1
00:00:08,299 --> 00:00:05,599
good morning everyone welcome to NASA's

2
00:00:10,450 --> 00:00:08,309
Jet Propulsion Laboratory I'm gayi Hill

3
00:00:14,030 --> 00:00:10,460
two weeks ago the Dawn spacecraft

4
00:00:17,240 --> 00:00:14,040
entered orbit around the asteroid Vesta

5
00:00:19,580 --> 00:00:17,250
and today we are releasing new pictures

6
00:00:21,890 --> 00:00:19,590
and you'll get the opportunity to hear

7
00:00:23,450 --> 00:00:21,900
from the scientists and engineers but

8
00:00:26,900 --> 00:00:23,460
first let's take a moment and introduce

9
00:00:32,500 --> 00:00:26,910
you to JPL's director dr. Charles elachi

10
00:00:38,260 --> 00:00:35,600
thank you and good morning all and

11
00:00:40,459 --> 00:00:38,270
welcome to NASA's Jet Propulsion lab and

12
00:00:42,229 --> 00:00:40,469
we hope we're going to be seeing will

13
00:00:44,840 --> 00:00:42,239

pretty often this year because we have a

14
00:00:47,330 --> 00:00:44,850
lot of activity going on and as dr.

15
00:00:50,630 --> 00:00:47,340
Hartman would be mentioning this is just

16
00:00:52,430 --> 00:00:50,640
the first salvo of many missions and a

17
00:00:54,979 --> 00:00:52,440
lot of encounter and exciting scientific

18
00:00:57,830 --> 00:00:54,989
results that will happen in the next 12

19
00:01:01,029 --> 00:00:57,840
months culminating in the landing of

20
00:01:04,789 --> 00:01:01,039
curiosity on Mars exactly a year and

21
00:01:07,160 --> 00:01:04,799
nine days and one hour and 15 minutes

22
00:01:08,660 --> 00:01:07,170
and three seconds from the time we are

23
00:01:11,179 --> 00:01:08,670
talking here hopefully it will be all

24
00:01:13,760 --> 00:01:11,189
successful and that will be roughly the

25
00:01:16,280 --> 00:01:13,770
same time that Don would be leaving

26
00:01:19,249 --> 00:01:16,290
Vesta and heading towards series

27
00:01:21,770 --> 00:01:19,259
exploring another world you know for

28
00:01:24,230 --> 00:01:21,780
excited for science and learning about

29
00:01:26,330 --> 00:01:24,240
our solar system now when we talk about

30
00:01:29,359 --> 00:01:26,340
asteroid people immediately think of

31
00:01:31,880 --> 00:01:29,369
small rocky objects just to put it in

32
00:01:34,280 --> 00:01:31,890
perspective Vesta is much larger than

33
00:01:36,440 --> 00:01:34,290
the state of California and it has some

34
00:01:38,270 --> 00:01:36,450
very exciting do morphological features

35
00:01:40,370 --> 00:01:38,280
and Composition features that you'll be

36
00:01:42,260 --> 00:01:40,380
hearing about today which shed some

37
00:01:45,170 --> 00:01:42,270
light about how our solar system

38
00:01:47,359 --> 00:01:45,180

actually was formed and this was enabled

39
00:01:50,030 --> 00:01:47,369
by a very advanced technology which

40
00:01:52,399 --> 00:01:50,040
called electric propulsion that mark

41
00:01:54,139 --> 00:01:52,409
Raymond will be talking about in my mind

42
00:01:56,690 --> 00:01:54,149
when I describe it to my neighbor I just

43
00:01:58,520 --> 00:01:56,700
tell them think Star Trek now we're not

44
00:02:00,260 --> 00:01:58,530
moving faster than the speed of light I

45
00:02:03,139 --> 00:02:00,270
think we do respect the laws of physics

46
00:02:06,380 --> 00:02:03,149
but it's kind of in general you know the

47
00:02:07,760 --> 00:02:06,390
same idea and I want also to thank you

48
00:02:10,150 --> 00:02:07,770
know all our colleagues who made this

49
00:02:13,160 --> 00:02:10,160
mission possible this is a team effort

50
00:02:13,700 --> 00:02:13,170
it involved our international partner

51
00:02:16,190 --> 00:02:13,710
particular

52
00:02:18,530 --> 00:02:16,200
from italy and germany who played a key

53
00:02:20,800 --> 00:02:18,540
role in this mission it involve our

54
00:02:22,550 --> 00:02:20,810
industrial partner particularly orbital

55
00:02:24,980 --> 00:02:22,560
corporation we should develop the

56
00:02:27,920 --> 00:02:24,990
spacecraft and last but not least the

57
00:02:30,140 --> 00:02:27,930
superb team from UCLA and JPL and the

58
00:02:32,990 --> 00:02:30,150
science team which made this mission

59
00:02:34,730 --> 00:02:33,000
possible now usually from the outside

60
00:02:36,590 --> 00:02:34,740
people thinks all these things are easy

61
00:02:38,570 --> 00:02:36,600
you know we see animation we see all

62
00:02:40,100 --> 00:02:38,580
think of the things are easy i have to

63
00:02:42,260 --> 00:02:40,110

tell you because i know it on a day to

64
00:02:44,530 --> 00:02:42,270
day basis this team faced a lot of

65
00:02:46,610 --> 00:02:44,540
challenges and really was able to

66
00:02:49,370 --> 00:02:46,620
overcome those challenges with

67
00:02:51,170 --> 00:02:49,380
professionalism with calmness with

68
00:02:52,790 --> 00:02:51,180
school headedness and of course was

69
00:02:55,580 --> 00:02:52,800
excellent at these characteristics of

70
00:02:56,930 --> 00:02:55,590
nasa and JPL thank you very much and I

71
00:03:01,730 --> 00:02:56,940
guess we'll move now to hear about the

72
00:03:03,890 --> 00:03:01,740
exciting results thanks dr. G all right

73
00:03:06,890 --> 00:03:03,900
so let's introduce you to the panelists

74
00:03:08,830 --> 00:03:06,900
first colleen hartman she is the

75
00:03:11,300 --> 00:03:08,840
assistant associate administrator

76
00:03:15,290 --> 00:03:11,310
science Mission Directorate NASA

77
00:03:18,200 --> 00:03:15,300
headquarters Washington next we go to

78
00:03:20,330 --> 00:03:18,210
Chris Russell dawn principal

79
00:03:25,670 --> 00:03:20,340
investigator university of california

80
00:03:28,520 --> 00:03:25,680
los angeles mark Raymond Don chief

81
00:03:32,090 --> 00:03:28,530
engineer and mission director from here

82
00:03:34,610 --> 00:03:32,100
at jet propulsion laboratory Holger

83
00:03:37,880 --> 00:03:34,620
Xerox he's a part of the framing camera

84
00:03:42,350 --> 00:03:37,890
team he's with the mocks plonk society

85
00:03:45,710 --> 00:03:42,360
catlin Berg lindau Germany and finally

86
00:03:49,700 --> 00:03:45,720
Enrico Flamini chief scientist Italian

87
00:03:52,240 --> 00:03:49,710
space agency Rome Italy all right let's

88
00:03:55,100 --> 00:03:52,250

start things off with Colleen thank you

89
00:03:58,130 --> 00:03:55,110
my colleagues on the panel today will

90
00:04:01,490 --> 00:03:58,140
reveal to you striking full-frame

91
00:04:04,430 --> 00:04:01,500
pictures of Vesta taken by the first

92
00:04:08,210 --> 00:04:04,440
spacecraft to ever orbit a main belt

93
00:04:09,830 --> 00:04:08,220
asteroid the Dawn spacecraft my job here

94
00:04:12,230 --> 00:04:09,840
today is to tell you a little bit about

95
00:04:15,050 --> 00:04:12,240
how Don fits into the science program at

96
00:04:16,789 --> 00:04:15,060
NASA as well as tell you just very

97
00:04:19,670 --> 00:04:16,799
quickly all of the wonderful things

98
00:04:23,240 --> 00:04:19,680
we're doing in 2011 in space and earth

99
00:04:26,120 --> 00:04:23,250
science so don is part of the discovery

100
00:04:28,940 --> 00:04:26,130
program and this is a highly competitive

101
00:04:31,550 --> 00:04:28,950
program that allows scientists to open

102
00:04:34,520 --> 00:04:31,560
up their imaginations and use their

103
00:04:37,820 --> 00:04:34,530
innovation to understand and unlock the

104
00:04:39,770 --> 00:04:37,830
secrets of the solar system Discovery

105
00:04:42,790 --> 00:04:39,780
Program missions have landed on

106
00:04:45,920 --> 00:04:42,800
asteroids have discovered earth-sized

107
00:04:48,410 --> 00:04:45,930
extrasolar planet candidates in the

108
00:04:51,380 --> 00:04:48,420
habitable zone and have flown up to the

109
00:04:53,390 --> 00:04:51,390
Sun to breathe in solar particles and

110
00:04:56,600 --> 00:04:53,400
return them here to earth for further

111
00:04:59,930 --> 00:04:56,610
study so now dawn is joining this

112
00:05:02,570 --> 00:04:59,940
pantheon of missions and I want to join

113
00:05:04,790 --> 00:05:02,580

Charles elachi and congratulate the

114
00:05:08,510 --> 00:05:04,800
leader and principal investigator of

115
00:05:09,950 --> 00:05:08,520
dawn Chris Russell from UCLA the orbital

116
00:05:12,890 --> 00:05:09,960
sciences corporation that made the

117
00:05:14,750 --> 00:05:12,900
spacecraft bus the Jet Propulsion lab

118
00:05:16,640 --> 00:05:14,760
that provided project management

119
00:05:19,100 --> 00:05:16,650
oversight for this complicated mission

120
00:05:22,040 --> 00:05:19,110
and especially to our European partners

121
00:05:24,980 --> 00:05:22,050
who are here with us today from Germany

122
00:05:28,070 --> 00:05:24,990
and from Italy each of which provided an

123
00:05:30,380 --> 00:05:28,080
important component a science instrument

124
00:05:32,180 --> 00:05:30,390
for this mission now you'll hear as

125
00:05:34,700 --> 00:05:32,190
Charles mentioned a little later from

126
00:05:36,950 --> 00:05:34,710
mark about the ion propulsion but I do

127
00:05:40,100 --> 00:05:36,960
want to mention that this innovative

128
00:05:43,190 --> 00:05:40,110
propulsive technology these gentle puffs

129
00:05:45,980 --> 00:05:43,200
of xenon that allow us to go to not one

130
00:05:48,890 --> 00:05:45,990
but two of the largest asteroids in the

131
00:05:52,970 --> 00:05:48,900
main belt was developed for NASA and

132
00:05:54,410 --> 00:05:52,980
right here at the Jet Propulsion lab so

133
00:05:56,000 --> 00:05:54,420
now let me tell you a little bit about

134
00:06:00,050 --> 00:05:56,010
what we've done in the first half of

135
00:06:02,210 --> 00:06:00,060
2011 the Stardust next mission has

136
00:06:05,510 --> 00:06:02,220
gotten up close and personal with comet

137
00:06:08,240 --> 00:06:05,520
tempel 1 the messenger mission has gone

138
00:06:11,030 --> 00:06:08,250

perfectly into orbit around mercury this

139
00:06:13,670 --> 00:06:11,040
is the first spacecraft to ever orbit

140
00:06:15,770 --> 00:06:13,680
mercury we are now mapping all of the

141
00:06:18,680 --> 00:06:15,780
surface of mercury and unlocking its

142
00:06:21,530 --> 00:06:18,690
