NASA's EPOXI successfully flies past Comet Hartley 2

1
00:00:07,039 --> 00:00:03,710
hello I'm je Hill welcome to NASA's Jet

2
00:00:08,990 --> 00:00:07,049
Propulsion Laboratory 2011 is one of the

3
00:00:11,780 --> 00:00:09,000
busiest years ever and planet

4
00:00:14,030 --> 00:00:11,790
exploration we have four space missions

5
00:00:16,790 --> 00:00:14,040
launching this year plus a meet up with

6
00:00:19,250 --> 00:00:16,800
an asteroid just weeks away in the last

7
00:00:22,070 --> 00:00:19,260
few months we've had to comment flybys

8
00:00:24,650 --> 00:00:22,080
on Valentine's Day Stardust next took us

9
00:00:27,800 --> 00:00:24,660
on a return visit to comet Tempel 1 and

10
00:00:30,439 --> 00:00:27,810
in November JPL is EPOXI mission zoom

11
00:01:01,819 --> 00:00:30,449
past of peanut-shaped comet Hartley 2

12
00:01:04,100 --> 00:01:01,829
and found itself in an ice storm flew by

13
00:01:06,410 --> 00:01:04,110

at a speed of about 27,000 miles per

14
00:01:09,140 --> 00:01:06,420
hour and the spacecraft was slightly

15
00:01:10,850 --> 00:01:09,150
below the comet in some plane who would

16
00:01:14,249 --> 00:01:10,860
have thought that we actually get to see

17
00:01:16,800 --> 00:01:14,259
a comet close up like we just did

18
00:01:19,649 --> 00:01:16,810
and when we first saw this our mouths

19
00:01:21,870 --> 00:01:19,659
just drop to me this whole thing looks

20
00:01:24,719 --> 00:01:21,880
like a snow globe that you're just

21
00:01:26,819 --> 00:01:24,729
simply shaken and watching it fly when

22
00:01:29,850 --> 00:01:26,829
we saw the images come down even in real

23
00:01:32,730 --> 00:01:29,860
time in the raw data and realized we had

24
00:01:35,039 --> 00:01:32,740
a cloud of snow around the nucleus we

25
00:01:38,309 --> 00:01:35,049
were astounded those are not stars those

26
00:01:40,679 --> 00:01:38,319
are all chunks of ice we think the

27
00:01:43,590 --> 00:01:40,689
biggest ones are at least the size of a

28
00:01:45,600 --> 00:01:43,600
golf ball and possibly up to the size of

29
00:01:47,880 --> 00:01:45,610
a basketball so what that means is that

30
00:01:49,289 --> 00:01:47,890
the snowballs are not what we might have

31
00:01:50,219 --> 00:01:49,299
thought to begin with we're not seeing

32
00:01:52,080 --> 00:01:50,229
softballs

33
00:01:54,990 --> 00:01:52,090
or even ice cubes what we're seeing are

34
00:02:05,789 --> 00:01:55,000
fluffy aggregates of very small pieces

35
00:02:07,710 --> 00:02:05,799
of ice was this mission a hundred

36
00:02:10,830 --> 00:02:07,720
percent successful in terms of the

37
00:02:14,160 --> 00:02:10,840
science I would have to say no it was a

38
00:02:18,150 --> 00:02:14,170

thousand percent successful we achieved

39
00:02:20,370 --> 00:02:18,160
all of our science objectives we do in

40
00:02:23,849 --> 00:02:20,380
fact have a comparison of the deep

41
00:02:25,780 --> 00:02:23,859
impact area and in fact does show an

42
00:02:29,229 --> 00:02:25,790
impact crater

43
00:02:31,509 --> 00:02:29,239
this spacecraft Stardust went through

44
00:02:33,099 --> 00:02:31,519
this cloud of dust and rocks coming off

45
00:02:34,990 --> 00:02:33,109
the comet we have instruments on the

46
00:02:36,880 --> 00:02:35,000
front of the spacecraft call it dust

47
00:02:39,459 --> 00:02:36,890
flux monitor instrument and they have

48
00:02:42,490 --> 00:02:39,469
sensor to detect these impacts a good

49
00:02:54,849 --> 00:02:42,500
analogy of thinking of a like a b-17 in

