1
00:03:15,870 --> 00:03:14,100
good evening welcome to the second of

2
00:03:17,730 --> 00:03:15,880
our briefings tonight at the Space

3
00:03:20,790 --> 00:03:17,740
Telescope Science Institute in Baltimore

4
00:03:23,580 --> 00:03:20,800
we have tonight with this dr. Heidi

5
00:03:25,020 --> 00:03:23,590
Hammel who will be discussing in just a

6
00:03:27,090 --> 00:03:25,030
moment the first image from the Hubble

7
00:03:37,920 --> 00:03:27,100
Space Telescope that we receive just a

8
00:03:42,190 --> 00:03:40,330
what you're seeing is a full disc of

9
00:03:45,039 --> 00:03:42,200
Jupiter taken with the with the wide

10
00:03:49,300 --> 00:03:45,049
field camera in a blue filter the

11
00:03:53,039 --> 00:03:49,310
wavelength is 410 nanometers and you see

12
00:03:55,990 --> 00:03:53,049
on the left a blow-up of the impact site

13
00:04:00,759 --> 00:03:56,000

it's expanded and enhanced so you can

14
00:04:05,860 --> 00:04:00,769
see it it's very dark we have

15
00:04:11,440 --> 00:04:05,870
wavelengths ranging from 3036 nanometers

16
00:04:13,000 --> 00:04:11,450
out to 9000 5956 nanometers we don't

17
00:04:14,470 --> 00:04:13,010
have those already to show you now

18
00:04:16,990 --> 00:04:14,480
because we obviously haven't had enough

19
00:04:20,199 --> 00:04:17,000
time to do that but I'd like to describe

20
00:04:23,710 --> 00:04:20,209
for you what it looks like at all

21
00:04:26,620 --> 00:04:23,720
wavelengths except a methane band it

22
00:04:30,279 --> 00:04:26,630
looks like this it's dark and it has

23
00:04:33,580 --> 00:04:30,289
this dark material to the south in the

24
00:04:36,129 --> 00:04:33,590
methane band image the wavelength is 889

25
00:04:39,850 --> 00:04:36,139
nanometers everything that you see is

26
00:04:44,620 --> 00:04:39,860
dark there is bright it's completely

27
00:04:46,270 --> 00:04:44,630
inverted looks like a negative image we

28
00:04:50,100 --> 00:04:46,280
don't fully understand what we're seeing

29
00:04:52,300 --> 00:04:50,110
here yet we don't have ready for you yet

30
00:04:56,409 --> 00:04:52,310
images that were taken in the previous

31
00:05:00,129 --> 00:04:56,419
orbit in that orbit what we could see at

32
00:05:03,339 --> 00:05:00,139
all wavelengths was what looked like a

33
00:05:06,399 --> 00:05:03,349
plume on the limb of the planet and then

34
00:05:10,839 --> 00:05:06,409
we saw the plume flatten as if it was

35
00:05:12,460 --> 00:05:10,849
spreading out and that was always saw we

36
00:05:15,939 --> 00:05:12,470
detected it at all those wavelengths

37
00:05:18,129 --> 00:05:15,949
though and so will be working throughout

38
00:05:22,810 --> 00:05:18,139

the night to get these data ready to

39
00:05:24,640 --> 00:05:22,820
show to you tomorrow morning I would now

40
00:05:26,469 --> 00:05:24,650
like to show you a video if any of you

41
00:05:29,140 --> 00:05:26,479
are not convinced that this is from this

42
00:05:30,460 --> 00:05:29,150
comment I i would like to show you a

43
00:05:32,980 --> 00:05:30,470
video of what jupiter looked like

44
00:05:35,800 --> 00:05:32,990
yesterday and this is brand-new

45
00:05:38,890 --> 00:05:35,810
preliminary data and it's a fairly RAW

46
00:05:42,040 --> 00:05:38,900
format so you'll see seams and colors

47
00:05:43,750 --> 00:05:42,050
that if we had had more than 18 hours we

48
00:05:46,480 --> 00:05:43,760
would have done a prettier job but I

49
00:05:47,709 --> 00:05:46,490
wanted you to see the quality of imaging

50
00:05:49,090 --> 00:05:47,719
that we're getting from the Hubble Space

51
00:05:52,030 --> 00:05:49,100
Telescope so

52
00:05:54,190 --> 00:05:52,040
we could run that video please it was

53
00:05:58,390 --> 00:05:54,200
created by Eric to young based on six

54
00:06:02,110 --> 00:05:58,400
orbits of data yesterday afternoon and I

55
00:06:07,630 --> 00:06:02,120
hope we have the video can you roll the

56
00:06:13,290 --> 00:06:07,640
video please okay it it's going out on

57
00:06:20,710 --> 00:06:16,600
this will basically take five different

58
00:06:22,720 --> 00:06:20,720
images of Hubble and what we have done

59
00:06:26,230 --> 00:06:22,730
is Matt project them and then recombine

60
00:06:31,930 --> 00:06:26,240
them to make basically a sphere I hope

61
00:06:34,240 --> 00:06:31,940
we do get to see it well while they're

62
00:06:36,100 --> 00:06:34,250
working on that let me just show you the

63
00:06:37,540 --> 00:06:36,110

geometry of this impact in case some of

64
00:06:41,230 --> 00:06:37,550
you are a little bit confused because

65
00:06:43,660 --> 00:06:41,240
that's a very confusing image if this is

66
00:06:47,470 --> 00:06:43,670
Jupiter and you're all on the earth

67
00:06:50,620 --> 00:06:47,480
you're looking this way okay Jupiter's

68
00:06:53,260 --> 00:06:50,630
spinning like this okay these impacts

69
00:06:56,200 --> 00:06:53,270
this train of comets nuclei are coming

70
00:06:58,600 --> 00:06:56,210
in from the bottom at about an angle

71
00:07:03,010 --> 00:06:58,610
something like this and you can't see

72
00:07:06,460 --> 00:07:03,020
them happen all right there we go let's

73
00:07:08,950 --> 00:07:06,470
take a quick look at the video this is a

74
00:07:11,710 --> 00:07:08,960
very rough reconstruction but you can

75
00:07:15,130 --> 00:07:11,720
see the amazing quality of the images

76
00:07:17,770 --> 00:07:15,140
from the wide field camera and there is

77
00:07:20,860 --> 00:07:17,780
the site it's going to stop on the right

78
00:07:23,260 --> 00:07:20,870
longitude so you can see the pre impact

79
00:07:26,530 --> 00:07:23,270
view there's the Great Red Spot and a

80
00:07:28,540 --> 00:07:26,540
white oval this is the wide field camera

81
00:07:32,200 --> 00:07:28,550
with the planetary camera we're going to

82
00:07:33,820 --> 00:07:32,210
get even better resolution and we'll of

83
00:07:35,140 --> 00:07:33,830
course we'll have a little bit of time

84
00:07:39,460 --> 00:07:35,150
to clean this up and it'll be a really

85
00:07:41,830 --> 00:07:39,470
nice video when we get that chance okay

86
00:07:43,270 --> 00:07:41,840
that's the view very similar not quite

87
00:07:44,710 --> 00:07:43,280
exactly the same is similar to the

88
00:07:47,530 --> 00:07:44,720

impact site you see the Great Red Spot

89
00:07:50,380 --> 00:07:47,540
and you see that little white plume off

90
00:07:54,490 --> 00:07:50,390
to the side that just below and to the

91
00:07:55,840 --> 00:07:54,500
left and if we could go back to the

92
00:07:59,980 --> 00:07:55,850
other one I don't know if that's

93
00:08:02,270 --> 00:07:59,990
possible or not yes we can

94
00:08:04,370 --> 00:08:02,280
we'll look again for the great red spot

95
00:08:06,440 --> 00:08:04,380
in that white spot and you'll see where

96
00:08:12,460 --> 00:08:06,450
the little black thing is next to it the

97
00:08:16,580 --> 00:08:15,470
little bit of dead time okay in the

98
00:08:18,980 --> 00:08:16,590
meantime while they're working on that

99
00:08:20,690 --> 00:08:18,990
continue my story here all right you

100
00:08:22,790 --> 00:08:20,700
could not see the impacts occurring

101
00:08:25,820 --> 00:08:22,800
although the Galileo spacecraft you'll

102
00:08:27,770 --> 00:08:25,830
all remember is in a perfect view to get

103
00:08:29,810 --> 00:08:27,780
some good pictures of that and so that

104
00:08:32,360 --> 00:08:29,820
will be fascinating to see here we go

105
00:08:34,700 --> 00:08:32,370
see the Great Red Spot see the little

106
00:08:37,159 --> 00:08:34,710
white oval and now further on you see

107
00:08:40,670 --> 00:08:37,169
that black splotch it was not there the

108
00:08:43,870 --> 00:08:40,680
day before it's a new feature on Jupiter

109
00:08:47,030 --> 00:08:43,880
and we're going to have 20 more of them

110
00:08:51,200 --> 00:08:47,040
even brighter it's going to be a great

111
00:08:53,090 --> 00:08:51,210
week so I think I'll stop there and let

112
00:08:55,100 --> 00:08:53,100
the rest of my team have some time to

113
00:08:56,660 --> 00:08:55,110

talk ok I'd like to go ahead and

114
00:08:58,850 --> 00:08:56,670
introduce the other members of science

115
00:09:01,430 --> 00:08:58,860
team thank you dr. Hamill to her left

116
00:09:03,350 --> 00:09:01,440
dr. Hal Weaver of the Space Telescope

117
00:09:05,630 --> 00:09:03,360
Science Institute member of the wide

118
00:09:10,040 --> 00:09:05,640
field and planetary camera 2 and faint

119
00:09:11,930 --> 00:09:10,050
object spectrograph teams next dr. Keith

120
00:09:13,520 --> 00:09:11,940
Knoll of the Institute a member of the

121
00:09:17,270 --> 00:09:13,530
faint object spectrograph and high

122
00:09:20,120 --> 00:09:17,280
resolution spectrograph team next is dr.

123
00:09:21,140 --> 00:09:20,130
john clark university of michigan and a

124
00:09:24,850 --> 00:09:21,150
member of the wide field planetary

125
00:09:29,150 --> 00:09:24,860
camera 2 and faint object camera teams

126
00:09:32,090 --> 00:09:29,160
following that is dr. bob west of Jet

127
00:09:36,430 --> 00:09:32,100
Propulsion Laboratory and he's a member

128
00:09:41,060 --> 00:09:39,410
at the end hi down there Melissa dr.