secrets then we had a JPL mission the

143
00:06:23,660 --> 00:06:21,540
Aquarius mission which launched and it

144
00:06:27,470 --> 00:06:23,670
will look at sea surface salinity of

145
00:06:29,600 --> 00:06:27,480
mother earth and help us to understand

146
00:06:30,980 --> 00:06:29,610
the relationship between the oceans and

147
00:06:33,320 --> 00:06:30,990
something important to all life

148
00:06:37,460 --> 00:06:33,330
particularly we human life here on earth

149
00:06:39,230 --> 00:06:37,470
the water cycle so in the vein of what

150
00:06:39,719 --> 00:06:39,240
have you done for me lately there's the

151
00:06:43,079 --> 00:06:39,729
second half

152
00:06:45,149 --> 00:06:43,089
of 2011 and later this week we will be

153
00:06:46,860 --> 00:06:45,159
launching the Juno mission and it is

154
00:06:49,529 --> 00:06:46,870
filled with first as well as

155
00:06:51,779 --> 00:06:49,539
international partners and the Juno

156
00:06:54,719 --> 00:06:51,789
mission will use solar power for the

157
00:06:57,689 --> 00:06:54,729
first time to go the 5a use to Jupiter

158
00:07:00,540 --> 00:06:57,699
and there it will be the first mission

159
00:07:02,909 --> 00:07:00,550
to drop in to polar orbit around the

160
00:07:05,760 --> 00:07:02,919
planet basically kissing the cloud tops

161
00:07:07,559 --> 00:07:05,770
of Jupiter and the spacecraft will be no

162
00:07:10,469 --> 00:07:07,569
further away from those clouds than we

163
00:07:13,230 --> 00:07:10,479

are right now from New York so then it

164
00:07:16,529 --> 00:07:13,240
will unlock the secrets of that very

165
00:07:19,230 --> 00:07:16,539
complicated planetary system on to

166
00:07:22,019 --> 00:07:19,240
another JPL mission the twin Grail

167
00:07:24,659 --> 00:07:22,029
spacecraft will go to the moon return to

168
00:07:28,079 --> 00:07:24,669
the moon to to map the moon's gravity

169
00:07:29,639 --> 00:07:28,089
field to unprecedented detail followed

170
00:07:32,399 --> 00:07:29,649
by something called the end pose

171
00:07:35,159 --> 00:07:32,409
preparatory project and this is a bridge

172
00:07:38,249 --> 00:07:35,169
mission that helps us move into the

173
00:07:41,489 --> 00:07:38,259
future for climate and for weather here

174
00:07:43,920 --> 00:07:41,499
on earth and as Charles mentioned last

175
00:07:46,019 --> 00:07:43,930
but not least is the November launch and

176
00:07:48,899 --> 00:07:46,029
he had it apparently down to the second

177
00:07:51,600 --> 00:07:48,909
of the Mars Science Laboratory called

178
00:07:54,029 --> 00:07:51,610
curiosity and I call it a behemoth I

179
00:07:56,519 --> 00:07:54,039
mean this is the size of a car it has

180
00:07:59,519 --> 00:07:56,529
five times more science capability than

181
00:08:02,550 --> 00:07:59,529
any other Rover we've ever put down on

182
00:08:04,619 --> 00:08:02,560
the surface of the red planet and it is

183
00:08:08,339 --> 00:08:04,629
meant to help us determine whether Mars

184
00:08:12,959 --> 00:08:08,349
has been is or perhaps ever will be

185
00:08:15,449 --> 00:08:12,969
hospitable to microbial life so with

186
00:08:17,549 --> 00:08:15,459
this plethora of missions I believe

187
00:08:19,769 --> 00:08:17,559
there's only one guarantee and that's

188
00:08:23,189 --> 00:08:19,779

that the universe consistently refuses

189
00:08:25,529 --> 00:08:23,199
to read our science textbooks so we will

190
00:08:27,269 --> 00:08:25,539
be having news discoveries perhaps

191
00:08:29,309 --> 00:08:27,279
rewriting the textbooks that children

192
00:08:32,219 --> 00:08:29,319
all around the world will be reading for

193
00:08:35,279 --> 00:08:32,229
years to come so on this beautiful

194
00:08:38,579 --> 00:08:35,289
morning at the Jet Propulsion lab with a

195
00:08:41,839 --> 00:08:38,589
blue sky a new day is dawning and will

196
00:08:44,639 --> 00:08:41,849
now go to hear more about dawn and its

197
00:08:46,769 --> 00:08:44,649
investigation of Vesta and I want to

198
00:08:48,780 --> 00:08:46,779
introduce my colleague and friend Chris

199
00:08:51,569 --> 00:08:48,790
Russell to tell you more Thank You

200
00:08:52,750 --> 00:08:51,579
Colleen I'm Dawn's principal

201
00:08:55,420 --> 00:08:52,760
investigator

202
00:08:59,020 --> 00:08:55,430
and I can speak for the entire team

203
00:09:02,140 --> 00:08:59,030
about exactly how excited we are about

204
00:09:06,370 --> 00:09:02,150
this mission we've been working on this

205
00:09:10,000 --> 00:09:06,380
for it seems like decades we send in the

206
00:09:12,100 --> 00:09:10,010
proposal in two thousand we got the

207
00:09:16,720 --> 00:09:12,110
project together it was accepted by nasa

208
00:09:19,090 --> 00:09:16,730
in 2002 we were launched in 2007 and

209
00:09:22,680 --> 00:09:19,100
another four years and we're finally in

210
00:09:26,920 --> 00:09:22,690
orbit around Vesta and it's everything

211
00:09:30,340 --> 00:09:26,930
everything we ever expected and a lot

212
00:09:31,780 --> 00:09:30,350
more as we will see I want to share some

213
00:09:35,470 --> 00:09:31,790

of those images that we've been taking

214
00:09:38,530 --> 00:09:35,480
with you today and you will see for

215
00:09:42,880 --> 00:09:38,540
yourself that this surface is a very

216
00:09:46,750 --> 00:09:42,890
exciting and varied surface we were

217
00:09:49,840 --> 00:09:46,760
looking for the oldest surface in the

218
00:09:53,250 --> 00:09:49,850
solar system so that we could record

219
00:09:56,710 --> 00:09:53,260
those early events in the solar system

220
00:09:59,920 --> 00:09:56,720
we were also looking for the building

221
00:10:01,570 --> 00:09:59,930
blocks that we thought were used to

222
00:10:06,520 --> 00:10:01,580
build the terrestrial planets like the

223
00:10:10,060 --> 00:10:06,530
earth and try to understand the workings

224
00:10:11,770 --> 00:10:10,070
of those small objects and I'm we will

225
00:10:15,430 --> 00:10:11,780
show you a little bit of the evidence

226
00:10:17,800 --> 00:10:15,440
today that we've captured that and that

227
00:10:19,780 --> 00:10:17,810
it will be very very informative to our

228
00:10:21,940 --> 00:10:19,790
understanding of the earth as well as

229
00:10:26,340 --> 00:10:21,950
our understanding of the asteroid belt

230
00:10:34,000 --> 00:10:26,350
could I have the first image please this

231
00:10:40,110 --> 00:10:34,010
image will show the still image of Vesta

232
00:10:47,170 --> 00:10:40,120
I still don't see the first image yet oh

233
00:10:51,460 --> 00:10:47,180
okay it's not on my monitor okay and you

234
00:10:56,980 --> 00:10:51,470
can see although I cannot see the that

235
00:10:59,830 --> 00:10:56,990
the rotation axis north end of it is in

236
00:11:03,780 --> 00:10:59,840
the upper left hand corner and in the

237
00:11:06,450 --> 00:11:03,790
lower right of the image is the southern

238
00:11:09,310 --> 00:11:06,460

region what

239
00:11:11,740 --> 00:11:09,320
happened many years ago and was revealed

240
00:11:17,170 --> 00:11:11,750
by the Hubble Space Telescope is that

241
00:11:20,770 --> 00:11:17,180
there was a very large impact on Vesta

242
00:11:27,400 --> 00:11:20,780
and it has let's say damaged the

243
00:11:30,430 --> 00:11:27,410
southern part of the of Vesta and then

244
00:11:34,150 --> 00:11:30,440
spread material and around the solar

245
00:11:37,420 --> 00:11:34,160
system and around the surface so that

246
00:11:45,310 --> 00:11:37,430
we're seeing quite a different terrain

247
00:11:48,550 --> 00:11:45,320
on the South than the North the images

248
00:11:51,820 --> 00:11:48,560
across the surface can be then turned

249
00:11:55,690 --> 00:11:51,830
into a mosaic and as sort of a

250
00:11:58,930 --> 00:11:55,700
photographic map of the surface and i

251
00:12:01,020 --> 00:11:58,940
would like to queue up that and if the

252
00:12:05,650 --> 00:12:01,030
audience could tell me when it's there

253
00:12:08,490 --> 00:12:05,660
then okay then oh and it's on the

254
00:12:12,010 --> 00:12:08,500
monitors now good what we're seeing here

255
00:12:15,010 --> 00:12:12,020
is the equatorial regions about plus or

256
00:12:19,150 --> 00:12:15,020
minus 30 degrees of latitude on the

257
00:12:21,130 --> 00:12:19,160
surface and we can see the south is much

258
00:12:23,290 --> 00:12:21,140
smoother than the North here we see lots

259
00:12:26,650 --> 00:12:23,300
of craters that's partially illumination

260
00:12:29,590 --> 00:12:26,660
but also partially that there is an

261
00:12:33,250 --> 00:12:29,600
older surface with much more craters on

262
00:12:36,700 --> 00:12:33,260
the in the North these craters are very

263
00:12:39,820 --> 00:12:36,710

interesting they have features in it in

264
00:12:43,240 --> 00:12:39,830
them that we did not expect and we're

265
00:12:48,310 --> 00:12:43,250
learning about these processes that

266
00:12:50,980 --> 00:12:48,320
create these features now and today as

267
00:12:53,530 --> 00:12:50,990
we go through the press conference we

268
00:12:55,990 --> 00:12:53,540
will be looking at more pictures from

269
00:12:57,970 --> 00:12:56,000
the framing camera the framing camera

270
00:13:01,750 --> 00:12:57,980
not only gives us the black-and-white

271
00:13:05,079 --> 00:13:01,760
images that you just saw but also color

272
00:13:09,610 --> 00:13:05,089
images and we can use pairs of images

273
00:13:12,310 --> 00:13:09,620
for making stereo pictures and that will

274
00:13:14,800 --> 00:13:12,320
give us the dimensions of the body the

275
00:13:17,510 --> 00:13:14,810
topography and we can have a digital

276
00:13:20,570 --> 00:13:17,520
model of the

277
00:13:24,620 --> 00:13:20,580
asteroid we will also take a look at

278
00:13:27,640 --> 00:13:24,630
images returned from the visible and

279
00:13:31,880 --> 00:13:27,650
infrared mapping spectrometer that

280
00:13:35,570 --> 00:13:31,890
instrument gives very fine resolution on

281
00:13:38,840 --> 00:13:35,580
color it gives us the full spectrum from

282
00:13:41,600 --> 00:13:38,850
visible to through the near-infrared and

283