50
00:02:56,679 --> 00:02:54,859
World War 2 flying through flack I have

51
00:02:59,140 --> 00:02:56,689
a message for any school kids out there

52
00:03:01,509 --> 00:02:59,150
who might be wondering how NASA can send

53
00:03:03,879 --> 00:03:01,519
a spacecraft billions of miles through

54
00:03:06,550 --> 00:03:03,889
the solar system and somehow wind up

55
00:03:09,640 --> 00:03:06,560
flying so close to a tiny comet only a

56
00:03:14,289 --> 00:03:09,650
few kilometers in diameter it's done

57
00:03:16,569 --> 00:03:14,299
with math did you know that both comet

58
00:03:18,789 --> 00:03:16,579
missions were carried out using recycled

59
00:03:21,220 --> 00:03:18,799
spacecraft that's right they were

60
00:03:23,619 --> 00:03:21,230
originally used for other missions and

61
00:03:26,409 --> 00:03:23,629
repurposed to conduct new jobs before

62
00:03:28,899 --> 00:03:26,419
the fuel ran out makes economic sense a

63
00:03:32,020 --> 00:03:28,909

way of stretching taxpayer dollars by

64
00:03:35,050 --> 00:03:32,030
doing a second mission at one-tenth of

65
00:03:37,629 --> 00:03:35,060
the usual cost another mission that

66
00:03:40,960 --> 00:03:37,639
studying small solar system bodies is

67
00:03:43,270 --> 00:03:40,970
about to reach a major milestone JPL's

68
00:03:45,819 --> 00:03:43,280
dawn is just months away from reaching

69
00:03:48,789 --> 00:03:45,829
its first port of call in the asteroid

70
00:03:50,920 --> 00:03:48,799
belt Vesta some people think it's an

71
00:03:53,860 --> 00:03:50,930
asteroid but others think it's a proto

72
00:03:56,259 --> 00:03:53,870
planet a celestial body that almost

73
00:03:56,949 --> 00:03:56,269
formed into a planet but never quite

74
00:03:59,349 --> 00:03:56,959
made it

75
00:04:02,050 --> 00:03:59,359
the missions goal is to compare Vesta

76
00:04:04,180 --> 00:04:02,060
and the dwarf planet Ceres two of the

77
00:04:07,089 --> 00:04:04,190
largest residents of the asteroid belt

78
00:04:09,339 --> 00:04:07,099
the spacecraft is on its final approach

79
00:04:13,089 --> 00:04:09,349
to Vesta and should arrive around July

80
00:04:15,069 --> 00:04:13,099
16th dawn will orbit Vesta for one year

81
00:04:17,740 --> 00:04:15,079
and then head to its second destination

82
00:04:20,379 --> 00:04:17,750
Ceres in 2015

83
00:04:22,839 --> 00:04:20,389
scientists think both alien worlds will

84
00:04:24,909 --> 00:04:22,849
provide important insights into the dawn

85
00:04:27,440 --> 00:04:24,919
of the solar system that's why the

86
00:04:30,210 --> 00:04:27,450
mission is called

87
00:04:33,120 --> 00:04:30,220
JPL robotic missions teach us about

88
00:04:36,600 --> 00:04:33,130

other worlds they also teach us a lot

89
00:04:40,620 --> 00:04:36,610
about one very important planet how we

90
00:04:43,020 --> 00:04:40,630
roam this June our Aquarius mission will

91
00:04:45,510 --> 00:04:43,030
launch from Vandenberg Air Force Base to

92
00:04:49,200 --> 00:04:45,520
begin studying an important piece of

93
00:04:51,930 --> 00:04:49,210
Earth's climate puzzle salt salt and the

94
00:04:58,140 --> 00:04:51,940
oceans affect the water cycle ocean

95
00:04:59,670 --> 00:04:58,150
circulation and our climate when we're

96
00:05:01,770 --> 00:04:59,680
talking about salt in the ocean we're

97
00:05:04,050 --> 00:05:01,780
talking pretty much the same salt that

98
00:05:06,480 --> 00:05:04,060
you use in cooking the chemical known as

99
00:05:08,250 --> 00:05:06,490
sodium chloride you've been to the beach