129
00:09:42,620 --> 00:09:41,070
Melissa McGrath the Space Telescope

130
00:09:45,110 --> 00:09:42,630
Science Institute a member of the faint

131
00:09:48,800 --> 00:09:45,120
object spectrograph and high resolution

132
00:09:52,730 --> 00:09:50,810
and what I'd like to do at this point is

133
00:09:55,100 --> 00:09:52,740
turn it over to hell and just for a few

134
00:09:56,570 --> 00:09:55,110
brief comments and the discussion

135
00:09:59,930 --> 00:09:56,580
members of the team and we'll open it to

136
00:10:01,519 --> 00:09:59,940
Q&A first of all I just like to say it

137
00:10:03,490 --> 00:10:01,529
looks like this comment was not a done

138
00:10:06,440 --> 00:10:03,500

let it ring out to the rest of the world

139
00:10:08,420 --> 00:10:06,450
we've had a wonderful time observing

140
00:10:10,970 --> 00:10:08,430
this fascinating object up until now but

141
00:10:14,840 --> 00:10:10,980
of course it's been highly uncertain as

142
00:10:16,760 --> 00:10:14,850
to how big these pieces are our last we

143
00:10:19,460 --> 00:10:16,770
took to some images of the comment on

144
00:10:21,440 --> 00:10:19,470
Thursday and there were some reports

145
00:10:22,940 --> 00:10:21,450
that the comment was fragmenting but in

146
00:10:24,620 --> 00:10:22,950
fact when you look at the Hubble images

147
00:10:27,700 --> 00:10:24,630
there was no evidence that you know the

148
00:10:31,910 --> 00:10:27,710
kind of the pieces were fragmenting and

149
00:10:34,640 --> 00:10:31,920
the fact that we see a plume coming out

150
00:10:37,040 --> 00:10:34,650
of this explosion it's very strong

151
00:10:39,200 --> 00:10:37,050
evidence that these nuclei are traveling

152
00:10:40,850 --> 00:10:39,210
very deep into Jupiter's atmosphere it's

153
00:10:42,230 --> 00:10:40,860
hard to understand how you have

154
00:10:44,440 --> 00:10:42,240
something's going to shoot out above the

155
00:10:47,240 --> 00:10:44,450
limb by a thousand kilometers or more

156
00:10:48,769 --> 00:10:47,250
unless you had a plume formed an

157
00:10:51,200 --> 00:10:48,779
explosion deep down in the atmosphere

158
00:10:56,240 --> 00:10:51,210
that would be my preliminary guess at

159
00:10:57,950 --> 00:10:56,250
what's going on all right now just for a

160
00:11:00,680 --> 00:10:57,960
couple of moments I know everyone is

161
00:11:02,510 --> 00:11:00,690
prepared here for a lot of questions and

162
00:11:04,340 --> 00:11:02,520
we would like to go ahead and open it up

163
00:11:07,370 --> 00:11:04,350

in just a moment but we do have right

164
00:11:10,160 --> 00:11:07,380
now to show you a video that was taken

165
00:11:12,680 --> 00:11:10,170
just a few minutes actually a few hours

166
00:11:14,960 --> 00:11:12,690
ago during the initial receipt of the

167
00:11:17,300 --> 00:11:14,970
data here at the Hubble Institute so go

168
00:11:23,520 --> 00:11:17,310
ahead and roll the video and we'll see

169
00:11:30,940 --> 00:11:29,710
we're looking for something yeah the

170
00:11:44,760 --> 00:11:30,950
latitude that we're looking for

171
00:11:44,770 --> 00:12:21,970
okay

172
00:12:29,030 --> 00:12:24,710
for the benefit of members in the

173
00:12:31,280 --> 00:12:29,040
gallery here we will have a rerun of the

174
00:12:33,380 --> 00:12:31,290
state later we apologize we had some

175
00:12:35,840 --> 00:12:33,390
tape sync problems the signal went out

176
00:12:38,450 --> 00:12:35,850
on the satellite ok however I understand

177
00:12:40,970 --> 00:12:38,460
so we will replay it and we have some

178
00:12:44,660 --> 00:12:40,980
dubs available for the media that need

179
00:12:48,530 --> 00:12:44,670
that after after the briefing apologize

180
00:12:51,310 --> 00:12:48,540
for that but the or we're all working in

181
00:12:53,000 --> 00:12:51,320
real time here and we do have a few of

182
00:12:54,170 --> 00:12:53,010
difficulties with some technical

183
00:12:55,880 --> 00:12:54,180
equipment as we're trying to work

184
00:12:58,370 --> 00:12:55,890
through but I'd like to open it up to

185
00:13:00,800 --> 00:12:58,380
questions and answers if we're all ready

186
00:13:02,840 --> 00:13:00,810
for that here and the Institute in

187
00:13:04,910 --> 00:13:02,850
Baltimore and please wait for the

188
00:13:08,860 --> 00:13:04,920

microphone and state your name and

189
00:13:13,940 --> 00:13:08,870
affiliation any questions in front row

190
00:13:15,740 --> 00:13:13,950
wait for the microphone Linda Howe

191
00:13:20,000 --> 00:13:15,750
chancellor communications Philadelphia

192
00:13:22,370 --> 00:13:20,010
in one of the email releases out here it

193
00:13:24,830 --> 00:13:22,380
said that the Nordic optical telescope

194
00:13:27,800 --> 00:13:24,840
in la palma in the Canary Islands had

195
00:13:31,310 --> 00:13:27,810
reported that two hours after the first

196
00:13:34,580 --> 00:13:31,320
bright image was seen that there a black

197
00:13:37,340 --> 00:13:34,590
dot became visible in the video image of

198
00:13:40,280 --> 00:13:37,350
Jupiter at exactly the same position of

199
00:13:43,550 --> 00:13:40,290
this bright impact what could make this

200
00:13:49,580 --> 00:13:43,560
black dot be seen two hours after this

201
00:13:55,950 --> 00:13:52,560
pretty simple part of the part of the

202
00:13:58,940 --> 00:13:55,960
answer to that is pretty simple the

203
00:14:01,650 --> 00:13:58,950
impact occurred at a certain time we saw

204
00:14:06,360 --> 00:14:01,660
apparently a plume on the on the limb of

205
00:14:10,110 --> 00:14:06,370
Jupiter at that time and then as Jupiter

206
00:14:13,230 --> 00:14:10,120
rotated into our rotated around as it

207
00:14:15,990 --> 00:14:13,240
does the impact site came into our view

208
00:14:18,390 --> 00:14:16,000
and that impact site is a place where we

209
00:14:20,700 --> 00:14:18,400
now see dark material and so is Jupiter

210
00:14:22,020 --> 00:14:20,710
continues to rotate that's coming more

211
00:14:23,370 --> 00:14:22,030
and more into our field of view and I

212
00:14:25,440 --> 00:14:23,380
think the fact that they're reporting

213
00:14:28,290 --> 00:14:25,450

seeing about two hours after the initial

214
00:14:30,780 --> 00:14:28,300
plume is that initially it was it was

215
00:14:32,460 --> 00:14:30,790
close to the the edge of where the

216
00:14:34,680 --> 00:14:32,470
sunlight is and very difficult to see on

217
00:14:37,470 --> 00:14:34,690
the edge of Jupiter and I think their

218
00:14:39,240 --> 00:14:37,480
camera system was probably not good

219
00:14:42,210 --> 00:14:39,250
enough had didn't have enough resolution

220
00:14:44,130 --> 00:14:42,220
to see that until it rotated far enough

221
00:14:47,130 --> 00:14:44,140
into interview that they could pick it

222
00:14:48,570 --> 00:14:47,140
up whereas we saw it essentially

223
00:14:50,640 --> 00:14:48,580
immediately or at least in the next

224
00:14:52,950 --> 00:14:50,650
orbit and there's also the question that

225