00:13:44,840 --> 00:13:41,610
that can give us a mineral

284
00:13:48,440 --> 00:13:44,850
identification so we know exactly what

285
00:13:52,640 --> 00:13:48,450
the surface is made out of and also this

286
00:13:55,100 --> 00:13:52,650
surface temperature now as the mission

287
00:13:57,980 --> 00:13:55,110
progress progresses we will be taking

288
00:14:00,710 --> 00:13:57,990

data at higher and higher resolution

289
00:14:03,380 --> 00:14:00,720
that will enable us to understand the

290
00:14:07,940 --> 00:14:03,390
surface processes and interior processes

291
00:14:10,520 --> 00:14:07,950
better we when we get down to about 200

292
00:14:13,340 --> 00:14:10,530
kilometers altitude above the surface

293
00:14:16,580 --> 00:14:13,350
then we'll be able to measure the

294
00:14:19,100 --> 00:14:16,590
elemental composition the metals like

295
00:14:23,540 --> 00:14:19,110
aluminum and magnesium on the surface

296
00:14:27,110 --> 00:14:23,550
and determine more about the way that

297
00:14:29,330 --> 00:14:27,120
the body came together in that Elton in

298
00:14:32,660 --> 00:14:29,340
that altitude range we'll also be taking

299
00:14:34,880 --> 00:14:32,670
gravity data and radio from the radio

300
00:14:38,470 --> 00:14:34,890
telemetry system and learn more about

301
00:14:41,270 --> 00:14:38,480
the mass distribution today we will

302
00:14:43,880 --> 00:14:41,280
examine the initial images from the

303
00:14:46,850 --> 00:14:43,890
framing camera and from the visible and

304
00:14:49,520 --> 00:14:46,860
infrared mapping spectrometer these

305
00:14:52,850 --> 00:14:49,530
photos have been already a great

306
00:14:55,580 --> 00:14:52,860
revolutions revelation to the team about

307
00:14:58,580 --> 00:14:55,590
what the surface is like we did not

308
00:15:01,490 --> 00:14:58,590
imagine the detail that we're seeing and

309
00:15:04,850 --> 00:15:01,500
the various processes that we're seeing

310
00:15:07,760 --> 00:15:04,860
evidence of now these are really

311
00:15:11,630 --> 00:15:07,770
insightful into the this building block

312
00:15:14,510 --> 00:15:11,640
of the early solar system you know I

313
00:15:17,830 --> 00:15:14,520

thought that you know we would have you

314
00:15:20,690 --> 00:15:17,840
know look at an early planet or

315
00:15:24,680 --> 00:15:20,700
protoplanet out there in the system but

316
00:15:27,230 --> 00:15:24,690
it's really a beautiful exciting small

317
00:15:28,820 --> 00:15:27,240
world sitting there in the middle of the

318
00:15:30,450 --> 00:15:28,830
asteroid belt that we're going to learn

319
00:15:33,030 --> 00:15:30,460
very much about

320
00:15:37,500 --> 00:15:33,040
but before we get into some of those

321
00:15:40,470 --> 00:15:37,510
images I like to ask mark Raymond the

322
00:15:43,200 --> 00:15:40,480
Dons chief engineer and mission director

323
00:15:46,710 --> 00:15:43,210
to tell us more about iron propulsion

324
00:15:49,950 --> 00:15:46,720
and how we got to Vesta and what we'll

325
00:15:52,080 --> 00:15:49,960
be doing there mark thank you Chris well

326
00:15:54,420 --> 00:15:52,090
I share Chris's excitement and I know

327
00:15:56,250 --> 00:15:54,430
the entire dawn team does I mean one of

328
00:15:58,740 --> 00:15:56,260
the things that's so neat about this

329
00:16:01,290 --> 00:15:58,750
mission is that we're exploring some of

330
00:16:03,990 --> 00:16:01,300
the last uncharted worlds in the inner

331
00:16:05,820 --> 00:16:04,000
solar system and the way we got into

332
00:16:07,980 --> 00:16:05,830
orbit is very different from what you're

333
00:16:10,350 --> 00:16:07,990
accustomed to in which a spacecraft

334
00:16:12,780 --> 00:16:10,360
comes screaming up to its destination at

335
00:16:15,600 --> 00:16:12,790
high velocity and then executes a

336
00:16:17,340 --> 00:16:15,610
whiplash inducing burn while our friends

337
00:16:20,250 --> 00:16:17,350
and colleagues sit here in Mission

338
00:16:23,130 --> 00:16:20,260

Control biting their nails and tensley

339
00:16:25,500 --> 00:16:23,140
waiting for the good news and the reason

340
00:16:27,540 --> 00:16:25,510
it's so different don don is because as

341
00:16:29,610 --> 00:16:27,550
you heard we take advantage of the

342
00:16:31,560 --> 00:16:29,620
tremendous capability of ion propulsion

343
00:16:35,220 --> 00:16:31,570
which I first heard of in a Star Trek

344
00:16:38,610 --> 00:16:35,230
episode and while the ion propulsion is

345
00:16:41,340 --> 00:16:38,620
extremely efficient the ion thruster

346
00:16:43,560 --> 00:16:41,350
only pushes on the spacecraft as hard as

347
00:16:47,400 --> 00:16:43,570
this single piece of paper pushes on my

348
00:16:50,400 --> 00:16:47,410
hand and yet gradually over time the

349
00:16:53,250 --> 00:16:50,410
effect of this whisper like thrust can

350
00:16:55,850 --> 00:16:53,260
build up and produce fantastically high

351
00:16:58,860 --> 00:16:55,860
velocity so this is what i like to call

352
00:17:01,020 --> 00:16:58,870
acceleration with patience and now our

353
00:17:04,829 --> 00:17:01,030
patients is paying off very handsomely

354
00:17:07,350 --> 00:17:04,839
indeed so most spacecraft spend most of

355
00:17:09,930 --> 00:17:07,360
their time coasting just like Earth and

356
00:17:12,390 --> 00:17:09,940
the moon coast in their orbits but Dawn

357
00:17:15,390 --> 00:17:12,400
has spent seventy percent of its time in

358
00:17:18,420 --> 00:17:15,400
space gently thrusting gradually

359
00:17:20,340 --> 00:17:18,430
reshaping its orbit around the Sun to

360
00:17:23,760 --> 00:17:20,350
match vestas orbit around the Sun and

361
00:17:27,060 --> 00:17:23,770
the effect of all that maneuvering is

362
00:17:29,480 --> 00:17:27,070
that Vesta and Dawn together were racing

363
00:17:31,800 --> 00:17:29,490

around the Sun in very similar paths

364
00:17:34,890 --> 00:17:31,810
this is no different from when you drive

365
00:17:37,410 --> 00:17:34,900
your car on a freeway near another car

366
00:17:40,110 --> 00:17:37,420
you may both be traveling at high speed

367
00:17:42,880 --> 00:17:40,120
but your relative velocity can be very

368
00:17:45,070 --> 00:17:42,890
low and so when Dawn entered

369
00:17:47,800 --> 00:17:45,080
orbit it was only approaching Vesta at

370
00:17:49,540 --> 00:17:47,810
60 miles an hour the last time it

371
00:17:51,460 --> 00:17:49,550
approached a destination at that speed

372
00:17:55,420 --> 00:17:51,470
is when it was being driven on a truck

373
00:17:56,710 --> 00:17:55,430
to Cape Canaveral now thanks to all the

374
00:17:59,770 --> 00:17:56,720
thrusting that we've been doing all

375
00:18:03,160 --> 00:17:59,780
along the way dawn was able to slowly

376
00:18:05,890 --> 00:18:03,170
creep up on Vesta and slip ever so

377
00:18:08,770 --> 00:18:05,900
gently into orbit with the same grace

378
00:18:11,470 --> 00:18:08,780
and elegance it's displayed in nearly a

379
00:18:14,140 --> 00:18:11,480
thousand days of interplanetary ion

380
00:18:16,270 --> 00:18:14,150
thrusting from the spacecraft's point of

381
00:18:19,660 --> 00:18:16,280
view this was a very typical day in the

382
00:18:23,140 --> 00:18:19,670
mission but it so happened that at about

383
00:18:25,600 --> 00:18:23,150
9 47 p.m. on July fifteenth it was

384
00:18:28,630 --> 00:18:25,610
traveling close enough and slowly enough

385
00:18:31,060 --> 00:18:28,640
that vest is gravity tenderly took hold

386
00:18:34,390 --> 00:18:31,070
of the spacecraft and Dawn was in orbit

387
00:18:37,000 --> 00:18:34,400
even as it was continuing to thrust now

388
00:18:39,990 --> 00:18:37,010

we had no need to monitor it our mission

389
00:18:43,750 --> 00:18:40,000
control was empty I was out dancing and

390
00:18:45,670 --> 00:18:43,760
yet it all worked perfectly and about 25

391
00:18:48,160 --> 00:18:45,680
hours later we conducted a routine

392
00:18:50,320 --> 00:18:48,170
communication session and verified that

393
00:18:51,910 --> 00:18:50,330
the spacecraft is healthy and that it

394
00:18:55,990 --> 00:18:51,920
went into orbit exactly as we had

395
00:18:59,590 --> 00:18:56,000
planned so it's exciting it's important

396
00:19:02,950 --> 00:18:59,600
it's really neat but it wasn't tense and

397
00:19:05,230 --> 00:19:02,960
it wasn't dramatic now because the

398
00:19:08,410 --> 00:19:05,240
thrust is so gentle the spacecraft

399
00:19:11,890 --> 00:19:08,420
changes course only gradually and so

400
00:19:14,800 --> 00:19:11,900
it's been spiraling around Vesta slowly

401
00:19:16,630 --> 00:19:14,810
getting closer and closer and we stop

402
00:19:18,520 --> 00:19:16,640
thrusting for a few days to collect the

403
00:19:21,370 --> 00:19:18,530
spectacular images that you're seeing

404
00:19:23,290 --> 00:19:21,380
today but we've since resumed and the

405
00:19:26,020 --> 00:19:23,300
spacecraft is now descending to its

406
00:19:29,560 --> 00:19:26,030
first science orbit and at an altitude

407
00:19:32,680 --> 00:19:29,570
of 1,700 miles we'll begin our intensive

408
00:19:34,960 --> 00:19:32,690
observations of Vesta at on August

409
00:19:37,270 --> 00:19:34,970
eleventh so if we take a look at the

410
00:19:40,090 --> 00:19:37,280
first video we can see an animation of

411
00:19:42,040 --> 00:19:40,100
dawn in orbit around Vesta and see the

412
00:19:44,080 --> 00:19:42,050
way it operates and I don't see it

413
00:19:47,020 --> 00:19:44,090

projected here but if you're seeing it

414
00:19:48,910 --> 00:19:47,030
ok so there it is you can see the fields

415
00:19:51,310 --> 00:19:48,920
of view of the camera and the mapping

416
00:19:53,380 --> 00:19:51,320
spectrometer when we're on the day side

417
00:19:54,620 --> 00:19:53,390
we collect these images when we're on

418
00:19:58,790 --> 00:19:54,630
the night side we return

419
00:20:01,940 --> 00:19:58,800
the data and I like this view because to

420
00:20:03,770 --> 00:20:01,950
me this sort of suggests how big Vesta

421
00:20:05,720 --> 00:20:03,780
is I think most people think of

422
00:20:07,850 --> 00:20:05,730
asteroids is these little chips of rock

