
Johnson Spa
Space C

1
00:00:06,550 --> 00:00:04,390
good morning and welcome to nasa's

2
00:00:08,950 --> 00:00:06,560
johnson space center for today's mission

3
00:00:10,390 --> 00:00:08,960
status briefing of the sts-134 space

4
00:00:12,230 --> 00:00:10,400
shuttle mission to the international

5
00:00:13,990 --> 00:00:12,240
space station we'll start with some

6
00:00:16,150 --> 00:00:14,000
opening comments and then take questions

7
00:00:18,070 --> 00:00:16,160
from reporters for our comments and

8
00:00:19,590 --> 00:00:18,080
updates today we have the lead space

9
00:00:21,029 --> 00:00:19,600
station flight director of the mission

10
00:00:23,750 --> 00:00:21,039
derek hossman

11
00:00:25,990 --> 00:00:23,760
seated next to derek is dr samuel ting

12
00:00:27,990 --> 00:00:26,000
the principal investigator of the alpha

13
00:00:30,470 --> 00:00:28,000

magnetic spectrometer

14
00:00:32,549 --> 00:00:30,480
and next to dr ting is mark sustiling

15
00:00:34,150 --> 00:00:32,559
the ams program manager from nasa

16
00:00:36,709 --> 00:00:34,160
headquarters so i'll turn it over to

17
00:00:38,069 --> 00:00:36,719
derek okay thanks colin kylie and good

18
00:00:39,590 --> 00:00:38,079
morning to everyone

19
00:00:41,670 --> 00:00:39,600
it's a it's a pleasure to be here to

20
00:00:43,510 --> 00:00:41,680
talk to you after what was an amazing

21
00:00:45,190 --> 00:00:43,520
day in space

22
00:00:47,190 --> 00:00:45,200
as everyone knows that the number one

23
00:00:48,229 --> 00:00:47,200
objective on flight day four today was

24
00:00:50,310 --> 00:00:48,239
to get the

25
00:00:51,830 --> 00:00:50,320
alpha magnetic spectrometer removed from

26
00:00:53,670 --> 00:00:51,840
the shuttle payload bay and installed on

27
00:00:54,950 --> 00:00:53,680
the space station and i'm happy to

28
00:00:56,790 --> 00:00:54,960
report that that

29
00:00:59,110 --> 00:00:56,800
that activity was

30
00:01:00,389 --> 00:00:59,120
performed absolutely flawlessly by the

31
00:01:03,029 --> 00:01:00,399
by the crew

32
00:01:04,950 --> 00:01:03,039
we used the the space shuttle

33
00:01:07,030 --> 00:01:04,960
uh robotic arm to remove the payload

34
00:01:10,149 --> 00:01:07,040
from uh remove ams from the shuttle

35
00:01:12,550 --> 00:01:10,159
payload bay maneuver maneuvered ams to a

36
00:01:14,630 --> 00:01:12,560
pre-planned hand-off position

37
00:01:16,550 --> 00:01:14,640
at that point we paused there had the

38
00:01:18,630 --> 00:01:16,560

space station crew

39
00:01:20,550 --> 00:01:18,640
actually the 134 crew on station using

40
00:01:22,630 --> 00:01:20,560
the station robotic arm grappled the

41
00:01:25,270 --> 00:01:22,640
payload we released it with the shuttle

42
00:01:27,990 --> 00:01:25,280
arm and then maneuvered it to its final

43
00:01:29,830 --> 00:01:28,000
home on the s3 truss

44
00:01:31,510 --> 00:01:29,840
at that point once the installation and

45
00:01:35,109 --> 00:01:31,520
the attachment was complete we applied

46
00:01:36,789 --> 00:01:35,119
power and uh handed over the payload to

47
00:01:39,270 --> 00:01:36,799
professor ting and his team to start the

48
00:01:41,270 --> 00:01:39,280
initial activation and checkout so just

49
00:01:42,950 --> 00:01:41,280
an amazing day it was um

50
00:01:45,990 --> 00:01:42,960
it was a rewarding thing to watch the

51
00:01:47,510 --> 00:01:46,000
the uh both the crews on orbit and uh

52
00:01:49,910 --> 00:01:47,520
the ground teams execute those

53
00:01:52,310 --> 00:01:49,920
activities today which again went very

54
00:01:54,149 --> 00:01:52,320
very smooth and and very very well and

55
00:01:55,990 --> 00:01:54,159
it's just an honor for me and my team to

56
00:01:58,550 --> 00:01:56,000
be uh be a part of that and and to

57
00:02:01,030 --> 00:01:58,560
contribute in a small way uh to to

58
00:02:02,789 --> 00:02:01,040
getting ams to space station and uh

59
00:02:05,429 --> 00:02:02,799
before i hand over to professor ting to

60
00:02:08,070 --> 00:02:05,439
talk about uh the details and uh what

61
00:02:10,710 --> 00:02:08,080
he's seen so far i'll just uh look ahead

62
00:02:13,110 --> 00:02:10,720
to tomorrow um what what the the crew

63
00:02:14,710 --> 00:02:13,120

was doing on space station as i left the

64
00:02:17,350 --> 00:02:14,720
mission control was prepping for

65
00:02:18,790 --> 00:02:17,360
tomorrow's uh spacewalk will be eva one

66
00:02:21,030 --> 00:02:18,800
which will be the first spacewalk plan

67
00:02:22,949 --> 00:02:21,040
for the mission and uh

68
00:02:24,949 --> 00:02:22,959
by this time i expect that uh drew

69
00:02:26,550 --> 00:02:24,959
feustel and greg shamatoff will be

70
00:02:28,710 --> 00:02:26,560
buttoned up in the airlocks starting the

71
00:02:30,229 --> 00:02:28,720
uh the camp out in preparation for

72
00:02:31,589 --> 00:02:30,239
tomorrow's eba so we're looking forward

73
00:02:33,270 --> 00:02:31,599
to that as well

74
00:02:34,949 --> 00:02:33,280
and uh with that i'll hand over to

75
00:02:37,430 --> 00:02:34,959
professor ting

76
00:02:39,350 --> 00:02:37,440
good morning

77
00:02:42,630 --> 00:02:39,360
i'm samuel ting the principal

78
00:02:45,190 --> 00:02:42,640
investigator of ms experiment

79
00:02:48,470 --> 00:02:45,200
coming together with me today

80
00:02:51,509 --> 00:02:48,480
is professor stephen schael

81
00:02:53,430 --> 00:02:51,519
the director of the best physical

82
00:02:56,229 --> 00:02:53,440
institute in germany

83
00:02:58,710 --> 00:02:56,239
who made a tremendous contribution

84
00:03:02,070 --> 00:02:58,720
to the ms experiment

85
00:03:07,589 --> 00:03:05,030
and professor andreas cantin

86
00:03:09,910 --> 00:03:07,599
former director of one of the oldest

87
00:03:12,869 --> 00:03:09,920
university in europe

88
00:03:15,830 --> 00:03:12,879

from from bologna they also

89
00:03:18,149 --> 00:03:15,840
made extremely important contribution to

90
00:03:20,390 --> 00:03:18,159
ams

91
00:03:22,869 --> 00:03:20,400
for us

92
00:03:24,390 --> 00:03:22,879
for me and my wife susan

93
00:03:26,789 --> 00:03:24,400
the day began

94
00:03:27,750 --> 00:03:26,799
at 1am

95
00:03:30,949 --> 00:03:27,760
we

96
00:03:32,550 --> 00:03:30,959
came to the control room

97
00:03:33,509 --> 00:03:32,560
and

98
00:03:34,309 --> 00:03:33,519
watch

99
00:03:35,990 --> 00:03:34,319
the

100
00:03:38,949 --> 00:03:36,000
incredible

101
00:03:40,070 --> 00:03:38,959
work how they take ms out

102
00:03:42,630 --> 00:03:40,080
and

103
00:03:44,869 --> 00:03:42,640
