



Illustration

1  
00:00:05,749 --> 00:00:02,990  
ability to autonomously Target and alter

2  
00:00:07,870 --> 00:00:05,759  
the orbit of a celestial object the

3  
00:00:11,570 --> 00:00:07,880  
impact of Dart into the asteroid

4  
00:00:13,610 --> 00:00:11,580  
dimorphos was confirmed at 7 14 PM

5  
00:00:16,250 --> 00:00:13,620  
eastern time when the dart Mission

6  
00:00:18,529 --> 00:00:16,260  
operations center here at APL lost

7  
00:00:20,689 --> 00:00:18,539  
signal with the spacecraft

8  
00:00:23,689 --> 00:00:20,699  
now normally losing signal from a

9  
00:00:25,849 --> 00:00:23,699  
spacecraft is a very bad thing but in

10  
00:00:28,490 --> 00:00:25,859  
this case it was the ideal outcome

11  
00:00:30,050 --> 00:00:28,500  
during the next half hour we will get a

12  
00:00:32,210 --> 00:00:30,060  
sense of what it was like in the control

13  
00:00:34,190 --> 00:00:32,220

room as we hear from some of the team

14

00:00:36,229 --> 00:00:34,200

members who were there for the Final

15

00:00:39,290 --> 00:00:36,239

Approach and impact of the dart

16

00:00:41,389 --> 00:00:39,300

spacecraft I want to thank NASA for

17

00:00:43,970 --> 00:00:41,399

challenging us with this problem and

18

00:00:47,630 --> 00:00:43,980

entrusting us with the mission Dart has

19

00:00:50,090 --> 00:00:47,640

now joined a long list of APL firsts in

20

00:00:52,549 --> 00:00:50,100

space first photos of Earth from space

21

00:00:54,950 --> 00:00:52,559

creation of satellite navigation with

22

00:00:57,290 --> 00:00:54,960

the transit system the incredible New

23

00:00:59,209 --> 00:00:57,300

Horizons flyby of Pluto and the

24

00:01:01,910 --> 00:00:59,219

record-setting Parker solo probe that

25

00:01:05,030 --> 00:01:01,920

has touched the sun we can now add to

26

00:01:07,490 --> 00:01:05,040

this list Dart our world's first

27

00:01:09,590 --> 00:01:07,500

planetary defense test mission

28

00:01:12,170 --> 00:01:09,600

on behalf of the Applied Physics

29

00:01:14,690 --> 00:01:12,180

laboratory congratulations to the dark

30

00:01:16,850 --> 00:01:14,700

team and to NASA on this historic

31

00:01:19,550 --> 00:01:16,860

accomplishment and first demonstration

32

00:01:26,749 --> 00:01:19,560

of a game-changing planetary defense

33

00:01:32,149 --> 00:01:29,210

thank you director Samuel and again

34

00:01:34,370 --> 00:01:32,159

welcome to the Johns Hopkins Applied

35

00:01:38,569 --> 00:01:34,380

Physics laboratory where NASA's Dart

36

00:01:40,190 --> 00:01:38,579

Mission has just made history I'm Josh

37

00:01:41,630 --> 00:01:40,200

Handel with NASA's office of

38

00:01:44,749 --> 00:01:41,640

communications

39

00:01:47,149 --> 00:01:44,759

earlier we saw incredible live coverage

40

00:01:50,690 --> 00:01:47,159

of dart's terminal approach with its

41

00:01:53,270 --> 00:01:50,700

Target asteroid in near real time for

42

00:01:55,310 --> 00:01:53,280

Humanity's first ever test for planetary

43

00:01:56,990 --> 00:01:55,320

defense let's take a look at that

44

00:02:04,130 --> 00:01:57,000

instant replay in that incredible

45

00:02:08,210 --> 00:02:05,630

wow

46

00:02:10,249 --> 00:02:08,220

so here you can see didimos and

47

00:02:11,990 --> 00:02:10,259

dimorphous

48

00:02:13,850 --> 00:02:12,000

the spacecraft is autonomously

49

00:02:16,130 --> 00:02:13,860

navigating itself

50

00:02:17,570 --> 00:02:16,140

it is precision locked on the asteroid

51  
00:02:20,869 --> 00:02:17,580  
moonlit

52  
00:02:24,290 --> 00:02:20,879  
cruising in at a speed of 4 000 miles

