



1  
00:01:37,950 --> 00:01:36,360  
they slap huntsville for fred class yeah

2  
00:01:39,480 --> 00:01:37,960  
Fred just wanted to check and see where

3  
00:03:27,710 --> 00:01:39,490  
you are and also I have an update to

4  
00:03:32,270 --> 00:03:29,810  
this is Mission Control Houston this

5  
00:03:35,960 --> 00:03:32,280  
live television from Columbia shows the

6  
00:03:38,630 --> 00:03:35,970  
problem with thee so that you know at

7  
00:03:41,200 --> 00:03:38,640  
that time there wasn't any correlation

8  
00:03:44,540 --> 00:03:41,210  
or the jet firing any other disturbance

9  
00:03:48,770 --> 00:03:44,550  
and a copy this is just going on and on

10  
00:03:50,300 --> 00:03:48,780  
now Edison what it was like when we

11  
00:03:54,500 --> 00:03:50,310  
first started up it lasted probably

12  
00:03:55,670 --> 00:03:54,510  
forget let's say three four minutes well

13  
00:03:57,560 --> 00:03:55,680

you know the discussion we're having

14

00:04:00,560 --> 00:03:57,570

obviously we're going to hand it off to

15

00:04:08,630 --> 00:04:00,570

the next team but we have a potential

16

00:04:17,890 --> 00:04:08,640

ifm here don't think understand how to

17

00:04:23,469 --> 00:04:20,050

that kinda feels good to be step back in

18

00:04:24,939 --> 00:04:23,479

to see you know believe the video up

19

00:04:27,310 --> 00:04:24,949

we're going to stop the Shah maneuver in

20

00:04:28,960 --> 00:04:27,320

about a minute and a half with this gold

21

00:04:30,640 --> 00:04:28,970

clip floating in you you'll see what the

22

00:04:39,129 --> 00:04:30,650

acceleration will do too Oh that'll be

23

00:04:40,840 --> 00:04:39,139

great thanks when we're done with the

24

00:04:43,540 --> 00:04:40,850

yaw maneuvers here will send up your

25

00:04:48,240 --> 00:04:43,550

entry messages we want to have good on

26

00:04:50,680 --> 00:04:48,250

an interrupted come all right there

27

00:04:54,010 --> 00:04:50,690

currently at Columbia is in the midst of

28

00:04:55,540 --> 00:04:54,020

a yah yah maneuver one of us several

29

00:05:02,460 --> 00:04:55,550

maneuvers that it's been performing over

30

00:05:16,900 --> 00:05:04,719

after that spotted you more than me

31

00:05:18,400 --> 00:05:16,910

right now too windy these maneuvers have

32

00:05:21,100 --> 00:05:18,410

for the space acceleration measurement

33

00:05:23,529 --> 00:05:21,110

system experiment onboard measuring at

34

00:05:25,540 --> 00:05:23,539

the various rates of acceleration on

35

00:05:27,159 --> 00:05:25,550

board the spacecraft at during such

36

00:05:29,409 --> 00:05:27,169

maneuvers again earlier Columbia

37

00:05:32,469 --> 00:05:29,419

performed a roll maneuver a 360 degree

38

00:05:37,420 --> 00:05:32,479

roll now it's I've been performing a 360

39  
00:05:39,850 --> 00:05:37,430  
degree yah maneuver maneuvering it about

40  
00:05:43,210 --> 00:05:39,860  
a degree per second its nearing the end

41  
00:05:44,800 --> 00:05:43,220  
of that maneuver at which point to pilot

42  
00:05:56,270 --> 00:05:44,810  
control my anger will stop at the

43  
00:05:59,750 --> 00:05:58,460  
this is Mission Control Houston now

44  
00:06:01,490 --> 00:05:59,760  
we're continuing to receive live

45  
00:06:04,940 --> 00:06:01,500  
television from Columbia we're handing

46  
00:06:07,580 --> 00:06:04,950  
over in the control center or but one is

47  
00:06:10,040 --> 00:06:07,590  
our last shift for Brian and I but the

48  
00:06:12,710 --> 00:06:10,050  
