



1
00:00:06,470 --> 00:00:03,590
hi i'm casey i'm david i'm ivan i'm lisa

2
00:00:08,390 --> 00:00:06,480
i'm jacob i'm michael i'm misty we are

3
00:00:10,310 --> 00:00:08,400
the cargo integration officers on the

4
00:00:35,350 --> 00:00:10,320
final shuttle mission and you're

5
00:00:35,360 --> 00:00:43,990
bones sinking like stones

6
00:00:44,000 --> 00:00:57,270
places we've grown all of

7
00:00:57,280 --> 00:01:16,230
here we us

8
00:01:16,240 --> 00:01:28,710
we've thrown all of us

9
00:01:28,720 --> 00:01:41,510
here we go

10
00:01:47,429 --> 00:01:43,429
good morning atlantis and a special good

11
00:01:51,990 --> 00:01:49,990
good morning houston uh thanks shannon

12
00:01:53,749 --> 00:01:52,000
i'd like to thank my wife karen and my

13
00:01:55,749 --> 00:01:53,759

son jack for the great song may not

14

00:01:57,990 --> 00:01:55,759

really like it and

15

00:01:59,990 --> 00:01:58,000

also like to say hi to my mom and dad

16

00:02:02,149 --> 00:02:00,000

and my brother and his family in upstate

17

00:02:04,310 --> 00:02:02,159

new york

18

00:02:06,230 --> 00:02:04,320

we are uh

19

00:02:08,150 --> 00:02:06,240

getting ready for undock today we get to

20

00:02:11,430 --> 00:02:08,160

do one last lap of the planets around

21

00:02:13,589 --> 00:02:11,440

the iss and then start our trip home

22

00:02:15,830 --> 00:02:13,599

thanks houston

23

00:02:16,790 --> 00:02:15,840

sounds great atlantis have a good fly

24

00:02:19,190 --> 00:02:16,800

around

25

00:02:21,350 --> 00:02:19,200

and while i have you to execute packages

26
00:02:23,830 --> 00:02:21,360
on board and printing your go to change

27
00:02:27,589 --> 00:02:23,840
out both image cards in the kfx machine

28
00:02:32,309 --> 00:02:29,589
capcom shannon lucid there talking with

29
00:02:34,470 --> 00:02:32,319
pilot doug hurley sending up the crew's

30
00:02:37,190 --> 00:02:34,480
wake-up call for the day that came in

31
00:02:39,350 --> 00:02:37,200
the form of don't panic by coldplay and

32
00:02:41,030 --> 00:02:39,360
was song was played for pilot doug

33
00:02:44,790 --> 00:02:41,040
hurley

34
00:02:48,550 --> 00:02:44,800
be behind the wheel of atlantis for

35
00:02:49,990 --> 00:02:48,560
today's undocking first moving into

36
00:02:52,869 --> 00:02:50,000
away from the international space

37
00:02:55,350 --> 00:02:52,879
station and then uh steering it in a

38
00:02:58,149 --> 00:02:55,360

half lap around the station

39

00:03:02,830 --> 00:02:58,159

for the final fly around

40

00:03:07,750 --> 00:03:05,509

shuttle this is mission control houston

41

00:03:09,509 --> 00:03:07,760

10 days 13 hours five minutes into the

42

00:03:11,430 --> 00:03:09,519

flight of atlantis to the international

43

00:03:13,750 --> 00:03:11,440

space station

44

00:03:16,390 --> 00:03:13,760

there is the docking interface at the

45

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

top the black conical

46

00:03:20,710 --> 00:03:18,480

devices pressurized mating adapter

47

00:03:24,070 --> 00:03:20,720

number two the docking port to which

48

00:03:26,470 --> 00:03:24,080

shuttles have docked

49

00:03:28,949 --> 00:03:26,480

for more than a decade now at the bottom

50

00:03:29,910 --> 00:03:28,959

is the orbiter docking system

51

00:03:31,670 --> 00:03:29,920

at the

52

00:03:33,270 --> 00:03:31,680

forward portion of the payload bay right

53

00:03:34,390 --> 00:03:33,280

behind the aft bulkhead or the crew

54

00:03:37,509 --> 00:03:34,400

compartment

55

00:03:40,869 --> 00:03:39,270

hooks and latches will begin to

56

00:03:42,710 --> 00:03:40,879

disengage

57

00:03:44,949 --> 00:03:42,720

just about a minute or two before

58

00:03:47,350 --> 00:03:44,959

physical separation of the two vehicles

59

00:03:49,589 --> 00:03:47,360

which will be induced by springs on both

60

00:03:52,710 --> 00:03:49,599

sides of the docking interface pushing

61

00:03:54,630 --> 00:03:52,720

off against one another to create a

62

00:03:56,470 --> 00:03:54,640

separation rate of about one tenth of a

63

00:03:59,110 --> 00:03:56,480

foot per second

64

00:04:00,949 --> 00:03:59,120

there will be uh two separation burns

65

00:04:03,110 --> 00:04:00,959

that will be

66

00:04:04,630 --> 00:04:03,120

conducted by pilot doug hurley who will

67

00:04:07,589 --> 00:04:04,640

be flying atlantis from the aft to

68

00:04:09,589 --> 00:04:07,599

flight deck basically minor pulses of

69

00:04:12,070 --> 00:04:09,599

the reaction control system jets to

70

00:04:33,270 --> 00:04:12,080

induce a larger opening rate for the

71

00:04:37,189 --> 00:04:34,950

the shuttle atlantis

72

00:04:40,469 --> 00:04:37,199

in the home stretch of its 33rd and

73

00:04:43,110 --> 00:04:40,479

final mission of its 26-year career

74

00:04:45,590 --> 00:04:43,120

a good look at the

75

00:04:46,710 --> 00:04:45,600

the flight deck windows and the nose of

76

00:04:49,590 --> 00:04:46,720

atlantis

77

00:04:51,430 --> 00:04:49,600

that knows the reinforced carbon carbon

78

00:04:54,310 --> 00:04:51,440

on the nose cap of atlantis will be one

79

00:04:56,070 --> 00:04:54,320

of the areas of uh inspection in the

80

00:04:58,550 --> 00:04:56,080

late inspection that will be conducted

81

00:05:00,629 --> 00:04:58,560

after the uh undocking fly around and

82

00:05:01,990 --> 00:05:00,639

final separation activities are are

83

00:05:04,870 --> 00:05:02,000

completed

84

00:05:06,629 --> 00:05:04,880

the crew commander chris ferguson pilot

85

00:05:08,469 --> 00:05:06,639

doug hurley and mission specialist sandy

86

00:05:10,629 --> 00:05:08,479

magnus will be taking turns at the af