100
00:05:10,410 --> 00:05:08,260
you've gone swimming in the ocean you

101
00:05:11,790 --> 00:05:10,420
know that the ocean is salty what most

102
00:05:13,740 --> 00:05:11,800
people don't recognize is that the

103
00:05:16,320 --> 00:05:13,750
concentration of salt or what we call

104
00:05:18,720 --> 00:05:16,330
salinity varies quite a bit from one

105
00:05:20,520 --> 00:05:18,730
part of the ocean to another when water

106
00:05:22,830 --> 00:05:20,530
evaporates off the sea surface and goes

107
00:05:24,270 --> 00:05:22,840
into the atmosphere that makes the water

108
00:05:25,650 --> 00:05:24,280
saltier because you're taking fresh

109
00:05:28,440 --> 00:05:25,660
water out and you're leaving more salt

110
00:05:31,080 --> 00:05:28,450
behind as the minerals of the salt

111
00:05:33,180 --> 00:05:31,090
circulates around in the oceans it moves

112
00:05:35,430 --> 00:05:33,190
heat around heat that's carried by the

113
00:05:36,990 --> 00:05:35,440

ocean affects the atmosphere the changes

114
00:05:38,910 --> 00:05:37,000
of the atmosphere and the sea surface

115
00:05:42,180 --> 00:05:38,920
temperature is coupled together

116
00:05:44,310 --> 00:05:42,190
it controls climate we have measured sea

117
00:05:47,190 --> 00:05:44,320
surface temperature you measured winds

118
00:05:49,920 --> 00:05:47,200
over water sea level rise color of the

119
00:05:53,510 --> 00:05:49,930
ocean but yet we do not know one of the

120
00:05:56,779 --> 00:05:53,520
fundamental properties that affect climb

121
00:05:59,360 --> 00:05:56,789
which is the density the concentration

122
00:06:01,100 --> 00:05:59,370
of salt in the ocean salinity is one of

123
00:06:02,990 --> 00:06:01,110
the missing parameters will never be

124
00:06:04,730 --> 00:06:03,000
measured from space before we have no

125
00:06:06,020 --> 00:06:04,740
salinity samples at all from parts of

126
00:06:07,580 --> 00:06:06,030
the world particularly in the southern

127
00:06:08,990 --> 00:06:07,590
hemisphere in the South Pacific and the

128
00:06:11,390 --> 00:06:09,000
South Atlantic and southern Indian

129
00:06:13,309 --> 00:06:11,400
Oceans so there's a big date again this

130
00:06:15,830 --> 00:06:13,319
mission called Aquarius is one the most

131
00:06:18,950 --> 00:06:15,840
exciting mission to date it measures how

132
00:06:21,320 --> 00:06:18,960
salty the ocean is from space as you

133
00:06:24,050 --> 00:06:21,330
take a pinch of salt we put in a gallon

134
00:06:28,580 --> 00:06:24,060
of water we can measure that kind of

135
00:06:31,279 --> 00:06:28,590
sensitivity of salt from 408 miles above

136
00:06:33,529 --> 00:06:31,289
the earth in seven days we'll map the

137
00:06:35,270 --> 00:06:33,539
entire Earth and go back to the same

138
00:06:38,210 --> 00:06:35,280

point measuring it over and over again

139
00:06:41,089 --> 00:06:38,220
and we'll monitor over time how the

140
00:06:43,430 --> 00:06:41,099
changes in variability are by having

141
00:06:45,200 --> 00:06:43,440
salinity information from space or

142
00:06:47,360 --> 00:06:45,210
provide this missing link and make

143
00:06:49,550 --> 00:06:47,370
better predictions on the climate change

144
00:06:50,990 --> 00:06:49,560
in climate model all the measurements

145
00:06:53,749 --> 00:06:51,000
that we make in the Earth Sciences

146
00:06:55,790 --> 00:06:53,759
program within NASA are really to better

147
00:06:57,770 --> 00:06:55,800
understand the climate processes that

148