out of the shuttle put on this

104
00:03:45,750 --> 00:03:44,879
space station

105
00:03:48,550 --> 00:03:45,760
so

106
00:03:51,270 --> 00:03:48,560
just finished about

107
00:03:54,710 --> 00:03:51,280
five four or five o'clock

108
00:03:55,670 --> 00:03:54,720
and we did some small check and then we

109
00:03:58,630 --> 00:03:55,680
turned

110
00:04:01,830 --> 00:03:58,640
our detector on

111
00:04:04,350 --> 00:04:01,840
let me remind you the detector has 300

112
00:04:07,509 --> 00:04:04,360
000 channels of electronics

113
00:04:10,390 --> 00:04:07,519

650 microprocessors

114
00:04:17,030 --> 00:04:13,030
the detectors are aligned

115
00:04:20,550 --> 00:04:17,040
to one tenth of the human hair

116
00:04:21,909 --> 00:04:20,560
so we immediately check all the detector

117
00:04:24,070 --> 00:04:21,919
everything

118
00:04:26,629 --> 00:04:24,080
function properly

119
00:04:29,590 --> 00:04:26,639
not a single wire was broken

120
00:04:32,310 --> 00:04:29,600
not a single electronic channels

121
00:04:33,590 --> 00:04:32,320
was malfunctioning

122
00:04:35,110 --> 00:04:33,600
and

123
00:04:36,790 --> 00:04:35,120
right away

124
00:04:39,110 --> 00:04:36,800
we began to see

125
00:04:41,030 --> 00:04:39,120
enormous amount of data

126
00:04:43,189 --> 00:04:41,040
coming down

127
00:04:45,749 --> 00:04:43,199
and so i'll let me just show

128
00:04:50,469 --> 00:04:47,030
events

129
00:04:50,479 --> 00:04:53,830
20

130
00:05:00,070 --> 00:04:57,670
billion electron volt electron

131
00:05:01,749 --> 00:05:00,080
passing through

132
00:05:04,070 --> 00:05:01,759
the detector

133
00:05:06,629 --> 00:05:04,080
from the top is the transaction

134
00:05:07,830 --> 00:05:06,639
radiation detector which gives out a

135
00:05:09,830 --> 00:05:07,840
signal

136
00:05:12,469 --> 00:05:09,840
when the electron pass transaction

137
00:05:15,430 --> 00:05:12,479
reduction detector was built in ochen

138
00:05:18,390 --> 00:05:15,440

under the leadership of professor shell

139
00:05:19,990 --> 00:05:18,400
and followed by two counter two layers

140
00:05:23,029 --> 00:05:20,000
of counters

141
00:05:26,150 --> 00:05:23,039
built by professor cantin's group

142
00:05:28,230 --> 00:05:26,160
and then followed by silicon detector

143
00:05:30,870 --> 00:05:28,240
and then in the bottom

144
00:05:33,430 --> 00:05:30,880
a ring image drunk of counter

145
00:05:36,790 --> 00:05:33,440
and real in the bottom you see a blue

146
00:05:38,870 --> 00:05:36,800
shade these are the showers it shows

147
00:05:41,590 --> 00:05:38,880
you can see how clean this events are

148
00:05:43,189 --> 00:05:41,600
you means are coming in thousands

149
00:05:45,510 --> 00:05:43,199
by the thousands

150
00:05:46,790 --> 00:05:45,520
and these are very basically the first

151
00:05:48,469 --> 00:05:46,800
few minutes

152
00:05:50,710 --> 00:05:48,479
we have many events

153
00:05:52,870 --> 00:05:50,720
we choose to two

154
00:05:54,029 --> 00:05:52,880
the second event

155
00:05:58,950 --> 00:05:54,039
has a

156
00:06:02,870 --> 00:05:58,960
42 billion electron volt carbon nuclei

157
00:06:05,110 --> 00:06:02,880
and there on the top you see

158
00:06:07,510 --> 00:06:05,120
the red

159
00:06:09,830 --> 00:06:07,520
that's the energy loss because carbon is

160
00:06:10,790 --> 00:06:09,840
so heavy so you have a lot of energy

161
00:06:12,550 --> 00:06:10,800
loss

162
00:06:16,390 --> 00:06:12,560
and then you see

163
00:06:18,390 --> 00:06:16,400

two blue since also energy loss

164
00:06:19,590 --> 00:06:18,400
large energy loss because carbon is

165
00:06:22,950 --> 00:06:19,600
heavy

166
00:06:23,830 --> 00:06:22,960
and in the bottom you see a ring

167
00:06:26,309 --> 00:06:23,840
in this

168
00:06:28,790 --> 00:06:26,319
ring image chunk of counter

169
00:06:31,189 --> 00:06:28,800
and this shows

170
00:06:32,830 --> 00:06:31,199
the detector

171
00:06:35,430 --> 00:06:32,840
functions

172
00:06:37,830 --> 00:06:35,440
properly without

173
00:06:41,270 --> 00:06:37,840
any

174
00:06:46,710 --> 00:06:43,830
deformation whatsoever

175
00:06:48,390 --> 00:06:46,720
and we're very pleased took us 17 years

176
00:06:50,629 --> 00:06:48,400
to build this thing

177
00:06:52,390 --> 00:06:50,639
and so finally for the next for the

178
00:06:54,390 --> 00:06:52,400
duration

179
00:06:55,830 --> 00:06:54,400
of the space station

180
00:06:57,110 --> 00:06:55,840
we will be there

181
00:06:59,189 --> 00:06:57,120
hopefully

182
00:07:00,870 --> 00:06:59,199
10 to 20 years

183
00:07:02,790 --> 00:07:00,880
and we hope

184
00:07:04,870 --> 00:07:02,800
with this device

185
00:07:08,150 --> 00:07:04,880
we will be able to

186
00:07:10,629 --> 00:07:08,160
really make an important contribution

187
00:07:15,270 --> 00:07:10,639
to our understanding of the origin of

188
00:07:19,990 --> 00:07:15,280

the universe understanding of cosmos

189
00:07:25,510 --> 00:07:20,950
any

190
00:07:27,909 --> 00:07:25,520
we also checked the leak rate of a

191
00:07:30,790 --> 00:07:27,919
detector

192
00:07:33,110 --> 00:07:30,800
and found out there's no leak rate

193
00:07:36,390 --> 00:07:33,120
what's in space actually is better than

194
00:07:41,830 --> 00:07:36,400
what we measured underground so we can

195
00:07:45,990 --> 00:07:44,469
and from now on

196
00:07:47,830 --> 00:07:46,000
what we're going to do

197
00:07:51,830 --> 00:07:47,840
is we're going to

198
00:07:54,550 --> 00:07:51,840
spend a few days check more carefully

199
00:07:55,430 --> 00:07:54,560
every one of the elements we did one

200
00:07:58,390 --> 00:07:55,440
check

201
00:08:03,270 --> 00:07:58,400
it again

202
00:08:05,110 --> 00:08:03,280
we're going to set tight

203
00:08:06,710 --> 00:08:05,120
collecting data

204
00:08:08,629 --> 00:08:06,720
also learn

205
00:08:12,309 --> 00:08:08,639
how to work

206
00:08:13,430 --> 00:08:12,319
with johnson space center

207
00:08:16,550 --> 00:08:13,440
and so

208
00:08:20,150 --> 00:08:16,560
to learn how to communicate with nasa

209
00:08:22,790 --> 00:08:20,160
and after that we will return to

210
00:08:24,869 --> 00:08:22,800
geneva switzerland where we have

211
00:08:27,350 --> 00:08:24,879
our park which now

212
00:08:31,270 --> 00:08:27,360
will be finished i think in a few days

213
00:08:36,310 --> 00:08:34,469

finished okay

214
00:08:38,469 --> 00:08:36,320
all right my name is mark cecili i'm the

215
00:08:43,029 --> 00:08:38,479
nasa ams program manager and have been

216
00:08:45,350 --> 00:08:43,039
so for the last since 1994.