87

00:05:13,749 --> 00:05:10,639

flight deck of the orbiter in the final

88

00:05:16,150 --> 00:05:13,759

use of the space shuttle's robotic arm

89

00:05:18,070 --> 00:05:16,160

and the attached orbiter boom sensor

90

00:05:19,590 --> 00:05:18,080

system extension

91

00:05:21,590 --> 00:05:19,600

that will be used to inspect the

92

00:05:23,430 --> 00:05:21,600

starboard wing the leading edge of the

93

00:05:25,990 --> 00:05:23,440

starboard wing and its reinforced carbon

94

00:05:28,310 --> 00:05:26,000

carbon the nose cap of atlantis and then

95

00:05:29,990 --> 00:05:28,320

the port wing of the orbiter before the

96

00:05:32,469 --> 00:05:30,000

boom is birthed for the final time on

97

00:05:35,189 --> 00:05:32,479

the starboard sill of atlantis

98

00:05:38,310 --> 00:05:35,199

just preceding the final birthing of the

99

00:05:41,430 --> 00:05:38,320

space shuttle's robotic arm to complete

100

00:05:49,350 --> 00:05:41,440

30 years of work by that arm in support

101
00:05:53,189 --> 00:05:50,830
physical separation

102
00:05:56,629 --> 00:05:53,199
houston houston

103
00:05:56,639 --> 00:06:04,629
at 1 28 am central time

104
00:06:08,150 --> 00:06:06,150
atlanta's ways anchor from the

105
00:06:11,430 --> 00:06:08,160
international space station for the last

106
00:06:15,350 --> 00:06:13,430
12 and a half years of shuttle missions

107
00:06:19,670 --> 00:06:15,360
to build and service a million pound

108
00:06:26,070 --> 00:06:21,430
rendezvous officer reports a good

109
00:06:35,510 --> 00:06:29,670
atlantis station is in attitude control

110
00:06:39,110 --> 00:06:37,270
through the center line camera in the

111
00:06:41,749 --> 00:06:39,120
orbiter docking system you're looking at

112
00:06:44,070 --> 00:06:41,759
sequential still video of the docking

113
00:06:46,790 --> 00:06:44,080

port pressurized mating adapter number

114

00:06:49,029 --> 00:06:46,800

two that atlantis is backing away from

115

00:06:50,790 --> 00:06:49,039

atlanta is now 30 feet away from the

116

00:07:02,469 --> 00:06:50,800

docking interface with the international

117

00:07:07,189 --> 00:07:04,390

atlantis departing the international

118

00:07:09,189 --> 00:07:07,199

space station for the last time

119

00:07:12,390 --> 00:07:09,199

thank you for your 12 doc missions to

120

00:07:13,909 --> 00:07:12,400

the iss and for capping off 37 space

121

00:07:16,870 --> 00:07:13,919

shuttle missions to construct this

122

00:07:19,589 --> 00:07:16,880

incredible orbiting research facility

123

00:07:21,189 --> 00:07:19,599

we'll miss you guys godspeed soft

124

00:07:23,830 --> 00:07:21,199

landing and we'll see you back on earth

125

00:07:29,909 --> 00:07:27,430

hey thanks uh ron usos lead and to the

126
00:07:32,309 --> 00:07:29,919
station commander andre porosenko we

127
00:07:33,909 --> 00:07:32,319
appreciate your hospitality again

128
00:07:35,670 --> 00:07:33,919
hey when a great uh when a generation

129
00:07:37,430 --> 00:07:35,680
could accomplish is a great thing it's

130
00:07:40,550 --> 00:07:37,440
got a right to stand back and for just a

131
00:07:42,230 --> 00:07:40,560
moment admire and take pride in its work

132
00:07:43,670 --> 00:07:42,240
from our unique vantage point right here

133
00:07:45,110 --> 00:07:43,680
perched above the earth we can see the

134
00:07:47,110 --> 00:07:45,120
international space station is a

135
00:07:48,950 --> 00:07:47,120
wonderful accomplishment it was born at

136
00:07:51,749 --> 00:07:48,960
the end of the cold war it's enabled

137
00:07:54,230 --> 00:07:51,759
many nations to speak one in space

138
00:07:55,670 --> 00:07:54,240

as the iss now energy era of utilization

139

00:07:58,150 --> 00:07:55,680

will never forget the role the space

140

00:07:59,990 --> 00:07:58,160

shuttle played in his creation like a

141

00:08:01,670 --> 00:08:00,000

proud parent we anticipate great things

142

00:08:03,670 --> 00:08:01,680

to follow from the men and women who

143

00:08:05,110 --> 00:08:03,680

build operate and live there

144

00:08:07,189 --> 00:08:05,120

from this unique vantage point we can

145

00:08:14,950 --> 00:08:07,199

see a great thing has been accomplished

146

00:08:20,629 --> 00:08:18,070

tinged with the finality of the moment

147

00:08:22,629 --> 00:08:20,639

words from ron garan nasa flight

148

00:08:24,390 --> 00:08:22,639

engineer aboard the international space

149

00:08:26,390 --> 00:08:24,400

station and atlantis commander chris

150

00:08:29,189 --> 00:08:26,400

ferguson

151
00:08:31,749 --> 00:08:29,199
as atlantis continues to move away from

152
00:08:34,949 --> 00:08:31,759
the complex currently at a distance of

153
00:08:37,029 --> 00:08:34,959
71 feet moving ultimately to a point

154
00:08:39,670 --> 00:08:37,039
about 600 feet directly in front of the

155
00:08:41,589 --> 00:08:39,680
station for a period of 27 minutes of

156
00:08:44,389 --> 00:08:41,599
station keeping to enable the station to

157
00:08:47,190 --> 00:08:44,399
yaw 90 degrees prior to the start of a

158
00:08:53,350 --> 00:08:47,200
half lap fly around by pilot doug hurley

159
00:08:53,360 --> 00:08:57,990
commander chris ferguson has now taken

160
00:09:02,790 --> 00:09:00,310
the shuttle communications systems out

161
00:09:04,870 --> 00:09:02,800
of radar mode and put them back into com

162
00:09:07,750 --> 00:09:04,880
mode as it's called enabling us to have

163
00:09:10,710 --> 00:09:07,760

downlink television from the orbiter

164

00:09:15,509 --> 00:09:10,720

atlantis now just over 400 feet in front

165

00:09:20,389 --> 00:09:18,070

37 visits of space shuttles to this

166

00:09:21,550 --> 00:09:20,399