423
00:20:10,640 --> 00:20:07,860
maybe the size of a building or a

424
00:20:14,540 --> 00:20:10,650
mountain or even a city but Vesta is

425
00:20:17,240 --> 00:20:14,550
entirely unlike that at 330 miles in

426
00:20:22,330 --> 00:20:17,250
diameter it has twice the surface area

427
00:20:27,560 --> 00:20:25,880
in fact Vesta is the second most massive

428
00:20:31,130 --> 00:20:27,570
resident of the main asteroid belt

429
00:20:32,990 --> 00:20:31,140
between Mars and Jupiter now thanks to

430
00:20:35,120 --> 00:20:33,000
the maneuvering power of the ion

431
00:20:37,820 --> 00:20:35,130
propulsion system we can change our

432
00:20:39,320 --> 00:20:37,830
orbits a great deal and so when we're

433
00:20:41,270 --> 00:20:39,330
finished conduct conducting our

434
00:20:44,480 --> 00:20:41,280
observations in this first science orbit

435
00:20:46,640 --> 00:20:44,490
will spiral to our next one and we'll

436
00:20:48,680 --> 00:20:46,650
have a different view of Vesta and we'll

437
00:20:51,050 --> 00:20:48,690
continue this pattern over the next year

438
00:20:53,000 --> 00:20:51,060

each time going to an orbit which is

439
00:20:56,120 --> 00:20:53,010
optimized for particular set of

440
00:20:58,340 --> 00:20:56,130
scientific investigations and then in

441
00:21:00,470 --> 00:20:58,350
july of next year we'll use the ion

442
00:21:02,540 --> 00:21:00,480
propulsion system to spiral out of orbit

443
00:21:05,450 --> 00:21:02,550
and so if we take a look at the next

444
00:21:08,180 --> 00:21:05,460
animation we can see Don using its ion

445
00:21:10,430 --> 00:21:08,190
propulsion system leaving what by then

446
00:21:13,880 --> 00:21:10,440
will be a well explored world and

447
00:21:17,000 --> 00:21:13,890
heading for dwarf planet Ceres which

448
00:21:19,610 --> 00:21:17,010
will reach in 2015 and once again will

449
00:21:22,640 --> 00:21:19,620
spiral into orbit to conduct a campaign

450
00:21:24,740 --> 00:21:22,650
there of revealing what secrets this

451
00:21:28,580 --> 00:21:24,750
world holds about the dawn of the solar

452
00:21:31,190 --> 00:21:28,590
system and Don actually isn't only the

453
00:21:33,410 --> 00:21:31,200
first spacecraft to orbit an object in

454
00:21:35,510 --> 00:21:33,420
the main asteroid belt but this is the

455
00:21:39,020 --> 00:21:35,520
first spacecraft targeted to orbit any

456
00:21:42,650 --> 00:21:39,030
two solar system destinations this is a

457
00:21:44,600 --> 00:21:42,660
true interplanetary spaceship just

458
00:21:46,540 --> 00:21:44,610
orbiting Vesta alone which we've now

459
00:21:48,530 --> 00:21:46,550
accomplished would have been

460
00:21:50,150 --> 00:21:48,540
unaffordable within the constraints of

461
00:21:52,730 --> 00:21:50,160
the discovery program if we used

462
00:21:54,800 --> 00:21:52,740
conventional propulsion an orbiting

463
00:21:58,190 --> 00:21:54,810

Vesta and Ceres together would be truly

464
00:22:00,590 --> 00:21:58,200
impossible but what I think is really

465
00:22:03,410 --> 00:22:00,600
exciting about this is that after two

466
00:22:05,139 --> 00:22:03,420
centuries of observing this fuzzy little

467
00:22:08,619 --> 00:22:05,149
blob of light among the

468
00:22:13,359 --> 00:22:08,629
dars earth now has a robotic emissary in

469
00:22:15,639 --> 00:22:13,369
orbit at Vesta and so to continue to

470
00:22:19,499 --> 00:22:15,649
tell you about this amazing place

471
00:22:22,839 --> 00:22:19,509
because we're here today to say earth

472
00:22:24,999 --> 00:22:22,849
meet Vesta and to continue that

473
00:22:26,709 --> 00:22:25,009
introduction I'd like to turn it over to

474
00:22:30,310 --> 00:22:26,719
holger's lyrics from the framing camera

475
00:22:32,219 --> 00:22:30,320
team thank you mark as the person

476
00:22:34,749 --> 00:22:32,229
responsible for the framing camera

477
00:22:38,259 --> 00:22:34,759
distribute a contribution to dawn I'm

478
00:22:41,070 --> 00:22:38,269
really exciting excited today to share

479
00:22:44,709 --> 00:22:41,080
these images with you I want to show

480
00:22:48,599 --> 00:22:44,719
vestar is at best resolution to date a

481
00:22:52,959 --> 00:22:48,609
movie of Vesta rotating and zoom means a

482
00:22:56,979 --> 00:22:52,969
distinct areas so can I get the first

483
00:23:01,029 --> 00:22:56,989
image please this is a full frame image

484
00:23:03,339 --> 00:23:01,039
of Vesta as the one chris has shown with

485
00:23:05,979 --> 00:23:03,349
the mosaic the north pole is on the

486
00:23:09,489 --> 00:23:05,989
upper left the South Pole on the lower

487
00:23:11,799 --> 00:23:09,499
right the image was taken on July 24 at

488
00:23:14,320 --> 00:23:11,809

a distance of five thousand two hundred

489
00:23:17,589 --> 00:23:14,330
kilometers and a resolution of

490
00:23:20,499 --> 00:23:17,599
approximately 500 meters you see the

491
00:23:24,039 --> 00:23:20,509
shape of Vesta with a central peak at

492
00:23:26,829 --> 00:23:24,049
the South Pole the lower right the South

493
00:23:29,619 --> 00:23:26,839
Pole area appears to be a smoother

494
00:23:32,769 --> 00:23:29,629
certainly different and less created

495
00:23:35,829 --> 00:23:32,779
than the northern hemisphere best

496
00:23:39,579 --> 00:23:35,839
original beetle contrast you see the

497
00:23:41,649 --> 00:23:39,589
bright spots and the dark areas on the

498
00:23:45,219 --> 00:23:41,659
undersurface of Vesta there are

499
00:23:48,459 --> 00:23:45,229
topographic highs and lows and elongated

500
00:23:51,759 --> 00:23:48,469
white and kilometers deep grooves in the

501
00:23:54,669 --> 00:23:51,769
north there are also deep grooves in the

502
00:23:58,539 --> 00:23:54,679
equatorial region this can be better

503
00:24:03,190 --> 00:23:58,549
seen in the western movie so let's now

504
00:24:08,079 --> 00:24:03,200
get Vesta rotate we see a full rotation

505
00:24:10,509 --> 00:24:08,089
of Vesta over 5.3 hours you see the

506
00:24:13,479 --> 00:24:10,519
elongated grooves at the equatorial

507
00:24:16,769 --> 00:24:13,489
region coming out nicely the orbital

508
00:24:18,940 --> 00:24:16,779
motion of the spacecraft during the

509
00:24:21,610 --> 00:24:18,950
imaging brought us from

510
00:24:24,160 --> 00:24:21,620
the equatorial to the mid southern

511
00:24:26,620 --> 00:24:24,170
latitudes so that's why you see the

512
00:24:30,490 --> 00:24:26,630
North Pole at the South Pole peak coming

513
00:24:32,620 --> 00:24:30,500

out nicely in our view the southern

514
00:24:35,320 --> 00:24:32,630
hemisphere appears very different

515
00:24:37,660 --> 00:24:35,330
compared to the north best are so rich

516
00:24:42,070 --> 00:24:37,670
in features that it will keep the

517
00:24:46,000 --> 00:24:42,080
science team busy for years let's now

518
00:24:50,260 --> 00:24:46,010
zoom into some surface features of Vesta

519
00:24:55,060 --> 00:24:50,270
with the next image the South Pole peek

520
00:24:59,490 --> 00:24:55,070
at the lower right shows various

521
00:25:02,010 --> 00:24:59,500
structures note the scale bar is 15

522
00:25:05,610 --> 00:25:02,020
kilometers so the structures are large

523
00:25:08,710 --> 00:25:05,620
the quote oriole region on the left side

524
00:25:11,710 --> 00:25:08,720
shows deep grooves in a very contrast

525
00:25:14,950 --> 00:25:11,720
rich perspective this region also

526
00:25:16,990 --> 00:25:14,960
appears to be heavily cratered the

527
00:25:19,480 --> 00:25:17,000
visible dark and bright features are

528
00:25:22,840 --> 00:25:19,490
discussed within the dawn science team

529
00:25:26,470 --> 00:25:22,850
and we need images from lower altitude

530
00:25:28,450 --> 00:25:26,480
of it really to understand these the

531
00:25:32,320 --> 00:25:28,460
south polar region again appears much

532
00:25:34,630 --> 00:25:32,330
less created in contrast to the north we

533
00:25:39,070 --> 00:25:34,640
want to look at to create a close up

534
00:25:42,400 --> 00:25:39,080
areas on the next image so this set of

535
00:25:44,890 --> 00:25:42,410
three craters we nicknamed these the

536
00:25:47,980 --> 00:25:44,900
Snowman so you'll see the the two large

537
00:25:50,140 --> 00:25:47,990
and the this wall on top they are

538
00:25:52,720 --> 00:25:50,150

located in the northern hemisphere the

539
00:25:56,460 --> 00:25:52,730
craters appear to be filled with debris

540
00:26:01,060 --> 00:25:56,470
and they have an ejecta blanket around

541
00:26:04,150 --> 00:26:01,070
so the rims they appear mostly sharp but

542
00:26:08,800 --> 00:26:04,160
we also see downhill landslides in

543
00:26:13,450 --> 00:26:08,810
various areas let's look at craters with

544
00:26:16,150 --> 00:26:13,460
a dark and bright slopes all of these

545
00:26:19,450 --> 00:26:16,160
large craters in this image are located

546
00:26:21,610 --> 00:26:19,460
on the southern equatorial region they

547
00:26:25,870 --> 00:26:21,620
show distinct bright and dark features

548
00:26:28,480 --> 00:26:25,880
and sir and we are investigating these

549
00:26:31,450 --> 00:26:28,490
the differences between the dark and the

550
00:26:31,869 --> 00:26:31,460
bright areas within the dawn science

551
00:26:36,819 --> 00:26:31,879
team

552
00:26:39,819 --> 00:26:36,829
the crater rims appears shop around and

553
00:26:42,849 --> 00:26:39,829
we see an ejecta blanket again around

554
00:26:45,430 --> 00:26:42,859
the craters we don't know yet what the

555
00:26:48,339 --> 00:26:45,440
dark spots mean to us what they tell to

556
00:26:50,829 --> 00:26:48,349
us but we will find out when we get the

557
00:26:54,279 --> 00:26:50,839
higher result resolution images from the

558
00:26:57,219 --> 00:26:54,289
lower orbit the framing camera also has

559
00:27:00,759 --> 00:26:57,229
colors as we have heard before let's

560
00:27:03,430 --> 00:27:00,769
have a look what they can tell us this

561
00:27:05,649 --> 00:27:03,440
image is a false-color composite so not

562
00:27:08,859 --> 00:27:05,659
a true color as you would see it with

563
00:27:12,039 --> 00:27:08,869

bare eyes it's a composite of a crater