217
00:08:47,670 --> 00:08:45,360
from a nasa agency perspective this is a

218
00:08:50,949 --> 00:08:47,680
major historic day

219
00:08:53,990 --> 00:08:50,959
because in a very real sense okay

220
00:08:56,310 --> 00:08:54,000
a science voyage of discovery into our

221
00:08:58,470 --> 00:08:56,320
galaxy and beyond has started today from

222
00:08:59,350 --> 00:08:58,480
the international space station

223
00:09:01,910 --> 00:08:59,360
okay

224
00:09:03,910 --> 00:09:01,920
and certainly nasa takes great pride in

225
00:09:05,990 --> 00:09:03,920
its partnership with the u.s department

226
00:09:09,030 --> 00:09:06,000
of energy which has sponsored this

227
00:09:09,910 --> 00:09:09,040
international collaboration

228
00:09:12,470 --> 00:09:09,920
it

229
00:09:15,509 --> 00:09:12,480
we cannot say enough how proud we are in

230
00:09:16,550 --> 00:09:15,519
nasa to have a world-class science

231
00:09:18,710 --> 00:09:16,560
facility

232
00:09:20,829 --> 00:09:18,720
like this on the space station

233
00:09:23,750 --> 00:09:20,839
for 10 or more

234
00:09:24,949 --> 00:09:23,760
years certainly it was a challenge for

235
00:09:28,230 --> 00:09:24,959
nasa

236
00:09:31,670 --> 00:09:28,240
to fly this on the space shuttle and

237
00:09:37,509 --> 00:09:34,870
nasa had a very very fine

238
00:09:38,949 --> 00:09:37,519

project team here at the johnson space

239
00:09:42,389 --> 00:09:38,959
center

240
00:09:44,870 --> 00:09:42,399
led by trent martin my project manager

241
00:09:46,630 --> 00:09:44,880
and ken bolwig my deputy project manager

242
00:09:47,670 --> 00:09:46,640
who are among the best engineers in the

243
00:09:50,150 --> 00:09:47,680
agency

244
00:09:51,910 --> 00:09:50,160
okay and through their efforts and the

245
00:09:53,829 --> 00:09:51,920
efforts of many other good people here

246
00:09:55,910 --> 00:09:53,839
at the johnson space center and at the

247
00:09:59,910 --> 00:09:55,920
kennedy space center okay we were able

248
00:10:02,230 --> 00:09:59,920
to achieve what we did today okay

249
00:10:03,750 --> 00:10:02,240
and i think that's all i want to say

250
00:10:05,269 --> 00:10:03,760
okay thank you gentlemen we'll start

251
00:10:10,949 --> 00:10:05,279
with questions here at the johnson space

252
00:10:16,470 --> 00:10:13,990
seth bernstein associated press uh first

253
00:10:18,550 --> 00:10:16,480
i have a two one for dr ting i know it's

254
00:10:21,110 --> 00:10:18,560
early but you and you did get you know a

255
00:10:23,190 --> 00:10:21,120
good amount of results already i assume

256
00:10:24,870 --> 00:10:23,200
none of them are surprising but

257
00:10:27,190 --> 00:10:24,880
are are all the results you're getting

258
00:10:29,670 --> 00:10:27,200
exactly what you would expect or is

259
00:10:33,110 --> 00:10:29,680
there anything already a surprise

260
00:10:34,550 --> 00:10:33,120
in a few seconds or these are first few

261
00:10:35,430 --> 00:10:34,560
minute data

262
00:10:37,670 --> 00:10:35,440
and

263
00:10:41,590 --> 00:10:37,680

if i say there's something surprised

264
00:10:45,590 --> 00:10:43,430
and we are going to

265
00:10:48,790 --> 00:10:45,600
do this very carefully

266
00:10:50,150 --> 00:10:48,800
very systematically

267
00:10:53,670 --> 00:10:50,160
because no

268
00:10:56,870 --> 00:10:53,680
as i mentioned to you last time

269
00:10:58,710 --> 00:10:56,880
in the next 30 to 40 years i think it

270
00:11:00,790 --> 00:10:58,720
would be very difficult

271
00:11:03,190 --> 00:11:00,800
for anyone to make

272
00:11:05,910 --> 00:11:03,200
a spectrometer of this precision to

273
00:11:10,389 --> 00:11:05,920
space and therefore it is extremely

274
00:11:13,750 --> 00:11:10,399
important for my collaborators and i

275
00:11:16,470 --> 00:11:13,760
do things correctly

276
00:11:18,790 --> 00:11:16,480
and thank you and for derrick um just

277
00:11:20,630 --> 00:11:18,800
looking ahead to the eva today

278
00:11:23,030 --> 00:11:20,640
uh you could look at it and say it's a

279
00:11:25,110 --> 00:11:23,040
very sort of routine eva

280
00:11:26,630 --> 00:11:25,120
which are your um i know we went through

281
00:11:29,030 --> 00:11:26,640
this a while back but you go through

282
00:11:30,949 --> 00:11:29,040
what your prior which of the sort of

283
00:11:32,630 --> 00:11:30,959
routine tasks are the most priorities

284
00:11:35,269 --> 00:11:32,640
and which one are you more concerned

285
00:11:37,190 --> 00:11:35,279
about in terms of uh

286
00:11:39,910 --> 00:11:37,200
the ability to get done or most worried

287
00:11:41,590 --> 00:11:39,920
that it can get done right

288
00:11:43,110 --> 00:11:41,600

yeah as you know

289
00:11:45,269 --> 00:11:43,120
you know after all these years of

290
00:11:47,190 --> 00:11:45,279
success we tend to make these things

291
00:11:49,509 --> 00:11:47,200
look routine and feel routine but but

292
00:11:51,750 --> 00:11:49,519
they never are um of course any time you

293
00:11:53,430 --> 00:11:51,760
put put the crew in a spacesuit and send

294
00:11:54,550 --> 00:11:53,440
them outside there's there's risk

295
00:11:55,990 --> 00:11:54,560
involved but

296
00:11:57,509 --> 00:11:56,000
we understand how to do that and we do

297
00:12:00,550 --> 00:11:57,519
it well and we manage the risk

298
00:12:02,790 --> 00:12:00,560
appropriately but uh eba one

299
00:12:05,190 --> 00:12:02,800
the the first thing that we get to right

300
00:12:06,710 --> 00:12:05,200
out the door are the dod missi payloads

301
00:12:09,110 --> 00:12:06,720
which are going to be installed

302
00:12:11,350 --> 00:12:09,120
externally on the space station truss

303
00:12:13,030 --> 00:12:11,360
where we are retrieving a missy that was

304
00:12:14,310 --> 00:12:13,040
flown previously and it's reached the

305
00:12:16,069 --> 00:12:14,320
end of its life and it's going to be

306
00:12:18,150 --> 00:12:16,079
brought down to be studied and we're

307
00:12:21,509 --> 00:12:18,160
deploying two additional misses in

308
00:12:22,710 --> 00:12:21,519
addition to that work uh we are setting

309
00:12:25,269 --> 00:12:22,720
up for

310
00:12:27,190 --> 00:12:25,279
a top off or a refill if you will of one

311
00:12:28,389 --> 00:12:27,200
of the cooling loops on the outside of

312
00:12:29,910 --> 00:12:28,399
the space station where the ammonia

313
00:12:31,509 --> 00:12:29,920

cooling loops

314
00:12:34,069 --> 00:12:31,519
so

315
00:12:35,269 --> 00:12:34,079
you know i won't say it's easy but all

316
00:12:37,430 --> 00:12:35,279