00:06:59,450 --> 00:06:57,780
are happening now how we can use that

149
00:07:02,089 --> 00:06:59,460
information to better predict the future

150
00:07:03,499 --> 00:07:02,099
so we can plan better salinity is one of

151
00:07:05,270 --> 00:07:03,509
those measurements that we need to fill

152
00:07:07,459 --> 00:07:05,280
an important gap to do that very thing

153
00:07:11,749 --> 00:07:07,469
that's how it affects you and me and the

154
00:07:13,700 --> 00:07:11,759
person next door another earth mission

155
00:07:16,129 --> 00:07:13,710
the gravity and recovery climate

156
00:07:18,969 --> 00:07:16,139
experiment or grace is so successful

157
00:07:21,800 --> 00:07:18,979
there's about to be a spinoff the

158
00:07:23,839 --> 00:07:21,810
technology of using twin satellites to

159
00:07:26,390 --> 00:07:23,849
make detailed measurements of Earth's

160
00:07:29,270 --> 00:07:26,400
gravity field that grace demonstrated

161
00:07:31,399 --> 00:07:29,280
will now be applied to the moon it's

162
00:07:33,589 --> 00:07:31,409
about to be huge in a mission called the

163
00:07:38,240 --> 00:07:33,599

Gravity Recovery and interior laboratory

164
00:07:40,959 --> 00:07:38,250
or Grail we've landed people on the moon

165
00:07:44,689 --> 00:07:40,969
we've orbited spacecraft around the moon

166
00:07:45,620 --> 00:07:44,699
but the part of lunar understanding that

167
00:07:49,070 --> 00:07:45,630
we don't get

168
00:07:50,960 --> 00:07:49,080
is what's inside the Grail is a mission

169
00:07:54,380 --> 00:07:50,970
which is going to study the interior

170
00:07:56,420 --> 00:07:54,390
structure and evolution of the moon will

171
00:07:59,150 --> 00:07:56,430
actually be sending two spacecraft to

172
00:08:00,710 --> 00:07:59,160
the moon by measuring distance change

173
00:08:02,720 --> 00:08:00,720
between the two spacecraft very

174
00:08:04,460 --> 00:08:02,730
precisely believe it or not we're going

175
00:08:06,800 --> 00:08:04,470
to be able to reconstruct what the

176
00:08:08,480 --> 00:08:06,810
interior of the moon is made of and how

177
00:08:11,600 --> 00:08:08,490
it got to be the way that it is today

178
00:08:15,200 --> 00:08:11,610
it's a little bit like doing a cat scan

179
00:08:18,010 --> 00:08:15,210
of the moon understanding the lunar

180
00:08:21,410 --> 00:08:18,020
interior allows us to go back and study

181
00:08:26,900 --> 00:08:21,420
aspects of what the earth was like in

182
00:08:29,870 --> 00:08:26,910
its earliest history Grail is the first

183
00:08:34,279 --> 00:08:29,880
planetary mission to carry instruments

184
00:08:38,020 --> 00:08:34,289
that are entirely devoted to education

185
00:08:42,740 --> 00:08:38,030
and outreach we will have up to four

186
00:08:46,220 --> 00:08:42,750
cameras on each Grail spacecraft that

187
00:08:50,750 --> 00:08:46,230
will be used solely for schoolchildren

188
00:08:53,510 --> 00:08:50,760

to propose targets that they would like

189
00:08:56,180 --> 00:08:53,520
to image on the surface of the Moon we

190
00:08:59,440 --> 00:08:56,190
expect students to learn a lot about the

191
00:09:02,990 --> 00:08:59,450
process of what it takes to operate

192
00:09:06,290 --> 00:09:03,000
instrumentation in space this experiment

193
00:09:09,440 --> 00:09:06,300
is going to teach students a great deal

194
00:09:12,200 --> 00:09:09,450
about the moon itself and we also expect

195
00:09:14,240 --> 00:09:12,210
that it's gonna go a long way towards

196
00:09:16,430 --> 00:09:14,250
