



1
00:00:07,909 --> 00:00:05,309
good afternoon and welcome to the

2
00:00:09,910 --> 00:00:07,919
sts-131 international space station

3
00:00:11,509 --> 00:00:09,920
science and technology briefing

4
00:00:12,870 --> 00:00:11,519
this is a two-part panel briefing

5
00:00:14,789 --> 00:00:12,880
starting one o'clock starting one right

6
00:00:16,630 --> 00:00:14,799
now 110 and the second one will follow

7
00:00:18,310 --> 00:00:16,640
with a five-minute interval in between

8
00:00:20,550 --> 00:00:18,320
joining us here today

9
00:00:23,830 --> 00:00:20,560
is mark iran the assistant associate

10
00:00:25,509 --> 00:00:23,840
administrator for space station

11
00:00:26,950 --> 00:00:25,519
clarence sams

12
00:00:30,310 --> 00:00:26,960
chief scientist

13
00:00:34,229 --> 00:00:30,320

iss medical project

14

00:00:36,150 --> 00:00:34,239

dr scott dolshovsky iss investigator

15

00:00:38,950 --> 00:00:36,160

chairman department of surgery at henry

16

00:00:40,150 --> 00:00:38,960

ford hospital in detroit

17

00:00:41,510 --> 00:00:40,160

and

18

00:00:43,830 --> 00:00:41,520

nubuyashi

19

00:00:45,510 --> 00:00:43,840

fujimoto jaxa's associate senior

20

00:00:47,750 --> 00:00:45,520

engineer for human space systems and

21

00:00:48,790 --> 00:00:47,760

utilization

22

00:00:50,310 --> 00:00:48,800

we're going to start with some opening

23

00:00:52,630 --> 00:00:50,320

remarks from our panelists and then take

24

00:00:54,630 --> 00:00:52,640

questions mark

25

00:00:56,389 --> 00:00:54,640

thank you john uh we're happy to be here

26

00:00:57,910 --> 00:00:56,399

with you this morning uh this is a

27

00:00:59,990 --> 00:00:57,920

continuing

28

00:01:02,389 --> 00:01:00,000

press conference that we started several

29

00:01:03,670 --> 00:01:02,399

missions before to help you understand

30

00:01:05,750 --> 00:01:03,680

the scope and

31

00:01:07,030 --> 00:01:05,760

the applications of the science program

32

00:01:08,710 --> 00:01:07,040

that we're going to be pursuing on the

33

00:01:10,469 --> 00:01:08,720

space station

34

00:01:13,030 --> 00:01:10,479

i'll meet with you periodically to keep

35

00:01:15,190 --> 00:01:13,040

you updated on the perspective from

36

00:01:16,550 --> 00:01:15,200

washington dc as you know

37

00:01:18,789 --> 00:01:16,560

the iss

38

00:01:20,870 --> 00:01:18,799

was extended in the president's budget

39

00:01:23,830 --> 00:01:20,880

which was released back on february 1 so

40

00:01:25,510 --> 00:01:23,840

we're now 60 days into the process

41

00:01:28,149 --> 00:01:25,520

of looking at the implications of that

42

00:01:30,550 --> 00:01:28,159

extension this forum is our opportunity

43

00:01:32,469 --> 00:01:30,560

to offer you insight into the

44

00:01:33,670 --> 00:01:32,479

science and technology program as we

45

00:01:35,670 --> 00:01:33,680

ramp it up

46

00:01:38,230 --> 00:01:35,680

we're happy to report that just in the

47

00:01:40,630 --> 00:01:38,240

first 60 days we we are rapidly

48

00:01:41,990 --> 00:01:40,640

expanding the scope of the science and

49

00:01:44,310 --> 00:01:42,000

technology that we're going to see on

50

00:01:46,710 --> 00:01:44,320

the space station over the next decade

51
00:01:48,950 --> 00:01:46,720
we're positioning this program for a

52
00:01:51,270 --> 00:01:48,960
decade of productive activity

53
00:01:53,109 --> 00:01:51,280
we still have to coordinate closely with

54
00:01:55,030 --> 00:01:53,119
both the white house and the congress in

55
00:01:57,590 --> 00:01:55,040
the days to come but as we move through

56
00:02:00,230 --> 00:01:57,600
that coordinating period we'll share

57
00:02:02,789 --> 00:02:00,240
with you the progress as we go along the

58
00:02:04,950 --> 00:02:02,799
program is going to be very expansive uh

59
00:02:07,190 --> 00:02:04,960
i think today what i'd like to help you

60
00:02:08,710 --> 00:02:07,200
understand is that there's really three

61
00:02:11,270 --> 00:02:08,720
areas

62
00:02:13,110 --> 00:02:11,280
that you'll see progress in

63
00:02:14,390 --> 00:02:13,120

in our future discussions

64

00:02:16,710 --> 00:02:14,400

first and foremost there are

65

00:02:19,670 --> 00:02:16,720

international uses of the station those

66

00:02:22,390 --> 00:02:19,680

are the uses by our partners in canada

67

00:02:24,390 --> 00:02:22,400

europa japan and russia

68

00:02:26,309 --> 00:02:24,400

those uses of the station are managed by

69

00:02:27,430 --> 00:02:26,319

our partners funded and budgeted by our

70

00:02:29,750 --> 00:02:27,440

partners

71

00:02:31,350 --> 00:02:29,760

and we collaborate closely with them

72

00:02:33,190 --> 00:02:31,360

through international forums that have

73

00:02:35,670 --> 00:02:33,200

already been established then there's of

74

00:02:37,350 --> 00:02:35,680

course nasa uses of the station those

75

00:02:38,630 --> 00:02:37,360

are the uses that meet our mission

76

00:02:40,949 --> 00:02:38,640

requirements

77

00:02:43,270 --> 00:02:40,959

part of what drove us to build a space

78

00:02:45,430 --> 00:02:43,280

station and they're largely in the areas

79

00:02:47,750 --> 00:02:45,440

of biomedical research so that we can

80

00:02:49,350 --> 00:02:47,760

extend our human crews further and

81

00:02:51,350 --> 00:02:49,360

farther into space and of course in

82

00:02:53,750 --> 00:02:51,360

spacecraft technology

83

00:02:55,750 --> 00:02:53,760

development for next generation systems

84

00:02:57,509 --> 00:02:55,760

but then there's a third area that you

85

00:02:59,110 --> 00:02:57,519

haven't heard a lot about in the past

86

00:03:02,470 --> 00:02:59,120

that i think you'll hear more of in the

87

00:03:06,630 --> 00:03:02,480

future and that that are u.s national

88

00:03:09,190 --> 00:03:06,640

uses of of the iss within our us share

89

00:03:11,110 --> 00:03:09,200

of the resources and accommodations

90

00:03:13,270 --> 00:03:11,120

on space station

91

00:03:16,390 --> 00:03:13,280

we've entered into agreements with other

92

00:03:18,470 --> 00:03:16,400

government agencies uh private firms and

93

00:03:21,830 --> 00:03:18,480

nonprofit organizations

94

00:03:24,070 --> 00:03:21,840

to conduct r d in space

95

00:03:25,990 --> 00:03:24,080

and we expect that those agreements are

96

00:03:27,750 --> 00:03:26,000

going to be increasing now that the

97

00:03:30,630 --> 00:03:27,760

space station is being extended beyond

98

00:03:32,789 --> 00:03:30,640

2015. so we'll share with you the status

99

00:03:35,430 --> 00:03:32,799

of those partnership agreements

100

00:03:37,830 --> 00:03:35,440

as we proceed it may sound a little bit

101
00:03:41,350 --> 00:03:37,840
ambitious but it's important for you to

102
00:03:44,550 --> 00:03:41,360
recognize that we've got 46

103
00:03:46,390 --> 00:03:44,560
payload positions on the space station

104
00:03:50,470 --> 00:03:46,400
uh you know that that is like the

105
00:03:52,710 --> 00:03:50,480
equivalent of seven or eight space labs

106
00:03:54,949 --> 00:03:52,720
flying simultaneously

107
00:03:57,190 --> 00:03:54,959
and continuously throughout the year so

108
00:03:59,429 --> 00:03:57,200
this is really a tremendous

109
00:04:01,270 --> 00:03:59,439
jump in capability over our history

110
00:04:03,429 --> 00:04:01,280
we'll be able to do

111
00:04:05,750 --> 00:04:03,439
research in a much different way than

112
00:04:08,149 --> 00:04:05,760
we've done it over the past 25 years

113
00:04:10,710 --> 00:04:08,159

those 46 positions are divided up about

114

00:04:13,030 --> 00:04:10,720

halfway between the internal positions

115

00:04:14,949 --> 00:04:13,040

and the external positions so

116

00:04:17,189 --> 00:04:14,959

the opportunities are there both for

117

00:04:19,270 --> 00:04:17,199

science and for technology

118

00:04:21,830 --> 00:04:19,280

now today's theme is going to be in

119

00:04:22,950 --> 00:04:21,840

human physiology and the applications of

120

00:04:25,430 --> 00:04:22,960

that

121

00:04:26,950 --> 00:04:25,440

but we also want to add this technology

122

00:04:29,749 --> 00:04:26,960

panel so that we can share our

123

00:04:31,670 --> 00:04:29,759

enthusiasm for the sabbatier reactor

124

00:04:34,550 --> 00:04:31,680

that's going up on this flight we're

125

00:04:36,390 --> 00:04:34,560

making consistent progress

126

00:04:38,150 --> 00:04:36,400

with our regenerative

127

00:04:39,990 --> 00:04:38,160

environmental control and life support

128

00:04:42,390 --> 00:04:40,000

system that's the system that recycles

129

00:04:44,950 --> 00:04:42,400

our water and oxygen and of course we're

130

00:04:46,629 --> 00:04:44,960

always looking to minimize the the water

131

00:04:49,350 --> 00:04:46,639

that we need to take to orbit because of

132

00:04:51,510 --> 00:04:49,360

the mass penalties associated with it

133

00:04:53,430 --> 00:04:51,520

but we are making consistent progress

134

00:04:55,670 --> 00:04:53,440

towards closing the loops in water and

135

00:04:57,749 --> 00:04:55,680

oxygen and the folks will tell you

136

00:05:00,310 --> 00:04:57,759

where we are today

137

00:05:02,790 --> 00:05:00,320

the iss may well be the most advanced

138

00:05:05,430 --> 00:05:02,800

system in operation for both energy

139

00:05:07,909 --> 00:05:05,440

efficiency and environmental recycling

140

00:05:09,670 --> 00:05:07,919

we have to be because we're 350

141

00:05:12,310 --> 00:05:09,680

kilometers up

142

00:05:14,870 --> 00:05:12,320

you'll also hear about the new nanoracks

143

00:05:17,029 --> 00:05:14,880

partnership that we put in place

144

00:05:18,950 --> 00:05:17,039

what this does is it extends our

145

00:05:22,310 --> 00:05:18,960

philosophy of standardizing the

146

00:05:25,029 --> 00:05:22,320

interfaces down into the rack level we

147

00:05:26,950 --> 00:05:25,039

previously standardized the interfaces

148

00:05:27,670 --> 00:05:26,960

at the laboratory level

149

00:05:29,909 --> 00:05:27,680

we've

150

00:05:31,830 --> 00:05:29,919

standardized the racks themselves so

151

00:05:33,830 --> 00:05:31,840

that they're interchangeable and now

152

00:05:36,230 --> 00:05:33,840

we're just moving the next logical step

153

00:05:38,629 --> 00:05:36,240

into standardizing the interfaces within

154

00:05:40,870 --> 00:05:38,639

those racks and what it does is it

155

00:05:43,909 --> 00:05:40,880

enables us to carry on

156

00:05:46,790 --> 00:05:43,919

a micro scale or a nano sat equivalent

157

00:05:49,510 --> 00:05:46,800

program uh inside the pressurized volume

158

00:05:51,110 --> 00:05:49,520

of the station so we're very excited

159

00:05:54,710 --> 00:05:51,120

about the range of opportunities

160

00:05:57,590 --> 00:05:54,720

available and we will share with you

161

00:05:59,909 --> 00:05:57,600

one subset one theme at a time

162

00:06:01,189 --> 00:05:59,919

so today's theme is human physiology and

163

00:06:04,150 --> 00:06:01,199

with that let me hand it over to

164

00:06:06,070 --> 00:06:04,160