the tasks

317
00:12:39,269 --> 00:12:37,440
are relatively straightforward

318
00:12:41,030 --> 00:12:39,279
and although i worry about everything

319
00:12:42,550 --> 00:12:41,040
there's nothing in particular on eva

320
00:12:44,389 --> 00:12:42,560
eba1

321
00:12:47,350 --> 00:12:44,399
that i'm more worried about than the

322
00:12:50,629 --> 00:12:47,360
others it we did talk before but on eba

323
00:12:52,949 --> 00:12:50,639
2 as the follow-on to the ammonia refill

324
00:12:54,470 --> 00:12:52,959
task we actually actuate quick

325
00:12:56,310 --> 00:12:54,480
disconnects that

326
00:12:57,590 --> 00:12:56,320
on lines that have ammonia pressurized

327
00:12:59,350 --> 00:12:57,600
ammonia and these are the quick

328
00:13:01,509 --> 00:12:59,360
disconnects that we've had challenges

329
00:13:03,430 --> 00:13:01,519
with in the past we've had

330
00:13:05,190 --> 00:13:03,440
issues with them leaking and sticking

331
00:13:06,550 --> 00:13:05,200
and that sort of thing so you know

332
00:13:08,389 --> 00:13:06,560
looking ahead at all the evas i would

333
00:13:10,069 --> 00:13:08,399
say that that would be the area of most

334
00:13:14,870 --> 00:13:10,079
concern would be the work with those

335
00:13:19,910 --> 00:13:17,110
clara moscowitz with space.com and uh

336
00:13:21,990 --> 00:13:19,920
two questions for dr ting first the two

337
00:13:23,750 --> 00:13:22,000
particles that you mentioned today are

338
00:13:25,590 --> 00:13:23,760

those particles that

339
00:13:27,350 --> 00:13:25,600
instruments on the earth can see or are

340
00:13:30,790 --> 00:13:27,360
they only visible in space above the

341
00:13:32,629 --> 00:13:30,800
atmosphere by an instrument like ams

342
00:13:35,509 --> 00:13:32,639
on earth

343
00:13:38,870 --> 00:13:35,519
you can produce these particles in

344
00:13:41,829 --> 00:13:38,880
accelerators in man-made accelerators

345
00:13:43,189 --> 00:13:41,839
but on earth you are not able to measure

346
00:13:45,990 --> 00:13:43,199
this particle

347
00:13:49,509 --> 00:13:46,000
from space because they will be absorbed

348
00:13:53,509 --> 00:13:49,519
by earth's atmosphere so to see the

349
00:13:54,470 --> 00:13:53,519
the cosmic rays of this energy

350
00:13:58,150 --> 00:13:54,480
and

351
00:14:00,629 --> 00:13:58,160
this mass you really have to go to space

352
00:14:02,629 --> 00:14:00,639
and my second question is if there was

353
00:14:04,710 --> 00:14:02,639
no international space station could

354
00:14:07,750 --> 00:14:04,720
there be an ams in other words could the

355
00:14:09,750 --> 00:14:07,760
ams exist free-floating in space

356
00:14:12,069 --> 00:14:09,760
as you know

357
00:14:14,949 --> 00:14:12,079
in 2005

358
00:14:16,949 --> 00:14:14,959
we were removed from the manifest

359
00:14:19,110 --> 00:14:16,959
so we have looked

360
00:14:20,710 --> 00:14:19,120
very carefully

361
00:14:22,629 --> 00:14:20,720
whether there is a

362
00:14:23,670 --> 00:14:22,639
way we can

363
00:14:25,509 --> 00:14:23,680

fly

364
00:14:27,350 --> 00:14:25,519
to put ms

365
00:14:31,030 --> 00:14:27,360
in space

366
00:14:32,790 --> 00:14:31,040
but because of the size the precision

367
00:14:34,470 --> 00:14:32,800
and the power

368
00:14:37,430 --> 00:14:34,480
required

369
00:14:41,590 --> 00:14:37,440
and also the rate of data coming down

370
00:14:44,790 --> 00:14:41,600
it's simply not possible

371
00:14:46,870 --> 00:14:44,800
to do it with a rocket

372
00:14:47,910 --> 00:14:46,880
unless you put the billions billions and

373
00:14:51,350 --> 00:14:47,920
billions

374
00:14:53,110 --> 00:14:51,360
you need a 2500 watts of power and you

375
00:14:54,949 --> 00:14:53,120
need a high rate data transpo

376
00:14:56,949 --> 00:14:54,959
transmission

377
00:15:00,870 --> 00:14:56,959
you need a large

378
00:15:02,150 --> 00:15:00,880
platform space station is the ideal

379
00:15:13,670 --> 00:15:02,160
place

380
00:15:18,870 --> 00:15:15,990
oh thank you mark caro for aviation week

381
00:15:20,470 --> 00:15:18,880
i had a couple questions

382
00:15:22,870 --> 00:15:20,480
kind of housekeeping questions really

383
00:15:25,030 --> 00:15:22,880
but how soon after

384
00:15:27,590 --> 00:15:25,040
ams was anchored to the space station

385
00:15:28,870 --> 00:15:27,600
did you start to see this

386
00:15:31,829 --> 00:15:28,880
flow of

387
00:15:35,509 --> 00:15:31,839
particles through the detector

388
00:15:39,670 --> 00:15:38,230

checked there's no leak rate

389
00:15:42,550 --> 00:15:39,680
nothing leaked

390
00:15:43,910 --> 00:15:42,560
i think waiting hours a couple hours two

391
00:15:44,870 --> 00:15:43,920
or three hours

392
00:15:47,910 --> 00:15:44,880
thank you

393
00:15:49,350 --> 00:15:47,920
another housekeeping question if you can

394
00:15:51,990 --> 00:15:49,360
address this

395
00:15:54,790 --> 00:15:52,000
what what's the size of your ams cadre

396
00:16:00,629 --> 00:15:54,800
in houston and how soon will you migrate

397
00:16:05,430 --> 00:16:03,269
we have collaborators

398
00:16:06,310 --> 00:16:05,440
total

399
00:16:07,590 --> 00:16:06,320
in

400
00:16:09,829 --> 00:16:07,600
houston

401
00:16:10,550 --> 00:16:09,839
about 60 people

402
00:16:14,069 --> 00:16:10,560
and

403
00:16:17,189 --> 00:16:14,079
we will not migrate to cern will return

404
00:16:22,150 --> 00:16:20,150
return to europe i should say

405
00:16:23,189 --> 00:16:22,160
and when would you anticipate that would

406
00:16:25,670 --> 00:16:23,199
be

407
00:16:31,269 --> 00:16:27,670
our building

408
00:16:36,550 --> 00:16:34,629
will be finished by june 15th

409
00:16:38,870 --> 00:16:36,560
and

410
00:16:39,910 --> 00:16:38,880
because

411
00:16:42,710 --> 00:16:39,920
we

412
00:16:46,949 --> 00:16:42,720
there was a shuttle delay

413
00:16:48,230 --> 00:16:46,959

originally it was the 29th then may 16th

414
00:16:52,389 --> 00:16:48,240
we hope

415
00:16:58,870 --> 00:16:55,749
as early as possible

416
00:17:02,949 --> 00:16:58,880
even though we're aiming at june 15th

417
00:17:05,429 --> 00:17:02,959
and i think by end of june we'll be gone

418
00:17:08,789 --> 00:17:05,439
thank you sir yeah what we want to do is

419
00:17:11,110 --> 00:17:08,799
we when we leave we have a good working

420
00:17:17,510 --> 00:17:11,120
relationship with johnson space center

421
00:17:17,520 --> 00:17:21,829
any more questions here

422
00:17:24,949 --> 00:17:24,150
seth bornstein again one more for dr

423
00:17:26,949 --> 00:17:24,959
