1
00:01:44,170 --> 00:01:36,719
you

2
00:01:46,389 --> 00:01:44,180
probably be heading there sound sad some

3
00:01:49,539 --> 00:01:46,399
day flowers will grow there but first

4
00:01:53,760 --> 00:01:49,549
you gotta go there oh you will go to the

5
00:01:57,940 --> 00:01:53,770
moon you gonna get I you will live star

6
00:02:01,210 --> 00:01:57,950
your backyard will probably be Mars you

7
00:02:05,980 --> 00:02:01,220
will ride later and your computer oh

8
00:02:10,150 --> 00:02:05,990
yeah wow you're stellar smile will

9
00:02:14,670 --> 00:02:10,160
always be knowing your home and home to

10
00:02:17,949 --> 00:02:14,680
stay and you look down upon the earth

11
00:02:23,320 --> 00:02:17,959
say I can't believe we ever lived that

12
00:02:27,250 --> 00:02:23,330
way to will go to the their clients or a

13
00:02:29,860 --> 00:02:27,260

hotel a Laguna you'll be favoring a star

14
00:02:36,030 --> 00:02:29,870
Putin kicking up your moon boot are you

15
00:02:41,710 --> 00:02:37,960
paradise

16
00:02:46,300 --> 00:02:41,720
yeah but I was always sunny you'll be

17
00:02:50,380 --> 00:02:46,310
raking than the money how you can i but

18
00:02:54,010 --> 00:02:50,390
it's been our mother fighting dream and

19
00:02:58,450 --> 00:02:54,020
a dream is an easy sell and when the

20
00:03:05,770 --> 00:02:58,460
tourists come in Joe you'll be the big

21
00:03:09,340 --> 00:03:05,780
cheese on that orbiting rundown you will

22
00:03:18,610 --> 00:03:09,350
go through the moon is daring hi any

23
00:03:18,620 --> 00:03:35,640
we'll go back to the move

24
00:03:51,070 --> 00:03:43,810
yeah good morning discovery it's friday

25
00:03:52,990 --> 00:03:51,080
eight a good morning mark if you got

26
00:04:31,620 --> 00:03:53,000
that pan we'll go ahead and load it and

27
00:04:36,360 --> 00:04:33,870
we're speaking with the commander of

28
00:04:38,370 --> 00:04:36,370
space shuttle Discovery can't rominger

29
00:04:42,690 --> 00:04:38,380
first can't tell us where discovery is

30
00:04:44,580 --> 00:04:42,700
this moment now let me a peek over here

31
00:04:46,920 --> 00:04:44,590
my world map flee or I go up to the

32
00:04:48,480 --> 00:04:46,930
Atlantic Ocean right now coming up on a

33
00:04:51,180 --> 00:04:48,490
NASA kit looks like we're gonna write

34
00:04:53,040 --> 00:04:51,190
over gambia now as I mentioned you're

35
00:04:54,660 --> 00:04:53,050
the pilot doesn't look like you're at

36
00:04:58,980 --> 00:04:54,670
the controls right now who's flying the

37
00:05:01,230 --> 00:04:58,990
shuttle actually we've got five

38
00:05:03,150 --> 00:05:01,240

computers onboard to do a great job and

39
00:05:05,730 --> 00:05:03,160
as much as privacy to admit it we've got

40
00:05:08,640 --> 00:05:05,740
a super autopilot and the majority of

41
00:05:10,380 --> 00:05:08,650
the control the spacecraft on orbit is

42
00:05:13,500 --> 00:05:10,390
through the autopilot so the autopilot

43
00:05:15,030 --> 00:05:13,510
is in control and actually Colonel

44
00:05:17,310 --> 00:05:15,040
brandon is sitting up here to controls

45
00:05:18,840 --> 00:05:17,320
ready to grab him he's hoping it gets to

46
00:05:20,790 --> 00:05:18,850
grab them with the autopilot comes out

47
00:05:22,770 --> 00:05:20,800
well we won't keep you too long so that

48
00:05:25,920 --> 00:05:22,780
doesn't happen this mission watch the

49
00:05:28,200 --> 00:05:25,930
first time an experimental robot arm was

50
00:05:32,100 --> 00:05:28,210
moved back and forth by controllers on

51
00:05:34,440 --> 00:05:32,110
the ground how did that go it's gone

52
00:05:37,080 --> 00:05:34,450
very well in that this arm is a very

53
00:05:39,300 --> 00:05:37,090
dexterous arm unlike most shuttle

54
00:05:41,310 --> 00:05:39,310
flights fly a large arm that's length of

55
00:05:44,130 --> 00:05:41,320
a payload Bay about 60 feet long a

56
00:05:46,380 --> 00:05:44,140
Canadian designed and built arm that we

57
00:05:48,810 --> 00:05:46,390
use to a release and grapple satellites

58