53  
00:02:28,190 --> 00:02:26,030  
and now you can see dimorphous slowly

54  
00:02:30,770 --> 00:02:28,200  
filling the screen we've never seen this

55  
00:02:30,780 --> 00:02:36,650  
bullseye

56  
00:02:42,530 --> 00:02:38,990  
we also have incredible high resolution

57  
00:02:46,009 --> 00:02:42,540  
imagery from darts Draco camera which we

58  
00:02:46,019 --> 00:02:48,290  
foreign

59  
00:02:48,300 --> 00:02:51,949  
system

60  
00:02:51,959 --> 00:02:56,210  
dimorphous filling the field of view

61  
00:03:02,150 --> 00:02:59,390  
incredible surface detail of an asteroid

62  
00:03:04,070 --> 00:03:02,160  
7 million miles from Earth that we have

63  
00:03:07,190 --> 00:03:04,080

never before seen

64

00:03:11,270 --> 00:03:07,200

absolutely amazing some

65

00:03:16,250 --> 00:03:14,089

and and this is the last frame from the

66

00:03:17,809 --> 00:03:16,260

spacecraft before we confirmed loss of

67

00:03:19,790 --> 00:03:17,819

signal

68

00:03:21,830 --> 00:03:19,800

I'm joined Now by some members from the

69

00:03:23,570 --> 00:03:21,840

dart team who have helped turn this

70

00:03:25,190 --> 00:03:23,580

incredible first of its kind Mission

71

00:03:27,470 --> 00:03:25,200

which honestly sounds like something

72

00:03:28,970 --> 00:03:27,480

from a science fiction movie into

73

00:03:32,330 --> 00:03:28,980

science fact

74

00:03:34,850 --> 00:03:32,340

they include Ed Reynolds Dart project

75

00:03:37,850 --> 00:03:34,860

manager here at APL

76  
00:03:40,130 --> 00:03:37,860  
Aina Adams Dart mission systems engineer

77  
00:03:43,430 --> 00:03:40,140  
at APL

78  
00:03:46,250 --> 00:03:43,440  
Mark ginsenius Dart smart nav guidance

79  
00:03:48,410 --> 00:03:46,260  
engineer at APL

80  
00:03:51,289 --> 00:03:48,420  
Carolyn Ernst Dart Draco instrument

81  
00:03:53,270 --> 00:03:51,299  
scientist at APL

82  
00:03:57,050 --> 00:03:53,280  
and Julie Belarus

83  
00:03:59,030 --> 00:03:57,060  
Dart navigation lead at APL

84  
00:04:00,410 --> 00:03:59,040  
at sorry at NASA's jet propulsion

85  
00:04:02,149 --> 00:04:00,420  
Laboratory

86  
00:04:04,009 --> 00:04:02,159  
we're going to quickly hear some opening

87  
00:04:05,210 --> 00:04:04,019  
remarks from Ed and Lena and then we're

88  
00:04:06,890 --> 00:04:05,220

going to take some questions from our

89

00:04:09,289 --> 00:04:06,900

media that we have with us here in the

90

00:04:10,970 --> 00:04:09,299

room both at APL and also dialed into

91

00:04:12,410 --> 00:04:10,980

our phone Bridge

92

00:04:14,030 --> 00:04:12,420

we're going to try and answer as many

93

00:04:16,789 --> 00:04:14,040

questions as we have in the limited

94

00:04:18,890 --> 00:04:16,799

amount of time so let's get started Ed

95

00:04:19,849 --> 00:04:18,900

and Lena tell us how are you feeling

96

00:04:21,850 --> 00:04:19,859

right now

97

00:04:29,629 --> 00:04:21,860

yeah

98

00:04:29,639 --> 00:04:33,050

relieved and

99

00:04:39,310 --> 00:04:36,590

and to do something this amazing and we

100

00:04:41,510 --> 00:04:39,320

are so excited to be done

101  
00:04:44,570 --> 00:04:41,520  
uh you know we've worked on this mission

102  
00:04:46,610 --> 00:04:44,580  
for at least seven years now and uh it's

103  
00:04:48,890 --> 00:04:46,620  
been a work of over a thousand people

104  
00:04:52,249 --> 00:04:48,900  
that have put their heart and soul into

105  
00:04:55,850 --> 00:04:52,259  
it so to see it so beautifully concluded

106  
00:04:59,090 --> 00:04:55,860  
today was just an incredible feeling and

107  