clarence thank you mark

165

00:06:08,150 --> 00:06:06,080

as mark pointed out uh you know we're

166

00:06:11,350 --> 00:06:08,160

moving into the utilization phase of uh

167

00:06:13,510 --> 00:06:11,360

the station and uh with that it has an

168

00:06:17,189 --> 00:06:13,520

enormous amount of assets that are

169

00:06:20,150 --> 00:06:17,199

contributed by a range of partners um

170

00:06:21,909 --> 00:06:20,160

it's a very very unique facility and as

171

00:06:24,629 --> 00:06:21,919

with all unique facilities it also has

172

00:06:25,749 --> 00:06:24,639

some unique challenges to operate in

173

00:06:27,830 --> 00:06:25,759

one of the things i wanted to talk to

174

00:06:29,670 --> 00:06:27,840

you about is if you're a researcher here

175

00:06:31,110 --> 00:06:29,680

on the ground the first question you

176
00:06:32,309 --> 00:06:31,120
might ask is well i got my science

177
00:06:35,270 --> 00:06:32,319
selected

178
00:06:37,350 --> 00:06:35,280
how do i operate here and how do i

179
00:06:38,550 --> 00:06:37,360
translate my science from the laboratory

180
00:06:41,110 --> 00:06:38,560
i'm used to working in here in the

181
00:06:43,830 --> 00:06:41,120
ground to this unique asset that is on

182
00:06:44,870 --> 00:06:43,840
board and operating uh in a very unique

183
00:06:45,590 --> 00:06:44,880
place

184
00:06:48,150 --> 00:06:45,600
and

185
00:06:51,189 --> 00:06:48,160
issnp or the international space station

186
00:06:53,029 --> 00:06:51,199
medical project is a team that whose job

187
00:06:55,029 --> 00:06:53,039
it is to try and enhance

188
00:06:56,710 --> 00:06:55,039

and optimize the return of the life

189

00:06:58,870 --> 00:06:56,720

sciences investigation the human life

190

00:07:02,550 --> 00:06:58,880

sciences investigations during the life

191

00:07:04,710 --> 00:07:02,560

of station and so our role is to be a

192

00:07:07,110 --> 00:07:04,720

bridging interface between the research

193

00:07:09,350 --> 00:07:07,120

community and the operations community

194

00:07:10,550 --> 00:07:09,360

of station we're the ones that help

195

00:07:12,629 --> 00:07:10,560

translate

196

00:07:15,110 --> 00:07:12,639

investigators experiment from here on

197

00:07:16,390 --> 00:07:15,120

the ground into operations and flights

198

00:07:18,629 --> 00:07:16,400

such that we can

199

00:07:20,550 --> 00:07:18,639

maximize the output for the investigator

200

00:07:23,110 --> 00:07:20,560

and get the most science within the

201
00:07:25,029 --> 00:07:23,120
station assets that are available

202
00:07:27,350 --> 00:07:25,039
you know we serve as the primary point

203
00:07:29,670 --> 00:07:27,360
of contact for the research teams and

204
00:07:30,710 --> 00:07:29,680
the types of roles that we serve are to

205
00:07:32,550 --> 00:07:30,720
do things

206
00:07:35,270 --> 00:07:32,560
we initially will assess

207
00:07:37,830 --> 00:07:35,280
assess the experiment that was proposed

208
00:07:39,749 --> 00:07:37,840
and translate those into implementation

209
00:07:41,589 --> 00:07:39,759
requirements because at nasa we work off

210
00:07:43,670 --> 00:07:41,599
implementation requirements and these

211
00:07:45,510 --> 00:07:43,680
will include facilities hardware how to

212
00:07:47,670 --> 00:07:45,520
fit it into the timeline and what

213
00:07:49,510 --> 00:07:47,680

constraints the experiment has on it so

214

00:07:51,189 --> 00:07:49,520

that what does a crew member have to do

215

00:07:52,469 --> 00:07:51,199

what does the crew member have to not do

216

00:07:53,670 --> 00:07:52,479

in order to participate in this

217

00:07:55,430 --> 00:07:53,680

experiment

218

00:07:56,869 --> 00:07:55,440

we then work with the pis to develop

219

00:07:59,430 --> 00:07:56,879

training and procedures for that so the

220

00:08:01,510 --> 00:07:59,440

crew members can carry this out and then

221

00:08:04,230 --> 00:08:01,520

ultimately we work with the iss ops

222

00:08:06,390 --> 00:08:04,240

teams in order to implement

223

00:08:07,830 --> 00:08:06,400

the experiments on board and these would

224

00:08:09,909 --> 00:08:07,840

include things of getting the

225

00:08:12,390 --> 00:08:09,919

appropriate human use committee things

226

00:08:15,749 --> 00:08:12,400

crew briefings crew training and also

227

00:08:18,150 --> 00:08:15,759

ongoing supporting of the owen orbit ops

228

00:08:20,550 --> 00:08:18,160

iss also maintains a human research

229

00:08:22,070 --> 00:08:20,560

facility on board and so the

230

00:08:23,990 --> 00:08:22,080

human

231

00:08:26,309 --> 00:08:24,000

assets on board that are in the u.s

232

00:08:29,029 --> 00:08:26,319

allocation in iraq's are maintained by

233

00:08:30,869 --> 00:08:29,039

ssmp that are applied to a lot of the

234

00:08:33,029 --> 00:08:30,879

human resources

235

00:08:35,430 --> 00:08:33,039

we also interface with all of our

236

00:08:38,310 --> 00:08:35,440

partner agencies so that we can broadly

237

00:08:40,230 --> 00:08:38,320

share our experimental assets across

238

00:08:41,829 --> 00:08:40,240

experiments from each of the partners so

239

00:08:43,509 --> 00:08:41,839

there's a lot of sharing that goes on

240

00:08:45,990 --> 00:08:43,519

board with all the assets of the

241

00:08:48,389 --> 00:08:46,000

partners and that enhances the ability

242

00:08:52,710 --> 00:08:48,399

that any individual researcher can have

243

00:08:56,790 --> 00:08:54,310

one of the interesting things of doing

244

00:08:59,030 --> 00:08:56,800

this is of course in in in this team we

245

00:09:01,430 --> 00:08:59,040

end up uh uh pretty much

246

00:09:03,670 --> 00:09:01,440

interfacing across the board for and

247

00:09:05,670 --> 00:09:03,680

representing the research teams to the

248

00:09:07,430 --> 00:09:05,680

international partners our iss our

249

00:09:09,110 --> 00:09:07,440

station program office

250

00:09:11,670 --> 00:09:09,120

the crew office to interface with the

251
00:09:14,310 --> 00:09:11,680
crews and and do their training

252
00:09:16,790 --> 00:09:14,320
we take information that they are are

253
00:09:19,190 --> 00:09:16,800
learning and feed that back into the

254
00:09:20,790 --> 00:09:19,200
request that our agency is making it's a

255
00:09:22,389 --> 00:09:20,800
very close interaction also with the

256
00:09:24,550 --> 00:09:22,399
medical operations guys because in the

257
00:09:26,949 --> 00:09:24,560
human life sciences everything that you

258
00:09:28,470 --> 00:09:26,959
do from an experiment on the humans

259
00:09:29,910 --> 00:09:28,480
impacts the guys that are trying to do

260
00:09:31,590 --> 00:09:29,920
the crew care on the orbit for the crew

261
00:09:34,070 --> 00:09:31,600
members as well so there's a very

262
00:09:35,910 --> 00:09:34,080
dynamic back and forth there that feeds

263
00:09:38,710 --> 00:09:35,920

both the research side and feeds the

264

00:09:42,070 --> 00:09:38,720

medical operations sites as well

265

00:09:43,910 --> 00:09:42,080

so just as a quick wrap up here iss mp

266

00:09:45,910 --> 00:09:43,920

really works with the research and ops

267

00:09:48,310 --> 00:09:45,920

community to integrate their activity on

268

00:09:50,150 --> 00:09:48,320

board to enable the research uh to

269

00:09:52,389 --> 00:09:50,160

happen in the human life sciences on

270

00:09:57,030 --> 00:09:52,399

station

271

00:09:59,190 --> 00:09:57,040

research on

272

00:10:01,190 --> 00:09:59,200

from translating what person is used to

273

00:10:03,590 --> 00:10:01,200

here on the ground but it's a very

274

00:10:04,710 --> 00:10:03,600

capable laboratory and has a very unique

275

00:10:06,470 --> 00:10:04,720

assets

276

00:10:09,190 --> 00:10:06,480

both these challenges

277

00:10:11,670 --> 00:10:09,200

allow both science content and the

278

00:10:14,230 --> 00:10:11,680

challenge of actually operating there

279

00:10:16,310 --> 00:10:14,240

evolves our tech technology and there's

280

00:10:18,470 --> 00:10:16,320

benefits to both of them

281

00:10:19,829 --> 00:10:18,480

dr daltrowski will be talking about an

282

00:10:20,550 --> 00:10:19,839

area where

283

00:10:25,030 --> 00:10:20,560

the

284

00:10:27,269 --> 00:10:25,040

medical diagnostics on board has

285

00:10:28,470 --> 00:10:27,279

actually turned around and changed the

286

00:10:30,310 --> 00:10:28,480

applications of some of those

287

00:10:32,230 --> 00:10:30,320

technologies routinely here on the

288

00:10:34,230 --> 00:10:32,240

ground and both of those are real

289

00:10:35,430 --> 00:10:34,240

products from the from the program as

290

00:10:37,350 --> 00:10:35,440

you go through

291

00:10:40,310 --> 00:10:37,360

with that i'll pass it on to scott

292

00:10:42,870 --> 00:10:40,320

thanks clarence good afternoon everybody

293

00:10:44,870 --> 00:10:42,880

it might not seem intuitive how

294

00:10:46,949 --> 00:10:44,880

providing care on the international

295

00:10:49,430 --> 00:10:46,959

space station in a remote village in

296

00:10:50,949 --> 00:10:49,440

africa are similar but let me let me

297

00:10:52,870 --> 00:10:50,959

share some of that with you and i'll

298

00:10:54,150 --> 00:10:52,880

have you pull up my first slide if if

299

00:10:56,230 --> 00:10:54,160

you would

300

00:10:58,949 --> 00:10:56,240

let's think about that village in africa

301
00:11:00,949 --> 00:10:58,959
for just a second we have a challenge of

302
00:11:03,750 --> 00:11:00,959
often not having a physician available

303
00:11:06,230 --> 00:11:03,760
we have limitations in equipment

304
00:11:07,509 --> 00:11:06,240
training challenges and certainly cost

305
00:11:08,949 --> 00:11:07,519
things

306
00:11:10,790 --> 00:11:08,959
now take a look at this photo we have

307
00:11:11,990 --> 00:11:10,800
the exact same constraints right there

308
00:11:14,150 --> 00:11:12,000
and i might add that we're going to have

309
00:11:15,829 --> 00:11:14,160
those same constraints in the u.s with

310
00:11:17,750 --> 00:11:15,839
the recent health care bill bill

311
00:11:18,790 --> 00:11:17,760
enactment so we better get used to this

312
00:11:22,150 --> 00:11:18,800
stuff

313
00:11:25,350 --> 00:11:22,160

now my challenge was to how to provide

314

00:11:27,269 --> 00:11:25,360

medical care to non-physician

315

00:11:29,190 --> 00:11:27,279

providers on the international space

316

00:11:30,790 --> 00:11:29,200

station and do it what we with what we

317

00:11:32,470 --> 00:11:30,800

already had on board

318

00:11:34,949 --> 00:11:32,480

so we currently have an ultrasound

319

00:11:37,110 --> 00:11:34,959

machine in the human research facility

320

00:11:38,790 --> 00:11:37,120

on on station

321

00:11:41,190 --> 00:11:38,800

many of you know that ultrasound is used

322

00:11:43,590 --> 00:11:41,200

when you have a child to diagnose the

323

00:11:45,670 --> 00:11:43,600

sex of that child or an abdominal

324

00:11:48,069 --> 00:11:45,680

ailment but our first challenge was to

325

00:11:50,310 --> 00:11:48,079