ting

424
00:17:28,549 --> 00:17:26,959
uh since we're approaching the last

425
00:17:30,630 --> 00:17:28,559
shuttle flight after this

426
00:17:32,630 --> 00:17:30,640
a lot has been talked about of you know

427
00:17:34,070 --> 00:17:32,640
sort of the legacy of the shuttle and

428
00:17:35,669 --> 00:17:34,080
many people say the legacy of the

429
00:17:37,590 --> 00:17:35,679
shuttle is not so much the shuttle

430
00:17:39,430 --> 00:17:37,600
itself but things like hubble and they

431
00:17:41,350 --> 00:17:39,440
hope ams ii

432
00:17:42,950 --> 00:17:41,360
um and since you said space station's

433
00:17:44,390 --> 00:17:42,960
the only place you could have put this

434
00:17:45,750 --> 00:17:44,400
and i assume shuttle is the only way you

435
00:17:47,029 --> 00:17:45,760
could have gotten

436
00:17:49,190 --> 00:17:47,039
you couldn't have used any of the other

437
00:17:51,029 --> 00:17:49,200
transportation methods

438
00:17:53,110 --> 00:17:51,039

i was wondering if you might tell me a

439
00:17:54,710 --> 00:17:53,120
bit about how important the shuttle

440
00:17:56,549 --> 00:17:54,720
program is for you especially since

441
00:17:59,830 --> 00:17:56,559
you've been one of the few who's been on

442
00:18:02,150 --> 00:17:59,840
it kicked off of it and back on

443
00:18:03,750 --> 00:18:02,160
sort of the importance of the legacy of

444
00:18:06,950 --> 00:18:03,760
the shuttle to you

445
00:18:09,510 --> 00:18:06,960
without a shuttle

446
00:18:10,870 --> 00:18:09,520
i think you would not be

447
00:18:12,630 --> 00:18:10,880
possible

448
00:18:13,830 --> 00:18:12,640
to do an

449
00:18:17,110 --> 00:18:13,840
experiment

450
00:18:22,630 --> 00:18:20,870
and for a duration of 20 years

451
00:18:25,350 --> 00:18:22,640
and collect

452
00:18:29,510 --> 00:18:25,360
terabytes of data

453
00:18:31,909 --> 00:18:29,520
micro energies to trilling electron vote

454
00:18:34,310 --> 00:18:31,919
you send it simply at least i would not

455
00:18:39,750 --> 00:18:34,320
know how to do it and i think my

456
00:18:43,110 --> 00:18:41,669
thank you we'll take questions from the

457
00:18:44,070 --> 00:18:43,120
phone bridge now we have marcia done

458
00:18:47,110 --> 00:18:44,080
please

459
00:18:50,310 --> 00:18:47,120
yes hi can you hear me yes we can yes dr

460
00:18:53,270 --> 00:18:50,320
king i'm wondering how soon after the

461
00:18:55,270 --> 00:18:53,280
installation of the spectrometer

462
00:18:57,110 --> 00:18:55,280
or the detector is all turned on was

463
00:19:02,870 --> 00:18:57,120

that in a matter of minutes or

464
00:19:10,630 --> 00:19:07,190
when we were plugged in or connected

465
00:19:13,830 --> 00:19:10,640
electrically with the space station and

466
00:19:15,190 --> 00:19:13,840
then waiting an hour

467
00:19:16,870 --> 00:19:15,200
we were

468
00:19:18,870 --> 00:19:16,880
checking all the things

469
00:19:20,070 --> 00:19:18,880
and so within hours we were collecting

470
00:19:22,710 --> 00:19:20,080
data

471
00:19:25,669 --> 00:19:22,720
and so it's early in the morning

472
00:19:28,150 --> 00:19:25,679
i was slightly sleepy so

473
00:19:32,310 --> 00:19:28,160
so i couldn't tell you it's

474
00:19:36,150 --> 00:19:34,150
but it was very quick well we had no

475
00:19:37,669 --> 00:19:36,160
problem whatsoever

476
00:19:39,909 --> 00:19:37,679
thank you and did i understand you to

477
00:19:42,150 --> 00:19:39,919
say earlier that already you have

478
00:19:45,029 --> 00:19:42,160
registered thousands of particles

479
00:19:46,870 --> 00:19:45,039
passing through your device we have more

480
00:19:48,549 --> 00:19:46,880
thousands and thousands of second

481
00:19:51,830 --> 00:19:48,559
signatures already

482
00:19:55,510 --> 00:19:51,840
thank you that's all thank you very much

483
00:19:58,150 --> 00:19:55,520
okay next on the line is irene claus

484
00:20:02,549 --> 00:19:58,160
i am screaming with reuters can hear me

485
00:20:02,559 --> 00:20:06,950
irene are you still there

486
00:20:11,190 --> 00:20:09,190
yes can you hear me okay yes

487
00:20:12,549 --> 00:20:11,200
hi thanks very much um i have a couple

488
00:20:14,710 --> 00:20:12,559

questions um

489
00:20:17,510 --> 00:20:14,720
for uh mr sistely is there still going

490
00:20:20,710 --> 00:20:17,520
to be nasa budget for ams support is

491
00:20:25,669 --> 00:20:20,720
there anything that nasa needs to pay

492
00:20:30,549 --> 00:20:28,230
the major part of the ams budget we

493
00:20:31,830 --> 00:20:30,559
clearly spent getting ready for this

494
00:20:34,390 --> 00:20:31,840
launch

495
00:20:35,830 --> 00:20:34,400
we have a much much smaller budget plan

496
00:20:38,549 --> 00:20:35,840
for the

497
00:20:42,470 --> 00:20:38,559
the post launch time period to provide

498
00:20:47,510 --> 00:20:42,480
operational support to professors teams

499
00:20:49,669 --> 00:20:47,520
team here in houston as well as at cern

500
00:20:51,909 --> 00:20:49,679
but it's considerably smaller than what

501
00:20:54,149 --> 00:20:51,919
we've been spending today we spent to

502
00:20:57,669 --> 00:20:54,159
date

503
00:21:00,070 --> 00:20:57,679
since 1999 about 85 million dollars on

504
00:21:01,590 --> 00:21:00,080
ams unique costs as far as integrating

505
00:21:03,110 --> 00:21:01,600
on the shuttle and the space station

506
00:21:07,270 --> 00:21:03,120
leading up to the day

507
00:21:09,029 --> 00:21:07,280
uh beyond this day our costs uh through

508
00:21:10,710 --> 00:21:09,039
the next several years will probably be

509
00:21:13,669 --> 00:21:10,720
on the orbit perhaps another 10 million

510
00:21:15,750 --> 00:21:13,679
dollars so it's much much smaller

511
00:21:17,990 --> 00:21:15,760
thanks very much and uh for professor

512
00:21:21,430 --> 00:21:18,000
ting i'm sorry if i missed this but is

513
00:21:23,430 --> 00:21:21,440

there also a calibration period that ams

514
00:21:26,230 --> 00:21:23,440
will need to go through before you would

515
00:21:29,669 --> 00:21:26,240
say that it's in its uh kind of full

516
00:21:29,679 --> 00:21:32,390
so far

517
00:21:37,029 --> 00:21:34,470
the data we have seen

518
00:21:40,149 --> 00:21:37,039
is based on the calibration we have done

519
00:21:41,990 --> 00:21:40,159
underground it shows all the detectors

520
00:21:45,190 --> 00:21:42,000
of function

521
00:21:47,350 --> 00:21:45,200
we have built in alignment system

522
00:21:48,669 --> 00:21:47,360
and built in calibration we were

523
00:21:51,190 --> 00:21:48,679
constantly

524