00:05:50,760 --> 00:05:48,820
with this arm is designed to go on the

59
00:05:53,520 --> 00:05:50,770
end of a barge on similar to that on

60
00:05:55,530 --> 00:05:53,530
Space Station come coming up and it was

61
00:05:57,660 --> 00:05:55,540
designed by the Japanese two very fine

62
00:06:00,450 --> 00:05:57,670
task you can unscrew bolts it can open

63
00:06:02,270 --> 00:06:00,460

doors it's a very nimble dexterous

64
00:06:04,380 --> 00:06:02,280
little arm it's only about six feet long

65
00:06:05,820 --> 00:06:04,390
does it work the same way as the

66
00:06:07,500 --> 00:06:05,830
canadian armed where somebody inside

67
00:06:11,460 --> 00:06:07,510
kind of uses a joystick to move it

68
00:06:12,810 --> 00:06:11,470
around it does in the it's too bad you

69
00:06:14,640 --> 00:06:12,820
don't have video this the right behind

70
00:06:16,950 --> 00:06:14,650
is a control station and we have two

71
00:06:19,080 --> 00:06:16,960
controllers similar like video games

72
00:06:21,390 --> 00:06:19,090
one's a stick and one's a another

73
00:06:24,180 --> 00:06:21,400
control stick that we can control all

74
00:06:25,590 --> 00:06:24,190
six degrees of freedom all the rotations

75
00:06:29,730 --> 00:06:25,600
pitch roll and yaw as well as

76
00:06:32,070 --> 00:06:29,740
translations in all three axes so we fly

77
00:06:33,270 --> 00:06:32,080
it from on board additionally this arm

78
00:06:35,190 --> 00:06:33,280
can be controlled from the ground

79
00:06:36,810 --> 00:06:35,200
through a computer link-up it can

80
00:06:39,540 --> 00:06:36,820
actually be flown from Miss control

81
00:06:42,300 --> 00:06:39,550
there in Houston why is it so important

82
00:06:47,210 --> 00:06:42,310
to have an arm that's capable of working

83
00:06:50,880 --> 00:06:49,350
well when we're on orbit in the space

84
00:06:53,490 --> 00:06:50,890
station we're going to have pallets

85
00:06:55,650 --> 00:06:53,500
outside of the station so a lot of the

86
00:06:57,390 --> 00:06:55,660
research goes on inside but in addition

87
00:06:59,340 --> 00:06:57,400
to that their palates outside where

88
00:07:00,750 --> 00:06:59,350

there's a lot of science conducted and

89
00:07:03,750 --> 00:07:00,760
you need an arm that's very dexterous

90
00:07:06,320 --> 00:07:03,760
similar human arm to go out and change

91
00:07:08,880 --> 00:07:06,330
now different payloads open doors

92
00:07:11,100 --> 00:07:08,890
pulling a new one and the one that may

93
00:07:13,050 --> 00:07:11,110
have been done position it so it can be

94
00:07:15,990 --> 00:07:13,060
sent back to earth or bot inside the

95
00:07:18,150 --> 00:07:16,000
station can you and the rest of the crew

96
00:07:20,130 --> 00:07:18,160
have been keeping watch over an ozone

97
00:07:22,890 --> 00:07:20,140
mapping satellite that you are deployed

98
00:07:25,590 --> 00:07:22,900
into orbit last week I understand that

99
00:07:31,020 --> 00:07:25,600
satellite had what might be considered a

100
00:07:32,310 --> 00:07:31,030
close call with some space junk yeah if

101
00:07:35,760 --> 00:07:32,320
you may have heard there is a fair

102
00:07:37,950 --> 00:07:35,770
amount of space junk debris in orbit a

103
00:07:41,100 --> 00:07:37,960
lot of its left them the space programs

104
00:07:42,480 --> 00:07:41,110
around the world but the I guess it

105
00:07:46,890 --> 00:07:42,490
could have been as close as a mile and a

106
00:07:49,230 --> 00:07:46,900
half of rocket left over from a 1984

107
00:07:52,110 --> 00:07:49,240
launch asked within a mile and a half of

108
00:07:54,900 --> 00:07:52,120
Christa spas how much of a problem is

109
00:08:00,360 --> 00:07:54,910
space junk becoming for astronauts who

110
00:08:02,730 --> 00:08:00,370
go up on the space shuttles yeah it's

111
00:08:05,310 --> 00:08:02,740
not really that big of a problem at this

112
00:08:06,900 --> 00:08:05,320
point C of the debris all the debris

113
00:08:09,300 --> 00:08:06,910

that's larger than about the size of a

114
00:08:13,050 --> 00:08:09,310