00:05:02,030 --> 00:04:59,100  
also very tiring

108  
00:05:04,790 --> 00:05:02,040  
again a huge congratulations to you and

109  
00:05:07,189 --> 00:05:04,800  
the entire dart team absolutely amazing

110  
00:05:08,510 --> 00:05:07,199  
history has been made today

111  
00:05:10,189 --> 00:05:08,520  
we're now going to take a few questions

112  
00:05:11,689 --> 00:05:10,199  
from the media for folks in the room

113  
00:05:13,790 --> 00:05:11,699

with us here if you have a question

114

00:05:15,530 --> 00:05:13,800

please make your way to one of the

115

00:05:17,570 --> 00:05:15,540

microphones in the aisles and state your

116

00:05:19,249 --> 00:05:17,580

name and affiliation and for anyone

117

00:05:21,590 --> 00:05:19,259

dialed into our phone Bridge please

118

00:05:23,689 --> 00:05:21,600

press star 1 to be entered into the

119

00:05:26,390 --> 00:05:23,699

queue

120

00:05:28,249 --> 00:05:26,400

yes hi Jeff House of space news uh so

121

00:05:31,070 --> 00:05:28,259

how close of a bullseye was this I heard

122

00:05:33,290 --> 00:05:31,080

something about 17 meters uh from the

123

00:05:36,350 --> 00:05:33,300

center uh do you have an idea just how

124

00:05:38,570 --> 00:05:36,360

close you got to hitting the the target

125

00:05:41,210 --> 00:05:38,580

that's right we were about 17 meters

126  
00:05:42,710 --> 00:05:41,220  
getting really close in and we'll get a

127  
00:05:45,290 --> 00:05:42,720  
much better understanding of where we

128  
00:05:47,270 --> 00:05:45,300  
are from the impact images that the

129  
00:05:50,629 --> 00:05:47,280  
investigation team now is going to

130  
00:05:52,090 --> 00:05:50,639  
analyze for quite some time

131  
00:05:55,310 --> 00:05:52,100  
Mark

132  
00:05:58,070 --> 00:05:55,320  
17 meters was the final estimate out of

133  
00:06:00,710 --> 00:05:58,080  
our onboard guidance that is to the

134  
00:06:02,330 --> 00:06:00,720  
center of the lit up pixels so there may

135  
00:06:03,650 --> 00:06:02,340  
be a refinement on that still is the

136  
00:06:05,870 --> 00:06:03,660  
investigation team takes a look at

137  
00:06:08,090 --> 00:06:05,880  
things yeah because you saw the asteroid

138  
00:06:10,070 --> 00:06:08,100

was not completely lit from all the

139

00:06:14,330 --> 00:06:10,080

sides so actually finding where that

140

00:06:16,730 --> 00:06:15,710

thank you we're ready for the next

141

00:06:18,590 --> 00:06:16,740

question

142

00:06:19,730 --> 00:06:18,600

uh hi uh Joel akenbach with the

143

00:06:22,010 --> 00:06:19,740

Washington Post first of all

144

00:06:24,590 --> 00:06:22,020

congratulations a tremendous Mission

145

00:06:27,830 --> 00:06:24,600

when did you know you were going to hit

146

00:06:31,070 --> 00:06:27,840

it and um like how at what point during

147

00:06:32,930 --> 00:06:31,080

the approach did you know this is this

148

00:06:35,090 --> 00:06:32,940

is going to be successful in terms of

149

00:06:37,670 --> 00:06:35,100

hitting whether it was 17 meters or Not

150

00:06:39,469 --> 00:06:37,680

that we're going to hit the asteroid

151  
00:06:40,249 --> 00:06:39,479  
I'm going to take the first part and

152  
00:06:43,150 --> 00:06:40,259  
then

153  
00:06:45,650 --> 00:06:43,160  
um you can add more detail but

154  
00:06:48,170 --> 00:06:45,660  
the thing

155  
00:06:50,629 --> 00:06:48,180  
you know as as we approached

156  
00:06:52,550 --> 00:06:50,639  
you know even when we were like an hour

157  
00:06:56,629 --> 00:06:52,560  
or 50 minutes out

158  
00:07:00,290 --> 00:06:56,639  