00:21:54,070 --> 00:21:51,200
self-calibrating the detector all the

525
00:21:57,909 --> 00:21:56,230
okay thank you and um

526
00:22:00,310 --> 00:21:57,919
could you maybe just describe a little

527
00:22:02,630 --> 00:22:00,320
bit about what happens with the ams data

528
00:22:04,149 --> 00:22:02,640
where does it go once it's relayed like

529
00:22:07,190 --> 00:22:04,159
through the tdrs satellite and through

530
00:22:08,789 --> 00:22:07,200
the nasa system um is it going to

531
00:22:11,430 --> 00:22:08,799
like individual

532
00:22:14,789 --> 00:22:11,440
science team member institutions or does

533
00:22:20,070 --> 00:22:14,799
everything go first to cern and

534
00:22:26,390 --> 00:22:23,190
the data will come to marshall

535
00:22:29,750 --> 00:22:26,400
and then

536
00:22:31,110 --> 00:22:29,760
now comes to johnson space center after

537
00:22:32,870 --> 00:22:31,120
end of june

538
00:22:35,110 --> 00:22:32,880

you will go to cern

539
00:22:41,029 --> 00:22:35,120
and from cern you will go to

540
00:22:44,950 --> 00:22:43,029
for analysis

541
00:22:47,350 --> 00:22:44,960
thanks and my last question for you is

542
00:22:51,669 --> 00:22:47,360
the um this has been quite a roller

543
00:22:53,590 --> 00:22:51,679
coaster ride since uh ams 01 was

544
00:22:54,789 --> 00:22:53,600
first unveiled and

545
00:22:56,789 --> 00:22:54,799
if you could maybe just talk a little

546
00:22:58,789 --> 00:22:56,799
bit about what sort of if you had a

547
00:23:01,590 --> 00:22:58,799
sense of relief to see it

548
00:23:02,390 --> 00:23:01,600
up um finally up on station uh was it

549
00:23:03,669 --> 00:23:02,400
worth

550
00:23:06,470 --> 00:23:03,679
all the uh

551
00:23:08,310 --> 00:23:06,480
the the the headaches and the uh what it

552
00:23:10,870 --> 00:23:08,320
took for you to keep this team together

553
00:23:16,070 --> 00:23:10,880
form the team keep it together and and

554
00:23:16,080 --> 00:23:19,510
i don't have headaches

555
00:23:23,350 --> 00:23:21,669
but unfortunately my wife sometimes has

556
00:23:26,230 --> 00:23:23,360
headaches

557
00:23:26,240 --> 00:23:29,990
what is worth it or not

558
00:23:35,590 --> 00:23:31,590
it's hard to say

559
00:23:37,909 --> 00:23:35,600
all i can say is we enter into a region

560
00:23:40,870 --> 00:23:37,919
nobody has entered before

561
00:23:42,549 --> 00:23:40,880
what we're going to see nobody knows so

562
00:23:43,750 --> 00:23:42,559
we

563
00:23:45,430 --> 00:23:43,760

explore

564
00:23:47,110 --> 00:23:45,440
unknown region

565
00:23:49,590 --> 00:23:47,120
so whatever we see

566
00:23:51,190 --> 00:23:49,600
because of the position because of the

567
00:23:53,909 --> 00:23:51,200
energy will reach

568
00:23:56,470 --> 00:23:53,919
a certain will contribute

569
00:24:01,750 --> 00:23:56,480
to understand to a better understanding

570
00:24:07,669 --> 00:24:05,830
next on the line is james dean

571
00:24:08,950 --> 00:24:07,679
thank you this is james dean from

572
00:24:10,870 --> 00:24:08,960
florida today

573
00:24:13,350 --> 00:24:10,880
uh with a question for for derek and a

574
00:24:14,870 --> 00:24:13,360
couple for dr tang um

575
00:24:17,430 --> 00:24:14,880
derek i just wonder if you might have

576
00:24:19,430 --> 00:24:17,440
any updates on the status of the tps

577
00:24:22,230 --> 00:24:19,440
analysis

578
00:24:25,190 --> 00:24:22,240
uh i do not my focus over the last 10 or

579
00:24:27,350 --> 00:24:25,200
12 hours has been flight day 4 and ams

580
00:24:29,110 --> 00:24:27,360
installing the events that that followed

581
00:24:30,470 --> 00:24:29,120
that in the timeline

582
00:24:32,630 --> 00:24:30,480
i believe you have a briefing later

583
00:24:34,630 --> 00:24:32,640
today from leroy kane and i expect that

584
00:24:36,870 --> 00:24:34,640
he'll have the the latest on the tps

585
00:24:39,350 --> 00:24:36,880
analysis

586
00:24:40,870 --> 00:24:39,360
okay thanks uh dr ting

587
00:24:42,310 --> 00:24:40,880
uh mentioned to the

588
00:24:45,110 --> 00:24:42,320

the crew in your remarks that this had

589
00:24:46,950 --> 00:24:45,120
been a difficult experiment

590
00:24:48,549 --> 00:24:46,960
why has it been so difficult and what

591
00:24:50,470 --> 00:24:48,559
what has been the most difficult part

592
00:24:53,350 --> 00:24:50,480
has it been the technology or the

593
00:24:56,070 --> 00:24:53,360
political aspect of it

594
00:25:01,590 --> 00:24:56,080
uh it's hard to compare

595
00:25:06,070 --> 00:25:03,029
certainly

596
00:25:08,549 --> 00:25:06,080
we have tried the best

597
00:25:10,310 --> 00:25:08,559
to build the most

598
00:25:13,190 --> 00:25:10,320
precise detector

599
00:25:17,269 --> 00:25:13,200
we can accomplish

600
00:25:19,430 --> 00:25:17,279
and the translation radiation detector

601
00:25:23,830 --> 00:25:19,440
that was built under

602
00:25:28,630 --> 00:25:26,710
we have done in such a way

603
00:25:30,149 --> 00:25:28,640
the leak rate

604
00:25:33,110 --> 00:25:30,159
is five

605
00:25:34,710 --> 00:25:33,120
micrograms per second

606
00:25:37,269 --> 00:25:34,720
and the

607
00:25:40,310 --> 00:25:37,279
they're two meters long tubes

608
00:25:42,710 --> 00:25:40,320
and filled with xenon and co2 co2 of

609
00:25:45,590 --> 00:25:42,720
course it's extremely difficult to

610
00:25:47,669 --> 00:25:45,600
contain that's why coca-cola never lasts

611
00:25:48,390 --> 00:25:47,679
for a long time

612
00:25:51,110 --> 00:25:48,400
but

613
00:25:53,510 --> 00:25:51,120

the people in aachen

614
00:25:55,269 --> 00:25:53,520
was able to were able to build this

615
00:25:59,590 --> 00:25:55,279
detector

616
00:26:03,269 --> 00:25:59,600
would

617
00:26:06,630 --> 00:26:03,279
stay active for 30 years

618
00:26:08,710 --> 00:26:06,640
and the detector built in bologna and

619
00:26:11,590 --> 00:26:08,720
the professor canteen

620
00:26:12,710 --> 00:26:11,600
with multi redundancy and measure the

621
00:26:14,789 --> 00:26:12,720
time

622
00:26:16,390 --> 00:26:14,799
to 160

623
00:26:18,789 --> 00:26:16,400
picoseconds

624
00:26:20,549 --> 00:26:18,799
and they saw really

625
00:26:23,110 --> 00:26:20,559
what we try to do is

626
00:26:25,029 --> 00:26:23,120
to the limit of

627
00:26:27,590 --> 00:26:25,039
of abilities people

628
00:26:31,190 --> 00:26:27,600
normally do in accelerators

629
00:26:34,470 --> 00:26:31,200
we try to keep that position but do it

630
00:26:38,710 --> 00:26:37,029
and i i just wanted to ask i'm afraid i

631
00:26:40,710 --> 00:26:38,720
