22,000
excellent when we're excited for you as

266
00:08:25,189 --> 00:08:23,440
the field tests are coming up in just

267
00:08:27,830 --> 00:08:25,199
about a week and so there's a lot of

268
00:08:31,350 --> 00:08:27,840
data to study a lot of more deep more

269
00:08:32,870 --> 00:08:31,360
data to come out and um we thank you for

270
00:08:34,790 --> 00:08:32,880
uh taking some time to talk with us

271
00:08:36,630 --> 00:08:34,800
today dr john charles the chief