00:14:55,860 --> 00:14:52,960
may be part of your question is why are

226
00:14:57,930 --> 00:14:55,870
we seeing black material and that's the

227
00:15:00,420 --> 00:14:57,940
more interesting question I don't think

228
00:15:03,300 --> 00:15:00,430
anybody expected us to see black

229
00:15:06,150 --> 00:15:03,310
material I certainly didn't I expected

230
00:15:07,800 --> 00:15:06,160
that we would see perhaps bright

231
00:15:11,340 --> 00:15:07,810
material in the methane image which we

232
00:15:14,040 --> 00:15:11,350
do see but in other images I thought we

233
00:15:15,990 --> 00:15:14,050
might not see anything the reit I'm

234
00:15:19,230 --> 00:15:16,000
going to speculate now about why we

235
00:15:21,240 --> 00:15:19,240
might be seeing black material there's a

236
00:15:24,150 --> 00:15:21,250
couple of possibilities and I think what

237
00:15:26,610 --> 00:15:24,160
we're seeing here our particles either

238
00:15:28,830 --> 00:15:26,620

from the comet itself or particles that

239
00:15:31,560 --> 00:15:28,840
may have been dredged up from deeper and

240
00:15:34,800 --> 00:15:31,570
Jupiter's atmosphere if the particles

241
00:15:36,780 --> 00:15:34,810
are from the comet they could be partly

242
00:15:40,580 --> 00:15:36,790
silicate particles and maybe a little

243
00:15:43,230 --> 00:15:40,590
bit of iron in there they could also be

244
00:15:45,330 --> 00:15:43,240
carbonaceous material which normally is

245
00:15:48,870 --> 00:15:45,340
black the trouble with that explanation

246
00:15:51,090 --> 00:15:48,880
though is that we expect that material

247
00:15:54,300 --> 00:15:51,100
to have undergone very high temperatures

248
00:15:56,700 --> 00:15:54,310
something like 40,000 degrees Kelvin at

249
00:15:58,920 --> 00:15:56,710
those temperatures any particles would

250
00:16:00,060 --> 00:15:58,930
vaporize the carbon would probably go

251
00:16:02,790 --> 00:16:00,070
into

252
00:16:06,200 --> 00:16:02,800
carbon monoxide gas and we wouldn't see

253
00:16:09,480 --> 00:16:06,210
it that's one reason it's very puzzling

254
00:16:12,510 --> 00:16:09,490
as the fireball would rise out of the

255
00:16:15,000 --> 00:16:12,520
atmosphere the plume arises everything

256
00:16:17,340 --> 00:16:15,010
cools very quickly and out of that

257
00:16:20,130 --> 00:16:17,350
cooling cloud you expect things to

258
00:16:21,960 --> 00:16:20,140
condense like silicates and maybe even

259
00:16:23,880 --> 00:16:21,970
some of these carbonaceous particles if

260
00:16:26,460 --> 00:16:23,890
they're still around and finally Isis

261
00:16:28,800 --> 00:16:26,470
like water or ammonia ice we expect

262
00:16:31,440 --> 00:16:28,810
would condense as a as the thing cools

263
00:16:33,660 --> 00:16:31,450

enough now Isis we expect to be white so

264
00:16:37,440 --> 00:16:33,670
again we're puzzled why are we seeing

265
00:16:41,970 --> 00:16:37,450
dark stuff and going further in

266
00:16:43,440 --> 00:16:41,980
speculation we expect that in Jupiter's

267
00:16:45,330 --> 00:16:43,450
atmosphere there's a lot of sulfur

268
00:16:47,820 --> 00:16:45,340
although we haven't observed it

269
00:16:49,800 --> 00:16:47,830
spectroscopically yet we think there is

270
00:16:52,560 --> 00:16:49,810
we think that if there's material

271
00:16:54,210 --> 00:16:52,570
dredged up from the atmosphere it might

272
00:16:57,960 --> 00:16:54,220
be rich in sulfur as well as other

273
00:17:02,400 --> 00:16:57,970
things water and ammonia sulfur can can

274
00:17:04,500 --> 00:17:02,410
form colored compounds and just what

275
00:17:07,890 --> 00:17:04,510
kind of compounds would form in this

276
00:17:10,500 --> 00:17:07,900
situation I'm not prepared to say and so

277
00:17:12,929 --> 00:17:10,510
I'm guessing that maybe sulfur sulfur

278
00:17:16,140 --> 00:17:12,939
ions in some form are contributing to

279
00:17:18,390 --> 00:17:16,150
this dark stuff just quick follow-up in

280
00:17:21,000 --> 00:17:18,400
addition to the mystery of the color I

281
00:17:23,699 --> 00:17:21,010
also wondered if seeing this two hours

282
00:17:25,980 --> 00:17:23,709
after after perhaps the initial impact

283
00:17:28,530 --> 00:17:25,990
does that mean that we could be seeing

284
00:17:31,530 --> 00:17:28,540
the residue of these impacts for much

285
00:17:32,970 --> 00:17:31,540
longer than anyone ever thought I'm not

286
00:17:37,200 --> 00:17:32,980
sure about longer than anyone ever

287
00:17:38,970 --> 00:17:37,210
thought because in my thinking I expect

288
00:17:40,800 --> 00:17:38,980

that we should be able to see the

289
00:17:43,350 --> 00:17:40,810
residuals these particles in the

290
00:17:45,780 --> 00:17:43,360
stratosphere for possibly a year or

291
00:17:50,190 --> 00:17:45,790
longer and in fact when I proposed to do

292
00:17:52,980 --> 00:17:50,200
this observing it was to look over long

293
00:17:54,840 --> 00:17:52,990
timescales to use these particles as

294
00:17:57,720 --> 00:17:54,850
tracers of the stratospheric motion I

295
00:18:00,300 --> 00:17:57,730
see this I viewed this event is possibly

296
00:18:02,550 --> 00:18:00,310
analogous to on earth when there is a

297
00:18:05,250 --> 00:18:02,560
large eruption from like el chicano

298
00:18:06,960 --> 00:18:05,260
Pinatubo volcanic eruptions put

299
00:18:08,880 --> 00:18:06,970
particles high in the atmosphere where

300
00:18:11,310 --> 00:18:08,890
there were the stability of the

301
00:18:12,659 --> 00:18:11,320
atmosphere is is the atmosphere is very

302
00:18:15,239 --> 00:18:12,669
stable and there

303
00:18:17,460 --> 00:18:15,249
or particles can reside there for a long

304
00:18:19,919 --> 00:18:17,470
time and in fact on the earth this is

305
00:18:21,419 --> 00:18:19,929
one way we learn about the dynamics and

306
00:18:23,789 --> 00:18:21,429
circulation of the stratosphere is by

307
00:18:26,460 --> 00:18:23,799
watching how these particles spread with

308
00:18:29,009 --> 00:18:26,470
time and so I saw this is the first

309
00:18:31,470 --> 00:18:29,019
opportunity ever of doing this kind of

310
00:18:32,909 --> 00:18:31,480
thing on Jupiter and the timescales for

311
00:18:35,639 --> 00:18:32,919
spreading on earth in the stratosphere

312
00:18:38,519 --> 00:18:35,649
are over the order of a year or so and I

313
00:18:42,720 --> 00:18:38,529

expect that we may still be seeing stuff

314
00:18:45,090 --> 00:18:42,730
here from now from these events right

315
00:18:46,379 --> 00:18:45,100
here at second row I wait for the mic

316
00:18:48,960 --> 00:18:46,389
please and also I'd like to ask the

317
00:18:52,049 --> 00:18:48,970
panel members to introduce yourself also

318
00:18:53,789 --> 00:18:52,059
to to help us out here thank you Bob

319
00:18:56,430 --> 00:18:53,799
cook Newsday I understand one of the

320
00:18:58,109 --> 00:18:56,440
really interesting possibilities was the

321
00:18:59,970 --> 00:18:58,119
comments might get deep enough to punch