orbit one team is your entry team fact

49  
00:06:18,800 --> 00:06:12,720  
Blaine and rich are here now and we're

50  
00:06:25,790 --> 00:06:18,810  
handing over now to story I'm John

51  
00:06:28,390 --> 00:06:25,800  
Shannon and out orbit for all right dave

52  
00:06:31,540 --> 00:06:28,400  
was great working with all you today I

53  
00:06:34,220 --> 00:06:31,550  
just having that sense to block console

54  
00:06:35,780 --> 00:06:34,230  
got us a little bit of trouble see Ricky

55  
00:06:37,880 --> 00:06:35,790  
to maybe you should leave the moment

56  
00:06:40,100 --> 00:06:37,890  
next time so we really enjoyed working

57  
00:06:42,020 --> 00:06:40,110  
with y'all I better whisper smooth the

58  
00:06:44,960 --> 00:06:42,030  
little props we had gone through the

59  
00:06:46,580 --> 00:06:44,970  
check out the heart yeah it got pretty

60  
00:06:48,620 --> 00:06:46,590  
busy and you guys did a great job

61  
00:06:51,230 --> 00:06:48,630  
keeping up with it with the malfunctions

62  
00:06:54,620 --> 00:06:51,240  
so we've really enjoyed it and it did

63  
00:07:04,700 --> 00:06:54,630

start to feel like a sim ending over the

64

00:07:06,740 --> 00:07:04,710

story ok you know you know this

65

00:07:09,920 --> 00:07:06,750

television live from Columbia's Columbia

66

00:07:12,050 --> 00:07:09,930

passes just off the Cape of Africa the

67

00:07:17,870 --> 00:07:12,060

southern tip of that continent currently

68

00:07:20,750 --> 00:07:17,880

in an altitude of 100 in 170 statute

69

00:07:22,400 --> 00:07:20,760

miles on board the red team continuing

70

00:07:26,000 --> 00:07:22,410

through the early hours of their 12-hour

71

00:07:32,360 --> 00:07:26,010

shift flight day 16 for members of the

72

00:07:36,920 --> 00:07:32,370

red team hey plowed Huntsville we have

73

00:09:12,030 --> 00:07:36,930

live module video from eb see you in the

74

00:09:20,350 --> 00:09:16,600

so the crystal growth furnace gets to be

75

00:09:23,500 --> 00:09:20,360

the last major experiment system to shut

76

00:09:26,080 --> 00:09:23,510

down and it has been running for the

77

00:09:28,330 --> 00:09:26,090

longest continuous period of operation

78

00:09:34,360 --> 00:09:28,340

during during this us microgravity

79

00:09:38,820 --> 00:09:34,370

laboratory and furnace used that time

80

00:09:41,380 --> 00:09:38,830

for doing high-temperature materials

81

00:09:45,090 --> 00:09:41,390

processing research they were able to

82

00:09:47,650 --> 00:09:45,100

successfully process eight samples of

83

00:09:50,400 --> 00:09:47,660

the specialized types of electronic

84

00:09:53,200 --> 00:09:50,410

materials known as semiconductors and

85

00:09:55,810 --> 00:09:53,210

for the last two samples that were run

86

00:09:59,260 --> 00:09:55,820

in the crystal growth furnace material

87

00:10:02,740 --> 00:09:59,270

known as germanium gallium those last

88

00:10:06,730 --> 00:10:02,750

two runs were intended not so much for

89

00:10:11,080 --> 00:10:06,740

producing crystal and material itself

90

00:10:13,840 --> 00:10:11,090

because of of any special interest in it

91

00:10:17,140 --> 00:10:13,850

but rather as part of it a particular

92

00:10:18,580 --> 00:10:17,150

engineering test that one group wanted

93

00:10:23,860 --> 00:10:18,590

to perform with the crystal growth

94

00:10:33,070 --> 00:10:30,160

and get all their equipment prepared for

95

00:10:36,170 --> 00:10:33,080

sending it back to their home base

96

00:10:38,990 --> 00:10:36,180