it it really looked like a nominal

159  
00:07:02,570 --> 00:07:00,300  
um a nominal ex you know trajectory that

160  
00:07:03,529 --> 00:07:02,580  
we practiced over and over and over

161  
00:07:05,749 --> 00:07:03,539  
again

162  
00:07:08,930 --> 00:07:05,759  
and we practiced all types of different

163  
00:07:11,270 --> 00:07:08,940

geometries and scenarios and this was

164

00:07:13,249 --> 00:07:11,280

like I kept telling the people right

165

00:07:15,890 --> 00:07:13,259

next to me this is this is nominal this

166

00:07:18,830 --> 00:07:15,900

is normal this is not so and it just

167

00:07:20,629 --> 00:07:18,840

stayed nominal so you know like 40

168

00:07:22,550 --> 00:07:20,639

minutes out you were really getting the

169

00:07:24,589 --> 00:07:22,560

good feeling and you could tell

170

00:07:27,350 --> 00:07:24,599

everybody in the whole room was getting

171

00:07:30,469 --> 00:07:27,360

that same feeling that it was it was

172

00:07:33,650 --> 00:07:30,479

actually a fairly relaxed environment it

173

00:07:37,189 --> 00:07:33,660

wasn't tense and then as as we hit like

174

00:07:39,290 --> 00:07:37,199

the last two minutes where we could no

175

00:07:41,270 --> 00:07:39,300

longer command the spacecraft and you

176  
00:07:42,469 --> 00:07:41,280  
knew we were on the trajectory and you

177  
00:07:46,189 --> 00:07:42,479  
knew that we were not going to do

178  
00:07:49,010 --> 00:07:46,199  
anything to change it it was just Joy

179  
00:07:51,890 --> 00:07:49,020  
you know just yeah you got to enjoy the

180  
00:07:53,870 --> 00:07:51,900  
moment yeah absolutely the the one thing

181  
00:07:56,029 --> 00:07:53,880  
we definitely I just want to say thank

182  
00:07:58,610 --> 00:07:56,039  
you to the JPL navigation team because

183  
00:08:01,189 --> 00:07:58,620  
they put us on this perfect trajectory

184  
00:08:02,749 --> 00:08:01,199  
to didimos so the way this Mission

185  
00:08:04,550 --> 00:08:02,759  
worked is that we were guiding towards

186  
00:08:05,870 --> 00:08:04,560  
dinos for a while and then we switched

187  
00:08:09,650 --> 00:08:05,880  
over and started guiding towards the

188  
00:08:11,450 --> 00:08:09,660

amorphous so the JPL team actually did a

189

00:08:14,089 --> 00:08:11,460

lot of analysis recently we executed

190

00:08:15,589 --> 00:08:14,099

late Maneuvers and were able to put us

191

00:08:18,589 --> 00:08:15,599

on the trajectory that basically was

192

00:08:20,809 --> 00:08:18,599

hitting bullseye on dynamos and that is

193

00:08:23,570 --> 00:08:20,819

why the whole team felt so comfortable

194

00:08:27,290 --> 00:08:23,580

most of the time that we actually were

195

00:08:29,529 --> 00:08:27,300

going to impact and impact well you're

196

00:08:33,110 --> 00:08:29,539

very welcome

197

00:08:35,449 --> 00:08:33,120

yeah I'll say that uh once we got a look

198

00:08:36,829 --> 00:08:35,459

at amorphous I think that's when the

199

00:08:38,810 --> 00:08:36,839

team was confident

200

00:08:41,269 --> 00:08:38,820

that we were going to hit that was the

201  
00:08:42,709 --> 00:08:41,279  
one unknown go again yes absolutely

202  
00:08:45,769 --> 00:08:42,719  
against we knew what it looked like we

203  
00:08:50,269 --> 00:08:48,050  
yes absolutely that was definitely the

204  
00:08:53,990 --> 00:08:50,279  
defining moment where we were like oh

205  
00:08:55,850 --> 00:08:54,000  
yes a dimorphous exists so that was a

206  
00:08:58,310 --> 00:08:55,860  
big relief for everyone and then of

207  
00:09:00,110 --> 00:08:58,320  