322
00:19:06,509 --> 00:18:59,980
through the water clouds if they exist

323
00:19:09,840 --> 00:19:06,519
you think that might have happened one

324
00:19:12,779 --> 00:19:09,850
of the sorry Keith know from Space

325
00:19:14,070 --> 00:19:12,789
Telescope Science Institute one of the

326
00:19:15,930 --> 00:19:14,080
key things and all the spectroscopic

327
00:19:18,180 --> 00:19:15,940
observations that will be looking for

328
00:19:21,389 --> 00:19:18,190
both with Hubble Space Telescope and

329
00:19:22,590 --> 00:19:21,399
ground-based telescopes or molecules

330
00:19:26,009 --> 00:19:22,600
that are dredged up from the deep

331
00:19:28,739 --> 00:19:26,019
atmosphere and as you said the water

332
00:19:31,259 --> 00:19:28,749
cloud would be one of the things that

333
00:19:34,320 --> 00:19:31,269
would be looking for very keenly the

334
00:19:36,029 --> 00:19:34,330
reason for that is that if we see a huge

335
00:19:37,379 --> 00:19:36,039
increase in the amount of water more

336
00:19:40,560 --> 00:19:37,389
than could have come from the comet

337
00:19:42,180 --> 00:19:40,570
itself will know something about the

338
00:19:43,889 --> 00:19:42,190

energy of the impactor and how deep it

339
00:19:47,909 --> 00:19:43,899
penetrated into the atmosphere so we'll

340
00:19:49,529 --> 00:19:47,919
be using these molecular clues the

341
00:19:52,080 --> 00:19:49,539
debris from the comet and the stuff

342
00:19:54,960 --> 00:19:52,090
churned up from the atmosphere to tell

343
00:19:56,340 --> 00:19:54,970
us things about size of the comet how

344
00:20:00,710 --> 00:19:56,350
deeply penetrated into the atmosphere

345
00:20:04,739 --> 00:20:00,720
and as Bob alluded to before possibly

346
00:20:06,239 --> 00:20:04,749
allow us to see molecules that until now

347
00:20:15,570 --> 00:20:06,249
have been too deep in Jupiter's

348
00:20:19,480 --> 00:20:17,919
in the past few weeks we've been told

349
00:20:22,210 --> 00:20:19,490
that amateur astronomers have little

350
00:20:23,919 --> 00:20:22,220
chance of seeing this event does what

351
00:20:25,779 --> 00:20:23,929
you've seen so far make you a little

352
00:20:28,090 --> 00:20:25,789
more optimistic about with the unwashed

353
00:20:36,999 --> 00:20:28,100
masses or the semi wash matches washed

354
00:20:37,960 --> 00:20:37,009
message might say I'm Melissa McGrath

355
00:20:40,659 --> 00:20:37,970
from the Space Telescope Science

356
00:20:43,360 --> 00:20:40,669
Institute the most dramatic results

357
00:20:45,909 --> 00:20:43,370
we've seen so far brightness wise have

358
00:20:48,310 --> 00:20:45,919
actually been in the infrared and so

359
00:20:50,259 --> 00:20:48,320
unless they had infrared instruments I

360
00:20:52,509 --> 00:20:50,269
think actually in the visible it's

361
00:20:55,690 --> 00:20:52,519
unlikely that this would have been seen

362
00:20:58,090 --> 00:20:55,700
Hubble saw it because it has such good

363
00:21:01,090 --> 00:20:58,100

resolution and when you see the images

364
00:21:03,730 --> 00:21:01,100
tomorrow of the first plume that we

365
00:21:06,369 --> 00:21:03,740
detected it was very small very small

366
00:21:08,379 --> 00:21:06,379
and very close to the loom and because

367
00:21:10,539 --> 00:21:08,389
Jupiter's so bright that's very

368
00:21:13,570 --> 00:21:10,549
difficult to see with anything but

369
00:21:16,749 --> 00:21:13,580
Hubble so I imagine I mean we know that

370
00:21:18,070 --> 00:21:16,759
the B impact is at ten-thirty and some

371
00:21:20,080 --> 00:21:18,080
of us would actually like to go outside

372
00:21:22,690 --> 00:21:20,090
with our binoculars at ten-thirty and

373
00:21:25,180 --> 00:21:22,700
look because bees a lot bigger than a

374
00:21:27,129 --> 00:21:25,190
and so are a lot brighter than a so we

375
00:21:29,740 --> 00:21:27,139
think that means a lot bigger so you

376
00:21:31,509 --> 00:21:29,750
know it wasn't so bright in a and the

377
00:21:33,790 --> 00:21:31,519
visible but he may be brighter and I

378
00:21:38,600 --> 00:21:33,800
think we should all go work

379
00:21:42,050 --> 00:21:38,610
here at second rope it please state your

380
00:21:44,240 --> 00:21:42,060
name and affiliation Clint achoo San

381
00:21:48,200 --> 00:21:44,250
Jose Mercury News I'm a puzzle about how

382
00:21:49,820 --> 00:21:48,210
to describe this thing to readers what

383
00:21:51,980 --> 00:21:49,830
was it dark was it bright or what

384
00:21:54,020 --> 00:21:51,990
because some of the email messages were

385
00:21:56,270 --> 00:21:54,030
describing something right enough at

386
00:21:58,460 --> 00:21:56,280
certain wavelengths of light that it out

387
00:22:00,710 --> 00:21:58,470
shown anything else on Jupiter from the

388
00:22:03,020 --> 00:22:00,720

the things that look like polar caps in

389
00:22:06,560 --> 00:22:03,030
the methane band to anything else and

390
00:22:08,360 --> 00:22:06,570
even now shown I oh and then then you're

391
00:22:10,730 --> 00:22:08,370
talking about I guess in the visible

392
00:22:12,830 --> 00:22:10,740
wavelengths of thing is dark and so I

393
00:22:14,360 --> 00:22:12,840
don't know if I tell people that this is

394
00:22:15,950 --> 00:22:14,370
a real bright thing and then out shown

395
00:22:17,870 --> 00:22:15,960
everything am I really misleading them

396
00:22:20,360 --> 00:22:17,880
and what is the significance of this

397
00:22:22,220 --> 00:22:20,370
methane band or the implement the

398
00:22:23,750 --> 00:22:22,230
infrared bands that you're observing

399
00:22:24,770 --> 00:22:23,760
what are you seeing that that is

400
00:22:29,030 --> 00:22:24,780
different from what you're seeing in

401
00:22:31,430 --> 00:22:29,040
visible light i'm john clark university

402
00:22:33,470 --> 00:22:31,440
of michigan let me start with the

403
00:22:36,500 --> 00:22:33,480
infrared bands in the infrared you're

404
00:22:38,270 --> 00:22:36,510
looking you can think of it as a heat as

405
00:22:40,070 --> 00:22:38,280
much as it is light as you go farther

406
00:22:42,110 --> 00:22:40,080
into the infrared you sampling lower

407
00:22:43,760 --> 00:22:42,120
temperatures and these were at

408
00:22:46,760 --> 00:22:43,770
temperatures that are much hotter than

409
00:22:48,110 --> 00:22:46,770
what we have here in this room there

410
00:22:49,700 --> 00:22:48,120
were two wavelengths of about two

411
00:22:51,920 --> 00:22:49,710
microns where it appeared very bright

412
00:22:53,960 --> 00:22:51,930
and there it appeared bright because

413
00:22:56,060 --> 00:22:53,970

that one localized region was much

414
00:22:58,250 --> 00:22:56,070
hotter than the tops of Jupiter's clouds

415
00:23:00,740 --> 00:22:58,260
overall so it appeared to have a high

416
00:23:02,480 --> 00:23:00,750
contrast when we look at these visible

417
00:23:04,400 --> 00:23:02,490
wavelengths we're looking at sun light

418
00:23:06,890 --> 00:23:04,410
that's reflected from the cloud tops and