564
00:27:14,589 --> 00:27:12,049
just south of the equator the color

565
00:27:17,349 --> 00:27:14,599
composite is used to show us differences

566
00:27:20,289 --> 00:27:17,359
in composition of the material on the

567
00:27:24,279 --> 00:27:20,299
surface and is indicative for the

568
00:27:26,079 --> 00:27:24,289
chemistry and mineralogy on Vesta we see

569
00:27:30,189 --> 00:27:26,089
that vesture is covered with different

570
00:27:33,519 --> 00:27:30,199
material so you see this red stuff in

571
00:27:36,339 --> 00:27:33,529
the south area of the crater we see that

572
00:27:39,339 --> 00:27:36,349
the it's there's different material on

573
00:27:41,949 --> 00:27:39,349
the surface and we will learn what these

574
00:27:46,419 --> 00:27:41,959
difference mean to us we will find out

575
00:27:51,599 --> 00:27:46,429
so best I is not only one uniform unit

576
00:27:54,789 --> 00:27:51,609
everywhere the spectral diversity of

577
00:27:57,699 --> 00:27:54,799
Vesta is the domain of the vir

578
00:28:00,639 --> 00:27:57,709
instrument team and with this I hand

579
00:28:04,359 --> 00:28:00,649
over to doctor Enrico flamini and the

580
00:28:07,239 --> 00:28:04,369
Veer team thank you very much yes indeed

581
00:28:09,819 --> 00:28:07,249
I mean the visible imagery must be

582
00:28:11,349 --> 00:28:09,829
spectrometer as a primary goal to

583
00:28:13,479 --> 00:28:11,359
understand the mineralogical and

584
00:28:15,909 --> 00:28:13,489
distribution and composition of the

585
00:28:19,359 --> 00:28:15,919
surface is it is an imaging spectrometer

586
00:28:21,449 --> 00:28:19,369
that has been provided by the Italian

587
00:28:25,209 --> 00:28:21,459
space agency and is capable to

588
00:28:29,229 --> 00:28:25,219

delivering detailed images and the

589
00:28:31,809 --> 00:28:29,239
telespectral up to a hundred sixty four

590
00:28:35,709 --> 00:28:31,819
different spectra and up to a resolution

591
00:28:38,199 --> 00:28:35,719
of 50 meters at the when we are going to

592
00:28:43,329 --> 00:28:38,209
arrive to 2-under kilometers orbit as

593
00:28:44,680 --> 00:28:43,339
well as then capability to have an

594
00:28:47,629 --> 00:28:44,690
extended

595
00:28:50,299 --> 00:28:47,639
spectral range between ultraviolet I

596
00:28:53,599 --> 00:28:50,309
mean zero point 25 microns up to the

597
00:28:57,019 --> 00:28:53,609
infrared but 25 microns may we have see

598
00:29:00,859 --> 00:28:57,029
the first image please here you can see

599
00:29:03,619 --> 00:29:00,869
a image that is essentially a photograph

600
00:29:06,070 --> 00:29:03,629
acquired selecting three different

601
00:29:11,509 --> 00:29:06,080
spectral bands that are blue red and

602
00:29:14,180 --> 00:29:11,519
green that can be compared and to the

603
00:29:16,669 --> 00:29:14,190
two dead to the images beautiful and

604
00:29:19,580 --> 00:29:16,679
spectacular images that acquired by the

605
00:29:21,109 --> 00:29:19,590
camera even if of course the spatial

606
00:29:22,669 --> 00:29:21,119
resolution is different because the

607
00:29:24,769 --> 00:29:22,679
instrument has a different scope but

608
00:29:27,289 --> 00:29:24,779
what we can see here that is an images

609
00:29:30,409 --> 00:29:27,299
acquired by five thousand two hundred

610
00:29:33,289 --> 00:29:30,419
kilometers is a portion of the surface

611
00:29:36,849 --> 00:29:33,299
between seven degrees and 40 degrees of

612
00:29:39,649 --> 00:29:36,859
a northern hemisphere of vista vista and

613
00:29:42,830 --> 00:29:39,659

larger crater that you can see there is

614
00:29:48,489 --> 00:29:42,840
a 50 kilometers in diameter then in the

615
00:29:51,729 --> 00:29:48,499
next image is a more peculiar image

616
00:29:57,289 --> 00:29:51,739
elaborated taking into account the

617
00:30:00,970 --> 00:29:57,299
different indian colors and then to

618
00:30:04,669 --> 00:30:00,980
emphasize the diversity of the

619
00:30:07,119 --> 00:30:04,679
composition of the vestal surface you

620
00:30:09,019 --> 00:30:07,129
can see here that there are bright

621
00:30:11,419 --> 00:30:09,029
differences me a very dramatic

622
00:30:14,090 --> 00:30:11,429
difference in different region and this

623
00:30:16,639 --> 00:30:14,100
inner indicating then can we will see

624
00:30:19,849 --> 00:30:16,649
more in the future during the Italian

625
00:30:22,430 --> 00:30:19,859
analysis of the surface that there is

626
00:30:25,700 --> 00:30:22,440
not only different in mineralogical

627
00:30:30,139 --> 00:30:25,710
composition but also in the Indus eyes

628
00:30:32,779 --> 00:30:30,149
distribution and the end and behavior

629
00:30:34,430 --> 00:30:32,789
thermal behavior of the Recoleta to that

630
00:30:38,690 --> 00:30:34,440
here and there is covering the surface

631
00:30:40,999 --> 00:30:38,700
of esta in the next image that is taken

632
00:30:44,739 --> 00:30:41,009
in in the infrared part of the spectrum

633
00:30:48,019 --> 00:30:44,749
so between 3.5 and 5 microns is

634
00:30:52,279 --> 00:30:48,029
essentially the thermal emission of the

635
00:30:55,009 --> 00:30:52,289
avesta best way west is a a warmer body

636
00:30:57,259 --> 00:30:55,019
quote-unquote worm let's say that today

637
00:31:01,489 --> 00:30:57,269
we can estimate it between twenty two

638
00:31:05,089 --> 00:31:01,499

hundred and fifty and 270 degree Kelvin

639
00:31:09,560 --> 00:31:05,099
and from this image you can see that

640
00:31:12,859 --> 00:31:09,570
there are cold areas that are the inside

641
00:31:14,989 --> 00:31:12,869
of large crater and some bright hot

642
00:31:19,430 --> 00:31:14,999
spots here and there even this is

643
00:31:22,339 --> 00:31:19,440
something that is of course analyzed in

644
00:31:25,549 --> 00:31:22,349
more detail but is going to give us also

645
00:31:28,159 --> 00:31:25,559
the behavior of the suface with respect

646
00:31:30,979 --> 00:31:28,169
to the illumination from the Sun finally

647
00:31:33,379 --> 00:31:30,989
let me just say few words about the fact

648
00:31:35,180 --> 00:31:33,389
that an stimulii proud and happy ass

649
00:31:37,899 --> 00:31:35,190
Italian space agency and also

650
00:31:41,419 --> 00:31:37,909
representing the italian national

651
00:31:44,239 --> 00:31:41,429
institute for astrophysics to be a share

652
00:31:47,509 --> 00:31:44,249
with you the motion of these images that

653
00:31:50,599 --> 00:31:47,519
are providing us a new view on the

654
00:31:53,239 --> 00:31:50,609
beginning of our solar system and also

655
00:31:56,419 --> 00:31:53,249
to be here as a friend of angelito

656
00:31:59,119 --> 00:31:56,429
corradini proposed us actually proceed

657
00:32:03,169 --> 00:31:59,129
to me this instrument ten years ago when

658
00:32:05,089 --> 00:32:03,179
i was a director for science nation in

659
00:32:08,389 --> 00:32:05,099
association exploration in the agency

660
00:32:10,909 --> 00:32:08,399
and today we are seeing and looking at

661
00:32:14,149 --> 00:32:10,919
all these instrument is behaving and

662
00:32:15,859 --> 00:32:14,159
provide important information that will

663
00:32:17,239 --> 00:32:15,869

be merged with all the other information

664
00:32:21,379 --> 00:32:17,249
the instruments providing us the

665
00:32:24,409 --> 00:32:21,389
understanding of the body Thanks alright

666
00:32:27,799 --> 00:32:24,419
alright with that we will open this up

667
00:32:31,310 --> 00:32:27,809
for questions we can begin here in JPL

668
00:32:32,989 --> 00:32:31,320
or we can go to our calls online we have

669
00:32:35,749 --> 00:32:32,999
several callers on the phone right now

670
00:32:40,970 --> 00:32:35,759
any questions here in the auditorium

671
00:32:43,009 --> 00:32:40,980
this point just a second we'll get a mic

672
00:32:45,320 --> 00:32:43,019
over to you and please state your name

673
00:32:48,950 --> 00:32:45,330
and affiliation thank you John Brooks

674
00:32:50,690 --> 00:32:48,960
KNX Newsradio mr. Raymond this goes back

675
00:32:53,479 --> 00:32:50,700
to the beginning of the solar system can

676
00:32:55,399 --> 00:32:53,489
you give us a time frame and when do you

677
00:32:57,339 --> 00:32:55,409
think that this asteroid was formed and

678
00:32:59,210 --> 00:32:57,349
what it's possible composition is

679
00:33:00,529 --> 00:32:59,220
actually I think that question would be

680
00:33:03,859 --> 00:33:00,539
more appropriate for the principal

681
00:33:06,409 --> 00:33:03,869
investigator we believe this goes to the

682
00:33:09,859 --> 00:33:06,419
back to the first five million years of

683
00:33:10,889 --> 00:33:09,869
the solar system so that's the

684
00:33:15,419 --> 00:33:10,899
geochemist Ella

685
00:33:18,659 --> 00:33:15,429
that that is 4.6 five billion years ago

686
00:33:20,539 --> 00:33:18,669
so four hundred and you know four

687
00:33:27,109 --> 00:33:20,549
thousand six hundred and fifty million

688
00:33:31,320 --> 00:33:27,119

years ago and what happened back then

689
00:33:33,869 --> 00:33:31,330
was that the material that was orbiting

690
00:33:38,430 --> 00:33:33,879
what was going to become the Sun began

691
00:33:40,349 --> 00:33:38,440
began to condense and we have evidence

692
00:33:42,119 --> 00:33:40,359
of what was going on through very

693
00:33:47,609 --> 00:33:42,129
primitive meteorites that have fallen to

694
00:33:50,459 --> 00:33:47,619
the earth but right when Vesta started

695
00:33:54,479 --> 00:33:50,469
to come together we believe there was a

696
00:33:57,629 --> 00:33:54,489
supernova that irradiated the material

697
00:34:00,119 --> 00:33:57,639
and added radioactive material to it

698
00:34:02,789 --> 00:34:00,129
that when the material came together it

699
00:34:06,029 --> 00:34:02,799
had an additional heat source and some

700
00:34:09,269 --> 00:34:06,039
of these bodies that were formed melted

701
00:34:12,829 --> 00:34:09,279
and then differentiated they made you

702
00:34:16,609 --> 00:34:12,839
know a crust of lava an iron core and

703
00:34:19,289 --> 00:34:16,619
that is the those are some of the oldest

704