complex beginning with endeavour in

167

00:09:25,269 --> 00:09:21,560

december of

168

00:09:27,110 --> 00:09:25,279

1998 on the sts-88 mission that was

169

00:09:30,310 --> 00:09:27,120

commanded by the now director of the

170

00:09:32,630 --> 00:09:30,320

kennedy space center bob cabana

171

00:09:34,389 --> 00:09:32,640

that was uh the joining of the

172

00:09:35,910 --> 00:09:34,399

zarya module that had been launched a

173

00:09:37,990 --> 00:09:35,920

month earlier from the baikonur

174

00:09:41,350 --> 00:09:38,000

cosmodrome in kazakhstan

175

00:09:43,110 --> 00:09:41,360

with the unity connecting node

176

00:09:44,230 --> 00:09:43,120

or node one

177

00:09:46,710 --> 00:09:44,240

that

178

00:09:48,230 --> 00:09:46,720

still exists as the juncture between the

179

00:09:50,389 --> 00:09:48,240

u.s and russian segments of the

180

00:09:52,870 --> 00:09:50,399

international space station

181

00:09:55,269 --> 00:09:52,880

three spacewalks by jerry ross and jim

182

00:09:57,030 --> 00:09:55,279

newman helped assemble those modules to

183

00:09:57,990 --> 00:09:57,040

set the stage for the flights that would

184

00:10:00,550 --> 00:09:58,000

follow

185

00:10:02,550 --> 00:10:00,560

the first docking of atlantis to the

186

00:10:05,670 --> 00:10:02,560

international space station came in may

187

00:10:08,310 --> 00:10:05,680

of two thousand two months prior to the

188

00:10:09,910 --> 00:10:08,320

launching of the zvezda service module

189

00:10:12,949 --> 00:10:09,920

the first living quarters for the

190

00:10:15,190 --> 00:10:12,959

international space station the sts-101

191

00:10:16,829 --> 00:10:15,200

mission commanded by jim halsell

192

00:10:19,350 --> 00:10:16,839

delivered one and a half tons of

193

00:10:21,430 --> 00:10:19,360

supplies refurbished electrical

194

00:10:23,670 --> 00:10:21,440

environmental and communication systems

195

00:10:25,350 --> 00:10:23,680

in both zarya and unity

196

00:10:27,910 --> 00:10:25,360

and

197

00:10:30,310 --> 00:10:27,920

delivered the expedition 2 crew to the

198

00:10:33,829 --> 00:10:30,320

complex jim vos susan helms and yuri

199

00:10:39,509 --> 00:10:35,670

the rendezvous officer here in mission

200

00:10:43,509 --> 00:10:39,519

control reports that we're at 525 feet

201
00:10:45,829 --> 00:10:43,519
should reach that 600 foot bingo point

202
00:10:49,030 --> 00:10:45,839
for station keeping about a minute and a

203
00:10:51,190 --> 00:10:49,040
half to two minutes ahead of schedule

204
00:10:53,269 --> 00:10:51,200
the coordination between the shuttle and

205
00:10:55,190 --> 00:10:53,279
station flight control rooms then will

206
00:10:58,069 --> 00:10:55,200
give the go for russian thrusters to

207
00:11:00,470 --> 00:10:58,079
initiate this 90 degree yaw maneuver for

208
00:11:02,389 --> 00:11:00,480
the international space station

209
00:11:07,990 --> 00:11:02,399
we also are about eight minutes away

210
00:11:24,710 --> 00:11:08,949
houston

211
00:11:28,630 --> 00:11:26,230
atlantis and the international space

212
00:11:30,710 --> 00:11:28,640
station moving into an orbital sunrise

213
00:11:31,670 --> 00:11:30,720

over the atlantic ocean

214

00:11:33,430 --> 00:11:31,680

we should

215

00:11:36,470 --> 00:11:33,440

be hearing the initiation of the

216

00:11:38,069 --> 00:11:36,480

90-degree yaw maneuver momentarily from

217

00:11:40,310 --> 00:11:38,079

the space station flight control room

218

00:11:42,310 --> 00:11:40,320

and flight director jerry jason

219

00:11:44,550 --> 00:11:42,320

this yaw maneuver will be conducted by

220

00:11:46,389 --> 00:11:44,560

russian thrusters to place the

221

00:11:47,190 --> 00:11:46,399

longitudinal axis

222

00:11:48,710 --> 00:11:47,200

right

223

00:11:50,710 --> 00:11:48,720

in the field of view

224

00:11:57,750 --> 00:11:50,720

of atlantis for the fly-around of a

225

00:12:03,509 --> 00:11:59,430

atlanta season the station maneuver has

226

00:12:03,519 --> 00:12:14,550

atlantis copies

227

00:12:19,990 --> 00:12:16,550

atlantis station keeping now for a

228

00:12:21,750 --> 00:12:20,000

period of about 32 minutes

229

00:12:26,550 --> 00:12:21,760

while the international space station

230

00:12:31,750 --> 00:12:29,030

once uh the station has completed this

231

00:12:34,470 --> 00:12:31,760

unique maneuver atlantis will begin to

232

00:12:36,870 --> 00:12:34,480

fly to a position directly above the

233

00:12:38,629 --> 00:12:36,880

international space station then behind

234

00:12:40,470 --> 00:12:38,639

the station maintaining a radial

235

00:12:42,470 --> 00:12:40,480

distance of 600 feet

236

00:12:44,389 --> 00:12:42,480

for your essay

237

00:12:50,550 --> 00:12:44,399

time of completion of the maneuver about

238

00:13:01,030 --> 00:12:53,590

okay we copy on the big loop 26 minutes

239

00:13:07,350 --> 00:13:03,590

the 26 minutes represents the minimal

240

00:13:14,389 --> 00:13:09,829

well we're trying to give doug a chance

241

00:13:14,399 --> 00:13:29,670

hey what do you want speed or accuracy

242

00:13:35,110 --> 00:13:31,990

you saw the jets on atlantis's nose

243

00:13:39,750 --> 00:13:35,120

firing to maintain its station keeping

244

00:13:45,350 --> 00:13:41,990

these two vehicles so instrumental in

245

00:13:47,350 --> 00:13:45,360

human space flight over the past

246

00:13:50,069 --> 00:13:47,360

30 years and for the international space

247

00:13:51,910 --> 00:13:50,079

station over the course of its lifetime

248

00:13:53,910 --> 00:13:51,920

looking at one another

249

00:13:56,550 --> 00:13:53,920

admiring one another at a distance of