institutions in case of the surface

97

00:10:43,699 --> 00:10:39,000

tension team their equipment coming from

98

00:10:45,829 --> 00:10:43,709

the NASA Lewis Research Center and so

99

00:10:49,250 --> 00:10:45,839

those members of the science teams who

100

00:10:52,639 --> 00:10:49,260

have been on duty here for more than two

101  
00:10:55,190 --> 00:10:52,649  
weeks now will be preparing to return to

102  
00:10:57,940 --> 00:10:55,200  
their home institutions at different

103  
00:11:01,850 --> 00:10:57,950  
places around the United States and

104  
00:11:05,210 --> 00:11:01,860  
shortly fairly soon after Columbia's

105  
00:11:07,040 --> 00:11:05,220  
landing they will be getting the data

106  
00:11:08,750 --> 00:11:07,050  
that in some cases has to be physically

107  
00:11:11,480 --> 00:11:08,760  
brought back by the orbiter for instance

108  
00:11:14,870 --> 00:11:11,490  
all the tapes that have been videotaped

109  
00:11:17,660 --> 00:11:14,880  
on board will be eagerly a in the lower

110  
00:11:21,590 --> 00:11:17,670  
portion of the screen Columbia's

111  
00:11:23,870 --> 00:11:21,600  
direction of travel now being south and

112  
00:11:26,570 --> 00:11:23,880  
east early a little more to the east as

113  
00:11:29,900 --> 00:11:26,580

it starts to approach the southernmost

114

00:11:32,390 --> 00:11:29,910

point of current orbit currently at

115

00:11:35,600 --> 00:11:32,400

about 30 degrees south latitude and

116

00:11:39,410 --> 00:11:35,610

starting to swing more in a direct

117

00:11:43,130 --> 00:11:39,420

easterly direction since this orbit for

118

00:11:50,759 --> 00:11:43,140

the sto 73 flight is a 39 degree

119

00:11:58,739 --> 00:11:55,470

and in Columbia is now getting fairly

120

00:12:02,150 --> 00:11:58,749

close to the eastern coast of South

121

00:12:08,389 --> 00:12:02,160

America just about at the southernmost

122

00:12:13,379 --> 00:12:08,399

point of the vast country of Brazil

123

00:12:18,869 --> 00:12:13,389

should be somewhere over the large city

124

00:12:20,939 --> 00:12:18,879

of Sao Paulo and looking down on the

125

00:12:23,269 --> 00:12:20,949

coast now as it heads out over the

126  
00:12:25,799 --> 00:12:23,279  
Atlantic Ocean we see the coastline of

127  
00:12:30,960 --> 00:12:25,809  
South America there with cloudiness

128  
00:12:44,920 --> 00:12:30,970  
picking up just as the landmass turns to

129  
00:12:49,500 --> 00:12:47,650  
and the view towards the horizon here

130  
00:12:54,519 --> 00:12:49,510  
would be back in the direction that

131  
00:12:55,990 --> 00:12:54,529  
Columbia has just flown over aiming the

132  
00:12:58,900 --> 00:12:56,000  
camera out of the payload Bay we get a

133  
00:13:02,500 --> 00:12:58,910  
good view towards the west over a large

134  
00:13:09,940 --> 00:13:02,510  
portion of Central and somewhat southern

135  
00:13:12,820 --> 00:13:09,950  
South America payload Bay camera lens

136  
00:13:15,820 --> 00:13:12,830  
zoomed to a wide angle we start to see

137  
00:13:18,519 --> 00:13:15,830  
the not only the broad areas of the

138  
00:13:23,650 --> 00:13:18,529

South Atlantic spread out below Columbia

139

00:13:29,500 --> 00:13:23,660

but the Spacelab module where crew

140

00:13:32,820 --> 00:13:29,510

members over the past 14 days and in a

141

00:13:35,590 --> 00:13:32,830

little over close to 15 days have been

142

00:13:38,650 --> 00:13:35,600

using that module as a work place in

143

00:13:41,860 --> 00:13:38,660