00:34:21,930 --> 00:34:19,299
bodies out there but they occurred at a

705
00:34:26,269 --> 00:34:21,940
particular time and that makes Vesta

706
00:34:30,000 --> 00:34:26,279
very special because it's our our only

707
00:34:32,549 --> 00:34:30,010
good example of that particular period

708
00:34:36,180 --> 00:34:32,559
of the solar system formation and we're

709
00:34:39,269 --> 00:34:36,190
very very happy really happy to be able

710
00:34:42,029 --> 00:34:39,279
to look down at the surface and see what

711
00:34:45,240 --> 00:34:42,039
was going on at those very early moments

712
00:34:50,159 --> 00:34:45,250
of the solar system all right do we have

713
00:34:58,170 --> 00:34:50,169

another question here in the room right

714
00:35:02,589 --> 00:35:00,760
I'm Emily lock dawala from the Planetary

715
00:35:05,680 --> 00:35:02,599
Society and first of all congratulations

716
00:35:07,900 --> 00:35:05,690
these images are so exciting my second

717
00:35:09,970 --> 00:35:07,910
my question is I know it's early but

718
00:35:12,339 --> 00:35:09,980
have you compared the shape of Vesta to

719
00:35:13,569 --> 00:35:12,349
what was predicted from Hubble it seems

720
00:35:16,200 --> 00:35:13,579
to me that it's a little taller than

721
00:35:20,559 --> 00:35:16,210
then it appeared in the Hubble models um

722
00:35:23,530 --> 00:35:20,569
now what the people who made those maps

723
00:35:26,380 --> 00:35:23,540
and models from the Hubble data when

724
00:35:30,520 --> 00:35:26,390
they saw our initial images they said oh

725
00:35:32,680 --> 00:35:30,530
we got it wrong and but they didn't get

726
00:35:34,930 --> 00:35:32,690
it wrong it just looks that way when you

727
00:35:38,319 --> 00:35:34,940
got the higher resolution so I think

728
00:35:41,349 --> 00:35:38,329
they did a superb job at modeling the

729
00:35:42,789 --> 00:35:41,359
Hubble data and we're maybe find some

730
00:35:45,640 --> 00:35:42,799
differences of course we got higher

731
00:35:47,920 --> 00:35:45,650
resolution but I think that everything

732
00:35:50,470 --> 00:35:47,930
is perfectly consistent with the Hubble

733
00:35:52,750 --> 00:35:50,480
data and and then I think there is a

734
00:35:56,079 --> 00:35:52,760
there's a dark area on Vesta that was

735
00:35:57,520 --> 00:35:56,089
predicted from astronomic astronomical

736
00:35:59,740 --> 00:35:57,530
observations to are you finding that

737
00:36:01,839 --> 00:35:59,750
we're seeing we're seeing quite a varied

738
00:36:04,990 --> 00:36:01,849

surface and we again with a higher

739
00:36:08,200 --> 00:36:05,000
resolution it's not you don't always see

740
00:36:11,020 --> 00:36:08,210
exactly what that low resolution image

741
00:36:14,020 --> 00:36:11,030
was before and figured out we'll figure

742
00:36:17,230 --> 00:36:14,030
that out eventually but we certainly see

743
00:36:20,260 --> 00:36:17,240
a quite varied surface varied albedo you

744
00:36:23,349 --> 00:36:20,270
saw bright areas dark areas we saw we

745
00:36:25,030 --> 00:36:23,359
see dark material we'd never expected on

746
00:36:26,950 --> 00:36:25,040
there you know that what what is causing

747
00:36:29,920 --> 00:36:26,960
those craters with that you know the

748
00:36:32,559 --> 00:36:29,930
black streaks going down I haven't seen

749
00:36:34,329 --> 00:36:32,569
anything like that before thank you all

750
00:36:36,099 --> 00:36:34,339
right we're going to move over to some

751
00:36:39,280 --> 00:36:36,109
of the questions on the phone first

752
00:36:43,809 --> 00:36:39,290
person is Lee Holtz with the wall street

753
00:36:46,329 --> 00:36:43,819
journal me yes thank you this is very

754
00:36:48,760 --> 00:36:46,339
very exciting and interesting stuff I

755
00:36:50,680 --> 00:36:48,770
wonder if you all could help my readers

756
00:36:56,289 --> 00:36:50,690
understand a little bit more about the

757
00:36:58,329 --> 00:36:56,299
very distinctive grooves that band vesta

758
00:37:00,640 --> 00:36:58,339
that you were just showing us on those

759
00:37:02,559 --> 00:37:00,650
images very dramatic structures what

760
00:37:04,059 --> 00:37:02,569
what might have caused them what are

761
00:37:06,880 --> 00:37:04,069
they tell us a little bit more about

762
00:37:08,259 --> 00:37:06,890
their characteristics please

763
00:37:10,180 --> 00:37:08,269

older do you want to take this or would

764
00:37:15,160 --> 00:37:10,190
you rather I take I think you better

765
00:37:18,190 --> 00:37:15,170
take it that if you take a look at those

766
00:37:20,529 --> 00:37:18,200
images and you saw Vesta rotating in

767
00:37:23,049 --> 00:37:20,539
them you it'd be very apparent that

768
00:37:27,599 --> 00:37:23,059
those grooves are pretty much in the

769
00:37:30,309 --> 00:37:27,609
equatorial region and they're very much

770
00:37:32,650 --> 00:37:30,319
perpendicular to the direction we

771
00:37:36,910 --> 00:37:32,660
thought think that the impact was going

772
00:37:41,880 --> 00:37:36,920
when it hit struck Vesta down what where

773
00:37:45,309 --> 00:37:41,890
it now is the southern polar region so

774
00:37:48,849 --> 00:37:45,319
one thing that it could be is that when

775
00:37:53,829 --> 00:37:48,859
the compression of that fantastic impact

776
00:37:56,589 --> 00:37:53,839
came that Vesta got smaller in that

777
00:37:59,589 --> 00:37:56,599
direction for a while and then expanded

778
00:38:01,480 --> 00:37:59,599
and that caused tectonic features around

779
00:38:04,299 --> 00:38:01,490
the equatorial region that's only

780
00:38:06,339 --> 00:38:04,309
speculation at the present time we need

781
00:38:09,910 --> 00:38:06,349
those higher resolution images to

782
00:38:13,390 --> 00:38:09,920
understand the morphology of the surface

783
00:38:15,930 --> 00:38:13,400
in those grooves but the orientation of

784
00:38:19,799 --> 00:38:15,940
the grooves suggests that it was

785
00:38:22,390 --> 00:38:19,809
associated with that early giant impact

786
00:38:26,799 --> 00:38:22,400
all right we have another caller on the

787
00:38:28,450 --> 00:38:26,809
phone dan vergano USA Today dan thanks

788
00:38:30,160 --> 00:38:28,460

very much dan vergano with USA Today I

789
00:38:32,109 --> 00:38:30,170
was wondering if you could talk at this

790
00:38:34,240 --> 00:38:32,119
point about how optimistic you are using

791
00:38:36,880 --> 00:38:34,250
that southern crater is an assay to look

792
00:38:39,430 --> 00:38:36,890
deeper into Vesta and perhaps more

793
00:38:42,819 --> 00:38:39,440
widely using crater council that sort of

794
00:38:44,470 --> 00:38:42,829
thing to date or age the the asteroid is

795
00:38:45,759 --> 00:38:44,480
it still work the same way on the

796
00:38:51,190 --> 00:38:45,769
asteroid belt as it does for the inner

797
00:38:55,930 --> 00:38:51,200
terrestrial planets um let me speak to

798
00:38:58,480 --> 00:38:55,940
the last set of points first that yes

799
00:39:02,200 --> 00:38:58,490
we're using exactly the same crater

800
00:39:05,230 --> 00:39:02,210
counting techniques as we do on the

801
00:39:09,099 --> 00:39:05,240
lunar surface or on other planetary

802
00:39:15,370 --> 00:39:09,109
surfaces and we're getting something of

803
00:39:17,410 --> 00:39:15,380
the order of 4 billion years in age we

804
00:39:19,359 --> 00:39:17,420
need the again

805
00:39:22,120 --> 00:39:19,369
sound like it may be a broken record but

806
00:39:24,609 --> 00:39:22,130
we need those higher resolution data in

807
00:39:27,309 --> 00:39:24,619
order to do a better job at the crater

808
00:39:31,930 --> 00:39:27,319
counting and when we do we will be able

809
00:39:35,410 --> 00:39:31,940
to we hope differentiate the age in one

810
00:39:38,770 --> 00:39:35,420
part of the surface with another now you

811
00:39:40,150 --> 00:39:38,780
asked about the southern crater could

812
00:39:46,880 --> 00:39:40,160
you repeat the first part of your

813
00:39:51,589 --> 00:39:49,460

did we we must have lost them let's go

814
00:39:57,319 --> 00:39:51,599
to the next question then this one is

815
00:39:59,029 --> 00:39:57,329
from Denise Chow of space com hi donita

816
00:40:01,430 --> 00:39:59,039
java space com thanks for taking my

817
00:40:03,500 --> 00:40:01,440
question questions for Chris Russell

818
00:40:04,759 --> 00:40:03,510
just wondering if you could share the

819
00:40:07,250 --> 00:40:04,769
most surprising thing that you've found

820
00:40:10,700 --> 00:40:07,260
so far about the surface of a stone from

821
00:40:15,710 --> 00:40:10,710
these images uh that's like saying who's

822
00:40:18,019 --> 00:40:15,720
your favorite child ah the that you know

823
00:40:22,390 --> 00:40:18,029
those grooves are really neat and you

824
00:40:26,029 --> 00:40:22,400
know we saw those really early and they

825
00:40:28,400 --> 00:40:26,039
puzzled us and pleased us at the same

826
00:40:30,529 --> 00:40:28,410
time because it's something we didn't

827
00:40:32,870 --> 00:40:30,539
expect and it's going to tell us more

828
00:40:36,380 --> 00:40:32,880
about what was going on in the early

829
00:40:39,559 --> 00:40:36,390
days taking a look at the color

830
00:40:41,960 --> 00:40:39,569
intensity of the surface I was really

831
00:40:45,470 --> 00:40:41,970
pleased by that because you know

832
00:40:47,690 --> 00:40:45,480
sometimes when you go to you know a

833
00:40:50,329 --> 00:40:47,700
smaller asteroid it's pretty uniform

834
00:40:52,849 --> 00:40:50,339
it's just a block of material this is

835
00:40:54,970 --> 00:40:52,859
not a uniform body different things were

836
00:40:58,460 --> 00:40:54,980
happening in different regions of the

837
00:41:01,579 --> 00:40:58,470
surface and that indicates to me that

838
00:41:03,890 --> 00:41:01,589

the interior was being very active it

839
00:41:06,079 --> 00:41:03,900
was making this minute mineral over here

840
00:41:08,839 --> 00:41:06,089
and making that over there and pumping

841
00:41:11,029 --> 00:41:08,849
it out onto the surface so things were

842
00:41:15,859 --> 00:41:11,039
going on and we're going to learn about