250

00:14:00,230 --> 00:13:56,560

six hundred feet while the station yaws

251
00:14:01,670 --> 00:14:00,240
to an orientation for one final lap uh

252
00:14:04,389 --> 00:14:01,680
by atlantis

253
00:14:06,790 --> 00:14:04,399
to document the longitudinal access the

254
00:14:08,310 --> 00:14:06,800
modules and some of the components of

255
00:14:09,990 --> 00:14:08,320
the international space station that

256
00:14:31,189 --> 00:14:10,000
other shuttle fly arounds have not had

257
00:14:36,230 --> 00:14:32,790
atlantis and the international space

258
00:14:38,389 --> 00:14:36,240
station flying 241 miles over the border

259
00:14:40,949 --> 00:14:38,399
between spain and portugal

260
00:14:43,509 --> 00:14:40,959
this view now from

261
00:14:45,269 --> 00:14:43,519
the television cameras on atlantis

262
00:15:10,949 --> 00:14:45,279
looking back at the international space

263
00:15:15,189 --> 00:15:13,189

this is mission control houston in the

264

00:15:17,110 --> 00:15:15,199

space station flight control room the

265

00:15:19,350 --> 00:15:17,120

power systems officer

266

00:15:21,430 --> 00:15:19,360

is reporting to flight director jerry

267

00:15:23,269 --> 00:15:21,440

jason some shadowing on some of the

268

00:15:25,750 --> 00:15:23,279

struts for the solar arrays this is

269

00:15:27,430 --> 00:15:25,760

known as longeron shadowing

270

00:15:29,110 --> 00:15:27,440

although they haven't broken the

271

00:15:31,269 --> 00:15:29,120

threshold yet they're watching that very

272

00:15:32,550 --> 00:15:31,279

carefully about eight and a half more

273

00:15:34,389 --> 00:15:32,560

minutes

274

00:15:36,870 --> 00:15:34,399

for this yaw maneuver

275

00:15:38,389 --> 00:15:36,880

if in fact they do break the longeron

276
00:15:39,670 --> 00:15:38,399
shadowing threshold in other words

277
00:15:43,269 --> 00:15:39,680
temperatures

278
00:15:44,150 --> 00:15:43,279
affecting the struts on the solar arrays

279
00:15:46,550 --> 00:15:44,160
we have

280
00:15:49,110 --> 00:15:46,560
fairly tight limits on how

281
00:15:51,509 --> 00:15:49,120
cold those struts can get but if the

282
00:15:53,430 --> 00:15:51,519
shadowing does occur to a point that we

283
00:15:54,470 --> 00:15:53,440
don't feel comfortable we'll just stop

284
00:15:56,870 --> 00:15:54,480
the maneuver

285
00:15:58,710 --> 00:15:56,880
and atlantis will begin its fly around

286
00:16:01,189 --> 00:15:58,720
however we are continuing the maneuver

287
00:16:02,949 --> 00:16:01,199
at this point you can see this extremely

288
00:16:05,749 --> 00:16:02,959

unique view of the international space

289

00:16:25,269 --> 00:16:05,759

station as atlanta sits just over 600

290

00:16:31,749 --> 00:16:28,069

on the far left uh docked to the aft end

291

00:16:35,509 --> 00:16:31,759

of the zvezda service module

292

00:16:36,949 --> 00:16:35,519

that is the iss progress 43 resupply

293

00:16:40,949 --> 00:16:36,959

ship that arrived at the international

294

00:16:43,269 --> 00:16:40,959

space station on june 23rd

295

00:16:45,430 --> 00:16:43,279

the two vehicles that are docked at

296

00:16:47,910 --> 00:16:45,440

opposite ports uh vertically to the

297

00:16:50,310 --> 00:16:47,920

longitudinal axis of the station

298

00:16:53,509 --> 00:16:50,320

the space-facing side belongs to the

299

00:16:58,150 --> 00:16:55,990

docked to the zenith port of the service

300

00:17:00,790 --> 00:16:58,160

module is the poisk

301
00:17:04,549 --> 00:17:00,800
that is the 26 soyuz vehicle that

302
00:17:07,029 --> 00:17:04,559
arrived on april 6th or the soyuz tma-21

303
00:17:09,829 --> 00:17:07,039
that is the vehicle for andre barasenska

304
00:17:11,270 --> 00:17:09,839
alexander sama kutiayev and ron garan

305
00:17:13,270 --> 00:17:11,280
directly opposite that on the

306
00:17:15,590 --> 00:17:13,280
earth-facing port that is the piers

307
00:17:17,510 --> 00:17:15,600
docking compartment that

308
00:17:18,470 --> 00:17:17,520
is the residence at the moment for the

309
00:17:21,189 --> 00:17:18,480
iss

310
00:17:24,390 --> 00:17:21,199
progress 42 resupply ship that arrived

311
00:17:28,470 --> 00:17:26,549
and next to it sort of in the middle of

312
00:17:32,070 --> 00:17:28,480
the longitudinal axis that is the

313
00:17:36,789 --> 00:17:32,080

rossviet module and the home of the 27

314

00:17:39,669 --> 00:17:36,799

soyuz vehicle or the soyuz t uh tma-02m

315

00:17:42,390 --> 00:17:39,679

spacecraft that delivered sergey volkov

316

00:17:44,150 --> 00:17:42,400

satoshi furukawa and mike fossum to the

317

00:18:01,110 --> 00:17:44,160

international space station in early

318

00:18:06,230 --> 00:18:03,590

at the f flight deck of atlantis

319

00:18:08,710 --> 00:18:06,240

pilot doug hurley is at the controls as

320

00:18:12,230 --> 00:18:08,720

he continues uh the fly around that will

321

00:18:14,390 --> 00:18:12,240

take atlantis to a point about 645 or so

322

00:18:16,789 --> 00:18:14,400

feet directly above the international

323

00:18:19,350 --> 00:18:16,799

space station a short time from now

324

00:18:21,350 --> 00:18:19,360

then to a point behind the station for

325

00:18:23,830 --> 00:18:21,360

the first of two firings of reaction

326

00:18:25,990 --> 00:18:23,840

control system jets in a two-step

327

00:18:27,830 --> 00:18:26,000

separation maneuver that will enable

328

00:18:30,870 --> 00:18:27,840

atlantis to depart the station for the

329

00:18:36,070 --> 00:18:34,150

sandy magnus and rex walheim are

330

00:18:38,549 --> 00:18:36,080

equipped with a variety of digital

331

00:18:40,470 --> 00:18:38,559

cameras and high-powered lenses

332