see what we could do with this and so we

326

00:11:52,949 --> 00:11:50,320

went to a large academic medical center

327

00:11:54,829 --> 00:11:52,959

henry ford hospital it's a large place

328

00:11:57,269 --> 00:11:54,839

level one trauma center in downtown

329

00:11:59,190 --> 00:11:57,279

detroit and we said what what can we use

330

00:12:01,350 --> 00:11:59,200

this for can we diagnose a collapsed

331

00:12:03,590 --> 00:12:01,360

lung a broken bone something like that

332

00:12:06,230 --> 00:12:03,600

now in my hospital we would use an x-ray

333

00:12:08,389 --> 00:12:06,240

or a ct or an mri and we certainly

334

00:12:10,550 --> 00:12:08,399

didn't have that on station and what we

335

00:12:12,470 --> 00:12:10,560

found surprised us that it worked

336

00:12:14,230 --> 00:12:12,480

darn well for that in fact sometimes

337

00:12:17,030 --> 00:12:14,240

even better than what we were doing so

338

00:12:18,790 --> 00:12:17,040

now a terrestrial standard is to utilize

339

00:12:21,590 --> 00:12:18,800

ultrasound and it's based on outreach

340

00:12:23,910 --> 00:12:21,600

for these ultrasound techniques but that

341

00:12:25,910 --> 00:12:23,920

was in experts hands and we don't have

342

00:12:28,550 --> 00:12:25,920

that luxury on the international space

343

00:12:30,870 --> 00:12:28,560

station so the next thing we had to do

344

00:12:33,190 --> 00:12:30,880

was come up with a very quick training

345

00:12:35,990 --> 00:12:33,200

method to get our astronauts and

346

00:12:39,670 --> 00:12:36,000

cosmonauts on how to how to provide this

347

00:12:41,509 --> 00:12:39,680

this level of care my project atom

348

00:12:43,750 --> 00:12:41,519

advanced diagnostic ultrasound and

349

00:12:45,750 --> 00:12:43,760

microgravity allowed us to do just that

350

00:12:47,829 --> 00:12:45,760

with the astronaut crews with just in

351
00:12:50,870 --> 00:12:47,839
time training and something that we

352
00:12:53,030 --> 00:12:50,880
coined remote expert guidance where a

353
00:12:55,269 --> 00:12:53,040
individual on the ground would help the

354
00:12:57,030 --> 00:12:55,279
operator talk through doing one of these

355
00:12:59,910 --> 00:12:57,040
and if you'd pull that first slide back

356
00:13:02,069 --> 00:12:59,920
up this shows a astronaut genna or

357
00:13:05,030 --> 00:13:02,079
cosmonaut gennady padalka performing a

358
00:13:06,470 --> 00:13:05,040
bone ultrasound on mike fink in the

359
00:13:08,550 --> 00:13:06,480
human research facility on the

360
00:13:10,470 --> 00:13:08,560
international space station this is a

361
00:13:12,550 --> 00:13:10,480
really difficult technique and yet they

362
00:13:15,269 --> 00:13:12,560
were able to accomplish this in just

363
00:13:17,509 --> 00:13:15,279

under an hour of training this also

364

00:13:19,829 --> 00:13:17,519

formed the first publication submitted

365

00:13:23,430 --> 00:13:19,839

and accepted from space to the journal

366

00:13:26,230 --> 00:13:23,440

radiology next slide please

367

00:13:28,550 --> 00:13:26,240

well there's a lot of underserved areas

368

00:13:30,790 --> 00:13:28,560

on the earth medically and so we

369

00:13:32,870 --> 00:13:30,800

purposely chose one of the harshest ones

370

00:13:35,269 --> 00:13:32,880

to trial this technique

371

00:13:37,110 --> 00:13:35,279

this photo shows a swedish climber

372

00:13:39,990 --> 00:13:37,120

performing a chest ultrasound

373

00:13:42,069 --> 00:13:40,000

examination on another injured climber

374

00:13:44,550 --> 00:13:42,079

on mount everest now this is about

375

00:13:46,710 --> 00:13:44,560

twenty one thousand feet up

376

00:13:48,470 --> 00:13:46,720

you can see an ultrasound machine in the

377

00:13:51,030 --> 00:13:48,480

center screen much like the one on the

378

00:13:53,269 --> 00:13:51,040

international space station this climber

379

00:13:55,189 --> 00:13:53,279

had never seen an ultrasound before yet

380

00:13:57,829 --> 00:13:55,199

alone produced one

381

00:14:00,870 --> 00:13:57,839

this is a solar powered device we

382

00:14:04,150 --> 00:14:00,880

utilize the satellite phone you can see

383

00:14:07,509 --> 00:14:04,160

my picture using uvu across the the

384

00:14:09,829 --> 00:14:07,519

world wide web to diagnose a increased

385

00:14:11,910 --> 00:14:09,839

lung fluid in this climber which often

386

00:14:15,509 --> 00:14:11,920

occurs during high altitude

387

00:14:17,990 --> 00:14:15,519

endeavors next slide please

388

00:14:20,629 --> 00:14:18,000

well we wanted to bring this back to a

389

00:14:22,790 --> 00:14:20,639

more terrestrial environment and so we

390

00:14:25,189 --> 00:14:22,800

started talking to a variety of sporting

391

00:14:28,150 --> 00:14:25,199

venues we initially started out in my

392

00:14:30,870 --> 00:14:28,160

hometown detroit with the detroit red

393

00:14:34,230 --> 00:14:30,880

wings and so we utilized ultrasound to

394

00:14:36,389 --> 00:14:34,240

diagnose player injuries at the venue

395

00:14:38,550 --> 00:14:36,399

this was very popular it could get the

396

00:14:40,870 --> 00:14:38,560

the hockey players back on the rink very

397

00:14:43,350 --> 00:14:40,880

quickly we didn't have a doctor there i

398

00:14:45,750 --> 00:14:43,360

we taught athletic trainers how to how

399

00:14:47,590 --> 00:14:45,760

to do this uh technique and apparently

400

00:14:49,990 --> 00:14:47,600

they talk because we were then

401
00:14:52,230 --> 00:14:50,000
approached by the olympic committee

402
00:14:54,629 --> 00:14:52,240
and so we taught athletic trainers

403
00:14:57,430 --> 00:14:54,639
non-physicians in chula vista in

404
00:14:59,590 --> 00:14:57,440
colorado springs in lake placid how to

405
00:15:02,310 --> 00:14:59,600
perform these examinations we performed

406
00:15:05,110 --> 00:15:02,320
hundreds of evaluations in the training

407
00:15:07,189 --> 00:15:05,120
facilities and then finally in torino

408
00:15:09,670 --> 00:15:07,199
beijing and most recently in in

409
00:15:12,150 --> 00:15:09,680
vancouver now any of you who covered

410
00:15:14,389 --> 00:15:12,160
those events know that the downhill

411
00:15:17,269 --> 00:15:14,399
course was particularly challenging this

412
00:15:19,590 --> 00:15:17,279
year and we had a number of injuries one

413
00:15:22,389 --> 00:15:19,600

of which was with a noted downhill

414

00:15:24,629 --> 00:15:22,399

women's skier she had a bad fall on a

415

00:15:27,590 --> 00:15:24,639

practice run three days before her metal

416

00:15:29,670 --> 00:15:27,600

event we did a remote ultrasound guided

417

00:15:32,310 --> 00:15:29,680

much as we would on the international

418

00:15:35,670 --> 00:15:32,320

space station we diagnosed an injured

419

00:15:36,870 --> 00:15:35,680

leg but not a a limiting leg on her she

420

00:15:39,110 --> 00:15:36,880

was able to

421

00:15:42,790 --> 00:15:39,120

run and have a gold medal three days

422

00:15:48,949 --> 00:15:45,670

final thought i i have for you brings it

423

00:15:51,910 --> 00:15:48,959

really close to home maternal care

424

00:15:54,230 --> 00:15:51,920

so it's very challenging in many areas

425

00:15:56,870 --> 00:15:54,240

on our planet to provide high quality

426
00:15:59,030 --> 00:15:56,880
medical care to uh to women and

427
00:16:02,069 --> 00:15:59,040
particularly those in child bearing

428
00:16:04,389 --> 00:16:02,079
years the challenge of having a a child

429
00:16:06,870 --> 00:16:04,399
in an underserved village is about 300

430
00:16:08,790 --> 00:16:06,880
fold what it might be here in florida or

431
00:16:10,949 --> 00:16:08,800
in any of your cities

432
00:16:13,910 --> 00:16:10,959
across this this country

433
00:16:16,069 --> 00:16:13,920
we took our training methods we modified

434
00:16:18,629 --> 00:16:16,079
them a little bit because certainly when

435
00:16:21,590 --> 00:16:18,639
we're going to mars i don't have the

436
00:16:24,949 --> 00:16:21,600
luxury of telemedicine as we how knew it

437
00:16:26,949 --> 00:16:24,959
as we know it now if i'm a doctor at the

438
00:16:28,870 --> 00:16:26,959

johnson space center and i say wait a

439

00:16:30,470 --> 00:16:28,880

minute stop stop here they don't hear

440

00:16:32,389 --> 00:16:30,480

that until 20 minutes later and

441

00:16:35,350 --> 00:16:32,399

obviously that's not a not a good thing

442

00:16:36,710 --> 00:16:35,360

to do for medical care so we took a set

443

00:16:39,269 --> 00:16:36,720

of video glasses

444

00:16:41,910 --> 00:16:39,279

like this we took our programs on that

445

00:16:44,150 --> 00:16:41,920

and we did something called autonomous

446

00:16:46,949 --> 00:16:44,160

care so we gave them the capability to

447

00:16:48,870 --> 00:16:46,959

do this without talking to us and that's

448

00:16:51,269 --> 00:16:48,880

exactly what they did in this tiny

449

00:16:53,749 --> 00:16:51,279

village in the high arctic circle so we

450

00:16:56,389 --> 00:16:53,759

had them do very complex exams some

451
00:16:58,629 --> 00:16:56,399
pregnancy scans as shown on that slide

452
00:17:00,949 --> 00:16:58,639
some heart exams and things like that

453
00:17:04,630 --> 00:17:00,959
and they were able with very high

454
00:17:07,590 --> 00:17:04,640
accuracy to perform these examinations

455
00:17:08,870 --> 00:17:07,600
and i think in summary not only have we

456
00:17:11,669 --> 00:17:08,880
now

457
00:17:14,150 --> 00:17:11,679
improved care capabilities on the space

458
00:17:16,949 --> 00:17:14,160
station but i think we have translatable

459
00:17:19,510 --> 00:17:16,959
benefit back here on earth we will not

460
00:17:23,110 --> 00:17:19,520
always have the luxury of a high

461
00:17:25,829 --> 00:17:23,120
highly skilled practitioner and highly

462
00:17:27,350 --> 00:17:25,839
highly expensive imagery available i

463
00:17:29,830 --> 00:17:27,360

think we've gotten through

464

00:17:32,390 --> 00:17:29,840

that now on station and this should

465

00:17:33,830 --> 00:17:32,400

improve care capabilities here on earth

466

00:17:36,310 --> 00:17:33,840

as well

467

00:17:38,230 --> 00:17:36,320

i have some outreach cds that have this

468

00:17:42,390 --> 00:17:38,240

in greater detail should you wish those

469

00:17:48,549 --> 00:17:43,590

thank you

470

00:17:51,590 --> 00:17:48,559

uh since uh one and a half years have

471

00:17:52,870 --> 00:17:51,600

passed we start operation of the

472

00:17:55,190 --> 00:17:52,880

japanese

473

00:17:57,590 --> 00:17:55,200

experiment module called kibo onboard

474

00:17:58,870 --> 00:17:57,600

the space station and

475

00:17:59,750 --> 00:17:58,880

we believe

476

00:18:02,630 --> 00:17:59,760

now

477

00:18:04,310 --> 00:18:02,640

we are fully uh using the capability of

478

00:18:05,510 --> 00:18:04,320

the space station

479

00:18:09,750 --> 00:18:05,520

and uh

480

00:18:13,270 --> 00:18:09,760

this uh space shuttle 131 flight is very

481

00:18:14,470 --> 00:18:13,280

uh special space special right for japan

482