843
00:41:19,400 --> 00:41:15,869
how bodies such as you know Vesta worked

844
00:41:21,799 --> 00:41:19,410
when they were being you know coming

845
00:41:24,650 --> 00:41:21,809
together and evolving so we're learning

846
00:41:27,650 --> 00:41:24,660
to learn much about the evolution but

847
00:41:31,999 --> 00:41:27,660
you know you saw those craters with the

848
00:41:34,309 --> 00:41:32,009
black and white debris streaming down in

849
00:41:37,880 --> 00:41:34,319
them what why such a great color

850
00:41:40,370 --> 00:41:37,890
contrast or albedo contrast on on that

851
00:41:41,990 --> 00:41:40,380
material it's not something I'm familiar

852
00:41:44,359 --> 00:41:42,000
with we're going to have to take a very

853
00:41:47,029 --> 00:41:44,369
careful look at that and when we see

854
00:41:49,240 --> 00:41:47,039
surprises that things that don't fit

855
00:41:51,109 --> 00:41:49,250
into our understanding our preconceived

856
00:41:52,490 --> 00:41:51,119
understanding then we're going to learn

857
00:41:55,910 --> 00:41:52,500
and we're going to learn a lot from this

858
00:41:58,520 --> 00:41:55,920
body alright we have another caller Leo

859
00:42:00,830 --> 00:41:58,530
and right from Irish TV

860
00:42:02,450 --> 00:42:00,840
yes thanks for taking my question a

861
00:42:06,080 --> 00:42:02,460
couple of small questions ready first

862
00:42:08,960 --> 00:42:06,090
the snowman could you clarify that that

863
00:42:10,430 --> 00:42:08,970

is the large feature that we see on the

864
00:42:14,270 --> 00:42:10,440
equator and maybe talk a little bit

865
00:42:16,100 --> 00:42:14,280
about that but also for dr. Flamini to

866
00:42:19,610 --> 00:42:16,110
ask what was the reaction these

867
00:42:21,650 --> 00:42:19,620
multispectral pictures that dr. russell

868
00:42:23,780 --> 00:42:21,660
has been describing were very very

869
00:42:27,160 --> 00:42:23,790
dramatic did it cause a gasp in the

870
00:42:30,440 --> 00:42:27,170
science room when it was first seen huh

871
00:42:34,010 --> 00:42:30,450
well certainly it did when we first saw

872
00:42:37,330 --> 00:42:34,020
those pictures that we really did gasp

873
00:42:41,510 --> 00:42:37,340
and and smile a lot but I would like to

874
00:42:43,880 --> 00:42:41,520
pass the mic over to Holger and he can

875
00:42:47,750 --> 00:42:43,890
tell us a little bit more about the

876
00:42:50,030 --> 00:42:47,760
snowman and then dr. Flamini can tell us

877
00:42:53,150 --> 00:42:50,040
about the Veer pictures so hold her

878
00:42:55,340 --> 00:42:53,160
first yeah well I can confirm the the

879
00:42:58,190 --> 00:42:55,350
two craters you refer to the large

880
00:43:02,180 --> 00:42:58,200
craters in the equatorial region this is

881
00:43:04,010 --> 00:43:02,190
the wood we nicknamed the the snowman so

882
00:43:06,680 --> 00:43:04,020
it's not only these two craters it's

883
00:43:09,980 --> 00:43:06,690
only the small one on top of it of it so

884
00:43:12,260 --> 00:43:09,990
that's the head of the snowman and these

885
00:43:15,110 --> 00:43:12,270
two craters the bigger ones they are

886
00:43:18,410 --> 00:43:15,120
very interesting to us because they

887
00:43:21,830 --> 00:43:18,420
appear to be shallow and filled with

888
00:43:24,230 --> 00:43:21,840

debris so these are huge features on the

889
00:43:28,220 --> 00:43:24,240
surface and they also have a land

890
00:43:31,610 --> 00:43:28,230
landslide area so we can we can discuss

891
00:43:34,670 --> 00:43:31,620
and investigate on the metric material

892
00:43:38,780 --> 00:43:34,680
that was sliding down the rims of the

893
00:43:42,880 --> 00:43:38,790
crater so if that would answer your

894
00:43:47,000 --> 00:43:42,890
question I hand over to Enrico Thanks

895
00:43:50,000 --> 00:43:47,010
yeah I mean when I images that you have

896
00:43:53,840 --> 00:43:50,010
seen at first let me say that these are

897
00:43:56,930 --> 00:43:53,850
the first data that have been acquired

898
00:44:00,110 --> 00:43:56,940
and so far so far it means that a lot of

899
00:44:01,960 --> 00:44:00,120
analysis to be done and still and there

900
00:44:06,140 --> 00:44:01,970
is a lot of work year's work to do it

901
00:44:08,720 --> 00:44:06,150
but what we can see from now and what we

902
00:44:11,610 --> 00:44:08,730
can say from now is that in these images

903
00:44:14,340 --> 00:44:11,620
that correspond to

904
00:44:16,830 --> 00:44:14,350
difference spectral data it means two

905
00:44:20,400 --> 00:44:16,840
different kind of mineralogy composition

906
00:44:23,490 --> 00:44:20,410
mineralogical composition and even to

907
00:44:26,370 --> 00:44:23,500
the size of the regulate particles as

908
00:44:29,790 --> 00:44:26,380
well of the aging of the surface we can

909
00:44:31,260 --> 00:44:29,800
derive information on which are the

910
00:44:33,390 --> 00:44:31,270
minerals and then how they are

911
00:44:35,190 --> 00:44:33,400
associated to the creators and then to

912
00:44:39,900 --> 00:44:35,200
the formation then to the age of the

913
00:44:43,410 --> 00:44:39,910

body and what we can see today already

914
00:44:46,710 --> 00:44:43,420
is that this body is not uniform at all

915
00:44:48,960 --> 00:44:46,720
is not a rock that the muscle more or

916
00:44:51,540 --> 00:44:48,970
less has the same MO Genuity in

917
00:44:55,140 --> 00:44:51,550
composition that is a differentiated

918
00:44:59,400 --> 00:44:55,150
body that has undergone underwent I mean

919
00:45:01,470 --> 00:44:59,410
as a history of evolution and also as a

920
00:45:05,460 --> 00:45:01,480
son kind of differentiation during

921
00:45:08,280 --> 00:45:05,470
devolution so is it is a complex body is

922
00:45:11,640 --> 00:45:08,290
it is something that is real in the

923
00:45:14,550 --> 00:45:11,650
middle between an asteroid as we have

924
00:45:17,310 --> 00:45:14,560
seen sensor so far and and the planet

925
00:45:20,820 --> 00:45:17,320
and what images can tell us today is

926
00:45:22,980 --> 00:45:20,830
that this is quite a lively true all

927
00:45:26,670 --> 00:45:22,990
right we have a follow-up call from USA

928
00:45:28,050 --> 00:45:26,680
Today dan are you back yeah what I was

929
00:45:29,730 --> 00:45:28,060
just wondering was how optimistic are

930
00:45:31,320 --> 00:45:29,740
you about using that very large southern

931
00:45:32,970 --> 00:45:31,330
crater now as a way to look deeper into

932
00:45:35,210 --> 00:45:32,980
the planet to look at this

933
00:45:39,930 --> 00:45:35,220
differentiation that sort of thing um

934
00:45:42,510 --> 00:45:39,940
okay the well the crate that impact has

935
00:45:45,690 --> 00:45:42,520
happened and it seems to have removed a

936
00:45:48,690 --> 00:45:45,700
lot of material carved the southern part

937
00:45:50,670 --> 00:45:48,700
of the what I call planet too many times

938
00:45:54,030 --> 00:45:50,680

I mean the I you would get all over me

939
00:45:55,980 --> 00:45:54,040
but I think that of this body is really

940
00:45:58,710 --> 00:45:55,990
the smallest terrestrial planet well

941
00:46:00,540 --> 00:45:58,720
it's carved some material off and

942
00:46:03,360 --> 00:46:00,550
fortunately it did because then that

943
00:46:05,760 --> 00:46:03,370
material has been falling on earth over

944
00:46:08,390 --> 00:46:05,770
all these years so we got a good idea we

945
00:46:12,000 --> 00:46:08,400
have samples returned from Vesta already

946
00:46:14,610 --> 00:46:12,010
but that and that material is pretty

947
00:46:18,360 --> 00:46:14,620
much you know you know two different

948
00:46:21,300 --> 00:46:18,370
types the uke rights and the Diogenes

949
00:46:23,280 --> 00:46:21,310
with a mixture as the any of them in

950
00:46:28,950 --> 00:46:23,290
what we call the Howard I

951
00:46:32,850 --> 00:46:28,960
but we have now gone gone deeper into

952
00:46:35,850 --> 00:46:32,860
the planet because of that event and we

953
00:46:38,940 --> 00:46:35,860
have craters now in that material that

954
00:46:41,100 --> 00:46:38,950
are excavating down even further so we

955
00:46:45,120 --> 00:46:41,110
will be looking in the craters in the

956
00:46:48,240 --> 00:46:45,130
greater next to get deeper down into the

957
00:46:51,750 --> 00:46:48,250
planet i think that's that expectation

958
00:46:55,140 --> 00:46:51,760
that we were planning on i think that

959
00:46:59,400 --> 00:46:55,150
will come to for by looking at the the

960
00:47:01,140 --> 00:46:59,410
later craters in the big crater and we

961
00:47:04,410 --> 00:47:01,150
have another follow-up from lee Holtz

962
00:47:06,000 --> 00:47:04,420
Wall Street Journal I yes please I

963
00:47:09,210 --> 00:47:06,010

wonder if I could ask you all to just

964
00:47:12,810 --> 00:47:09,220
look forward for us over the next couple

965
00:47:15,110 --> 00:47:12,820
of months you said that as the

966
00:47:18,720 --> 00:47:15,120
spacecraft spirals into progressively

967
00:47:20,880 --> 00:47:18,730
closer orbits around Vesta each one of

968
00:47:24,320 --> 00:47:20,890
those orbits would lend itself to a

969
00:47:26,640 --> 00:47:24,330
particular kind of scientific

970
00:47:29,100 --> 00:47:26,650
observation so I'm wondering if you can

971
00:47:36,660 --> 00:47:29,110
just give us a sense of that process

972
00:47:38,220 --> 00:47:36,670
please okay let me take that the next

973
00:47:41,730 --> 00:47:38,230
thing that we're going to do we call

974
00:47:45,260 --> 00:47:41,740
survey orbit but it's really optimized

975
00:47:47,940 --> 00:47:45,270
for the veer or the visible and infrared

976
00:47:51,150 --> 00:47:47,950
spectrometer and we will get the

977
00:47:54,720 --> 00:47:51,160
chemical composition of the entire

978
00:47:57,360 --> 00:47:54,730
surface the minerals that are on the

979
00:47:59,820 --> 00:47:57,370
surface totally mapped in the sunlit

980
00:48:03,090 --> 00:47:59,830
areas which it will be about eighty

981
00:48:08,040 --> 00:48:03,100
percent of the body will also of course

982
00:48:10,020 --> 00:48:08,050
take camera images too but the part of