00:18:43,110 --> 00:18:40,480

they are documenting

333

00:18:46,950 --> 00:18:43,120

the

334

00:18:48,630 --> 00:18:46,960

station at this unique view

335

00:18:50,630 --> 00:18:48,640

where the longitudinal axis of the

336

00:18:56,310 --> 00:18:50,640

station is being presented to them

337

00:18:59,990 --> 00:18:58,470

on the far right of the axis of the

338

00:19:03,830 --> 00:19:00,000

space station

339

00:19:08,070 --> 00:19:06,310

in the horizontal position basically as

340

00:19:10,390 --> 00:19:08,080

you look at this view that's where

341

00:19:12,390 --> 00:19:10,400

atlantis was docked to and on either

342

00:19:14,710 --> 00:19:12,400

side those two large modules at the

343

00:19:16,549 --> 00:19:14,720

bottom is the european space agency's

344

00:19:17,990 --> 00:19:16,559

columbus laboratory

345

00:19:19,750 --> 00:19:18,000

and uh on

346

00:19:21,830 --> 00:19:19,760

on the top of harmony as you look at

347

00:19:24,710 --> 00:19:21,840

this view from directly above the space

348

00:19:27,510 --> 00:19:24,720

station is uh the large japanese segment

349

00:19:44,710 --> 00:19:27,520

of the complex the kibo module and its

350

00:19:49,430 --> 00:19:46,710

atlantis now beginning to move to a

351

00:19:51,549 --> 00:19:49,440

position behind the space station

352

00:19:54,630 --> 00:19:51,559

maintaining a radial distance of about

353

00:19:57,110 --> 00:19:54,640

685 feet or so

354

00:19:59,590 --> 00:19:57,120

the fly around going very well

355

00:20:05,669 --> 00:19:59,600

and all of the space station systems

356

00:20:09,990 --> 00:20:07,590

okay uh reflect your three steve and

357

00:20:21,350 --> 00:20:10,000

we're seeing about the 685 on the range

358

00:20:25,830 --> 00:20:23,430

you can see the jets firing on atlantis

359

00:20:26,870 --> 00:20:25,840

doug hurley in control of the aft flight

360

00:20:28,470 --> 00:20:26,880

deck

361

00:20:32,070 --> 00:20:28,480

atlantis and the international space

362

00:20:36,870 --> 00:20:32,080

station separated by 685 feet flying

363

00:20:41,750 --> 00:20:38,549

atlanta station on the big loop we see

364

00:20:45,590 --> 00:20:41,760

you from sergey's bedroom window

365

00:20:45,600 --> 00:20:56,710

you guys look good from here

366

00:21:00,470 --> 00:20:58,870

flight engineer ron garan admiring the

367

00:21:03,110 --> 00:21:00,480

view of atlantis

368

00:21:05,830 --> 00:21:03,120

chris ferguson responding

369

00:21:08,149 --> 00:21:05,840

doug hurley uh busy flying atlantis at

370

00:21:10,149 --> 00:21:08,159

the moment

371

00:21:12,070 --> 00:21:10,159

the orbiter is uh behind the

372

00:21:13,750 --> 00:21:12,080

international space station we're about

373

00:21:17,590 --> 00:21:13,760

six minutes away from the first of two

374

00:21:24,470 --> 00:21:21,110

the first uh burn a sep 1 burn is a 1.5

375

00:21:25,750 --> 00:21:24,480

foot per second radial downward burn

376

00:21:27,830 --> 00:21:25,760

that will

377

00:21:30,230 --> 00:21:27,840

enable atlantis to move to a position

378

00:21:32,789 --> 00:21:30,240

directly below the station for the final

379

00:21:34,789 --> 00:21:32,799

separation burn a sep 2 burn which is a

380

00:21:36,789 --> 00:21:34,799

larger component 10 feet per second a

381

00:21:38,470 --> 00:21:36,799

retrograde burn that will enable

382

00:21:53,909 --> 00:21:38,480

atlantis to depart the station for the

383

00:21:57,750 --> 00:21:55,430

and through the

384

00:22:00,149 --> 00:21:57,760

shuttles

385

00:22:02,390 --> 00:22:00,159

ban communication system the

386

00:22:04,710 --> 00:22:02,400

sequential still video view this is a

387

00:22:06,710 --> 00:22:04,720

frame refreshed view in the absence of a

388

00:22:08,149 --> 00:22:06,720

downlink ku band capability at the

389

00:22:10,830 --> 00:22:08,159
moment from

390

00:22:13,190 --> 00:22:10,840
atlantis looking back at the

391

00:22:15,590 --> 00:22:13,200
station which will maneuver back into

392

00:22:17,669 --> 00:22:15,600
its normal orientation following a final

393

00:22:19,750 --> 00:22:17,679
separation maneuver we're about 24

394

00:22:20,710 --> 00:22:19,760
seconds away from the first separation

395

00:22:23,590 --> 00:22:20,720
burn

396

00:22:29,830 --> 00:22:23,600
by pilot doug hurley this will be a 1.5

397

00:22:35,270 --> 00:22:33,510
copy we're with with you in a problem

398

00:22:53,270 --> 00:22:35,280
this will be about a four second burst

399

00:23:13,510 --> 00:22:56,630
and you saw the jets firing

400

00:23:17,590 --> 00:23:15,750
and uh iss atlantis on the big loop uh

401
00:23:19,350 --> 00:23:17,600
we're essentially complete with our fly

402
00:23:20,950 --> 00:23:19,360
around uh we'll be uh coming out

403
00:23:22,870 --> 00:23:20,960
underneath you and i should have a good

404
00:23:24,070 --> 00:23:22,880
view from the cupola i'm not sure when

405
00:23:25,750 --> 00:23:24,080
we're going to break down the big loop

406
00:23:28,390 --> 00:23:25,760
but uh if it's anytime soon we just

407
00:23:29,909 --> 00:23:28,400
wanted to give you a final uh goodbye

408
00:23:31,830 --> 00:23:29,919
hey thanks fergie we'll be watching you

409
00:23:33,190 --> 00:23:31,840
from the uh sm windows and uh you guys

410
00:23:35,029 --> 00:23:33,200
look really good on the firearms from

411
00:23:36,549 --> 00:23:35,039
what we can see and

412
00:23:37,590 --> 00:23:36,559
again thank you so much for all that you

413
00:23:39,110 --> 00:23:37,600

guys

414

00:23:57,830 --> 00:23:39,120

have done for us up here we really

415

00:24:02,230 --> 00:23:59,909

you couldn't script it any better but as