softball is tracked it's actively

115
00:08:15,240 --> 00:08:13,060
tracked so on some missions the space

116
00:08:17,070 --> 00:08:15,250
shuttle may get a call to they see a

117
00:08:19,380 --> 00:08:17,080
potential hazard with some space debris

118
00:08:21,330 --> 00:08:19,390
and it's fairly easy for us to go ahead

119
00:08:22,710 --> 00:08:21,340
and maneuver the shuttle out of the way

120
00:08:25,380 --> 00:08:22,720
to put us out of the flight path of that

121
00:08:27,990 --> 00:08:25,390
debris so we do actively track that and

122
00:08:29,730 --> 00:08:28,000
make sure we stay away from it have you

123
00:08:34,830 --> 00:08:29,740
personally ever had to maneuver out of

124
00:08:37,110 --> 00:08:34,840
the way of space junk I did on my first

125
00:08:40,740 --> 00:08:37,120
spaceflight we had a small maneuver to

126
00:08:43,469 --> 00:08:40,750
and make sure we had a adequate space

127
00:08:45,450 --> 00:08:43,479
between us in the debris up here now

128
00:08:47,190 --> 00:08:45,460
tell us a little bit about the the

129
00:08:51,810 --> 00:08:47,200
satellite that's out there what exactly

130
00:08:53,960 --> 00:08:51,820
is it doing it's looking back towards

131
00:08:57,150 --> 00:08:53,970
first and it's looking back into the

132
00:08:58,620 --> 00:08:57,160
medium atmosphere and looking at the

133
00:09:00,330 --> 00:08:58,630
trace elements in there

134
00:09:02,070 --> 00:09:00,340
what we're really trying to do and it's

135
00:09:03,600 --> 00:09:02,080
going from close to the North Pole too

136
00:09:06,780 --> 00:09:03,610
close to the South Pole back and forth

137
00:09:09,450 --> 00:09:06,790
it's time to determine what the dynamics

138
00:09:11,430 --> 00:09:09,460

of that medium atmosphere are and ozone

139
00:09:13,710 --> 00:09:11,440
is one of the elements in that and we're

140
00:09:15,450 --> 00:09:13,720
trying to determine the dynamics

141
00:09:17,970 --> 00:09:15,460
involved in those on the holes moving

142
00:09:19,380 --> 00:09:17,980
around and marching closing back down

143
00:09:22,440 --> 00:09:19,390
and they're trying to get it will get a

144
00:09:25,140 --> 00:09:22,450
handle on there now when will you

145
00:09:27,510 --> 00:09:25,150
actually recover this satellite and do

146
00:09:29,430 --> 00:09:27,520
you know about the the data that it has

147
00:09:34,380 --> 00:09:29,440
been receiving or what we find out about

148
00:09:36,120 --> 00:09:34,390
that later on the we get some feedback

149
00:09:38,100 --> 00:09:36,130
and the ground gets feedback from that

150
00:09:40,620 --> 00:09:38,110
satellite real time but they don't get

151
00:09:41,760 --> 00:09:40,630
all of the data so when we retreat the

152
00:09:43,830 --> 00:09:41,770
satellite and bring it back to earth

153
00:09:45,210 --> 00:09:43,840
they'll get a lot more the data but they

154
00:09:46,860 --> 00:09:45,220
have been receiving data they're very

155
00:09:48,840 --> 00:09:46,870
excited about it one of the things that

156
00:09:51,030 --> 00:09:48,850
satellite has already shown them is if

157
00:09:52,740 --> 00:09:51,040
there's a higher water content in the

158
00:09:55,410 --> 00:09:52,750
northern regions and northern latitudes

159
00:09:58,620 --> 00:09:55,420
then we earlier thought and water plays

160
00:10:02,280 --> 00:09:58,630
into the formation of hydroxides which

161
00:10:04,380 --> 00:10:02,290
are a key element in ozone so already

162
00:10:05,760 --> 00:10:04,390
the scientists on the ground are very

163
00:10:07,980 --> 00:10:05,770

very excited about the results of

164
00:10:10,740 --> 00:10:07,990
crystal and we plan on retrieving at day

165
00:10:12,240 --> 00:10:10,750
after tomorrow will you talk about this

166
00:10:17,340 --> 00:10:12,250
water is this water that is in the

167
00:10:19,880 --> 00:10:17,350
atmosphere yes it is the and one of the

168
00:10:25,340 --> 00:10:19,890
theories is maybe from house-sized

169
00:10:27,690 --> 00:10:25,350
snowballs or their comets long ago