00:18:16,630 --> 00:18:14,480

and jax

483

00:18:18,390 --> 00:18:16,640

not only because we have two

484

00:18:20,630 --> 00:18:18,400

japanese astronauts

485

00:18:23,350 --> 00:18:20,640

simon simultaneously onboard the space

486

00:18:24,870 --> 00:18:23,360

station and do the science

487

00:18:26,789 --> 00:18:24,880

with two

488

00:18:30,630 --> 00:18:26,799

crew member cooperation

489

00:18:31,750 --> 00:18:30,640

and but also we plan a multiple human

490

00:18:33,909 --> 00:18:31,760

research

491

00:18:36,310 --> 00:18:33,919

type of experiment on both the space

492

00:18:37,510 --> 00:18:36,320

station in the short time frame of this

493

00:18:40,150 --> 00:18:37,520

uh

494

00:18:44,310 --> 00:18:40,160

sds one study on flight

495

00:18:51,909 --> 00:18:48,710

we are planning four different type of

496

00:18:53,590 --> 00:18:51,919

human research type of experiment

497

00:18:57,110 --> 00:18:53,600

first one is the

498

00:19:01,029 --> 00:18:57,120

code name is myolab this experiment will

499

00:19:02,549 --> 00:19:01,039

investigate the muscle atrophy

500

00:19:05,669 --> 00:19:02,559

induced by the

501
00:19:06,470 --> 00:19:05,679
microgravity or unloaded condition

502
00:19:09,190 --> 00:19:06,480
and

503
00:19:11,350 --> 00:19:09,200
the next one is a new lot

504
00:19:14,710 --> 00:19:11,360
this experiment uh

505
00:19:16,070 --> 00:19:14,720
back side back please

506
00:19:17,830 --> 00:19:16,080
okay uh

507
00:19:18,630 --> 00:19:17,840
the first slide thank you

508
00:19:20,710 --> 00:19:18,640
the

509
00:19:23,430 --> 00:19:20,720
second uh decal

510
00:19:24,710 --> 00:19:23,440
it's a new rod this experiment focused

511
00:19:26,070 --> 00:19:24,720
on their

512
00:19:28,310 --> 00:19:26,080
uh

513
00:19:29,830 --> 00:19:28,320

space gladiation effect to the human

514

00:19:31,350 --> 00:19:29,840

nerve system

515

00:19:34,310 --> 00:19:31,360

and uh

516

00:19:38,150 --> 00:19:34,320

the third one is micro uh this is

517

00:19:40,230 --> 00:19:38,160

this experiment uh investigate dear uh

518

00:19:41,909 --> 00:19:40,240

microflora

519

00:19:43,510 --> 00:19:41,919

dynamics

520

00:19:45,350 --> 00:19:43,520

on the crew members

521

00:19:48,150 --> 00:19:45,360

and the last one is the

522

00:19:49,029 --> 00:19:48,160

radiation monitoring called padres

523

00:19:51,110 --> 00:19:49,039

here

524

00:19:53,190 --> 00:19:51,120

we have two pis

525

00:19:55,190 --> 00:19:53,200

one pi from

526
00:19:57,029 --> 00:19:55,200
tokshima university

527
00:19:59,110 --> 00:19:57,039
myola pi uh

528
00:20:00,310 --> 00:19:59,120
professor dr nicower

529
00:20:01,430 --> 00:20:00,320
and uh

530
00:20:03,909 --> 00:20:01,440
also

531
00:20:06,870 --> 00:20:03,919
i have another pi from kangoshima

532
00:20:09,510 --> 00:20:06,880
university a pi of neurolog and

533
00:20:11,990 --> 00:20:09,520
professor dr mashima

534
00:20:14,390 --> 00:20:12,000
so if you have any detailed questions we

535
00:20:17,909 --> 00:20:14,400
have a chance to ask them later

536
00:20:22,470 --> 00:20:19,750
i would like to quick uh

537
00:20:23,590 --> 00:20:22,480
quickly uh briefing about uh this

538
00:20:28,470 --> 00:20:23,600

experiment

539

00:20:31,430 --> 00:20:28,480

master atrophy

540

00:20:32,870 --> 00:20:31,440

uh dr nikova's team uh

541

00:20:35,909 --> 00:20:32,880

focused on

542

00:20:38,230 --> 00:20:35,919

the uh kind of

543

00:20:40,070 --> 00:20:38,240

enzyme or

544

00:20:41,190 --> 00:20:40,080

the proteins

545

00:20:42,310 --> 00:20:41,200

in

546

00:20:44,070 --> 00:20:42,320

the muscle

547

00:20:48,230 --> 00:20:44,080

cells

548

00:20:50,630 --> 00:20:48,240

the name is cblb or cb

549

00:20:52,230 --> 00:20:50,640

this is one of a key

550

00:20:53,510 --> 00:20:52,240

enzyme

551
00:20:57,510 --> 00:20:53,520
which will be

552
00:20:58,630 --> 00:20:57,520
effect to the muscular artery so

553
00:21:00,470 --> 00:20:58,640
we will

554
00:21:03,909 --> 00:21:00,480
culture the

555
00:21:06,149 --> 00:21:03,919
16 cells onboard the space station and

556
00:21:09,590 --> 00:21:06,159
chemically fixed and return back to

557
00:21:10,950 --> 00:21:09,600
theirs and investigate how this enzyme

558
00:21:13,029 --> 00:21:10,960
will

559
00:21:14,710 --> 00:21:13,039
working

560
00:21:16,870 --> 00:21:14,720
during the

561
00:21:17,909 --> 00:21:16,880
muscle atrophy

562
00:21:20,630 --> 00:21:17,919
uh

563
00:21:22,230 --> 00:21:20,640

nowadays

564

00:21:25,830 --> 00:21:22,240

many

565

00:21:29,510 --> 00:21:28,549

lied in bad condition or a wheelchair

566

00:21:32,350 --> 00:21:29,520

condition

567

00:21:35,669 --> 00:21:32,360

this is very a serious problem for

568

00:21:36,870 --> 00:21:35,679

a japanese society

569

00:21:37,909 --> 00:21:36,880

so

570

00:21:40,149 --> 00:21:37,919

we hope

571

00:21:42,870 --> 00:21:40,159

this kind of experiment will

572

00:21:44,630 --> 00:21:42,880

dedicate not only for the astronaut or

573

00:21:45,430 --> 00:21:44,640

space flight but also

574

00:21:48,390 --> 00:21:45,440

for

575

00:21:51,029 --> 00:21:48,400

human health on the ground

576

00:21:53,669 --> 00:21:51,039

next slide phrase

577

00:21:56,149 --> 00:21:53,679

another experiment is new rod this

578

00:21:58,390 --> 00:21:56,159

experiment focused

579

00:22:01,510 --> 00:21:58,400

on the space radiation effect

580

00:22:03,909 --> 00:22:01,520

on human cells especially for the

581

00:22:05,830 --> 00:22:03,919

central nervous cells

582

00:22:07,510 --> 00:22:05,840

this experiment also using a cell

583

00:22:08,470 --> 00:22:07,520

culture technique

584

00:22:10,310 --> 00:22:08,480

we will

585

00:22:13,750 --> 00:22:10,320

culture the

586

00:22:18,630 --> 00:22:17,270

human neuron like cell and name is sknsh

587

00:22:19,590 --> 00:22:18,640

cells

588

00:22:22,390 --> 00:22:19,600

will

589

00:22:25,190 --> 00:22:22,400

culture this cell line about a month

590

00:22:26,630 --> 00:22:25,200

long on both the space station and bring

591

00:22:28,070 --> 00:22:26,640

bring it back

592

00:22:32,310 --> 00:22:28,080

to the us and

593

00:22:37,430 --> 00:22:32,320

uh investigate uh using the uh

594

00:22:44,870 --> 00:22:41,270

gene analysis technique the uh the

595

00:22:47,830 --> 00:22:44,880

objective of this experiment is uh

596

00:22:49,990 --> 00:22:47,840

in the future uh we need to know

597

00:22:51,990 --> 00:22:50,000

how the

598

00:22:52,950 --> 00:22:52,000

space radiation affect to the crew

599

00:22:55,990 --> 00:22:52,960

members

600

00:22:57,430 --> 00:22:56,000

to prepare for a much longer time among

601
00:22:58,950 --> 00:22:57,440
the space

602
00:23:01,669 --> 00:22:58,960
activity

603
00:23:03,990 --> 00:23:01,679
next slide please

604
00:23:05,750 --> 00:23:04,000
the other two experiments are learning

605
00:23:07,270 --> 00:23:05,760
by jaxa

606
00:23:09,190 --> 00:23:07,280
ourselves

607
00:23:11,350 --> 00:23:09,200
one is

608
00:23:12,470 --> 00:23:11,360
investigate about their crew members

609
00:23:14,870 --> 00:23:12,480
health

610
00:23:17,909 --> 00:23:14,880
we are correcting uh

611
00:23:19,909 --> 00:23:17,919
crew members uh we are collecting

612
00:23:22,470 --> 00:23:19,919
samples from crew members

613
00:23:25,029 --> 00:23:22,480

from natural cavity or

614

00:23:27,110 --> 00:23:25,039

for links or skins

615

00:23:30,070 --> 00:23:27,120

these are not so painful for the crew

616

00:23:33,029 --> 00:23:30,080

members to collecting these samples

617

00:23:34,549 --> 00:23:33,039

but it is very important to understand

618

00:23:35,669 --> 00:23:34,559

these

619

00:23:38,710 --> 00:23:35,679

resident

620

00:23:40,630 --> 00:23:38,720

microflora because microflora on the

621

00:23:43,669 --> 00:23:40,640

body is uh

622

00:23:45,669 --> 00:23:43,679

essential or a very important law for

623

00:23:47,590 --> 00:23:45,679

the human health and

624

00:23:48,789 --> 00:23:47,600

human immune system

625

00:23:50,789 --> 00:23:48,799

the last one

626
00:23:53,750 --> 00:23:50,799
we are continuously

627
00:23:56,390 --> 00:23:53,760
monitoring the

628
00:23:57,909 --> 00:23:56,400
space radiation inside the gem module

629
00:23:59,190 --> 00:23:57,919
you can see

630
00:24:01,909 --> 00:23:59,200
about

631
00:24:03,510 --> 00:24:01,919
16 different points in the gem

632
00:24:06,950 --> 00:24:03,520
pressurized module

633
00:24:09,350 --> 00:24:06,960
we used a small passive decimator to

634
00:24:12,310 --> 00:24:09,360
continuously monitoring the

635
00:24:14,149 --> 00:24:12,320
space radiation inside the gem

636
00:24:15,029 --> 00:24:14,159
that is all

637
00:24:18,870 --> 00:24:15,039
the

638
00:24:21,110 --> 00:24:18,880

frame and uh

639

00:24:23,750 --> 00:24:21,120

the important thing is uh we're

640

00:24:27,269 --> 00:24:23,760

increasing this kind of human research

641

00:24:29,590 --> 00:24:27,279

in the uh japanese keyboard module for

642

00:24:33,190 --> 00:24:29,600

the future human

643

00:24:34,789 --> 00:24:33,200

activity in the space station thank you

644

00:24:36,390 --> 00:24:34,799

okay thank you

645

00:24:37,990 --> 00:24:36,400

we'll now take questions here at nasa's

646

00:24:39,590 --> 00:24:38,000

kennedy space center remember to wait

647

00:24:41,029 --> 00:24:39,600

for the microphone and state your name

648

00:24:46,789 --> 00:24:41,039

and affiliation

649

00:24:50,630 --> 00:24:49,029

uh dan cramer for um

650

00:24:52,390 --> 00:24:50,640

planetary society and space flight

651
00:24:53,350 --> 00:24:52,400
magazine let me ask the japanese

652
00:24:54,789 --> 00:24:53,360
colleague

653
00:24:56,950 --> 00:24:54,799
mark you mentioned

654
00:24:58,710 --> 00:24:56,960
the budget increase that president obama

655
00:25:00,070 --> 00:24:58,720
has announced for the u.s space program

656
00:25:01,990 --> 00:25:00,080
i'd like to know you have a new

657
00:25:03,590 --> 00:25:02,000
government in japan what is their

658
00:25:05,269 --> 00:25:03,600
attitude has your has your budget

659
00:25:06,950 --> 00:25:05,279
increased i read some reports they were

660
00:25:08,070 --> 00:25:06,960
actually interested in cutting the space

661
00:25:10,950 --> 00:25:08,080
program

662
00:25:13,430 --> 00:25:10,960
uh currently the budget is uh

663
00:25:16,870 --> 00:25:13,440

not increasing but not decreasing its

664

00:25:20,710 --> 00:25:16,880

flood base however a new government

665

00:25:23,190 --> 00:25:20,720

established a kind of boat to discussing

666

00:25:24,789 --> 00:25:23,200

our future

667

00:25:27,750 --> 00:25:24,799

space activity

668

00:25:29,029 --> 00:25:27,760

still they are discussing the strategy

669

00:25:32,390 --> 00:25:29,039

of japanese

670

00:25:34,470 --> 00:25:32,400

space program and discussion is not yet

671

00:25:35,990 --> 00:25:34,480

finished

672

00:25:38,549 --> 00:25:36,000

however

673

00:25:39,909 --> 00:25:38,559

maybe you know the japanese new

674