course the second part was that we're

208  
00:09:02,750 --> 00:09:00,120  
seeing where we're expecting it to see

209  
00:09:06,350 --> 00:09:02,760  
it was separating away from the larger

210  
00:09:08,509 --> 00:09:06,360  
asteroid as as we expected and then we

211  
00:09:11,509 --> 00:09:08,519  
were able to hit execute a textbook

212  
00:09:14,990 --> 00:09:12,889  
thank you we're ready for the next

213  
00:09:16,850 --> 00:09:15,000

question

214

00:09:19,009 --> 00:09:16,860

hello thank you ataric Malik with

215

00:09:21,230 --> 00:09:19,019

space.com I think for Elena or whomever

216

00:09:23,269 --> 00:09:21,240

would like to do it you mentioned uh or

217

00:09:25,370 --> 00:09:23,279

Ed described the feeling as absolute joy

218

00:09:26,870 --> 00:09:25,380

and I'm just curious I mean there were a

219

00:09:28,910 --> 00:09:26,880

lot of celebrations that we saw actually

220

00:09:30,710 --> 00:09:28,920

here they were screaming and chanting

221

00:09:32,090 --> 00:09:30,720

just all the way down I'm just curious

222

00:09:34,250 --> 00:09:32,100

of those last minutes five minutes in

223

00:09:35,810 --> 00:09:34,260

where you were all hands off what that

224

00:09:37,730 --> 00:09:35,820

atmosphere was like and then what

225

00:09:39,590 --> 00:09:37,740

dimorphous your first thoughts about

226

00:09:42,530 --> 00:09:39,600

seeing it up close with those Boulders

227

00:09:44,389 --> 00:09:42,540

and Craggs and shadows is like thank you

228

00:09:45,769 --> 00:09:44,399

so I'll say a couple of words and then

229

00:09:47,570 --> 00:09:45,779

I'll give it over to the rest of the

230

00:09:50,570 --> 00:09:47,580

team especially to Carolyn to talk more

231

00:09:53,630 --> 00:09:50,580

about the surface of the dimorphous now

232

00:09:55,490 --> 00:09:53,640

you're welcome but

233

00:09:58,850 --> 00:09:55,500

um definitely as we were getting close

234

00:10:02,449 --> 00:09:58,860

to the asteroid there was a lot of Ed

235

00:10:04,490 --> 00:10:02,459

said Joy I say both Terror and joy at

236

00:10:07,790 --> 00:10:04,500

the same time because we we saw that we

237

00:10:09,710 --> 00:10:07,800

were going to impact we this asteroid

238

00:10:11,449 --> 00:10:09,720

was coming into the field of view for

239

00:10:12,949 --> 00:10:11,459

the first time where he really had no

240

00:10:14,810 --> 00:10:12,959

idea what to expect we didn't really

241

00:10:17,449 --> 00:10:14,820

know the shape of the asteroid but when

242

00:10:19,190 --> 00:10:17,459

you we're going to hit so I think all of

243

00:10:20,690 --> 00:10:19,200

us we're kind of holding our breaths I'm

244

00:10:24,290 --> 00:10:20,700

kind of surprised none of us passed out

245

00:10:26,690 --> 00:10:24,300

actually for a second there but um but

246

00:10:29,150 --> 00:10:26,700

at the end you know I mean me personally

247

00:10:30,829 --> 00:10:29,160

I felt a little numb like yes we were

248

00:10:34,009 --> 00:10:30,839

celebrating there was a lot of Joy but

249

00:10:36,230 --> 00:10:34,019

you also feel a little numb that all of

250

00:10:40,009 --> 00:10:36,240

this you know so much so many years of

251

00:10:42,650 --> 00:10:40,019

work are now complete and so that

252

00:10:44,090 --> 00:10:42,660

expectation of what's next is but

253

00:10:46,009 --> 00:10:44,100

there's a lot of next things going on

254

00:10:47,870 --> 00:10:46,019

for darts so I'll let you guys talk

255

00:10:50,090 --> 00:10:47,880

about that yeah I was going to say that

256

00:10:51,650 --> 00:10:50,100