might be mischaracterizing something you

632
00:26:42,390 --> 00:26:40,720
said earlier but you described how i

633
00:26:43,669 --> 00:26:42,400
believe he said that um

634
00:26:46,149 --> 00:26:43,679
trying to find

635
00:26:47,830 --> 00:26:46,159
antimatter would be like

636
00:26:50,310 --> 00:26:47,840
picking a single

637
00:26:52,549 --> 00:26:50,320
drop out of a rainstorm

638
00:26:57,190 --> 00:26:52,559

a single drop of a different color

639
00:27:01,110 --> 00:26:58,950
the process of

640
00:27:03,430 --> 00:27:01,120
facing you for finding the the most

641
00:27:05,590 --> 00:27:03,440
difficult things dark matter antimatter

642
00:27:09,590 --> 00:27:05,600
is it a one in billion sort of chance of

643
00:27:10,470 --> 00:27:09,600
finding those things or is that um not

644
00:27:11,909 --> 00:27:10,480
really

645
00:27:14,310 --> 00:27:11,919
the right reflection of

646
00:27:15,350 --> 00:27:14,320
youtube it is to find these things

647
00:27:20,070 --> 00:27:15,360
okay

648
00:27:24,070 --> 00:27:21,830
one

649
00:27:25,269 --> 00:27:24,080
in a building

650
00:27:26,549 --> 00:27:25,279
means

651
00:27:28,149 --> 00:27:26,559
you have

652
00:27:30,470 --> 00:27:28,159
multi-redundancy

653
00:27:32,630 --> 00:27:30,480
you have self calibration

654
00:27:33,909 --> 00:27:32,640
and the important thing

655
00:27:35,750 --> 00:27:33,919
is

656
00:27:37,909 --> 00:27:35,760
always know

657
00:27:39,990 --> 00:27:37,919
how how you detect

658
00:27:41,830 --> 00:27:40,000
behave

659
00:27:44,149 --> 00:27:41,840
in my youth

660
00:27:45,990 --> 00:27:44,159
i have done two or three

661
00:27:48,470 --> 00:27:46,000
similar experiments

662
00:27:49,909 --> 00:27:48,480
including the one i was awarded the

663
00:27:52,310 --> 00:27:49,919

nobel prize

664
00:27:53,669 --> 00:27:52,320
and that was a really also difficult

665
00:27:55,350 --> 00:27:53,679
experiment

666
00:27:57,510 --> 00:27:55,360
but nothing

667
00:27:59,190 --> 00:27:57,520
compared to the experiment

668
00:28:00,870 --> 00:27:59,200
we're doing now

669
00:28:01,750 --> 00:28:00,880
the difference

670
00:28:04,470 --> 00:28:01,760
is

671
00:28:06,149 --> 00:28:04,480
experimenting accelerators if something

672
00:28:08,630 --> 00:28:06,159
something goes wrong

673
00:28:11,590 --> 00:28:08,640
you can go to fix it or if you don't

674
00:28:15,190 --> 00:28:11,600
want to you can send a student

675
00:28:16,950 --> 00:28:15,200
but in space you can send nobody

676
00:28:21,909 --> 00:28:16,960
and so

677
00:28:24,389 --> 00:28:21,919
this detector ams has many redundancies

678
00:28:28,070 --> 00:28:24,399
and mainly self-checking

679
00:28:30,549 --> 00:28:28,080
to make sure everything behave properly

680
00:28:38,870 --> 00:28:30,559
to keep it for 20 years

681
00:28:44,549 --> 00:28:42,149
okay next on the line is bill harwood

682
00:28:46,870 --> 00:28:44,559
yes thanks i've got uh one for professor

683
00:28:48,710 --> 00:28:46,880
ting if i could um you know the one

684
00:28:50,470 --> 00:28:48,720
question i get asked professor

685
00:28:52,630 --> 00:28:50,480
frequently about ams aside from the

686
00:28:55,029 --> 00:28:52,640
science is is what makes something like

687
00:28:57,029 --> 00:28:55,039
this cost as much as it did and i

688
00:28:59,110 --> 00:28:57,039

realized that you could talk for days

689
00:29:01,029 --> 00:28:59,120
about how that breakdown works but is

690
00:29:03,830 --> 00:29:01,039
there some way to to tell the average

691
00:29:06,310 --> 00:29:03,840
reader why a machine like this cost two

692
00:29:09,110 --> 00:29:06,320
billion dollars to build to test to get

693
00:29:10,070 --> 00:29:09,120
up into space thanks

694
00:29:13,190 --> 00:29:10,080
why

695
00:29:16,070 --> 00:29:13,200
i do not know

696
00:29:19,029 --> 00:29:16,080
the calculation of cost in a large

697
00:29:21,430 --> 00:29:19,039
international collaboration

698
00:29:24,070 --> 00:29:21,440
spending across the globe

699
00:29:26,230 --> 00:29:24,080
is not exactly easy

700
00:29:28,950 --> 00:29:26,240
we have

701
00:29:31,669 --> 00:29:28,960
people from the far east

702
00:29:34,310 --> 00:29:31,679
and people in europe

703
00:29:36,789 --> 00:29:34,320
people in mexico

704
00:29:40,950 --> 00:29:36,799
people in united states

705
00:29:43,590 --> 00:29:40,960
the labor costs are not exactly the same

706
00:29:47,909 --> 00:29:43,600
or different countries

707
00:29:51,029 --> 00:29:47,919
and so to estimate this

708
00:29:51,909 --> 00:29:51,039
is way beyond my ability

709
00:29:57,029 --> 00:29:51,919
and

710
00:30:02,789 --> 00:29:58,549
nasa

711
00:30:05,190 --> 00:30:02,799
made an estimate based on the available

712
00:30:06,710 --> 00:30:05,200
people and the laboratory we have the

713
00:30:11,110 --> 00:30:06,720

specular build

714
00:30:12,230 --> 00:30:11,120
and the test equipment we have to build

715
00:30:14,549 --> 00:30:12,240
the

716
00:30:18,149 --> 00:30:14,559
new buildings we have to build

717
00:30:21,510 --> 00:30:18,159
material we have bought and how many

718
00:30:24,389 --> 00:30:21,520
professors how many students how many

719
00:30:27,110 --> 00:30:24,399
technicians add them up

720
00:30:28,710 --> 00:30:27,120
in nasa's way of counting and this is

721
00:30:33,269 --> 00:30:28,720
how we gradually

722
00:30:37,029 --> 00:30:35,590
thanks and if i could ask one more um

723
00:30:38,870 --> 00:30:37,039
you've mentioned frequently whenever you

724
00:30:40,630 --> 00:30:38,880
talk about ams that

725
00:30:42,230 --> 00:30:40,640
that no physicist worth of salt will

726
00:30:43,909 --> 00:30:42,240
make a prediction about what something

727
00:30:45,510 --> 00:30:43,919
might find then you've always stressed

728
00:30:48,549 --> 00:30:45,520
that it's the unknown

729
00:30:50,389 --> 00:30:48,559
uh that you're really looking forward to

730
00:30:52,470 --> 00:30:50,399
can can you elaborate just a little bit

731
00:30:53,830 --> 00:30:52,480
on on the unknowns i know you don't know

732
00:30:56,230 --> 00:30:53,840
what you're going to see but i mean the

733
00:30:58,230 --> 00:30:56,240
excitement of going after something that

734
00:30:59,830 --> 00:30:58,240
no one's ever looked at before

735
00:31:02,710 --> 00:30:59,840
with an instrument of the precision that

736
00:31:05,029 --> 00:31:02,720
you guys have built

737
00:31:06,710 --> 00:31:05,039
just your general mood going into this

738
00:31:08,950 --> 00:31:06,720