00:25:41,430 --> 00:25:39,919

prime minister

675

00:25:42,390 --> 00:25:41,440

dr katoyama

676

00:25:46,470 --> 00:25:42,400

called

677

00:25:53,590 --> 00:25:46,480

uchujin that means spaceman so i hope

678

00:26:00,390 --> 00:25:55,830

jay claudic nebraska press association

679

00:26:04,950 --> 00:26:02,470

very interesting work on the ultrasound

680

00:26:06,789 --> 00:26:04,960

system is there anything in life

681

00:26:08,310 --> 00:26:06,799

sciences

682

00:26:10,549 --> 00:26:08,320

involving

683

00:26:13,350 --> 00:26:10,559

working on techniques or doing any

684

00:26:15,350 --> 00:26:13,360

training of astronauts for any on-orbit

685

00:26:17,590 --> 00:26:15,360

emergencies that might involve invasive

686

00:26:19,830 --> 00:26:17,600

procedures those that are not

687

00:26:21,669 --> 00:26:19,840

trained in a medical field and i mean

688

00:26:22,870 --> 00:26:21,679

i've heard of some short-term research

689

00:26:24,710 --> 00:26:22,880

taking place

690

00:26:26,630 --> 00:26:24,720

unlike the on the vomit comet but are

691

00:26:28,549 --> 00:26:26,640

there any plans for anything long term

692

00:26:31,830 --> 00:26:28,559

on the iss

693

00:26:34,549 --> 00:26:31,840

yeah i i'm i am but a pi so i can't

694

00:26:37,830 --> 00:26:34,559

speak for nasa however being exposed to

695

00:26:40,789 --> 00:26:37,840

a variety of experiments along this line

696

00:26:44,310 --> 00:26:40,799

i i think i was very surprised when i

697

00:26:46,549 --> 00:26:44,320

i'm a uh a long trained surgeon with

698

00:26:47,430 --> 00:26:46,559

many years in schooling and then on the

699

00:26:49,029 --> 00:26:47,440

job

700

00:26:51,269 --> 00:26:49,039

apprenticeship i thought that there was

701
00:26:53,110 --> 00:26:51,279
absolutely no way that these crews were

702
00:26:55,190 --> 00:26:53,120
going to be able to perform complex

703
00:26:57,350 --> 00:26:55,200
procedures that we were going to get

704
00:26:58,950 --> 00:26:57,360
them to do and i must say i was i was

705
00:27:00,549 --> 00:26:58,960
very impressed that we were able not

706
00:27:02,789 --> 00:27:00,559
only to have them do that but then they

707
00:27:04,630 --> 00:27:02,799
took the ball and they'd say hey can can

708
00:27:06,870 --> 00:27:04,640
we do this how about how about this and

709
00:27:09,110 --> 00:27:06,880
that so it was way more intuitive and i

710
00:27:11,510 --> 00:27:09,120
think we've now extended that to sports

711
00:27:14,230 --> 00:27:11,520
uh sports folks i had uh

712
00:27:16,470 --> 00:27:14,240
brett hull who's a defenseman from from

713
00:27:18,470 --> 00:27:16,480

the red wings doing ultrasound exams on

714

00:27:19,350 --> 00:27:18,480

his other partners so i guess i have to

715

00:27:22,549 --> 00:27:19,360

really

716

00:27:24,470 --> 00:27:22,559

re reevaluate my my training but i i

717

00:27:26,630 --> 00:27:24,480

think if if you wanted to extend that

718

00:27:27,990 --> 00:27:26,640

okay how about uh appendicitis it's

719

00:27:30,549 --> 00:27:28,000

something we all

720

00:27:33,190 --> 00:27:30,559

have have some thoughts about and i know

721

00:27:35,430 --> 00:27:33,200

the russians have one way of treating uh

722

00:27:36,549 --> 00:27:35,440

treating that we may we may have another

723

00:27:37,750 --> 00:27:36,559

one

724

00:27:39,590 --> 00:27:37,760

i think that

725

00:27:41,990 --> 00:27:39,600

and and we've all seen what's happened

726

00:27:44,470 --> 00:27:42,000

on antarctica with breast cancer in the

727

00:27:46,710 --> 00:27:44,480

past and things like that and what we're

728

00:27:48,470 --> 00:27:46,720

suggesting to do is may not necessarily

729

00:27:49,909 --> 00:27:48,480

be what you might get at henry ford

730

00:27:52,070 --> 00:27:49,919

hospital should you come in with

731

00:27:53,590 --> 00:27:52,080

appendicitis but it'll probably be good

732

00:27:56,310 --> 00:27:53,600

enough to get you through the eye of the

733

00:27:58,149 --> 00:27:56,320

needle till you get recover or get to

734

00:28:00,630 --> 00:27:58,159

another care facility and i think that

735

00:28:02,870 --> 00:28:00,640

that's what we're now working on

736

00:28:04,470 --> 00:28:02,880

relative to more complex and invasive

737

00:28:06,710 --> 00:28:04,480

procedures it may not be exactly

738

00:28:09,750 --> 00:28:06,720

equivalent in that but it will be

739

00:28:12,230 --> 00:28:09,760

life-sparing and morbidity decreasing on

740

00:28:14,470 --> 00:28:12,240

that one so i wouldn't think it's in our

741

00:28:16,389 --> 00:28:14,480

future to fly an operating room or an

742

00:28:18,710 --> 00:28:16,399

emergency room or things like that but

743

00:28:21,190 --> 00:28:18,720

it'll be in our future to fly

744

00:28:24,950 --> 00:28:21,200

educational tools that will provide some

745

00:28:26,710 --> 00:28:24,960

on-site very quick diagnostics and some

746

00:28:29,590 --> 00:28:26,720

moderate therapeutics which we already

747

00:28:31,590 --> 00:28:29,600

have and expand on that and then working

748

00:28:33,350 --> 00:28:31,600

with some of the smart medical systems

749

00:28:36,310 --> 00:28:33,360

that's really the future not only in the

750

00:28:38,870 --> 00:28:36,320

space program but uh and on our planet

751
00:28:41,430 --> 00:28:38,880
as well where you could provide some of

752
00:28:45,350 --> 00:28:41,440
that uh rather than having big fancy

753
00:28:47,350 --> 00:28:45,360
doctors all over the place

754
00:28:49,830 --> 00:28:47,360
uh john tierney with the new york times

755
00:28:51,190 --> 00:28:49,840
uh uh for both of the uh researchers

756
00:28:53,750 --> 00:28:51,200
um do you have any general thoughts

757
00:28:55,990 --> 00:28:53,760
about about what we've learned either uh

758
00:28:58,710 --> 00:28:56,000
that's encouraging or discouraging about

759
00:29:00,470 --> 00:28:58,720
the prospects for going to mars about

760
00:29:02,870 --> 00:29:00,480
the effects of muscle atrophy on the

761
00:29:04,630 --> 00:29:02,880
crew the effects of radiation and and

762
00:29:08,470 --> 00:29:04,640
dealing with emergencies along the way

763
00:29:13,990 --> 00:29:11,029

uh it's very uh

764

00:29:17,590 --> 00:29:14,000

at this moment uh difficult uh question

765

00:29:20,310 --> 00:29:17,600

because the uh space radiation uh

766

00:29:23,669 --> 00:29:20,320

on the moon or the towards the moon is

767

00:29:27,190 --> 00:29:23,679

much much higher than the oh uh the iss

768

00:29:31,350 --> 00:29:27,200

orbit so uh it must be affected through

769

00:29:33,350 --> 00:29:31,360

uh health so we need to investigate and

770

00:29:36,630 --> 00:29:33,360

protect crew members from the space

771

00:29:39,750 --> 00:29:36,640

station if we go to the moon or mass so

772

00:29:40,710 --> 00:29:39,760

that is an engineering challenge

773

00:29:42,950 --> 00:29:40,720

we

774

00:29:45,510 --> 00:29:42,960

in order to prepare for that

775

00:29:47,669 --> 00:29:45,520

we would like to continue

776

00:29:49,990 --> 00:29:47,679

the experiment on both the space station

777

00:29:53,190 --> 00:29:51,350

to learn

778

00:29:59,830 --> 00:29:53,200

about the

779

00:30:01,669 --> 00:29:59,840

muscle atrophy i think uh it's a lot

780

00:30:04,389 --> 00:30:01,679

positive because

781

00:30:07,990 --> 00:30:04,399

we have some counter measure

782

00:30:08,950 --> 00:30:08,000

one is of course the crew exercise and

783

00:30:11,110 --> 00:30:08,960

also

784

00:30:13,110 --> 00:30:11,120

almost a space station we are now

785

00:30:15,909 --> 00:30:13,120

investigate to using

786

00:30:17,990 --> 00:30:15,919

some kind of medicine to

787

00:30:21,110 --> 00:30:18,000

keep the bone

788

00:30:22,710 --> 00:30:21,120

or muscle to protect the from the

789

00:30:25,510 --> 00:30:22,720

atrophy so

790

00:30:26,470 --> 00:30:25,520

that may be overcome uh in the near

791

00:30:29,590 --> 00:30:26,480

future

792

00:30:32,070 --> 00:30:29,600

uh however radiation is maybe a much

793

00:30:34,630 --> 00:30:32,080

difficult uh challenge for the

794

00:30:37,590 --> 00:30:34,640

future space pride

795

00:30:38,630 --> 00:30:37,600

i i think that uh it's encouraging be

796

00:30:40,070 --> 00:30:38,640

because

797

00:30:41,669 --> 00:30:40,080

sometimes when you're faced with a

798

00:30:44,149 --> 00:30:41,679

constraint you you have to be

799

00:30:46,710 --> 00:30:44,159

particularly innovative so if we had no

800

00:30:48,149 --> 00:30:46,720

constraints we could fly a a vessel

801
00:30:50,549 --> 00:30:48,159
that's got a

802
00:30:52,389 --> 00:30:50,559
wall a foot thick a lead and we wouldn't

803
00:30:54,630 --> 00:30:52,399
have to worry about all of these things

804
00:30:55,990 --> 00:30:54,640
we could fly a full gym and everything

805
00:30:58,310 --> 00:30:56,000
else and it could be just just like

806
00:31:01,029 --> 00:30:58,320
earth but we don't have that luxury so

807
00:31:02,789 --> 00:31:01,039
we may not actually have an engineering

808
00:31:05,430 --> 00:31:02,799
solution to some of those challenges but

809
00:31:07,909 --> 00:31:05,440
we may have a pharmacologic so you may

810
00:31:09,669 --> 00:31:07,919
take a much bigger radiation hit than we

811
00:31:13,350 --> 00:31:09,679
would be comfortable in this room but we

812
00:31:15,830 --> 00:31:13,360
may have some wonderful drug protection

813
00:31:17,509 --> 00:31:15,840

against that hit we've already gotten

814

00:31:19,830 --> 00:31:17,519

through many of the constraints relative

815

00:31:22,230 --> 00:31:19,840

to the bone loss and relative to muscle

816

00:31:24,070 --> 00:31:22,240

and things like that there are more uh

817

00:31:26,070 --> 00:31:24,080

and that but i i think it i think it's

818

00:31:27,750 --> 00:31:26,080

very positive and i i'm assuming

819

00:31:29,430 --> 00:31:27,760

clarence has some thoughts on on some of

820

00:31:31,269 --> 00:31:29,440

the other things that we've done on some

821

00:31:33,350 --> 00:31:31,279

of the countermeasures

822

00:31:35,190 --> 00:31:33,360

yes i'd just like to add a couple of

823

00:31:36,870 --> 00:31:35,200

points i think from a

824

00:31:38,470 --> 00:31:36,880

a global perspective

825

00:31:40,070 --> 00:31:38,480

when you look at the crew members you

826

00:31:42,789 --> 00:31:40,080

find that human beings are much more

827

00:31:44,470 --> 00:31:42,799

adaptable than you necessarily expected

828

00:31:46,470 --> 00:31:44,480

them to be

829

00:31:49,350 --> 00:31:46,480

but that almost all the control systems

830

00:31:51,990 --> 00:31:49,360

are feedback loops so they respond to

831

00:31:53,350 --> 00:31:52,000

the environment they're in and you know

832

00:31:54,630 --> 00:31:53,360

a lot of what we're trying to learn

833

00:31:57,750 --> 00:31:54,640

during station

834

00:31:59,830 --> 00:31:57,760

is how to balance the fact that

835

00:32:02,710 --> 00:31:59,840

you have an adaptive organism that is

836

00:32:04,310 --> 00:32:02,720