space doing a variety of different types

144

00:13:43,690 --> 00:13:41,870

of science operations in a laboratory

145

00:13:46,900 --> 00:13:43,700

that has been very carefully assembled

146

00:13:48,340 --> 00:13:46,910

over about a three year process they

147

00:13:50,890 --> 00:13:48,350

planning and preparation for this

148

00:13:52,900 --> 00:13:50,900

mission extended over roughly three

149

00:13:58,800 --> 00:13:52,910

years in getting these experiments

150

00:14:01,930 --> 00:13:58,810

systems already and that preparation and

151  
00:14:04,449 --> 00:14:01,940  
planning and training that went into a

152  
00:14:21,269 --> 00:14:04,459  
flight like this as we've seen now paid

153  
00:14:25,030 --> 00:14:21,279  
off with that stowaway yes the

154  
00:14:27,790 --> 00:14:25,040  
experiment is his and he's also a backup

155  
00:14:33,280 --> 00:14:27,800  
favorite specialist and talking to us

156  
00:15:47,769 --> 00:14:33,290  
today yeah I've been talking to him

157  
00:15:58,420 --> 00:15:51,309  
and is that an inverse crystal growth

158  
00:16:07,540 --> 00:15:58,430  
maneuver their Kazakh Asako instead of a

159  
00:16:26,290 --> 00:16:07,550  
sack up I was trying hard to avoid the

160  
00:16:32,360 --> 00:16:30,860  
putting into place procedure to just

161  
00:16:37,460 --> 00:16:32,370  
make sure that that flexible glovebox

162  
00:16:41,150 --> 00:16:37,470  
won't be loose during the orbit and

163  
00:16:44,660 --> 00:16:41,160

landing and that being done that is the

164

00:16:46,700 --> 00:16:44,670

last major operation or the crew has to

165

00:16:51,170 --> 00:16:46,710

actually do much in a hands-on sense for

166

00:16:54,100 --> 00:16:51,180

the experiment systems and this is all

167

00:16:56,660 --> 00:16:54,110

part of the process of getting the

168

00:16:58,910 --> 00:16:56,670

laboratory workshops that the crew

169

00:17:01,760 --> 00:16:58,920

members have been using now for the last

170

00:17:28,590 --> 00:17:01,770

more than two weeks getting it all set

171

00:17:28,600 --> 00:18:01,200

applause for the amazing Socko

172

00:18:14,600 --> 00:18:05,190

and yes al this is the fulfillment of a

173

00:18:29,519 --> 00:18:18,320

that's pretty fun I've never had so much

174

00:18:35,379 --> 00:18:32,169

this is page live operations control

175

00:18:46,960 --> 00:18:35,389

Huntsville and their Lumia meaning they

176

00:18:49,509 --> 00:18:46,970

have put dangers hand over and we

177

00:18:51,190 --> 00:18:49,519

continue to live down like video we will

178

00:18:54,700 --> 00:18:51,200

be having an interruption of that

179

00:18:56,919 --> 00:18:54,710

shortly however as Columbia comes up to

180

00:18:58,509 --> 00:18:56,929

the handover point or transition from

181

00:19:01,509 --> 00:18:58,519

the Western tracking and data relay

182

00:19:05,590 --> 00:19:01,519

satellite to the eastern but while we do

183

00:19:08,049 --> 00:19:05,600

have it we're using that downlink signal

184

00:19:11,289 --> 00:19:08,059

capability to take these earth views

185

00:19:15,190 --> 00:19:11,299

over the extreme eastern portion of the

186

00:19:17,859 --> 00:19:15,200

Pacific Ocean and the that being the

187

00:19:19,690 --> 00:19:17,869

eastern Pacific Ocean and the point in

188

00:19:23,619 --> 00:19:19,700

the orbit which is about their further

189

00:19:27,099 --> 00:19:23,629

south that Columbia flies a spacecraft

190

00:19:30,009 --> 00:19:27,109

is just about to come up on the 39