416

00:24:05,029 --> 00:24:02,240

atlantis flies into an orbital sunset

417

00:24:08,789 --> 00:24:05,039

about to execute its second separation

418

00:24:13,510 --> 00:24:11,029

ron garan communicating with chris

419

00:24:15,430 --> 00:24:13,520

ferguson as atlantis approaches a point

420

00:24:18,149 --> 00:24:15,440

directly below the international space

421

00:24:21,430 --> 00:24:18,159

station that second separation burn will

422

00:24:23,430 --> 00:24:21,440

be noted as uh both ferguson and garin

423

00:24:25,909 --> 00:24:23,440

who heads up u.s orbital segment

424

00:24:27,269 --> 00:24:25,919

operations uh as one of the two nasa

425

00:24:28,870 --> 00:24:27,279

flight engineers on board the

426
00:24:31,750 --> 00:24:28,880
international space station along with

427
00:24:36,149 --> 00:24:33,909
the station crew is watching this

428
00:24:38,230 --> 00:24:36,159
activity now out of the zvezda service

429
00:24:40,070 --> 00:24:38,240
module windows their best vantage point

430
00:25:06,390 --> 00:24:40,080
for this particular orientation of the

431
00:25:10,950 --> 00:25:09,269
atlantis uh moments away from departing

432
00:25:13,110 --> 00:25:10,960
from the international space station for

433
00:25:15,830 --> 00:25:13,120
the final time having undocked almost an

434
00:25:17,909 --> 00:25:15,840
hour and a half ago

435
00:25:19,669 --> 00:25:17,919
the fly around is essentially complete

436
00:25:23,190 --> 00:25:19,679
there'll be one more burst of the

437
00:25:24,710 --> 00:25:23,200
reaction control system jets

438
00:25:26,070 --> 00:25:24,720

that coming in

439

00:25:29,269 --> 00:25:26,080

21 minutes

440

00:25:35,830 --> 00:25:29,279

to complete atlantis's 12th and final

441

00:25:35,840 --> 00:25:42,310

atlantis houston

442

00:25:47,350 --> 00:25:44,149

hey go ahead dan

443

00:25:49,350 --> 00:25:47,360

hey fergie from the ulf 7 orbit 1 team

444

00:25:50,789 --> 00:25:49,360

in the iss mission control room here in

445

00:25:52,630 --> 00:25:50,799

houston we just want to let you know

446

00:25:54,070 --> 00:25:52,640

that it's been our pleasure and honor to

447

00:25:56,070 --> 00:25:54,080

support this the

448

00:25:57,269 --> 00:25:56,080

37th mission of the space shuttle to the

449

00:25:59,190 --> 00:25:57,279

iss

450

00:26:01,110 --> 00:25:59,200

and we're proud to be the last in a

451
00:26:03,029 --> 00:26:01,120
countless line of mission control teams

452
00:26:06,149 --> 00:26:03,039
that have had the honor to watch over

453
00:26:08,149 --> 00:26:06,159
the iss while discovery and endeavor and

454
00:26:09,350 --> 00:26:08,159
atlantis have visited over the last 13

455
00:26:11,430 --> 00:26:09,360
years

456
00:26:13,190 --> 00:26:11,440
from this room we've watched the watched

457
00:26:15,669 --> 00:26:13,200
and supported as the shuttle has enabled

458
00:26:17,669 --> 00:26:15,679
the station to grow from a humble single

459
00:26:19,909 --> 00:26:17,679
module that was grappled by the stations

460
00:26:22,070 --> 00:26:19,919
on the shuttle's arm to a stunning

461
00:26:24,149 --> 00:26:22,080
facility that is so large that some

462
00:26:26,310 --> 00:26:24,159
astronauts have even momentarily gotten

463
00:26:28,070 --> 00:26:26,320

lost in it you can you can take it from

464

00:26:30,470 --> 00:26:28,080

me

465

00:26:32,470 --> 00:26:30,480

so of course the iss wouldn't be here

466

00:26:34,230 --> 00:26:32,480

without the space shuttle so while we

467

00:26:36,630 --> 00:26:34,240

have the communication link up for the

468

00:26:39,029 --> 00:26:36,640

last time we wanted to say thank you and

469

00:26:41,430 --> 00:26:39,039

farewell to the magnificent machines

470

00:26:44,230 --> 00:26:41,440

that delivered assembled and staffed our

471

00:26:46,870 --> 00:26:44,240

world-class laboratory in space

472

00:26:49,110 --> 00:26:46,880

so fergie chunky sandy and rex get her

473

00:26:55,110 --> 00:26:49,120

home safely and enjoy the last couple

474

00:27:01,029 --> 00:26:57,990

hey uh dan and uh to the whole uh figure

475

00:27:03,430 --> 00:27:01,039

one team and the orbit one team uh jerry

476
00:27:05,430 --> 00:27:03,440
from jury on down we do appreciate those

477
00:27:07,909 --> 00:27:05,440
great words you know it's been it's been

478
00:27:11,190 --> 00:27:07,919
an incredible ride and uh

479
00:27:14,070 --> 00:27:11,200
i think on on behalf of the four of us

480
00:27:15,750 --> 00:27:14,080
uh we uh we're really appreciative that

481
00:27:17,830 --> 00:27:15,760
we had the opportunity to work with you

482
00:27:21,669 --> 00:27:17,840
and extremely fortunate to have taken

483
00:27:23,269 --> 00:27:21,679
part in this uh this pivotal mission um

484
00:27:25,430 --> 00:27:23,279
we're looking forward to in a couple

485
00:27:27,590 --> 00:27:25,440
days to meeting up with most of you and

486
00:27:29,110 --> 00:27:27,600
uh patting you on the back and sharing

487
00:27:30,789 --> 00:27:29,120
some of the stories some of the behind

488
00:27:32,710 --> 00:27:30,799

the scenes stuff that we hope we

489

00:27:34,630 --> 00:27:32,720

successfully hid from you

490

00:27:36,549 --> 00:27:34,640

but uh believe me there was a little bit

491

00:27:38,950 --> 00:27:36,559

of pandemonium between what appeared to

492

00:27:40,789 --> 00:27:38,960

be all the calm um and we're uh we're

493

00:27:44,230 --> 00:27:40,799

glad to be headed home and we're happy

494

00:28:01,909 --> 00:27:45,430

fergie thanks a million we'll see you

495

00:28:06,070 --> 00:28:03,990

veteran astronaut and former expedition

496

00:28:08,630 --> 00:28:06,080

crew member dan tawney in the space