419
00:23:09,260 --> 00:23:06,900
they're there as much there's relatively

420
00:23:11,600 --> 00:23:09,270
less contrast here than you see infra

421
00:23:13,880 --> 00:23:11,610
red but there's more information about

422
00:23:16,400 --> 00:23:13,890
the disturbance because we have the

423
00:23:18,710 --> 00:23:16,410
better resolution in the methane band

424
00:23:21,140 --> 00:23:18,720
filter in particular we're looking at a

425
00:23:23,540 --> 00:23:21,150
particular wavelength of light of Sun

426
00:23:26,090 --> 00:23:23,550
light that is absorbed by gas methane

427
00:23:28,340 --> 00:23:26,100
gas in Jupiter's atmosphere and their

428
00:23:30,710 --> 00:23:28,350
Jupiter overall the pier is much darker

429
00:23:32,330 --> 00:23:30,720
because the the sunlight is being

430
00:23:34,820 --> 00:23:32,340
absorbed by the gas that's normally in

431
00:23:36,770 --> 00:23:34,830
the atmosphere and there the the comet

432
00:23:38,990 --> 00:23:36,780
fragment appears relatively bright just

433
00:23:41,930 --> 00:23:39,000
as a matter of contrast so it's a

434
00:23:43,490 --> 00:23:41,940
relative brightness thing there we also

435
00:23:46,860 --> 00:23:43,500
will be getting images in the

436
00:23:49,360 --> 00:23:46,870
ultraviolet wavelengths the first

437
00:23:51,520 --> 00:23:49,370
well about eight or ten hours will be

438
00:23:53,530 --> 00:23:51,530

taken and I'll come down tomorrow and in

439
00:23:55,210 --> 00:23:53,540
the ultraviolet which is my main

440
00:23:56,680 --> 00:23:55,220
interest will be observing the very

441
00:23:59,440 --> 00:23:56,690
highest parts of Jupiter's atmosphere

442
00:24:01,600 --> 00:23:59,450
and from what we've seen already in the

443
00:24:04,510 --> 00:24:01,610
lower parts I'm looking forward to

444
00:24:12,040 --> 00:24:04,520
seeing images and we'll get those

445
00:24:13,510 --> 00:24:12,050
tomorrow about noon in the front bill

446
00:24:14,980 --> 00:24:13,520
Hartwick CBS and I might have missed

447
00:24:17,500 --> 00:24:14,990
this earlier if I did I apologize can

448
00:24:22,300 --> 00:24:17,510
anyone give us a scale for the structure

449
00:24:25,410 --> 00:24:22,310
that we're seeing here how long have to

450
00:24:29,500 --> 00:24:25,420
be in fact this was and how big this is

451
00:24:33,540 --> 00:24:29,510
and I have a follow the box that you see

452
00:24:36,490 --> 00:24:33,550
the zoom box is about to earth diameters

453
00:24:39,070 --> 00:24:36,500
so that that structure that you're

454
00:24:43,600 --> 00:24:39,080
seeing that circular pattern is about

455
00:24:46,180 --> 00:24:43,610
the size of the earth Jupiter's a big

456
00:24:52,270 --> 00:24:46,190
planet remember that this is the a

457
00:24:55,720 --> 00:24:52,280
impact G is much brighter my next

458
00:24:56,740 --> 00:24:55,730
question actually a whole bunch of

459
00:24:59,410 --> 00:24:56,750
questions but I don't suppose that

460
00:25:01,330 --> 00:24:59,420
looking at this raw data that we know

461
00:25:04,930 --> 00:25:01,340
any have any better guest a minister how

462
00:25:06,370 --> 00:25:04,940
deep is this thing plunge don't you well

463
00:25:09,220 --> 00:25:06,380

as i said the fact that you see the

464
00:25:11,530 --> 00:25:09,230
plume means that you know you probably

465
00:25:12,970 --> 00:25:11,540
went very deep and produced a fireball

466
00:25:16,150 --> 00:25:12,980
like the theorists have been describing

467
00:25:17,860 --> 00:25:16,160
and you know we have a we have a plume

468
00:25:20,320 --> 00:25:17,870
that extends out more than thousand

469
00:25:24,070 --> 00:25:20,330
kilometers above the normal limb of the

470
00:25:25,360 --> 00:25:24,080
planet so i think that's that's pretty

471
00:25:28,720 --> 00:25:25,370
good evidence that you know these

472
00:25:30,940 --> 00:25:28,730
impacts really are 200,000 megatons of

473
00:25:33,519 --> 00:25:30,950
tnt or more

474
00:25:35,919 --> 00:25:33,529
did it does this match what you would

475
00:25:37,269 --> 00:25:35,929
expect from the model how deep you you

476
00:25:40,149 --> 00:25:37,279
thought you would get to get this kind

477
00:25:43,930 --> 00:25:40,159
of effect there were so many models you

478
00:25:45,430 --> 00:25:43,940
can imagine anything by the shoemaker's

479
00:25:46,990 --> 00:25:45,440
earlier tonight I mean is this matching

480
00:25:48,610 --> 00:25:47,000
pretty much with those that we missed

481
00:25:50,649 --> 00:25:48,620
the priest combo we were watching the

482
00:25:52,539 --> 00:25:50,659
integers gonna we can't tell you that

483
00:25:54,279 --> 00:25:52,549
when the shoemaker's saw the images jean

484
00:25:56,409 --> 00:25:54,289
shoemaker was extremely happy so

485
00:25:57,940 --> 00:25:56,419
apparently that's pretty good and the

486
00:25:59,740 --> 00:25:57,950
last question for me is how surprised

487
00:26:01,960 --> 00:25:59,750
were you people are really well you

488
00:26:05,980 --> 00:26:01,970

couldn't see that video we were pretty

489
00:26:08,830 --> 00:26:05,990
darn surprised this this is in my dreams

490
00:26:11,250 --> 00:26:08,840
the kind of stuff we saw we we couldn't

491
00:26:19,930 --> 00:26:11,260
have gotten any better no this is

492
00:26:23,259 --> 00:26:19,940
incredible next question second row Ron

493
00:26:25,690 --> 00:26:23,269
Cowan science news is it an agreement

494
00:26:29,950 --> 00:26:25,700
now about when this it when they

495
00:26:32,919 --> 00:26:29,960
actually hit Jupiter or we're working on

496
00:26:35,740 --> 00:26:32,929
that right now and would you mean would

497
00:26:38,440 --> 00:26:35,750
you say Hubble's saw this a minute after

498
00:26:46,299 --> 00:26:38,450
a few minutes after 30 minutes after you

499
00:26:48,430 --> 00:26:46,309
need our own a nap well that is but we

500
00:26:52,570 --> 00:26:48,440
saw the image on the limb and that was

501
00:26:55,389 --> 00:26:52,580
probably within 10 minutes 5 minutes 5

502
00:26:57,159 --> 00:26:55,399
to 10 minutes yeah we've we've and some

503
00:26:59,610 --> 00:26:57,169
of the ones later on in the week are

504
00:27:01,810 --> 00:26:59,620
actually impacting closer to the limb

505
00:27:04,799 --> 00:27:01,820
summit and they are brighter than this

506
00:27:07,240 --> 00:27:04,809
you know I would say one thing that G

507
00:27:12,580 --> 00:27:07,250
probably has an energy that's about 25

508
00:27:15,909 --> 00:27:12,590
times as high as a I'm just checking in

509
00:27:17,799 --> 00:27:15,919
that black spot there is the diameter of

510
00:27:21,220 --> 00:27:17,809
Earth is that what you're saying well

511
00:27:24,070 --> 00:27:21,230
the box you can fit to earth diameters

512
00:27:25,899 --> 00:27:24,080
in that box what about the black spot

513
00:27:27,789 --> 00:27:25,909

which is the that would be half the

514
00:27:30,049 --> 00:27:27,799
earth diannemurray but that's what

515
00:27:34,110 --> 00:27:30,059