changing and how do you keep it within

837

00:32:06,549 --> 00:32:04,320

the bounds of where you want

838

00:32:08,549 --> 00:32:06,559

and and we we have a variety of

839

00:32:11,110 --> 00:32:08,559

countermeasures uh activities that we're

840

00:32:12,630 --> 00:32:11,120

doing now but that i think in a large

841

00:32:14,549 --> 00:32:12,640

sense is the

842

00:32:15,990 --> 00:32:14,559

overall concept for the the human

843

00:32:18,389 --> 00:32:16,000

research program

844

00:32:19,669 --> 00:32:18,399

how do you keep people in the bounds of

845

00:32:21,350 --> 00:32:19,679

how you keep them healthy and how you

846

00:32:22,389 --> 00:32:21,360

keep them able to perform in the way you

847

00:32:23,990 --> 00:32:22,399

want them to

848

00:32:25,669 --> 00:32:24,000

knowing that they're an adaptive system

849

00:32:27,669 --> 00:32:25,679

you've put them in another environment

850

00:32:29,190 --> 00:32:27,679

if you don't do anything they'll adapt

851
00:32:33,110 --> 00:32:29,200
to that environment which may or may not

852
00:32:36,630 --> 00:32:34,950
robert hi robert perlman with

853
00:32:38,389 --> 00:32:36,640
collectspace.com with a couple of

854
00:32:40,070 --> 00:32:38,399
questions first for mark

855
00:32:42,149 --> 00:32:40,080
you mentioned that the

856
00:32:44,310 --> 00:32:42,159
the payload equivalent was about six to

857
00:32:46,310 --> 00:32:44,320
seven space halves but of course they

858
00:32:47,909 --> 00:32:46,320
were space labs um of course each of

859
00:32:49,990 --> 00:32:47,919
those would have had six to seven crew

860
00:32:52,950 --> 00:32:50,000
members so are you at the limits right

861
00:32:54,870 --> 00:32:52,960
now of crew capability to support the

862
00:32:55,830 --> 00:32:54,880
many science payloads or could more be

863
00:32:58,389 --> 00:32:55,840

added

864

00:33:00,310 --> 00:32:58,399

within the allottable crew time

865

00:33:02,549 --> 00:33:00,320

right well the the difference of course

866

00:33:05,269 --> 00:33:02,559

is the space lab missions were only six

867

00:33:08,710 --> 00:33:05,279

to eight days long so we've got a near

868

00:33:10,630 --> 00:33:08,720

continuous 365 day per year mission with

869

00:33:13,269 --> 00:33:10,640

our six crew

870

00:33:15,190 --> 00:33:13,279

and we're looking forward to ramping up

871

00:33:16,630 --> 00:33:15,200

into that available crew time the crew

872

00:33:18,950 --> 00:33:16,640

currently has

873

00:33:21,669 --> 00:33:18,960

the time to support more research than

874

00:33:23,750 --> 00:33:21,679

was previously being performed uh during

875

00:33:25,190 --> 00:33:23,760

the assembly phase so we're we're

876

00:33:30,470 --> 00:33:25,200

looking forward to being able to keep

877

00:33:36,950 --> 00:33:33,269

yeah sorry um just a a just a follow-up

878

00:33:38,950 --> 00:33:36,960

with um with scott and clarence uh

879

00:33:41,430 --> 00:33:38,960

it was mentioned about training

880

00:33:43,750 --> 00:33:41,440

non-doctors to perform medical

881

00:33:45,350 --> 00:33:43,760

procedures on on orbit but is there a

882

00:33:48,310 --> 00:33:45,360

value of having

883

00:33:50,710 --> 00:33:48,320

um of having trained mds on board the

884

00:33:52,149 --> 00:33:50,720

station and and have you been able to

885

00:33:55,190 --> 00:33:52,159

take advantage of the md's that have

886

00:33:59,190 --> 00:33:57,190

obviously you can do different training

887

00:34:01,190 --> 00:33:59,200

algorithms if you have somebody who's an

888

00:34:03,669 --> 00:34:01,200

expert already in that but please

889

00:34:05,750 --> 00:34:03,679

understand that the probability of a

890

00:34:08,069 --> 00:34:05,760

medical event during this

891

00:34:10,629 --> 00:34:08,079

during a mission is pretty darn low and

892

00:34:12,710 --> 00:34:10,639

so your training is appropriately focused

893

00:34:14,550 --> 00:34:12,720

on on that on that probability where you

894

00:34:16,230 --> 00:34:14,560

know you're going to have to do some

895

00:34:17,669 --> 00:34:16,240

other things to maintain the vehicle and

896

00:34:19,430 --> 00:34:17,679

other other

897

00:34:21,030 --> 00:34:19,440

contingencies

898

00:34:22,629 --> 00:34:21,040

i think that

899

00:34:24,310 --> 00:34:22,639

those

900

00:34:26,950 --> 00:34:24,320

skilled individuals who have been on

901
00:34:28,869 --> 00:34:26,960
orbit have been particularly useful

902
00:34:30,950 --> 00:34:28,879
because of the feedback they give us

903
00:34:32,869 --> 00:34:30,960
they say well i know how to do that i

904
00:34:35,030 --> 00:34:32,879
was trained in that but if we did it

905
00:34:36,389 --> 00:34:35,040
this way in that unique environment it

906
00:34:38,710 --> 00:34:36,399
would work better so i think they've

907
00:34:40,950 --> 00:34:38,720
streamlined and i must say we've we've

908
00:34:43,750 --> 00:34:40,960
performed almost 100 hours now of

909
00:34:45,750 --> 00:34:43,760
ultrasound uh on on orbit most of which

910
00:34:48,069 --> 00:34:45,760
has been done not with physicians dr

911
00:34:51,270 --> 00:34:48,079
barrett did do some of our our

912
00:34:53,109 --> 00:34:51,280
ultrasound at the end of the day i i i

913
00:34:55,190 --> 00:34:53,119

can't tell the difference between those

914

00:34:57,270 --> 00:34:55,200

those examinations and i think part of

915

00:34:59,349 --> 00:34:57,280

it is because of we talked to him before

916

00:35:01,270 --> 00:34:59,359

he went and the other crew members but

917

00:35:03,750 --> 00:35:01,280

the second thing is we had our listening

918

00:35:05,750 --> 00:35:03,760

ears on so when the crew went you know

919

00:35:09,030 --> 00:35:05,760

this would be really good if you would

920

00:35:11,190 --> 00:35:09,040

provide us with this and so having uh

921

00:35:14,310 --> 00:35:11,200

been able to have that that circular

922

00:35:16,310 --> 00:35:14,320

feedback to uh to a researcher which is

923

00:35:17,910 --> 00:35:16,320

unusual i think for standard standard

924

00:35:19,990 --> 00:35:17,920

research i think that that was the best

925

00:35:21,750 --> 00:35:20,000

thing that we did

926

00:35:23,670 --> 00:35:21,760

i just want to add one or two things to

927

00:35:25,910 --> 00:35:23,680

that and one is is uh you know looking

928

00:35:28,550 --> 00:35:25,920

at some of the ultrasound activities and

929

00:35:30,230 --> 00:35:28,560

and sort of how they're gone uh having

930

00:35:33,030 --> 00:35:30,240

people that are experts on orbit really

931

00:35:35,190 --> 00:35:33,040

does add that feedback and the the crews

932

00:35:36,470 --> 00:35:35,200

will come up with with as they're

933

00:35:38,069 --> 00:35:36,480

interacting with the research teams

934

00:35:39,670 --> 00:35:38,079

they'll sit there and go you know your

935

00:35:41,910 --> 00:35:39,680

procedure said to do this but if we did

936

00:35:44,150 --> 00:35:41,920

this we could get a much cleaner signal

937

00:35:46,069 --> 00:35:44,160

and so they evolved that with the

938

00:35:47,990 --> 00:35:46,079

research team as you're going on and

939

00:35:49,990 --> 00:35:48,000

that is another thing that is is also

940

00:35:53,270 --> 00:35:50,000

very much unique about

941

00:35:55,589 --> 00:35:53,280

station science compared to things like

942

00:35:57,430 --> 00:35:55,599

uh space labs and the other other types

943

00:36:00,230 --> 00:35:57,440

of of things were flown you know in a

944

00:36:01,589 --> 00:36:00,240

space lab your time is so constrained uh

945

00:36:03,750 --> 00:36:01,599

with the week that you've gotten you

946

00:36:05,670 --> 00:36:03,760

have so much activity you don't usually

947

00:36:07,750 --> 00:36:05,680

have the time for the interface with the

948

00:36:09,349 --> 00:36:07,760

crew member for the feedback between the

949

00:36:11,670 --> 00:36:09,359

crew member and the researcher and let's

950

00:36:13,430 --> 00:36:11,680

evolve the experiment as you go on and

951
00:36:15,910 --> 00:36:13,440
so on station you actually get to use

952
00:36:17,829 --> 00:36:15,920
people as your colleagues and that

953
00:36:20,710 --> 00:36:17,839
that's all the the individuals of the

954
00:36:22,790 --> 00:36:20,720
team and they evolve the science as it

955
00:36:24,550 --> 00:36:22,800
goes on their observations feedback to

956
00:36:26,390 --> 00:36:24,560
the science team and the science team

957
00:36:27,670 --> 00:36:26,400
goes gee i wasn't expecting that well

958
00:36:30,230 --> 00:36:27,680
let's do this and this and this next

959
00:36:31,910 --> 00:36:30,240
time and so it's very much a

960
00:36:48,310 --> 00:36:31,920
a

961
00:36:51,270 --> 00:36:48,320
i think one question to follow up my

962
00:36:53,589 --> 00:36:51,280
first one is for either uh mr erin or dr

963
00:36:56,550 --> 00:36:53,599

sam's with the station's extension uh

964

00:36:58,310 --> 00:36:56,560

through at least 2020 now i'm uh curious

965

00:36:59,910 --> 00:36:58,320

what types of

966

00:37:00,870 --> 00:36:59,920

studies you've had at the back of your

967

00:37:02,470 --> 00:37:00,880

head

968

00:37:04,710 --> 00:37:02,480

i guess at the back of your mind now

969

00:37:06,390 --> 00:37:04,720

maybe you'll get a chance to fly up

970

00:37:08,150 --> 00:37:06,400

and how

971

00:37:09,589 --> 00:37:08,160

the station can be a test but for things

972

00:37:11,109 --> 00:37:09,599

just not just for space but for on the

973

00:37:13,670 --> 00:37:11,119

ground like i i believe there's a

974

00:37:15,270 --> 00:37:13,680

filtration system on on discovery flying

975

00:37:17,589 --> 00:37:15,280

up that could be used for water

976
00:37:19,109 --> 00:37:17,599
purification for ivs you know in space

977
00:37:20,310 --> 00:37:19,119
or on the ground if you can kind of go

978
00:37:23,510 --> 00:37:20,320
into that a little bit that would be

979
00:37:24,790 --> 00:37:23,520
great thanks let me let me start it off

980
00:37:26,550 --> 00:37:24,800
at the

981
00:37:28,550 --> 00:37:26,560
general level

982
00:37:31,750 --> 00:37:28,560
a lot of the organizations that we were

983
00:37:33,190 --> 00:37:31,760
working with prior to the extension

984
00:37:35,349 --> 00:37:33,200
were interested in access to a

985
00:37:38,950 --> 00:37:35,359
laboratory for long term it's it's

986
00:37:40,870 --> 00:37:38,960
difficult to mount a research program

987
00:37:42,470 --> 00:37:40,880
if you know your laboratory assets are

988
00:37:44,550 --> 00:37:42,480

only going to be available to you for a

989

00:37:46,870 --> 00:37:44,560

couple a few more years

990

00:37:50,630 --> 00:37:46,880

once we did the extension we think that

991

00:37:52,550 --> 00:37:50,640

opens up the the scope of organizations

992

00:37:55,190 --> 00:37:52,560

that are willing to invest in a research

993

00:37:56,870 --> 00:37:55,200

program that now has a lifetime of 10

994

00:37:58,630 --> 00:37:56,880

years or better

995

00:38:00,630 --> 00:37:58,640