helping students understand just how

197
00:09:20,720 --> 00:09:16,440
much fun science and engineering is as a

198
00:09:23,690 --> 00:09:20,730
career the Grail mission launches in

199
00:09:25,670 --> 00:09:23,700
September now let's check out our Mars

200
00:09:27,800 --> 00:09:25,680
exploration Rovers Spirit and

201
00:09:30,260 --> 00:09:27,810
Opportunity the Rovers were built with

202
00:09:33,350 --> 00:09:30,270
warranties to operate 90 days on Mars

203
00:09:36,110 --> 00:09:33,360
instead they've both given us years of

204
00:09:38,000 --> 00:09:36,120
bonus time and missions the spirit

205
00:09:41,240 --> 00:09:38,010
hasn't communicated with earth since

206
00:09:43,640 --> 00:09:41,250
March 2010 and it's possible we may not

207
00:09:46,460 --> 00:09:43,650
hear from it again but opportunity

208
00:09:55,410 --> 00:09:46,470
remains active and continues its long

209
00:10:00,340 --> 00:09:58,420
it's been seven years since the rover's

210
00:10:02,740 --> 00:10:00,350
landed on Mars this was originally a

211
00:10:04,960 --> 00:10:02,750
90-day mission only three months the

212
00:10:07,020 --> 00:10:04,970
fact that they lasted this long and

213
00:10:10,750 --> 00:10:07,030

driven this far was a nobody's

214
00:10:14,230 --> 00:10:10,760
imagination opportunity is crossed

215
00:10:15,790 --> 00:10:14,240
almost 26 kilometers of Adama tree and

216
00:10:25,230 --> 00:10:15,800
it's still in very good health that

217
00:10:33,720 --> 00:10:29,079
opportunities and kind of a desert trek

218
00:10:37,269 --> 00:10:33,730
mode ever since we've left Victoria

219
00:10:40,030 --> 00:10:37,279
opportunity now is located at Santa

220
00:10:41,800 --> 00:10:40,040
Maria crater it's one of the freshest

221
00:10:44,800 --> 00:10:41,810
craters that other Rovers had a chance

222
00:10:47,500 --> 00:10:44,810
to explore and there's also evidence of

223
00:10:50,590 --> 00:10:47,510
some hydrated sulfate minerals around

224
00:10:53,470 --> 00:10:50,600
the southeast corner of this crater they

225
00:10:56,940 --> 00:10:53,480
can only form when there's been water

226
00:11:00,070 --> 00:10:56,950
along for a really long period of time

227
00:11:01,570 --> 00:11:00,080
the next big adventure for that Rover

228
00:11:03,940 --> 00:11:01,580
and that's to get to Endeavour crater

229
00:11:06,760 --> 00:11:03,950
which is a giant crater that still some

230
00:11:08,560 --> 00:11:06,770
six kilometers away from where the rover

231
00:11:13,389 --> 00:11:08,570
is right now we're trying to do a

232
00:11:15,480 --> 00:11:13,399
balance of driving as fast as we can but

233
00:11:18,490 --> 00:11:15,490
making sure we don't miss anything

234
00:11:21,370 --> 00:11:18,500
critical as we drive it endeavors such a

235
00:11:23,050 --> 00:11:21,380
large crater we might start seeing rocks

236
00:11:26,079 --> 00:11:23,060
ejected from Endeavour

237
00:11:28,269 --> 00:11:26,089
well before we get there that's our next

238
00:11:31,090 --> 00:11:28,279

big objective because we know there are

239
00:11:34,630 --> 00:11:31,100
these clay minerals present in the rim

240
00:11:37,990 --> 00:11:34,640
of the crater that is suggestive of

241
00:11:41,710 --> 00:11:38,000
ancient water on Mars that was a neutral

242
00:11:44,650 --> 00:11:41,720
pH neutral water is what astrobiologists

243
00:11:46,600 --> 00:11:44,660
assess that life started in and so the

244
00:11:48,850 --> 00:11:46,610
fact that there is evidence of ancient

245
00:11:51,579 --> 00:11:48,860