everybody within yes

516
00:27:36,150 --> 00:27:34,120
third to a half and lastly what's again

517
00:27:40,110 --> 00:27:36,160
at the moment what's the best estimate

518
00:27:49,180 --> 00:27:40,120
for the diameter of fragment a between

519
00:27:55,490 --> 00:27:52,730
hi I'm nolol McCormick with space x is

520
00:27:57,740 --> 00:27:55,500
there they took the image off the with

521
00:28:02,529 --> 00:27:57,750
acoustic energy be visible from these

522
00:28:06,289 --> 00:28:02,539
strikes well mark Marley would think so

523
00:28:08,810 --> 00:28:06,299
we have a lot of debate about that the

524
00:28:11,480 --> 00:28:08,820
dark area of way from the you know that

525
00:28:13,880 --> 00:28:11,490
surrounds this the darkest area could

526
00:28:17,450 --> 00:28:13,890
that be that type of energy we've been

527
00:28:19,610 --> 00:28:17,460
debating it my preference is to say no I

528
00:28:22,340 --> 00:28:19,620
think it's very difficult to make

529
00:28:24,289 --> 00:28:22,350
something dark on Jupiter from a

530
00:28:27,140 --> 00:28:24,299
pressure wave of something like that I

531
00:28:29,210 --> 00:28:27,150
think I think the likelihood is that

532
00:28:31,760 --> 00:28:29,220
anything thats dark on Jupiter is caused

533
00:28:34,610 --> 00:28:31,770
by particles in the atmosphere they're

534
00:28:36,590 --> 00:28:34,620
absorbing light but as I say this is far

535
00:28:39,230 --> 00:28:36,600
from being settled and I think time will

536
00:28:41,659 --> 00:28:39,240
tell we also have the better data set

537
00:28:43,610 --> 00:28:41,669
that this to look for those kind of

538
00:28:45,890 --> 00:28:43,620

phenomena and furthermore those

539
00:28:48,950 --> 00:28:45,900
phenomena are most likely to be detected

540
00:28:52,190 --> 00:28:48,960
in infrared imaging because those waves

541
00:28:54,470 --> 00:28:52,200
are temperature changes and so those

542
00:28:57,169 --> 00:28:54,480
that's the primary way to detect them

543
00:29:00,350 --> 00:28:57,179
we're here seeing sort of a secondary

544
00:29:01,940 --> 00:29:00,360
effect from the temperature change so it

545
00:29:04,310 --> 00:29:01,950
will be very interesting to see what the

546
00:29:09,160 --> 00:29:04,320
infrared telescopes around the world see

547
00:29:16,100 --> 00:29:09,170
from those brighter impacts nice

548
00:29:19,040 --> 00:29:16,110
out here Jim Reston for Esquire does

549
00:29:21,049 --> 00:29:19,050
this first image give us any insight

550
00:29:27,500 --> 00:29:21,059
into the question of whether there will

551
00:29:30,650 --> 00:29:27,510
be a permanent cyclone on Jupiter it's

552
00:29:32,810 --> 00:29:30,660
too soon to tell you and when I when

553
00:29:39,560 --> 00:29:32,820
will we start to get some fix on that

554
00:29:45,130 --> 00:29:39,570
question months no days days and he said

555
00:29:52,940 --> 00:29:49,580
okay we're going to go to a center right

556
00:29:58,409 --> 00:29:52,950
now for a question not sure which one

557
00:30:02,159 --> 00:30:00,210
perhaps are not on the line right at the

558
00:30:09,910 --> 00:30:02,169
moment we'll take another one here in

559
00:30:15,950 --> 00:30:13,280
will be my name is senior bandage guy I

560
00:30:17,660 --> 00:30:15,960
think this question with dr. McGrath and

561
00:30:20,450 --> 00:30:17,670
do you see some change at the plasma

562
00:30:22,850 --> 00:30:20,460
torus or the oral at Jupiter in this

563
00:30:24,440 --> 00:30:22,860

stage actually um we don't do

564
00:30:26,930 --> 00:30:24,450
observations with the Hubble Space

565
00:30:29,420 --> 00:30:26,940
Telescope of the torus until the end of

566
00:30:33,290 --> 00:30:29,430
the week we will do some observations

567
00:30:36,020 --> 00:30:33,300
with the iue satellite on tuesday i

568
00:30:37,960 --> 00:30:36,030
believe it is of the eye of horus one

569
00:30:41,030 --> 00:30:37,970
interesting thing that was reported

570
00:30:43,780 --> 00:30:41,040
closely related to that is that some

571
00:30:47,330 --> 00:30:43,790
japanese observers radio observers

572
00:30:49,910 --> 00:30:47,340
apparently saw a tenfold increase in the

573
00:30:52,220 --> 00:30:49,920
DECA metric radio emission from Jupiter

574
00:30:53,690 --> 00:30:52,230
well before the impact so there is some

575
00:30:55,730 --> 00:30:53,700
evidence that there was a large

576
00:30:57,290 --> 00:30:55,740
disturbance in the magnetosphere so I

577
00:30:59,000 --> 00:30:57,300
think we have high hopes that there may

578
00:31:02,150 --> 00:30:59,010
also be disturbance to the Eye of Horus

579
00:31:04,970 --> 00:31:02,160
there haven't been any for oral images

580
00:31:06,560 --> 00:31:04,980
with HST since the impact but there will

581
00:31:09,500 --> 00:31:06,570
be and we should be able to answer that

582
00:31:13,160 --> 00:31:09,510
question soon those first of all images

583
00:31:14,900 --> 00:31:13,170
will come down tomorrow we're going to

584
00:31:17,210 --> 00:31:14,910
go to Kennedy Space Center now for a

585
00:31:19,610 --> 00:31:17,220
question there and we'll come back after

586
00:31:22,910 --> 00:31:19,620
that go ahead state your name and

587
00:31:25,730 --> 00:31:22,920
affiliation please visit filter on earth

588
00:31:29,030 --> 00:31:25,740

news can you establish a minimum meth

589
00:31:31,250 --> 00:31:29,040
now for the piece and assuming the rough

590
00:31:33,050 --> 00:31:31,260
density that you've been assuming just

591
00:31:34,550 --> 00:31:33,060
how much kinetic energy was involved in

592
00:31:36,230 --> 00:31:34,560
it she can't you establish any lower

593
00:31:39,200 --> 00:31:36,240
limit now that would have been apart for

594
00:31:41,930 --> 00:31:39,210
just the fact that you thought I think

595
00:31:45,020 --> 00:31:41,940
the fact that we see the plume and

596
00:31:47,540 --> 00:31:45,030
apparently some very hot stuff which

597
00:31:50,270 --> 00:31:47,550
seems to you know back up some of the

598
00:31:54,470 --> 00:31:50,280
models or some of the models predicted

599
00:31:58,550 --> 00:31:54,480
this kind of phenomena if the impactor

600
00:32:00,020 --> 00:31:58,560
was about a kilometer in size in fact

601
00:32:01,760 --> 00:32:00,030
that we see something you know close to

602
00:32:03,260 --> 00:32:01,770
that indicates to me that we're talking

603
00:32:06,500 --> 00:32:03,270
about something roughly a kilometer in

604
00:32:11,390 --> 00:32:06,510
size which means roughly 200,000

605
00:32:13,760 --> 00:32:11,400
megatons of equivalent TNT but whether

606
00:32:16,760 --> 00:32:13,770
or not it's you know one kilometer

607
00:32:19,670 --> 00:32:16,770
versus two kilometer versus even 500

608
00:32:20,659 --> 00:32:19,680
meters I think that you know I couldn't

609
00:32:22,489 --> 00:32:20,669
say that right

610
00:32:27,830 --> 00:32:22,499
I couldn't you know tell you which one

611
00:32:30,320 --> 00:32:27,840
versus the other at this point follow up