it's really opened that scope up

996

00:38:02,950 --> 00:38:00,640

immensely and it's across all of the

997

00:38:04,950 --> 00:38:02,960

categories across biology chemistry and

998

00:38:07,829 --> 00:38:04,960

physics but clarence you probably have

999

00:38:10,310 --> 00:38:07,839

some specific examples uh yes we uh in

1000

00:38:11,430 --> 00:38:10,320

the human life sciences there's actually

1001

00:38:13,990 --> 00:38:11,440

uh an

1002

00:38:15,750 --> 00:38:14,000

integrated research plan on the u.s side

1003

00:38:17,829 --> 00:38:15,760

that basically has

1004

00:38:19,750 --> 00:38:17,839

uh if you're looking to you know solve

1005

00:38:21,270 --> 00:38:19,760

your human health and performance risk

1006

00:38:23,190 --> 00:38:21,280

for doing exploration class missions

1007

00:38:27,190 --> 00:38:23,200

which is one of the major objectives of

1008

00:38:29,430 --> 00:38:27,200

that program you know we have a lot of

1009

00:38:31,910 --> 00:38:29,440

risks and gaps of knowledge that we need

1010

00:38:33,829 --> 00:38:31,920

to fill and we've mapped those out

1011

00:38:34,870 --> 00:38:33,839

through the life of station so there is

1012

00:38:35,750 --> 00:38:34,880

a plan

1013

00:38:38,310 --> 00:38:35,760

to

1014

00:38:40,950 --> 00:38:38,320

both solicit uh specific things from the

1015

00:38:42,790 --> 00:38:40,960

research community specific subjects at

1016

00:38:45,270 --> 00:38:42,800

specific times to map them over the

1017

00:38:47,589 --> 00:38:45,280

asset that we have a station and yes it

1018

00:38:49,670 --> 00:38:47,599

certainly is a big benefit that we can

1019

00:38:51,510 --> 00:38:49,680

now map that over a 10-year period

1020

00:38:53,990 --> 00:38:51,520

because you can burn down a lot more of

1021

00:38:56,150 --> 00:38:54,000

those risk areas and

1022

00:38:57,910 --> 00:38:56,160

actually get the opportunity to

1023

00:38:59,670 --> 00:38:57,920

you know examine them have your evidence

1024

00:39:01,750 --> 00:38:59,680

base go to counter-measure development

1025

00:39:05,670 --> 00:39:01,760

and validate that before you get out of

1026

00:39:10,470 --> 00:39:08,069

a short follow-up there have been uh

1027

00:39:12,310 --> 00:39:10,480

maybe a limited number of humans that

1028

00:39:14,630 --> 00:39:12,320

have been able to fly in space and the

1029

00:39:16,950 --> 00:39:14,640

station's a good platform for i guess

1030

00:39:18,790 --> 00:39:16,960

extended studies and i'm just wondering

1031

00:39:20,310 --> 00:39:18,800

how significant the number of folks

1032

00:39:21,829 --> 00:39:20,320

you've had involved in the studies these

1033

00:39:23,510 --> 00:39:21,839

astronauts

1034

00:39:24,790 --> 00:39:23,520

are and how many more you might need to

1035

00:39:26,870 --> 00:39:24,800

really expand the statistical

1036

00:39:28,870 --> 00:39:26,880

significance of your tests versus maybe

1037

00:39:32,390 --> 00:39:28,880

medical studies on the ground that have

1038

00:39:37,430 --> 00:39:35,190

uh when when you you know obviously the

1039

00:39:39,670 --> 00:39:37,440

subject and is is always a challenge for

1040

00:39:40,950 --> 00:39:39,680

all of us uh from the research side and

1041

00:39:43,109 --> 00:39:40,960

and you're absolutely right one of the

1042

00:39:44,870 --> 00:39:43,119

things that that you see in typical

1043

00:39:46,950 --> 00:39:44,880

clinical studies is you know ends of

1044

00:39:48,150 --> 00:39:46,960

hundreds and thousands and and that type

1045

00:39:50,550 --> 00:39:48,160

of thing

1046

00:39:51,670 --> 00:39:50,560

you know i think one advantage you have

1047

00:39:54,950 --> 00:39:51,680

in some of the things that you're

1048

00:39:56,470 --> 00:39:54,960

looking at on space station is here on

1049

00:39:59,190 --> 00:39:56,480

the ground you tend to be looking at

1050

00:40:01,670 --> 00:39:59,200

things where your it's a very wide

1051
00:40:05,750 --> 00:40:03,829
population that you're looking at some

1052
00:40:07,990 --> 00:40:05,760
sometimes subtle events in

1053
00:40:10,230 --> 00:40:08,000
and for most part what we're looking at

1054
00:40:11,910 --> 00:40:10,240
on on our station crew members are some

1055
00:40:13,270 --> 00:40:11,920
relatively major events that turn on

1056
00:40:15,750 --> 00:40:13,280
like clockwork like the bone

1057
00:40:17,510 --> 00:40:15,760
demoralization and such if you look here

1058
00:40:19,510 --> 00:40:17,520
on the ground you have people who do

1059
00:40:21,430 --> 00:40:19,520
that people who don't do that and that

1060
00:40:22,950 --> 00:40:21,440
type of thing we have a population of

1061
00:40:25,670 --> 00:40:22,960
very healthy people we put them on orbit

1062
00:40:27,109 --> 00:40:25,680
and everybody starts losing bone and so

1063
00:40:29,430 --> 00:40:27,119

kind of our problem is a little bit

1064

00:40:32,069 --> 00:40:29,440

different and and to be able to get to

1065

00:40:33,510 --> 00:40:32,079

an end level that provides a confidence

1066

00:40:35,829 --> 00:40:33,520

that you understand that problem and

1067

00:40:37,109 --> 00:40:35,839

also can address it is is a different

1068

00:40:38,870 --> 00:40:37,119

type of problem than you have in some of

1069

00:40:40,309 --> 00:40:38,880

the clinical assets and i think we have

1070

00:40:42,069 --> 00:40:40,319

uh sort of a

1071

00:40:44,069 --> 00:40:42,079

an adequate plan to get us to an end to

1072

00:40:47,109 --> 00:40:44,079

solve solve the majority of those issues

1073

00:40:48,390 --> 00:40:47,119

scott yeah i had to go through just that

1074

00:40:50,230 --> 00:40:48,400

just that challenge because many of the

1075

00:40:51,750 --> 00:40:50,240

ultrasound techniques said for a

1076

00:40:53,990 --> 00:40:51,760

collapsed lung for instance that they

1077

00:40:58,069 --> 00:40:54,000

had not been done before and so what we

1078

00:40:59,430 --> 00:40:58,079

did was had an n of 500 in a in my large

1079

00:41:02,069 --> 00:40:59,440

large hospital that showed yeah it

1080

00:41:05,190 --> 00:41:02,079

seemed seems to work okay then we took

1081

00:41:07,349 --> 00:41:05,200

that as almost observationally to the

1082

00:41:08,550 --> 00:41:07,359

international national space station i

1083

00:41:11,589 --> 00:41:08,560

think that that's what we will have

1084

00:41:13,589 --> 00:41:11,599

we'll never get a large end

1085

00:41:16,069 --> 00:41:13,599

in in space research

1086

00:41:18,950 --> 00:41:16,079

except for more basic processes i was

1087

00:41:21,510 --> 00:41:18,960

honored enough to sit on the the last

1088

00:41:23,510 --> 00:41:21,520

nih panel which was now choosing the

1089

00:41:25,270 --> 00:41:23,520

next basic science that's going to fly

1090

00:41:28,069 --> 00:41:25,280

on station and in all of those

1091

00:41:29,910 --> 00:41:28,079

experiments statistical relevance was a

1092

00:41:31,510 --> 00:41:29,920

strong consideration so the ends you'll

1093

00:41:36,309 --> 00:41:31,520

see in more basic things are

1094

00:41:40,069 --> 00:41:38,309

andrew rennie from southern fm in

1095

00:41:42,069 --> 00:41:40,079

melbourne australia

1096

00:41:43,990 --> 00:41:42,079

a question to mark please

1097

00:41:46,950 --> 00:41:44,000

without the shuttle

1098

00:41:50,790 --> 00:41:46,960

will the european space agency's atv and

1099

00:41:53,430 --> 00:41:50,800

japan's htv be sufficient to loft all

1100

00:41:54,950 --> 00:41:53,440

the experiments to iss and a follow-up

1101

00:41:57,030 --> 00:41:54,960

question

1102

00:41:58,550 --> 00:41:57,040

and what about returning materials from

1103

00:42:00,829 --> 00:41:58,560

the space station will you have enough

1104

00:42:03,190 --> 00:42:00,839

capacity for the completed

1105

00:42:05,670 --> 00:42:03,200

science yeah no those are excellent

1106

00:42:07,589 --> 00:42:05,680

questions uh first you probably heard

1107

00:42:11,190 --> 00:42:07,599

the analogy that the shuttle is like a

1108

00:42:13,270 --> 00:42:11,200

16-wheeler it's it's much more capacity

1109

00:42:14,950 --> 00:42:13,280

than we would ever need to operate and

1110

00:42:17,270 --> 00:42:14,960

maintain the space station conduct the

1111

00:42:19,190 --> 00:42:17,280

research program over the next decade so

1112

00:42:21,990 --> 00:42:19,200

we have this combination of our partner

1113

00:42:23,589 --> 00:42:22,000

vehicles as well as the contracts that

1114

00:42:25,910 --> 00:42:23,599

we put in place here in the united

1115

00:42:27,030 --> 00:42:25,920

states for commercial vehicles that will

1116

00:42:29,589 --> 00:42:27,040

be

1117

00:42:30,950 --> 00:42:29,599

providing cargo resupply and return

1118

00:42:32,710 --> 00:42:30,960

services

1119

00:42:33,829 --> 00:42:32,720

to us over the next decade those are

1120

00:42:35,990 --> 00:42:33,839

going to be demonstrated the

1121

00:42:37,829 --> 00:42:36,000

demonstrations begin next year and over

1122

00:42:40,230 --> 00:42:37,839

the 2011

1123

00:42:42,230 --> 00:42:40,240

2012 period we'll see these commercial

1124

00:42:45,589 --> 00:42:42,240

capabilities come on orbit

1125

00:42:47,270 --> 00:42:45,599

if those capabilities were delayed

1126

00:42:49,190 --> 00:42:47,280

the resources available from our

1127

00:42:51,829 --> 00:42:49,200

partners are sufficient to operate and

1128

00:42:54,630 --> 00:42:51,839

maintain the spacecraft and to carry on

1129

00:42:57,109 --> 00:42:54,640

our mission requirements at nasa but we

1130

00:42:59,270 --> 00:42:57,119

would we would delay a full up

1131

00:43:01,270 --> 00:42:59,280

utilization of the station

1132

00:43:03,589 --> 00:43:01,280

if those cargo resupply services were

1133

00:43:04,870 --> 00:43:03,599

delayed but we're confident that within

1134

00:43:08,390 --> 00:43:04,880

the next one to two years we're going to

1135

00:43:09,829 --> 00:43:08,400

begin seeing those demonstrations

1136

00:43:11,910 --> 00:43:09,839

and one of those

1137

00:43:15,190 --> 00:43:11,920

resupply contractors has a return

1138

00:43:18,870 --> 00:43:16,710

right here in the front

1139

00:43:21,270 --> 00:43:18,880

hi ken kramer for space flight magazine

1140

00:43:23,190 --> 00:43:21,280

question for scott um can you tell us

1141

00:43:24,870 --> 00:43:23,200

the ultrasound have you actually the

1142

00:43:27,510 --> 00:43:24,880

astronauts actually diagnosed any

1143

00:43:30,309 --> 00:43:27,520

injuries even minor ones at all and you

1144

00:43:31,829 --> 00:43:30,319

mentioned the pharmaceuticals to to

1145

00:43:33,990 --> 00:43:31,839

uh as a counter measure for the

1146

00:43:36,470 --> 00:43:34,000

radiation can you mention a few specific

1147

00:43:38,309 --> 00:43:36,480

pharmaceuticals you would try yeah

1148

00:43:41,349 --> 00:43:38,319

uh let me let me first

1149

00:43:42,470 --> 00:43:41,359

do the easier one the the astronauts our

1150

00:43:45,430 --> 00:43:42,480

uh

1151