neutral water on Mars is very exciting

246
00:11:55,090 --> 00:11:51,589
for the bio potential of the planet it's

247
00:12:00,110 --> 00:11:55,100
an exciting time over the next year or

248
00:12:04,110 --> 00:12:01,560
for now

249
00:12:06,090 --> 00:12:04,120
all eyes are focused on our next Rover

250
00:12:08,330 --> 00:12:06,100
mission to the red planet the Mars

251
00:12:09,480 --> 00:12:08,340
Science Laboratory better known as

252
00:12:11,670 --> 00:12:09,490
curiosity

253
00:12:13,830 --> 00:12:11,680
we've been documenting the construction

254
00:12:22,250 --> 00:12:13,840
and testing and we put it on the web in

255
00:12:26,700 --> 00:12:24,450
today it's a really exciting day it's a

256
00:12:28,770 --> 00:12:26,710
milestone for MSL in a sense the first

257
00:12:31,350 --> 00:12:28,780
time we're seeing the rover derive its

258
00:12:33,180 --> 00:12:31,360
own wheels its own mobility system it's

259
00:12:36,150 --> 00:12:33,190
gone from designs on napkins to

260
00:12:39,180 --> 00:12:36,160
PowerPoint you know to CAD drawings to

261
00:12:40,920 --> 00:12:39,190
blueprints and now it's a rover so just

262
00:12:42,930 --> 00:12:40,930
recently we installed the robotic arm

263
00:12:44,790 --> 00:12:42,940

with a major milestone for the project

264
00:12:46,580 --> 00:12:44,800
not only for the engineers that worked

265
00:12:48,720 --> 00:12:46,590
on this arm for years designing

266
00:12:51,150 --> 00:12:48,730
assembling it and finally delivering it

267
00:12:52,800 --> 00:12:51,160
but for the project as a whole the tests

268
00:12:54,660 --> 00:12:52,810
we're doing now are actually helping us

269
00:12:56,880 --> 00:12:54,670
learn how to drive the arm from both the

270
00:12:58,890 --> 00:12:56,890
operator side as well as the flight

271
00:13:00,810 --> 00:12:58,900
software side helping us develop that

272
00:13:02,970 --> 00:13:00,820
4-over hand-eye coordination we just

273
00:13:04,500 --> 00:13:02,980
recently completed testing the wheels

274
00:13:06,510 --> 00:13:04,510
and suspension system on the flight

275
00:13:08,460 --> 00:13:06,520
rover it's a classic Walker bogie

276
00:13:10,770 --> 00:13:08,470
suspension system we've used the last

277
00:13:12,750 --> 00:13:10,780
two generations and Mars rovers so for

278
00:13:14,790 --> 00:13:12,760
this mission mobility system not only

279
00:13:16,470 --> 00:13:14,800
drives the rover around it's also the

280
00:13:17,850 --> 00:13:16,480
landing gear the wheels are actually the

281
00:13:20,880 --> 00:13:17,860
first thing to make contact with the

282
00:13:23,070 --> 00:13:20,890
surface of Mars so what we're doing

283
00:13:24,990 --> 00:13:23,080
today is we're getting ready for system

284
00:13:27,600 --> 00:13:25,000
tests so what the guys are doing now is

285
00:13:29,700 --> 00:13:27,610
they're electrically connecting up each

286
00:13:31,440 --> 00:13:29,710
of the vehicles together so that thinks

287
00:13:34,110 --> 00:13:31,450
it's mechanically hooked together which

288
00:13:35,880 --> 00:13:34,120

tells the rover or makes the rover think

289
00:13:38,070 --> 00:13:35,890
that it's going to go through all its

290
00:13:39,660 --> 00:13:38,080
mission phases we ran a major test

291
00:13:42,000 --> 00:13:39,670
called the sky crane full motion drop

292
00:13:50,350 --> 00:13:42,010
test so this is the sequence leading up

293
00:13:56,360 --> 00:13:53,000
we're here in the environmental test

294
00:13:58,040 --> 00:13:56,370