497

00:28:11,430 --> 00:28:08,640

station flight control room

498

00:28:13,350 --> 00:28:11,440

with an opportunity to say farewell to

499

00:28:15,590 --> 00:28:13,360

space shuttle atlantis and its commander

500

00:28:18,789 --> 00:28:15,600

chris ferguson

501
00:28:20,630 --> 00:28:18,799
atlantis is moments away from firing its

502
00:28:22,710 --> 00:28:20,640
reaction control system jets having

503
00:28:36,870 --> 00:28:22,720
completed the fly around a textbook fly

504
00:28:41,269 --> 00:28:39,110
with the departure of atlantis from the

505
00:28:43,110 --> 00:28:41,279
international space station the final

506
00:28:44,789 --> 00:28:43,120
big ticket item for the day will be the

507
00:28:47,190 --> 00:28:44,799
late inspection of atlanta's thermal

508
00:28:49,190 --> 00:28:47,200
protection heat shield a view of the

509
00:28:51,190 --> 00:28:49,200
orbiter boom sensor system at the end of

510
00:28:53,750 --> 00:28:51,200
the shuttle's robotic arm which is being

511
00:28:56,870 --> 00:28:53,760
maneuvered into the correct position

512
00:28:58,630 --> 00:28:56,880
over the port sill of the orbiter to

513
00:29:00,789 --> 00:28:58,640

accommodate the calibration of the

514

00:29:03,510 --> 00:29:00,799

sensors and cameras at the end of this

515

00:29:05,269 --> 00:29:03,520

boom extension the inspection boom that

516

00:29:07,510 --> 00:29:05,279

will be the focus of activity for the

517

00:29:09,510 --> 00:29:07,520

second half of the crew's work day as

518

00:29:12,230 --> 00:29:09,520

they conduct one final inspection of

519

00:29:14,470 --> 00:29:12,240

atlantis heat shield and a one final set

520

00:29:16,149 --> 00:29:14,480

of data for the imagery analysts here at

521

00:29:18,549 --> 00:29:16,159

the johnson space center

522

00:29:20,389 --> 00:29:18,559

as they continue to work as they do

523

00:29:23,029 --> 00:29:20,399

every mission right up until the day

524

00:29:25,190 --> 00:29:23,039

before landing to evaluate the health of

525

00:29:27,830 --> 00:29:25,200

the thermal protection system prior to

526

00:29:29,350 --> 00:29:27,840

atlantis return to earth

527

00:29:31,830 --> 00:29:29,360

you can see at the bottom of your screen

528

00:29:32,950 --> 00:29:31,840

the rafaello multi-purpose logistics

529

00:29:34,549 --> 00:29:32,960

module

530

00:29:37,269 --> 00:29:34,559

which is filled with about two and a

531

00:29:38,789 --> 00:29:37,279

half tons of items that were no longer

532

00:29:42,549 --> 00:29:38,799

needed on the international space

533

00:29:44,230 --> 00:29:42,559

station it was removed detached from the

534

00:29:47,269 --> 00:29:44,240

harmony module

535

00:29:49,029 --> 00:29:47,279

yesterday morning and placed back down

536

00:29:50,389 --> 00:29:49,039

into the payload bay for the trip back

537

00:29:52,870 --> 00:29:50,399

to earth

538

00:29:54,549 --> 00:29:52,880

behind it is a failed pump module that

539

00:29:55,669 --> 00:29:54,559
was removed

540

00:29:57,590 --> 00:29:55,679
from the

541

00:30:00,310 --> 00:29:57,600
space station's external stowage

542

00:30:02,149 --> 00:30:00,320
platform last week a week ago during a

543

00:30:04,389 --> 00:30:02,159
spacewalk by

544

00:30:06,549 --> 00:30:04,399
station flight engineers mike fossum and

545

00:30:08,549 --> 00:30:06,559
ron garan it will be returned to earth

546

00:30:10,470 --> 00:30:08,559
aboard atlantis for evaluation and

547

00:30:12,630 --> 00:30:10,480
analysis by engineers

548

00:30:14,389 --> 00:30:12,640
likely to be refurbished and reflow to

549

00:30:48,230 --> 00:30:14,399
the international space station as a

550

00:30:52,149 --> 00:30:50,230
houston this scan of atlantis heat

551
00:30:53,350 --> 00:30:52,159
shield continues today this is the final

552
00:30:54,870 --> 00:30:53,360
one this is just making sure that

553
00:30:56,950 --> 00:30:54,880
everything is uh

554
00:30:58,549 --> 00:30:56,960
ready to support atlantis landing coming

555
00:31:26,070 --> 00:30:58,559
up on thursday morning

556
00:31:30,029 --> 00:31:28,789
as this inspection continues atlantis is

557
00:31:32,470 --> 00:31:30,039
currently

558
00:31:34,070 --> 00:31:32,480
239 miles above africa heading down

559
00:31:40,470 --> 00:31:34,080
toward the southeast they're over parts

560
00:31:43,909 --> 00:31:42,389
there are some opportunities to spot

561
00:31:45,430 --> 00:31:43,919
atlantis and the night sky above your

562
00:31:47,110 --> 00:31:45,440
hometown

563
00:31:50,029 --> 00:31:47,120

early tomorrow morning if you're in

564

00:31:53,630 --> 00:31:50,039

north america we invite you to log onto

565

00:31:56,549 --> 00:31:55,269

spaceflight.nasa.gov once you're there

566

00:31:59,430 --> 00:31:56,559

just click on the button at the top that

567

00:32:00,789 --> 00:31:59,440

says real time data

568

00:32:02,470 --> 00:32:00,799

once you select that there will be a

569

00:32:04,630 --> 00:32:02,480

menu that pops out underneath that just

570

00:32:05,990 --> 00:32:04,640

click on citing opportunities

571

00:32:07,509 --> 00:32:06,000

and then follow the instructions on the

572

00:32:09,430 --> 00:32:07,519

left side of the screen you'll be able

573

00:32:11,430 --> 00:32:09,440

to select your home state

574

00:32:13,269 --> 00:32:11,440

and then your hometown

575

00:32:14,870 --> 00:32:13,279

some of the passes last upwards of three

576
00:32:16,230 --> 00:32:14,880
to four minutes but we encourage you to

577
00:32:17,990 --> 00:32:16,240
do this because obviously this is the

578
00:32:18,950 --> 00:32:18,000
last time you will ever be able to see

579
00:32:21,830 --> 00:32:18,960