612
00:32:32,239 --> 00:32:30,330
please so I remember the spectrograph

613
00:32:34,070 --> 00:32:32,249

the teams were you able to do any

614
00:32:36,379 --> 00:32:34,080
quicker special wrath of the area or

615
00:32:39,769 --> 00:32:36,389
that's doing the future and what would

616
00:32:45,499 --> 00:32:39,779
you expect that 889 nanometers at the

617
00:32:47,060 --> 00:32:45,509
methane line the first spectra we've

618
00:32:49,460 --> 00:32:47,070
gotten base line spectra over the last

619
00:32:51,019 --> 00:32:49,470
few days but the first spectra we're

620
00:32:53,539 --> 00:32:51,029
going to get will be of the G impact

621
00:32:55,759 --> 00:32:53,549
site and that's going to be on Monday

622
00:32:58,549 --> 00:32:55,769
morning while I Specter are going to be

623
00:33:00,399 --> 00:32:58,559
ultraviolet spectra visible wavelengths

624
00:33:03,169 --> 00:33:00,409
inspector will be done from ground-based

625
00:33:05,239 --> 00:33:03,179
telescopes and infrared spectra will be

626
00:33:07,489 --> 00:33:05,249
taken also from ground-based telescopes

627
00:33:09,710 --> 00:33:07,499
so we are doing what Hubble can uniquely

628
00:33:14,799 --> 00:33:09,720
do and that is obtained the

629
00:33:18,919 --> 00:33:17,149
what can you tell us that anybody know

630
00:33:20,180 --> 00:33:18,929
about those these other images I realize

631
00:33:21,529 --> 00:33:20,190
that you're just showing us the blue one

632
00:33:23,299 --> 00:33:21,539
where she took several different

633
00:33:27,470 --> 00:33:23,309
snapshots in different ways like that

634
00:33:30,320 --> 00:33:27,480
far as how different do they appear and

635
00:33:32,330 --> 00:33:30,330
where you get a false color or an

636
00:33:35,899 --> 00:33:32,340
imitation full color picture by the

637
00:33:40,999 --> 00:33:35,909
morning well I'd like to get a little

638
00:33:44,029 --> 00:33:41,009

sleep tonight at at most of the

639
00:33:46,759 --> 00:33:44,039
wavelengths that we looked at the the

640
00:33:49,759 --> 00:33:46,769
feature appears to very similar to what

641
00:33:52,330 --> 00:33:49,769
we short were showing in the blue so at

642
00:33:55,879 --> 00:33:52,340
almost all the wavelengths this dark

643
00:33:58,549 --> 00:33:55,889
streak with that circular pattern around

644
00:34:00,950 --> 00:33:58,559
it is what you see the only exception is

645
00:34:02,479 --> 00:34:00,960
the methane band wavelengths and as I

646
00:34:04,820 --> 00:34:02,489
said before that appears to be a

647
00:34:07,070 --> 00:34:04,830
complete negative what you see dark is

648
00:34:09,799 --> 00:34:07,080
bright so you see a little bright streak

649
00:34:13,069 --> 00:34:09,809
with a little bright swirl around the

650
00:34:15,889 --> 00:34:13,079
bottom of it it's too soon to talk about

651
00:34:18,319 --> 00:34:15,899
colors of this thing yet because we just

652
00:34:20,569 --> 00:34:18,329
simply have not had the time to work on

653
00:34:23,690 --> 00:34:20,579
it we will probably be trying to put

654
00:34:25,639 --> 00:34:23,700
together some color reconstructions I

655
00:34:28,200 --> 00:34:25,649
can't guarantee that will be tomorrow

656
00:34:30,990 --> 00:34:28,210
morning we'll do the best we can

657
00:34:32,899 --> 00:34:31,000
like to come back to these the telescope

658
00:34:38,220 --> 00:34:32,909
Institute here for some more questions

659
00:34:40,230 --> 00:34:38,230
in front Tyga I'm irani BBC television

660
00:34:42,000 --> 00:34:40,240
it's quite clear that the science team

661
00:34:43,560 --> 00:34:42,010
is very excited about this and you guys

662
00:34:45,780 --> 00:34:43,570
are going to have a lot of data to go

663
00:34:47,190 --> 00:34:45,790

through for months to come but what's in

664
00:34:49,560 --> 00:34:47,200
it for the guy on the street what does

665
00:35:00,630 --> 00:34:49,570
it mean to him he can be glad he doesn't

666
00:35:04,710 --> 00:35:00,640
live on Jupiter what you mean in terms

667
00:35:06,540 --> 00:35:04,720
of knowledge the well we've never had

668
00:35:08,190 --> 00:35:06,550
the opportunity to know in advance in a

669
00:35:09,690 --> 00:35:08,200
comment or a broken up asteroid or

670
00:35:11,670 --> 00:35:09,700
whatever it is who's going to hit a

671
00:35:13,320 --> 00:35:11,680
planet this is the first time in the

672
00:35:15,870 --> 00:35:13,330
history of humans we've been able to

673
00:35:17,339 --> 00:35:15,880
look at this at study it and we're lucky

674
00:35:20,160 --> 00:35:17,349
now that it's a big ones that we can

675
00:35:21,420 --> 00:35:20,170
really see the effects and we'll be

676
00:35:23,579 --> 00:35:21,430
learning more about how that process

677
00:35:25,530 --> 00:35:23,589
operates and how long how deep these

678
00:35:28,079 --> 00:35:25,540
effects are in the atmosphere of Jupiter

679
00:35:30,300 --> 00:35:28,089
and how long they last this has

680
00:35:32,640 --> 00:35:30,310
relevance to the earth we think more in

681
00:35:34,430 --> 00:35:32,650
terms of the origins of the earth we

682
00:35:36,780 --> 00:35:34,440
believe that the earth was formed by

683
00:35:39,630 --> 00:35:36,790
accretion of material coming in from

684
00:35:41,040 --> 00:35:39,640
space and this gives us an idea that's

685
00:35:42,329 --> 00:35:41,050
been talked about whether this might

686
00:35:45,720 --> 00:35:42,339
have been caused the demise of the

687
00:35:47,400 --> 00:35:45,730
dinosaurs probably proved out but we'll

688
00:35:49,380 --> 00:35:47,410

learn more about the general process and

689
00:35:52,800 --> 00:35:49,390
the history of the earth and maybe the

690
00:35:54,240 --> 00:35:52,810
future so can I just add to that I think

691
00:35:55,829 --> 00:35:54,250
there's a little bit more to it than

692
00:35:57,089 --> 00:35:55,839
just the science and of course we're

693
00:35:59,579 --> 00:35:57,099
interested in the science here because

694
00:36:02,910 --> 00:35:59,589
that's what we do but it's a fascinating

695
00:36:05,130 --> 00:36:02,920
thing I mean there are things whizzing

696
00:36:07,470 --> 00:36:05,140
around the solar system smashing into

697
00:36:09,390 --> 00:36:07,480
other things with huge explosions and

698
00:36:11,520 --> 00:36:09,400
that's just really incredible to think

699
00:36:13,500 --> 00:36:11,530
about I mean you know we don't often

700
00:36:14,880 --> 00:36:13,510
think about the universe out there we

701
00:36:17,040 --> 00:36:14,890
just sort of look at the sky and the

702
00:36:19,230 --> 00:36:17,050
stars are their big deal but if we

703
00:36:21,089 --> 00:36:19,240
really should take a step back and it's

704
00:36:23,670 --> 00:36:21,099
a really dynamic world out there it's a

705
00:36:25,680 --> 00:36:23,680
dynamic universe and this is just a key

706
00:36:30,559 --> 00:36:25,690
example of some of the energetics that

707
00:36:37,710 --> 00:36:34,200
from the estimate of the of the size of