facility at JPL where curiosity is going

295
00:14:05,260 --> 00:13:58,050
through a series of random vibration

296
00:14:10,340 --> 00:14:07,880
the marsh ad was created to try to

297
00:14:11,750 --> 00:14:10,350
simulate the types of different terrains

298
00:14:14,120 --> 00:14:11,760
that we might encounter on the surface

299
00:14:16,490 --> 00:14:14,130
of Mars we have everything on this Mars

300
00:14:20,060 --> 00:14:16,500
yard from rocks that are the size of

301
00:14:22,190 --> 00:14:20,070
about 25 to 30 inches in height to

302
00:14:23,600 --> 00:14:22,200
varying slope we just got out of

303
00:14:25,190 --> 00:14:23,610
vibration testing which is the cake

304
00:14:27,290 --> 00:14:25,200
portion and now we're moving on to the

305
00:14:29,120 --> 00:14:27,300
baked portion which would be our thermal

306
00:14:30,470 --> 00:14:29,130
vacuum testing at which point we can

307
00:14:32,540 --> 00:14:30,480
start changing the temperature inside

308
00:14:35,270 --> 00:14:32,550
and pumping down the pressure to

309
00:14:38,510 --> 00:14:35,280
simulate Mars conditions we've done a

310
00:14:40,370 --> 00:14:38,520
lot of testing already here at JPL now

311
00:14:42,200 --> 00:14:40,380
we're packing up our table and getting

312
00:14:44,150 --> 00:14:42,210
ready to ship it to Florida in Florida

313
00:14:46,670 --> 00:14:44,160

we'll be doing the most exciting test of

314
00:14:48,650 --> 00:14:46,680
all a full spacecraft with fuel loaded

315
00:14:53,970 --> 00:14:48,660
on the table measuring it to make sure

316
00:15:00,340 --> 00:14:57,160
jpo rovers come in all shapes and sizes

317
00:15:03,429 --> 00:15:00,350
one of them the all-terrain hex lemmed

318
00:15:06,670 --> 00:15:03,439
extraterrestrial Explorer is enormous

319
00:15:09,340 --> 00:15:06,680
athlete as it's called is big because

320
00:15:12,970 --> 00:15:09,350
it's designed for human exploration it's

321
00:15:15,730 --> 00:15:12,980
superb but despite its size it's quite

322
00:15:18,100 --> 00:15:15,740
nimble just for fun we took a fleets

323
00:15:21,809 --> 00:15:18,110
moves and sped them up to music and put

324
00:15:25,420 --> 00:15:21,819
the video on YouTube it got more than

325
00:15:26,949 --> 00:15:25,430
175,000 hits plus a spot on the TV show

326
00:16:16,960 --> 00:15:26,959
So You Think You Can Dance

327
00:16:23,750 --> 00:16:20,269
moving on now from our biggest Rover to

328
00:16:26,030 --> 00:16:23,760
the largest planet our mission Juno head

329
00:16:29,150 --> 00:16:26,040
to the granddaddy in the solar system

330
00:16:31,610 --> 00:16:29,160
Jupiter Jupiter's composition hasn't

331
00:16:33,950 --> 00:16:31,620
changed since the solar system began and

332
00:16:36,620 --> 00:16:33,960
scientists believe studying it will be

333
00:16:45,320 --> 00:16:36,630
like looking into a time capsule that's

334
00:16:47,300 --> 00:16:45,330
5 billion years old Jupiter is the fifth

335
00:16:49,610 --> 00:16:47,310
planet from the Sun and the largest

336
00:16:51,710 --> 00:16:49,620
planet in our solar system because of

337
00:16:53,750 --> 00:16:51,720
its enormous size and powerful gravity

338
00:16:55,460 --> 00:16:53,760

it's believed jupiter has influenced the

339
00:16:58,519 --> 00:16:55,470
formation and evolution of the other

340
00:17:00,050 --> 00:16:58,529
bodies that orbit our Sun hundreds of

341
00:17:01,640 --> 00:17:00,060
scientists and engineers in five

342
00:17:03,470 --> 00:17:01,650
countries have been working for more

343