the shuttle

580
00:32:23,590 --> 00:32:21,840
flying over your hometown

581
00:32:31,909 --> 00:32:23,600
both it and the station are quite a

582
00:32:35,430 --> 00:32:33,430
the robotics officer here inside the

583
00:32:36,630 --> 00:32:35,440
shuttle room is confirming to orbit to

584
00:32:37,909 --> 00:32:36,640
flight director rick labroad that

585
00:32:40,149 --> 00:32:37,919
everything has been wrapped up in terms

586
00:32:42,470 --> 00:32:40,159
of the wing survey and the nose cap

587
00:32:43,909 --> 00:32:42,480
survey the orbiter boom sensor system is

588
00:32:49,590 --> 00:32:43,919

now in what they call the low hover

589

00:33:21,190 --> 00:32:50,870

it's going to be installed back into the

590

00:33:26,470 --> 00:33:23,509

we think that closes this out for a pdrs

591

00:33:26,480 --> 00:33:29,750

we agreed great work

592

00:33:33,909 --> 00:33:32,310

hey uh i think ian young might be the uh

593

00:33:35,350 --> 00:33:33,919

orbit two guy uh thanks for all your

594

00:33:36,470 --> 00:33:35,360

help today i think things went pretty

595

00:33:38,070 --> 00:33:36,480

smoothly

596

00:33:40,630 --> 00:33:38,080

bill miller was our instructor and he

597

00:33:42,870 --> 00:33:40,640

did a fantastic job and uh you know

598

00:33:44,549 --> 00:33:42,880

inspection results notwithstanding uh

599

00:33:47,029 --> 00:33:44,559

that may be the last time we put both of

600

00:33:49,110 --> 00:33:47,039

those big long arms away and uh they've

601
00:33:51,269 --> 00:33:49,120
uh served us well one of them for about

602
00:33:53,590 --> 00:33:51,279
oh six years one of them for about 30

603
00:33:56,070 --> 00:33:53,600
and we're we're sorry to see them back

604
00:33:57,669 --> 00:33:56,080
in their cradles finally but

605
00:33:59,509 --> 00:33:57,679
hey we're happy to have completed

606
00:34:03,110 --> 00:33:59,519
successfully and hopefully we don't pull

607
00:34:08,149 --> 00:34:05,269
chris those are great words and zac drew

608
00:34:10,550 --> 00:34:08,159
your orbit to pdrs put together a little

609
00:34:12,230 --> 00:34:10,560
bit of history for you on the srms that

610
00:34:16,470 --> 00:34:12,240
we wanted to share with you

611
00:34:18,470 --> 00:34:16,480
on november 13th 1981 during sts-2 the

612
00:34:21,270 --> 00:34:18,480
srms was uncradled and tested for the

613
00:34:24,470 --> 00:34:21,280

first time in its 30-year lifetime it

614

00:34:26,790 --> 00:34:24,480

has grappled 72 payloads deployed or

615

00:34:28,310 --> 00:34:26,800

retrieved seven satellites including

616

00:34:30,389 --> 00:34:28,320

retrieval and servicing of the hubble

617

00:34:34,230 --> 00:34:30,399

space telescope five times

618

00:34:37,349 --> 00:34:34,240

it's assisted in 115 evas surveyed over

619

00:34:40,149 --> 00:34:37,359

31 000 feet of rcc and together with the

620

00:34:42,310 --> 00:34:40,159

ssrms helped to build the iss with

621

00:34:43,750 --> 00:34:42,320

delivery of 30 international space

622

00:34:45,270 --> 00:34:43,760

station components

623

00:34:46,869 --> 00:34:45,280

along with our canadian friends we

624

00:34:48,230 --> 00:34:46,879

celebrate this unique piece of hardware

625

00:34:54,470 --> 00:34:48,240

and its contributions to the space

626

00:34:58,230 --> 00:34:56,389

oh hey megan that was absolutely

627

00:35:00,630 --> 00:34:58,240

fantastic thanks so much i think they're

628

00:35:02,710 --> 00:35:00,640

great numbers i really do and you know

629

00:35:04,150 --> 00:35:02,720

once again it uh i mean it's our honor

630

00:35:05,910 --> 00:35:04,160

and privilege i guess to put it to bed

631

00:35:07,990 --> 00:35:05,920

for the final time like i said uh

632

00:35:10,230 --> 00:35:08,000

inspection not withstanding um you know

633

00:35:11,910 --> 00:35:10,240

we're sorry to see it in there but uh it

634

00:35:14,870 --> 00:35:11,920

looks just as good

635

00:35:17,109 --> 00:35:14,880

just as good as it did on day one

636

00:35:18,630 --> 00:35:17,119

we agree and i think all of us srms

637

00:35:20,150 --> 00:35:18,640

operators are shedding a little quiet

638

00:35:22,470 --> 00:35:20,160

tier down here but you guys did a great

639

00:35:24,069 --> 00:35:22,480

job with it and

640

00:35:28,829 --> 00:35:24,079

this will be probably hopefully the last

641

00:35:34,470 --> 00:35:32,310

amen and megan i'd like to uh extend

642

00:35:36,950 --> 00:35:34,480

some thanks as well paul reichert and

643

00:35:39,670 --> 00:35:36,960

dave williams were excellent trainers uh

644

00:35:41,430 --> 00:35:39,680

for photo tv including uh

645

00:35:43,030 --> 00:35:41,440

working our way through that playback

646

00:35:44,550 --> 00:35:43,040

menu and getting back to you guys

647

00:35:46,630 --> 00:35:44,560

efficiently but they did a really great

648

00:35:48,710 --> 00:35:46,640

job they were very patient i had eight

649

00:35:50,870 --> 00:35:48,720

million questions the rest of another

650

00:35:52,390 --> 00:35:50,880

eight million questions and they were

651
00:35:54,950 --> 00:35:52,400
great at getting us the information we

652
00:35:56,790 --> 00:35:54,960
needed hopefully some of our photos

653
00:35:58,630 --> 00:35:56,800
uh turned out well if they did it's

654
00:36:00,150 --> 00:35:58,640
because of their great training if it

655
00:36:01,510 --> 00:36:00,160
didn't it's because we weren't listening

656
00:36:03,670 --> 00:36:01,520
hard enough but i want to say a great

657
00:36:05,670 --> 00:36:03,680
big thank you to those guys they've did

658
00:36:07,910 --> 00:36:05,680
a great job and have for many many

659
00:36:09,349 --> 00:36:07,920
flights