170
00:10:29,340 --> 00:10:27,700
impact our atmosphere that's where that

171
00:10:32,450 --> 00:10:29,350
water came from what do you all do for

172
00:10:36,300 --> 00:10:32,460
entertainment as you're flying around

173
00:10:38,130 --> 00:10:36,310
weightless in orbit if you have free

174
00:10:39,870 --> 00:10:38,140
time yeah I think that would be an

175
00:10:41,880 --> 00:10:39,880
overwhelming we look at the windows ce

176
00:10:44,940 --> 00:10:41,890
o-- the earth is a beautiful planet and

177
00:10:47,790 --> 00:10:44,950
as we travel on this 57 of inclination

178
00:10:49,770 --> 00:10:47,800
we see the most of the world from 57

179
00:10:51,960 --> 00:10:49,780
degrees door to 57 degrees south and

180
00:10:53,700 --> 00:10:51,970
it's just an incredible sight flying

181
00:10:56,190 --> 00:10:53,710
over countries and seeing for example

182
00:10:57,660 --> 00:10:56,200
we're coming up over europe and you can

183
00:10:59,790 --> 00:10:57,670
look down and see all of Italy you can

184
00:11:01,320 --> 00:10:59,800
see the boot but just studying the

185
00:11:05,629 --> 00:11:01,330
geography and looking out the windows a

186
00:11:10,290 --> 00:11:07,980
discovery Houston just to let you know

187
00:11:16,829 --> 00:11:10,300
the mere 23 crew has landed in

188
00:11:18,150 --> 00:11:16,839

Kazakhstan well thanks used to we're

189
00:12:42,450 --> 00:11:18,160
glad they're safely on the ground thanks

190
00:12:48,190 --> 00:12:45,400
and these views now aboard the russian

191
00:12:50,950 --> 00:12:48,200
space station mir ich Apocalyptica

192
00:12:52,750 --> 00:12:50,960
anybody about this video to share they

193
00:12:54,430 --> 00:12:52,760
shouldn't need to put them numbers

194
00:12:58,090 --> 00:12:54,440
another prejudicial exclusion for Saul

195
00:13:02,980 --> 00:12:58,100
atta boy yo man this Excel there's a

196
00:13:05,680 --> 00:13:02,990
place exclusive commander Vasily Sibley

197
00:13:08,080 --> 00:13:05,690
have has been aboard the station for 185

198
00:13:25,450 --> 00:13:08,090
days headed home today along with his

199
00:13:27,370 --> 00:13:25,460
flight engineer alexander levin ET

200
00:13:33,460 --> 00:13:27,380
better basis to the best cleanup will

201
00:13:35,620 --> 00:13:33,470
you prepare water efficient and

202
00:13:38,290 --> 00:13:35,630
Commander Vasily Sibley of talking with

203
00:13:40,660 --> 00:13:38,300
Russian Mission Control outside Moscow

204
00:13:43,630 --> 00:13:40,670
at Korolyov thanking them for all of

205
00:13:48,990 --> 00:13:43,640
their support during his and Lazoo

206
00:13:54,370 --> 00:13:51,850
saying that the time had gone by rather

207
00:13:57,220 --> 00:13:54,380
quickly and they're handing over the

208
00:14:00,340 --> 00:13:57,230
vehicle to in good hands to Anatoly

209
00:14:07,690 --> 00:14:00,350
solovyev and Pavel Vinogradov aboard the

210
00:14:15,040 --> 00:14:07,700
station now as the mere 24 crew ok Danya

211
00:14:17,280 --> 00:14:15,050
the attrition is in here look at that it

212
00:14:25,910 --> 00:14:17,290
was the reporter is only one hour

213
00:14:39,540 --> 00:14:30,850

and a mere 24 commander Anatoly soloviev

214
00:14:44,430 --> 00:14:42,389
so low you have most recently flew

215
00:14:47,009 --> 00:14:44,440
aboard the Space Shuttle on the first

216
00:15:01,980 --> 00:14:47,019
docking mission as part of the mirror 19

217
00:15:05,639 --> 00:15:01,990
crew that was his last mission Soyuz

218
00:15:25,330 --> 00:15:05,649
capsule for the mere 23 crew as docked

219
00:15:39,879 --> 00:15:31,689
do

220
00:15:47,710 --> 00:15:39,889
underway this view looking back at the

221
00:15:55,569 --> 00:15:47,720
station from the Soyuz how do you hit

222
00:15:58,349 --> 00:15:55,579
them up the diameter zoominfo and the

223
00:16:01,479 --> 00:15:58,359
soy is now slowly backing away from the

224
00:16:12,210 --> 00:16:01,489
transfer no detach point on the Russian

225
00:16:19,420 --> 00:16:16,480
ending 185 days stay aboard the station