983
00:48:12,960 --> 00:48:10,030
the orbit that's optimized for the

984
00:48:17,400 --> 00:48:12,970
camera is what we call the low altitude

985
00:48:18,630 --> 00:48:17,410
mapping orbit which will start in if I

986
00:48:22,200 --> 00:48:18,640
remember the date right in

987
00:48:26,100 --> 00:48:22,210
late-september and go through the next

988
00:48:30,450 --> 00:48:26,110

month approximately and then we will

989
00:48:34,860 --> 00:48:30,460
have all the images that we need to do

990
00:48:37,050 --> 00:48:34,870
stereo work to get the size and shape of

991
00:48:40,800 --> 00:48:37,060
the body very accurate

992
00:48:43,560 --> 00:48:40,810
and then when we finish that mapping in

993
00:48:46,830 --> 00:48:43,570
the high altitude mapping orbit we go

994
00:48:51,630 --> 00:48:46,840
into the imaginatively named low

995
00:48:55,140 --> 00:48:51,640
altitude mapping orbit where we are

996
00:48:59,270 --> 00:48:55,150
about only 200 kilometers above the

997
00:49:03,600 --> 00:48:59,280
surface and our gamma ray and neutron

998
00:49:06,390 --> 00:49:03,610
detector will measure you know is

999
00:49:09,180 --> 00:49:06,400
sensitive enough to and has enough

1000
00:49:13,170 --> 00:49:09,190
resolution for us to start making maps

1001
00:49:16,200 --> 00:49:13,180
of the elements that go into these

1002
00:49:21,260 --> 00:49:16,210
minerals and that will give us more

1003
00:49:26,670 --> 00:49:21,270
ideas and more insight into how the body

1004
00:49:28,530 --> 00:49:26,680
evolved and came into a current state at

1005
00:49:30,810 --> 00:49:28,540
the same time we'll be able to take

1006
00:49:33,750 --> 00:49:30,820
high-resolution gravity measurements

1007
00:49:36,180 --> 00:49:33,760
with the radio system and learn more

1008
00:49:39,630 --> 00:49:36,190
about the mass distribution in the body

1009
00:49:42,870 --> 00:49:39,640
does that answer your question alright

1010
00:49:46,230 --> 00:49:42,880
we have one more question in the queue

1011
00:49:48,600 --> 00:49:46,240
for the phone interviews and it's ken

1012
00:49:50,300 --> 00:49:48,610
Kramer with Space Flight magazine and

1013
00:49:53,520 --> 00:49:50,310

then we'll bring it back into the room

1014
00:49:55,770 --> 00:49:53,530
ken hi thanks for taking my questions

1015
00:49:57,270 --> 00:49:55,780
first again congratulations to the team

1016
00:50:00,810 --> 00:49:57,280
haven't seen the launch it's pretty

1017
00:50:02,880 --> 00:50:00,820
fantastic to see results right now there

1018
00:50:04,500 --> 00:50:02,890
was the question I have is I'd like to

1019
00:50:06,720 --> 00:50:04,510
know about the south polar region if

1020
00:50:09,170 --> 00:50:06,730
there is anything this magnitude

1021
00:50:12,630 --> 00:50:09,180
anywhere else in the in the solar system

1022
00:50:15,120 --> 00:50:12,640
that has this gigantic central peak at

1023
00:50:18,960 --> 00:50:15,130
it and um now that you've seen it are

1024
00:50:21,080 --> 00:50:18,970
you reevaluating on your opinions on its

1025
00:50:23,840 --> 00:50:21,090
formation compared to the data you had

1026
00:50:26,940 --> 00:50:23,850
from the Hubble Space Telescope and

1027
00:50:29,370 --> 00:50:26,950
secondly um is there any other clothes n

1028
00:50:32,010 --> 00:50:29,380
log in the solar system to Vesta or is

1029
00:50:33,750 --> 00:50:32,020
this completely unique Thanks sure

1030
00:50:36,390 --> 00:50:33,760
you're not a member of the science team

1031
00:50:38,340 --> 00:50:36,400
ah that was an excellent question and

1032
00:50:41,340 --> 00:50:38,350
that is exactly the question that the

1033
00:50:46,320 --> 00:50:41,350
team has been mulling over for the last

1034
00:50:48,750 --> 00:50:46,330
couple of weeks and my email box is

1035
00:50:51,810 --> 00:50:48,760
filled with ideas of

1036
00:50:54,510 --> 00:50:51,820
and analogs and you know the closest is

1037
00:50:58,200 --> 00:50:54,520
is this but this is made of ice that you

1038
00:51:00,390 --> 00:50:58,210

know you know this this has Craig crater

1039
00:51:03,900 --> 00:51:00,400
walls all the way around it you know but

1040
00:51:05,670 --> 00:51:03,910
the one we have at you know at Vesta

1041
00:51:09,360 --> 00:51:05,680
doesn't you know have you ever seen

1042
00:51:13,410 --> 00:51:09,370
anything like it and we basically this

1043
00:51:17,790 --> 00:51:13,420
this is unique in many many features it

1044
00:51:20,730 --> 00:51:17,800
is almost a body shattering event it was

1045
00:51:22,460 --> 00:51:20,740
really very large by looking you know

1046
00:51:27,120 --> 00:51:22,470
the grooves that we talked about earlier

1047
00:51:30,360 --> 00:51:27,130
that's evidence that that there was

1048
00:51:34,590 --> 00:51:30,370
really a strong force when this body

1049
00:51:36,480 --> 00:51:34,600
slammed into Vesta I'm really anxious to

1050
00:51:39,900 --> 00:51:36,490
look at the North Pole to see if how

1051
00:51:43,410 --> 00:51:39,910
that energy focused through the body and

1052
00:51:45,060 --> 00:51:43,420
what it did to the north but we were

1053
00:51:49,260 --> 00:51:45,070
unfortunately that's in darkness now

1054
00:51:52,170 --> 00:51:49,270
this is hiding from us and but we do not

1055
00:51:56,670 --> 00:51:52,180
have a good analogue anywhere else we

1056
00:52:00,660 --> 00:51:56,680
have this feature it's uh what we

1057
00:52:03,060 --> 00:52:00,670
expected in the sense that yes it seems

1058
00:52:06,540 --> 00:52:03,070
to be an impact feature yes it's got a

1059
00:52:11,580 --> 00:52:06,550
central peak in it yes there are some

1060
00:52:13,950 --> 00:52:11,590
crater rim places there so we're fairly

1061
00:52:17,370 --> 00:52:13,960
sure it's a crater we're going to be

1062
00:52:20,970 --> 00:52:17,380
looking for melt on you know on the

1063
00:52:25,200 --> 00:52:20,980

surface there ponding of melt we'll look

1064
00:52:30,260 --> 00:52:25,210
for exactly how these grooves that are

1065
00:52:33,930 --> 00:52:30,270
in this area are shaped it may be that

1066
00:52:36,450 --> 00:52:33,940
that the the fact that Vesta was

1067
00:52:39,240 --> 00:52:36,460
rotating very quickly and this was a

1068
00:52:42,750 --> 00:52:39,250
very large event twisted the material

1069
00:52:46,140 --> 00:52:42,760
and made twisted grooves in in the

1070
00:52:48,810 --> 00:52:46,150
surface will be looking for that so

1071
00:52:52,350 --> 00:52:48,820
there's a lot of things that will be

1072
00:52:54,780 --> 00:52:52,360
doing to study this but we haven't found

1073
00:52:58,380 --> 00:52:54,790
the perfect analogue yet we found

1074
00:53:00,750 --> 00:52:58,390
analogs for this particular property or

1075
00:53:02,050 --> 00:53:00,760
that particular property but all

1076
00:53:04,390 --> 00:53:02,060
together this

1077
00:53:08,230 --> 00:53:04,400
something that is very new to us and

1078
00:53:09,520 --> 00:53:08,240
we'll be studying it very intently all

1079
00:53:12,790 --> 00:53:09,530
right we're going to bring it back to

1080
00:53:16,140 --> 00:53:12,800
the room and we have time just for two

1081
00:53:18,850 --> 00:53:16,150
more questions Emily and Alicia Chang

1082
00:53:20,440 --> 00:53:18,860
I'm just I was struck by how fresh

1083
00:53:21,550 --> 00:53:20,450
looking a lot of the craters are as

1084
00:53:23,770 --> 00:53:21,560
wondering if I should have been

1085
00:53:25,840 --> 00:53:23,780
surprised by that or if it's what you

1086
00:53:27,460 --> 00:53:25,850
expect in the asteroid belt well you're

1087
00:53:30,400 --> 00:53:27,470
you're always going to have some fresh

1088
00:53:33,730 --> 00:53:30,410

craters because the stuff is falling all

1089
00:53:37,420 --> 00:53:33,740
the time what we need to do is to try

1090
00:53:40,810 --> 00:53:37,430
and understand the weathering process

1091
00:53:43,000 --> 00:53:40,820
the aging process and we haven't had a

1092
00:53:45,730 --> 00:53:43,010
chance to do that that'll take the

1093
00:53:47,620 --> 00:53:45,740
higher resolution data but yes you're

1094
00:53:50,460 --> 00:53:47,630
seeing the same thing that the science

1095
00:53:52,750 --> 00:53:50,470
team is seeing there are constantly

1096
00:53:56,260 --> 00:53:52,760
commenting on the freshness of some of

1097
00:53:57,790 --> 00:53:56,270
the craters in a question from AP Alicia

1098
00:53:59,860 --> 00:53:57,800
Chang you should join with the

1099
00:54:01,390 --> 00:53:59,870
associated press as you officially start

1100
00:54:03,790 --> 00:54:01,400
your science campaign next week are

1101
00:54:05,770 --> 00:54:03,800
there any plans to release raw images as

1102
00:54:10,090 --> 00:54:05,780
they kept in as with other missions or

1103
00:54:14,680 --> 00:54:10,100
will they all be processed and yes our

1104
00:54:18,730 --> 00:54:14,690
plan is to have an image of the day and

1105
00:54:20,740 --> 00:54:18,740
have the scientists select out one of

1106
00:54:25,690 --> 00:54:20,750
the you know thousands of images that

1107
00:54:28,930 --> 00:54:25,700
come down so that you get a continuous

1108
00:54:33,430 --> 00:54:28,940
update on what we're finding and that

1109
00:54:37,630 --> 00:54:33,440
you get representative samples of the

1110
00:54:40,090 --> 00:54:37,640
whole planet so we're going to go into

1111
00:54:43,840 --> 00:54:40,100
our archive rather than inundate you

1112
00:54:47,100 --> 00:54:43,850
with them all have a best picture for

1113
00:54:50,860 --> 00:54:47,110

you to make it to keep it interesting

1114
00:54:53,410 --> 00:54:50,870
alright so that wraps up our Q&A and we

1115
00:54:55,480 --> 00:54:53,420
will we play all of our images following

1116
00:54:57,130 --> 00:54:55,490
this news conference and the news

1117
00:54:59,770 --> 00:54:57,140
conference will be played back in its

1118
00:55:02,740 --> 00:54:59,780
entirety on NASA TV as well as NASA's

1119
00:55:04,720 --> 00:55:02,750
ustream channel and JPL's ustream

1120
00:55:09,460 --> 00:55:04,730
channel and for more information you

1121
00:55:12,250 --> 00:55:09,470
should check out the website at WWDC gov