708
00:36:39,690 --> 00:36:37,720
the poon do we have any fix on whether

709
00:36:43,019 --> 00:36:39,700
whether enough material will be

710
00:36:50,190 --> 00:36:43,029
deposited around to create a new ring

711
00:36:51,779 --> 00:36:50,200
around Jupiter well I think that you

712
00:36:53,160 --> 00:36:51,789
know all of that material is just going

713
00:36:54,480 --> 00:36:53,170

to fall right back down the stuff that

714
00:36:57,059 --> 00:36:54,490
might contribute to the ring is a

715
00:36:58,769 --> 00:36:57,069
something mrs. Jupiter basically you

716
00:37:00,809 --> 00:36:58,779
know the dust when you saw around the

717
00:37:02,249 --> 00:37:00,819
comet you know everything that you know

718
00:37:04,289 --> 00:37:02,259
you saw in that plume is coming right

719
00:37:08,910 --> 00:37:04,299
back down eunos gravitationally bound

720
00:37:10,049 --> 00:37:08,920
Jupiter is not going to escape so we do

721
00:37:13,410 --> 00:37:10,059
have you know we had a fair amount of

722
00:37:19,910 --> 00:37:13,420
dust and maybe there will be people

723
00:37:23,759 --> 00:37:22,829
please wait for the mic and is there

724
00:37:25,890 --> 00:37:23,769
anything about any of your

725
00:37:27,539 --> 00:37:25,900
experimentation that might indicate when

726
00:37:29,940 --> 00:37:27,549
this is all over whether there's any

727
00:37:38,779 --> 00:37:29,950
kind of a more solid core in the center

728
00:37:41,460 --> 00:37:38,789
of this otherwise gaseous planet I guess

729
00:37:44,339 --> 00:37:41,470
we already know a lot about Jupiter and

730
00:37:46,229 --> 00:37:44,349
from Voyager flybys and Pioneer

731
00:37:49,979 --> 00:37:46,239
spacecraft flybys we have a pretty good

732
00:37:53,160 --> 00:37:49,989
idea of its interior structure and we

733
00:37:55,979 --> 00:37:53,170
know that there is a probably a solid

734
00:37:58,950 --> 00:37:55,989
core but that is very much much deeper

735
00:38:02,249 --> 00:37:58,960
down then these comments could possibly

736
00:38:04,349 --> 00:38:02,259
penetrate the only thing that well there

737
00:38:07,559 --> 00:38:04,359
is another piece to this the seismic

738
00:38:09,479 --> 00:38:07,569

wave phenomena may end up telling us

739
00:38:12,450 --> 00:38:09,489
something about something different and

740
00:38:15,599 --> 00:38:12,460
that is the boundary between gaseous

741
00:38:17,160 --> 00:38:15,609
hydrogen and a phase of hydrogen that

742
00:38:19,920 --> 00:38:17,170
comes about only under very high

743
00:38:22,019 --> 00:38:19,930
pressures and in Jupiter we believe that

744
00:38:24,839 --> 00:38:22,029
this occurs although it's not exactly

745
00:38:25,979 --> 00:38:24,849
clear where that transition occurs so

746
00:38:28,570 --> 00:38:25,989
there's some hope that will learn about

747
00:38:30,430 --> 00:38:28,580
that just quick follow-up is it

748
00:38:32,710 --> 00:38:30,440
that any of these pieces could penetrate

749
00:38:35,110 --> 00:38:32,720
deeply enough into wherever this hard

750
00:38:37,150 --> 00:38:35,120
matter is that part of the dark stuff

751
00:38:45,520 --> 00:38:37,160
actually could be substance from the

752
00:38:51,200 --> 00:38:45,530
hard interior of Jupiter no any further

753
00:38:56,390 --> 00:38:53,870
Oh what do you expect from the larger X

754
00:39:01,640 --> 00:38:56,400
from the larger impacts down the line

755
00:39:04,790 --> 00:39:01,650
with the what you know now more slots

756
00:39:06,200 --> 00:39:04,800
yeah this is this is just a preview it

757
00:39:08,359 --> 00:39:06,210
looks like it's gonna be an even bigger

758
00:39:10,760 --> 00:39:08,369
show for the rest of the week the only

759
00:39:13,880 --> 00:39:10,770
thing special about this one was that it

760
00:39:15,829 --> 00:39:13,890
was the first one we've got some 20-odd

761
00:39:19,010 --> 00:39:15,839
more to go including some much brighter

762
00:39:26,290 --> 00:39:19,020
ones so you would expect the bigger ones

763
00:39:28,460 --> 00:39:26,300

to penetrate farther perhaps sure okay

764
00:39:30,380 --> 00:39:28,470
next over here up please name and

765
00:39:32,210 --> 00:39:30,390
affiliation please Chris leads from NHK

766
00:39:33,920 --> 00:39:32,220
is there anything you can tell about

767
00:39:37,940 --> 00:39:33,930
what kinds of chemical reactions were

768
00:39:40,400 --> 00:39:37,950
taking place during the impact not not

769
00:39:42,920 --> 00:39:40,410
what can I should I start not from this

770
00:39:45,079 --> 00:39:42,930
this is just strictly imaging but now

771
00:39:46,760 --> 00:39:45,089
I'll pass it over to keep yeah that's

772
00:39:49,130 --> 00:39:46,770
what we hope to learn about later in the

773
00:39:50,780 --> 00:39:49,140
week when we get the spectroscopic data

774
00:39:56,420 --> 00:39:50,790
back that will tell us about the

775
00:39:58,700 --> 00:39:56,430
composition of the atmosphere ok if

776
00:40:01,520 --> 00:39:58,710
there are no further questions I think

777
00:40:04,400 --> 00:40:01,530
we will go ahead and wrap it up and we

778
00:40:07,490 --> 00:40:04,410
will what we like to do before we close

779
00:40:09,349 --> 00:40:07,500
and lose the satellite is have another

780
00:40:11,780 --> 00:40:09,359
replay of the still image and we'll run

781
00:40:13,790 --> 00:40:11,790
both the videos and for the benefit of

782
00:40:16,579 --> 00:40:13,800
those here we'll we'll have that on the

783
00:40:18,440 --> 00:40:16,589
monitor also I want to remind everyone

784
00:40:21,130 --> 00:40:18,450
that tomorrow morning sunday morning at

785
00:40:24,710 --> 00:40:21,140
ten a.m. eastern time we will have

786
00:40:26,960 --> 00:40:24,720
briefing which will have more images

787
00:40:28,910 --> 00:40:26,970
also some information from other

788
00:40:32,030 --> 00:40:28,920

observatories in the nasa and NSF

789
00:40:35,329 --> 00:40:32,040
observing campaign and at that panel

790
00:40:37,220 --> 00:40:35,339
will have doctors shoemaker and I

791
00:40:40,790 --> 00:40:37,230
Carolyn shoemaker and Dave levy and

792
00:40:42,170 --> 00:40:40,800
member the hubble science team and hope

793
00:40:44,870 --> 00:40:42,180
to see you out there and that will be

794
00:40:47,510 --> 00:40:44,880
also live on NASA select with Q&A from

795
00:40:50,000 --> 00:40:47,520
the Centers at that point we'll go ahead

796
00:40:52,160 --> 00:40:50,010
and close the press conference thank you

797
00:41:00,530 --> 00:40:52,170
for coming and we'll see you tomorrow

798
00:41:00,540 --> 00:42:34,050
these bro

799
00:42:34,060 --> 00:42:43,000
Oh

800
00:42:47,720 --> 00:42:46,250
so it's another step in the water with

801
00:42:52,220 --> 00:42:47,730
movie night we're looking for something

802
00:42:53,780 --> 00:42:52,230
much this is the first time yeah this is

803
00:42:56,510 --> 00:42:53,790
the latitude that we're looking for

804
00:43:01,160 --> 00:42:56,520
something like their contours to tell me