00:43:48,550 --> 00:43:45,440

our experiments were not based on

1152

00:43:51,349 --> 00:43:48,560

injury uh injury diagnosis in that that

1153

00:43:53,270 --> 00:43:51,359

said they found some interesting things

1154

00:43:55,430 --> 00:43:53,280

in each other that the

1155

00:43:56,230 --> 00:43:55,440

crew confidentiality won't let me get

1156

00:43:58,710 --> 00:43:56,240

into

1157

00:44:00,790 --> 00:43:58,720

i am confident that if they had

1158

00:44:03,109 --> 00:44:00,800

anything more substantive they would be

1159

00:44:05,349 --> 00:44:03,119

able to pick it up since they were

1160

00:44:08,150 --> 00:44:05,359

virtually performing autonomously by the

1161

00:44:09,750 --> 00:44:08,160

end of end of their six six-month stents

1162

00:44:11,829 --> 00:44:09,760

out there i was talking more

1163

00:44:14,870 --> 00:44:11,839

theoretically reli as a molecular

1164

00:44:17,670 --> 00:44:14,880

biologist about uh protective mechanisms

1165

00:44:18,870 --> 00:44:17,680

for radiation we're not quite there yet

1166

00:44:20,309 --> 00:44:18,880

but

1167

00:44:22,069 --> 00:44:20,319

there there are some interesting

1168

00:44:23,190 --> 00:44:22,079

developments coming coming down the pike

1169

00:44:25,829 --> 00:44:23,200

and i think by the time we're

1170

00:44:27,910 --> 00:44:25,839

contemplating a long duration

1171

00:44:30,150 --> 00:44:27,920

mission either to back to moon or to

1172

00:44:31,589 --> 00:44:30,160

mars that we will have some cocktails

1173

00:44:33,030 --> 00:44:31,599

that will be able to provide some

1174

00:44:34,870 --> 00:44:33,040

protection

1175

00:44:41,990 --> 00:44:34,880

james dean you have a question

1176

00:44:45,670 --> 00:44:44,309

james dean from florida today for mark

1177

00:44:47,270 --> 00:44:45,680

you're talking about a

1178

00:44:50,710 --> 00:44:47,280

increased interest level from

1179

00:44:51,670 --> 00:44:50,720

researchers based on a shuttle extension

1180

00:44:54,790 --> 00:44:51,680

for

1181

00:44:56,790 --> 00:44:54,800

studies that would take a longer period

1182

00:44:59,109 --> 00:44:56,800

of time obviously i'm just curious is

1183

00:45:00,790 --> 00:44:59,119

there a limit of how long any given

1184

00:45:03,030 --> 00:45:00,800

experiment can

1185

00:45:05,829 --> 00:45:03,040

occupy room on the station

1186

00:45:08,390 --> 00:45:05,839

and uh i'll follow up thanks

1187

00:45:10,470 --> 00:45:08,400

yeah and and uh it's on the basis of the

1188

00:45:12,630 --> 00:45:10,480

station extension not the shuttle

1189

00:45:14,870 --> 00:45:12,640

uh on the basis of the station extension

1190

00:45:16,550 --> 00:45:14,880

it's not so much a single experiment

1191

00:45:19,109 --> 00:45:16,560

that requires a 10-year period of

1192

00:45:21,270 --> 00:45:19,119

performance as it as it is being able to

1193

00:45:22,870 --> 00:45:21,280

conduct a research program over a

1194

00:45:24,069 --> 00:45:22,880

10-year period that allows you to

1195

00:45:26,230 --> 00:45:24,079

revisit

1196

00:45:27,990 --> 00:45:26,240

and and do the necessary follow-on

1197

00:45:29,750 --> 00:45:28,000

investigations that get you down to the

1198

00:45:31,990 --> 00:45:29,760

details necessary to reach your

1199

00:45:33,109 --> 00:45:32,000

scientific objective that's not done

1200

00:45:35,510 --> 00:45:33,119

quickly

1201
00:45:36,790 --> 00:45:35,520
typically a 10-year horizon is not

1202
00:45:39,030 --> 00:45:36,800
unusual

1203
00:45:41,430 --> 00:45:39,040
to develop a new application

1204
00:45:45,270 --> 00:45:41,440
from a basic research finding in fact

1205
00:45:47,589 --> 00:45:45,280
some of them are as long as 40 years

1206
00:45:50,390 --> 00:45:47,599
will a decade be sufficient we believe

1207
00:45:52,230 --> 00:45:50,400
that in a decade given the

1208
00:45:53,190 --> 00:45:52,240
capabilities that we have with this

1209
00:45:55,510 --> 00:45:53,200
vehicle

1210
00:45:57,750 --> 00:45:55,520
and the emerging transportation systems

1211
00:45:59,270 --> 00:45:57,760
to service it that we'll be able to

1212
00:46:01,190 --> 00:45:59,280
demonstrate enough competitive

1213
00:46:03,030 --> 00:46:01,200

advantages of this environment that

1214

00:46:05,109 --> 00:46:03,040

we're not worried at this point about

1215

00:46:07,270 --> 00:46:05,119

what happens after 2010 we think the

1216

00:46:09,670 --> 00:46:07,280

evidence we present will drive what

1217

00:46:12,309 --> 00:46:09,680

happens

1218

00:46:14,630 --> 00:46:12,319

and also just curious in terms of how

1219

00:46:16,069 --> 00:46:14,640

you're planning out what experiments get

1220

00:46:18,470 --> 00:46:16,079

to fly when

1221

00:46:19,829 --> 00:46:18,480

um is that something are you do you look

1222

00:46:21,910 --> 00:46:19,839

a few missions ahead are you looking

1223

00:46:24,150 --> 00:46:21,920

years out are you looking even beyond

1224

00:46:26,309 --> 00:46:24,160

2015 how how locked in are things now

1225

00:46:27,109 --> 00:46:26,319

how fluid is it to decide what flies

1226
00:46:29,030 --> 00:46:27,119
when

1227
00:46:30,790 --> 00:46:29,040
at the international level with our

1228
00:46:32,710 --> 00:46:30,800
partners we have a five-year planning

1229
00:46:34,870 --> 00:46:32,720
horizon

1230
00:46:37,030 --> 00:46:34,880
we then step back and we have a two-year

1231
00:46:39,349 --> 00:46:37,040
planning horizon for the more detailed

1232
00:46:41,910 --> 00:46:39,359
or what we call the tactical level of

1233
00:46:43,589 --> 00:46:41,920
scheduling a package on this flight

1234
00:46:44,870 --> 00:46:43,599
versus this flight versus the other

1235
00:46:46,790 --> 00:46:44,880
flight

1236
00:46:48,630 --> 00:46:46,800
it's it's a pretty detailed planning

1237
00:46:50,950 --> 00:46:48,640
process because it's highly optimized

1238
00:46:53,349 --> 00:46:50,960

first across the partnership and then

1239

00:46:54,950 --> 00:46:53,359

within any single partners planned

1240

00:46:57,030 --> 00:46:54,960

research

1241

00:46:58,870 --> 00:46:57,040

and the ability to bring in new science

1242

00:47:02,309 --> 00:46:58,880

at any step in that way is always

1243

00:47:04,630 --> 00:47:02,319

preserved and we don't allocate 100

1244

00:47:06,630 --> 00:47:04,640

of our available resources we we do

1245

00:47:09,109 --> 00:47:06,640

announcements and then we re-announce

1246

00:47:11,030 --> 00:47:09,119

two or three years later so that we can

1247

00:47:13,510 --> 00:47:11,040

have the freshest research ideas at any

1248

00:47:14,870 --> 00:47:13,520

given point in time

1249

00:47:16,390 --> 00:47:14,880

we have time for one more question

1250

00:47:19,750 --> 00:47:16,400

anymore

1251
00:47:24,390 --> 00:47:22,630
uh yes you mentioned the um ken kramer

1252
00:47:26,549 --> 00:47:24,400
for space flight magazine you mentioned

1253
00:47:28,950 --> 00:47:26,559
the radiation experiment can you tell us

1254
00:47:32,230 --> 00:47:28,960
what you have measured um has any

1255
00:47:34,470 --> 00:47:32,240
surprises have you found any leaks

1256
00:47:37,510 --> 00:47:34,480
inside kibo

1257
00:47:40,630 --> 00:47:37,520
okay so uh we started the radiation

1258
00:47:42,630 --> 00:47:40,640
monitoring since the kibo operation one

1259
00:47:45,349 --> 00:47:42,640
and a half years ago

1260
00:47:46,710 --> 00:47:45,359
our radiation monitor

1261
00:47:48,950 --> 00:47:46,720
is usually

1262
00:47:50,549 --> 00:47:48,960
back to the us

1263
00:47:51,750 --> 00:47:50,559

every half year

1264

00:47:53,910 --> 00:47:51,760

and

1265

00:47:54,710 --> 00:47:53,920

it's a passive dosimeter so

1266

00:47:56,710 --> 00:47:54,720

we

1267

00:47:59,270 --> 00:47:56,720

measure the energy

1268

00:48:03,750 --> 00:47:59,280

uh and uh

1269

00:48:05,270 --> 00:48:03,760

particular uh ion energy and

1270

00:48:08,790 --> 00:48:05,280

the current tree

1271

00:48:09,990 --> 00:48:08,800

we in the past we expected the uh

1272

00:48:14,309 --> 00:48:10,000

solar

1273

00:48:16,790 --> 00:48:14,319

activity it's a about uh 11 year cycle

1274

00:48:18,870 --> 00:48:16,800

and we expected uh we will have much

1275

00:48:21,910 --> 00:48:18,880

more uh variation in

1276

00:48:25,109 --> 00:48:21,920

the past past one year however uh the

1277

00:48:28,870 --> 00:48:25,119

result is uh the solar uh system is a

1278

00:48:32,230 --> 00:48:28,880

little bit quiet uh compared to the uh

1279

00:48:33,589 --> 00:48:32,240

uh expectation uh we are a little bit

1280

00:48:36,630 --> 00:48:33,599

less

1281

00:48:39,589 --> 00:48:36,640

radiation dose in the past one year but

1282

00:48:41,910 --> 00:48:39,599

it's not a surprising result because uh

1283

00:48:44,150 --> 00:48:41,920

this is observed in the various

1284

00:48:46,309 --> 00:48:44,160

different uh

1285

00:48:47,270 --> 00:48:46,319

astronomy or satellite

1286

00:48:49,670 --> 00:48:47,280

so

1287

00:48:51,589 --> 00:48:49,680

at this moment we have no uh

1288

00:48:53,109 --> 00:48:51,599

uh surprising

1289

00:48:59,589 --> 00:48:53,119

uh

1290

00:49:01,270 --> 00:48:59,599

inside radiation dose inside the gym and

1291

00:49:03,109 --> 00:49:01,280

uh we believe uh

1292

00:49:04,549 --> 00:49:03,119

the gem itself

1293

00:49:05,910 --> 00:49:04,559

performed

1294

00:49:08,230 --> 00:49:05,920

expected

1295

00:49:11,270 --> 00:49:08,240

protection of the radiation for crew

1296

00:49:12,630 --> 00:49:11,280

members and

1297

00:49:16,790 --> 00:49:12,640

we can

1298

00:49:19,349 --> 00:49:16,800

safely learning the gem module with the

1299

00:49:22,470 --> 00:49:19,359

astronauts at this moment

1300

00:49:24,470 --> 00:49:22,480

and we continue to this measurement

1301

00:49:26,150 --> 00:49:24,480

as long as we can

1302

00:49:29,109 --> 00:49:26,160

operate the gem

1303

00:49:35,190 --> 00:49:31,829

to compile the data this data will be

1304

00:49:38,630 --> 00:49:35,200

available on the website uh

1305

00:49:39,990 --> 00:49:38,640

of jaxa website so uh i think you can

1306

00:49:41,190 --> 00:49:40,000

see the

1307

00:49:42,390 --> 00:49:41,200

radiation

1308

00:49:47,670 --> 00:49:42,400

uh

1309

00:49:50,870 --> 00:49:49,349

okay thank you that's going to conclude

1310

00:49:52,549 --> 00:49:50,880

the first part of today's science and

1311

00:49:55,190 --> 00:49:52,559

technology briefing we're going to take

1312

00:49:58,710 --> 00:49:55,200

a five-minute break so around uh well at

1313

00:50:01,109 --> 00:49:58,720

1205 or excuse me 205

1314

00:50:02,710 --> 00:50:01,119

eastern time we'll get started with the

1315

00:50:04,870 --> 00:50:02,720

part two which is uh commercial

1316

00:50:06,549 --> 00:50:04,880

partnerships i hope you'll join us for

1317

00:50:08,390 --> 00:50:06,559

all this information you heard

1318

00:50:09,670 --> 00:50:08,400

and much more on space station science

1319

00:50:10,630 --> 00:50:09,680

visit us on the web

1320

00:50:11,990 --> 00:50:10,640

at