00:17:06,620 --> 00:17:03,480
than 10 years to design and build a

344
00:17:08,600 --> 00:17:06,630
spacecraft to Jupiter mission Juno will

345
00:17:11,300 --> 00:17:08,610
conduct an unprecedented examination of

346
00:17:14,210 --> 00:17:11,310
the atmosphere the interior and the vast

347
00:17:16,760 --> 00:17:14,220
magnetic field of the giant planet if we

348
00:17:18,710 --> 00:17:16,770
want to understand how two planets form

349
00:17:20,870 --> 00:17:18,720
how two solar systems form we really

350
00:17:23,240 --> 00:17:20,880
have to start with Jupiter by studying

351
00:17:25,910 --> 00:17:23,250
Jupiter you're gonna get one piece of

352
00:17:28,429 --> 00:17:25,920
the puzzle not necessarily how life

353
00:17:31,580 --> 00:17:28,439
formed but maybe how the ingredients

354
00:17:33,380 --> 00:17:31,590
that made up life eventually got spread

355
00:17:35,900 --> 00:17:33,390
around in the early solar system and got

356
00:17:38,210 --> 00:17:35,910
to us when the earth formed in the

357
00:17:40,610 --> 00:17:38,220
absence of Jupiter it probably would

358
00:17:42,620 --> 00:17:40,620
have gathered very little water and

359
00:17:45,590 --> 00:17:42,630
organic molecules which would have been

360
00:17:46,730 --> 00:17:45,600
concentrated in the colder outer part of

361
00:17:49,880 --> 00:17:46,740
the solar system

362
00:17:52,580 --> 00:17:49,890
what Jupiter evidently did as it formed

363
00:17:54,919 --> 00:17:52,590

was to scatter cold material that

364
00:17:56,960 --> 00:17:54,929
contained water ice and organic

365
00:17:59,150 --> 00:17:56,970
materials to the inner solar system

366
00:18:01,040 --> 00:17:59,160
where it could be captured by the earth

367
00:18:02,090 --> 00:18:01,050
and any other terrestrial planets we

368
00:18:03,380 --> 00:18:02,100
learned about the origin of the solar

369
00:18:05,570 --> 00:18:03,390
system we're learning about our own

370
00:18:07,880 --> 00:18:05,580
origins we're learning about how life

371
00:18:09,860 --> 00:18:07,890
comes to be about who we are and what

372
00:18:12,680 --> 00:18:09,870
our places in the universe it's about

373
00:18:15,830 --> 00:18:12,690
knowledge and about humanity's quest to

374
00:18:17,780 --> 00:18:15,840
understand Juno will study Jupiter in

375
00:18:19,060 --> 00:18:17,790
unprecedented detail for more than a

376
00:18:21,130 --> 00:18:19,070
year

377
00:18:23,320 --> 00:18:21,140
in our quest to unlock the history of

378
00:18:29,590 --> 00:18:23,330
the planets Jupiter is the gateway and

379
00:18:31,990 --> 00:18:29,600
Juno is the key the Juno mission is

380
00:18:33,700 --> 00:18:32,000
scheduled for launch in early August so

381
00:18:35,890 --> 00:18:33,710
there now you're up to date and

382
00:18:39,250 --> 00:18:35,900
up-to-the-minute with JPL highlights

383
00:18:41,860 --> 00:18:39,260
visit our homepage at JPL nasa.gov

384
00:18:44,500 --> 00:18:41,870
you'll find all sorts of things there

385
00:18:47,530 --> 00:18:44,510
including our new space images website

386
00:18:50,200 --> 00:18:47,540
and great apps for your iPhone iPad and

387
00:18:53,950 --> 00:18:50,210
Android sign up for email news or

388
00:18:56,650 --> 00:18:53,960

receive texts by texting JPL news to six

389
00:18:59,140 --> 00:18:56,660
seven four six three and of course you

390
00:19:02,680 --> 00:18:59,150
can always connect with us on Facebook

391
00:19:04,030 --> 00:19:02,690
Twitter Flickr Ustream or YouTube it's

392
00:19:07,240 --> 00:19:04,040
all there