because of of the chance to see

739
00:31:09,830 --> 00:31:08,960
something new thank you

740
00:31:13,190 --> 00:31:09,840
well

741
00:31:17,590 --> 00:31:13,200
it's really rather difficult for me to

742
00:31:22,630 --> 00:31:19,909
i only want to mention

743
00:31:26,549 --> 00:31:22,640
if you look the history of accelerators

744
00:31:28,230 --> 00:31:26,559
in united states and europe

745
00:31:30,310 --> 00:31:28,240
home

746
00:31:31,669 --> 00:31:30,320
in the 60s the highest energy

747
00:31:33,750 --> 00:31:31,679
accelerator

748
00:31:36,630 --> 00:31:33,760
were built at cern

749
00:31:39,590 --> 00:31:36,640
and built at brookhaven

750
00:31:41,269 --> 00:31:39,600
and their original purpose was to study

751
00:31:43,509 --> 00:31:41,279
nuclear force

752
00:31:46,630 --> 00:31:43,519
and what was discovered

753
00:31:48,630 --> 00:31:46,640
was a new type of quarks breakdown

754
00:31:53,190 --> 00:31:48,640
fundamental symmetry

755
00:31:59,190 --> 00:31:56,230
in that in the 60s in the

756
00:32:01,669 --> 00:31:59,200
in the 70s a very large accelerator was

757
00:32:02,870 --> 00:32:01,679
built in united states in fermi national

758
00:32:05,350 --> 00:32:02,880
laboratory

759
00:32:07,669 --> 00:32:05,360
the original purpose was to study

760
00:32:10,950 --> 00:32:07,679
something called neutrino physics

761
00:32:12,230 --> 00:32:10,960
what was discovered was the fifth

762
00:32:16,630 --> 00:32:12,240
and sixth

763
00:32:19,509 --> 00:32:16,640

type of quarks in stanford

764
00:32:23,029 --> 00:32:19,519
in 1970s

765
00:32:25,269 --> 00:32:23,039
united states built a very very powerful

766
00:32:26,710 --> 00:32:25,279
electron position

767
00:32:29,509 --> 00:32:26,720
collider

768
00:32:31,509 --> 00:32:29,519
the original purpose was to study

769
00:32:33,909 --> 00:32:31,519
the quantum

770
00:32:36,950 --> 00:32:33,919
property of electricity what was

771
00:32:38,710 --> 00:32:36,960
discovered was the fourth core the third

772
00:32:45,029 --> 00:32:38,720
type of

773
00:32:46,549 --> 00:32:45,039
and particles inside the protons

774
00:32:48,470 --> 00:32:46,559
so when you

775
00:32:51,669 --> 00:32:48,480
build something

776
00:32:54,389 --> 00:32:51,679
new you ask the best physicist

777
00:32:56,470 --> 00:32:54,399
to tell you what you can see but the

778
00:32:59,430 --> 00:32:56,480
best physicist

779
00:33:01,750 --> 00:32:59,440
of course base their judgment on

780
00:33:04,870 --> 00:33:01,760
existing knowledge

781
00:33:07,990 --> 00:33:04,880
discovery is something new is

782
00:33:11,590 --> 00:33:08,000
go beyond the existing knowledge

783
00:33:13,590 --> 00:33:11,600
that's why it's difficult to predict

784
00:33:20,149 --> 00:33:13,600
just to

785
00:33:22,710 --> 00:33:20,159
it's really not that interesting

786
00:33:29,509 --> 00:33:22,720
it is go beyond the theory that's how

787
00:33:34,789 --> 00:33:31,269
okay that must be all on the line are

788
00:33:39,909 --> 00:33:37,590

clara moskowitz again for space.com and

789
00:33:42,389 --> 00:33:39,919
this is a question for both of you ams

790
00:33:43,990 --> 00:33:42,399
scientists um and project manager if you

791
00:33:46,310 --> 00:33:44,000
could talk about just this morning your

792
00:33:48,070 --> 00:33:46,320
emotions while the robotic operations

793
00:33:49,909 --> 00:33:48,080
were going on i understand that it was

794
00:33:54,789 --> 00:33:49,919
somewhat complicated and did you have

795
00:33:54,799 --> 00:33:57,909
for me not

796
00:34:04,710 --> 00:34:01,029
about my european collaborators

797
00:34:08,149 --> 00:34:04,720
were up all night watching them

798
00:34:09,829 --> 00:34:08,159
so i had no i have no doubt

799
00:34:11,669 --> 00:34:09,839
they were

800
00:34:16,310 --> 00:34:11,679
they would be successful because i've

801
00:34:21,109 --> 00:34:18,550
well for myself like professor said

802
00:34:22,950 --> 00:34:21,119
earlier we were all very tired but i

803
00:34:24,950 --> 00:34:22,960
think we marvel at the precision that

804
00:34:27,510 --> 00:34:24,960
the way everything went

805
00:34:29,510 --> 00:34:27,520
after all the years of doing engineering

806
00:34:31,909 --> 00:34:29,520
and things going wrong or being tough or

807
00:34:34,389 --> 00:34:31,919
whatever when it finally came time to

808
00:34:37,109 --> 00:34:34,399
install the space station

809
00:34:40,149 --> 00:34:37,119
it just went very very well it really

810
00:34:42,710 --> 00:34:40,159
did as professor ting said a moment ago

811
00:34:44,710 --> 00:34:42,720
when it came time to activate the ams we

812
00:34:46,869 --> 00:34:44,720
were activated within hours

813
00:34:49,349 --> 00:34:46,879

and no major incidents all the detectors

814
00:34:52,710 --> 00:34:49,359
came up uh

815
00:34:57,030 --> 00:34:54,790
being happy about it seeing it's finally

816
00:34:59,109 --> 00:34:57,040
starting to work when we started looking

817
00:35:00,230 --> 00:34:59,119
at these particle tracks a few a few

818
00:35:02,630 --> 00:35:00,240
hours ago

819
00:35:04,550 --> 00:35:02,640
i was very very impressive yeah it's

820
00:35:06,790 --> 00:35:04,560
it's terrific science

821
00:35:09,349 --> 00:35:06,800
and it's it's making it all very much

822
00:35:11,190 --> 00:35:09,359
really worthwhile

823
00:35:13,829 --> 00:35:11,200
let me just add

824
00:35:15,190 --> 00:35:13,839
uh to mrs what mr

825
00:35:17,430 --> 00:35:15,200
steli said

826
00:35:19,510 --> 00:35:17,440
we had no major

827
00:35:26,470 --> 00:35:19,520
issue

828
00:35:31,109 --> 00:35:29,510
okay any other follow-ups

829
00:35:33,109 --> 00:35:31,119
seeing them we'll go ahead and conclude

830
00:35:35,829 --> 00:35:33,119
this briefing with a few uh programming

831
00:35:37,589 --> 00:35:35,839
notes coming up at 2 pm central time

832
00:35:39,270 --> 00:35:37,599
will be the video file which shows the

833
00:35:40,870 --> 00:35:39,280
compilation of newsworthy items from

834
00:35:42,950 --> 00:35:40,880
across the agency

835
00:35:44,550 --> 00:35:42,960
at 3 p.m that briefing that will follow

836
00:35:46,390 --> 00:35:44,560
the mission management team meeting will

837
00:35:48,710 --> 00:35:46,400
air on nasa television

838
00:35:51,109 --> 00:35:48,720

and at 4 pm we'll begin showing the

839
00:35:52,710 --> 00:35:51,119
video highlights from flight day 4. so

840
00:35:54,390 --> 00:35:52,720
with that we'll send it back to michigan

841
00:35:56,829 --> 00:35:54,400
troll as the crew members wrap up their