these guys their job is done but ours is

257

00:10:53,090 --> 00:10:51,660

just beginning so I've been lucky enough

258

00:10:54,949 --> 00:10:53,100

to be kind of embedded with the

259

00:10:58,009 --> 00:10:54,959

engineering team and watching them all

260

00:11:00,230 --> 00:10:58,019

hear plan and test and work together and

261

00:11:02,329 --> 00:11:00,240

Draco of course was built here at APL so

262

00:11:03,530 --> 00:11:02,339

seeing it come from plans all the way to

263

00:11:05,630 --> 00:11:03,540

something that took such amazing

264

00:11:07,009 --> 00:11:05,640

pictures was awesome these guys were all

265

00:11:08,509 --> 00:11:07,019

standing up on those last two minutes

266

00:11:10,970 --> 00:11:08,519

because they're hands off and looking

267

00:11:12,650 --> 00:11:10,980

and I was like this far from my screen

268

00:11:15,530 --> 00:11:12,660

looking at the amazing pictures come in

269

00:11:17,569 --> 00:11:15,540

because they're just outstanding um and

270

00:11:19,490 --> 00:11:17,579

I saw them come in at the same time as

271

00:11:21,350 --> 00:11:19,500

everybody here saw them come in so you

272

00:11:23,509 --> 00:11:21,360

know we will spend the next months and

273

00:11:25,670 --> 00:11:23,519

years doing analysis of course

274

00:11:28,310 --> 00:11:25,680

um our job has just started but it

275

00:11:29,990 --> 00:11:28,320

really looks just amazing it looks it's

276

00:11:31,250 --> 00:11:30,000

like adorable it's this little moon it's

277

00:11:32,930 --> 00:11:31,260

so cute

278

00:11:34,370 --> 00:11:32,940

um it looks in a lot of ways like some

279

00:11:36,110 --> 00:11:34,380

of the other small app stores we've seen

280

00:11:38,389 --> 00:11:36,120

you know if you remember we've seen

281

00:11:40,430 --> 00:11:38,399

bennu and ryugu recently through NASA

282

00:11:42,710 --> 00:11:40,440

and Japanese space agency missions and

283

00:11:45,230 --> 00:11:42,720

they are also covered in Boulders so we

284

00:11:47,389 --> 00:11:45,240

suspect it is likely to be a rebel pile

285

00:11:49,430 --> 00:11:47,399

kind of loosely Consolidated

286

00:11:50,990 --> 00:11:49,440

um did the most which you saw leaving

287

00:11:52,730 --> 00:11:51,000

the frame I almost wanted to watch it

288

00:11:54,110 --> 00:11:52,740

more you know obviously we want to hit

289

00:11:56,090 --> 00:11:54,120

but I was like oh look at that so cool

290

00:11:58,069 --> 00:11:56,100

it has maybe craters and boulders and

291

00:12:00,590 --> 00:11:58,079

smooth patches and so there's a lot of

292

00:12:02,630 --> 00:12:00,600

work that the proxim proximity working

293

00:12:04,310 --> 00:12:02,640

group will be doing over the next few

294

00:12:06,410 --> 00:12:04,320

days um we will be finding the exact

295

00:12:09,410 --> 00:12:06,420

impact site to really understand you

296

00:12:11,030 --> 00:12:09,420

know what kind of crater did we make and

297

00:12:13,190 --> 00:12:11,040

of course the The ground-based Observers

298

00:12:14,750 --> 00:12:13,200

are busy as we speak you know looking at

299

00:12:16,670 --> 00:12:14,760

the data and taking it over the course

300

00:12:19,250 --> 00:12:16,680

of the next um days and weeks to find

301

00:12:20,630 --> 00:12:19,260

out what we really did

302

00:12:22,910 --> 00:12:20,640

thank you we're ready for the next

303

00:12:24,949 --> 00:12:22,920

question

304

00:12:27,050 --> 00:12:24,959

Kristen Fisher with CNN

305

00:12:29,150 --> 00:12:27,060

um Elena I was wondering one more time

306

00:12:32,569 --> 00:12:29,160

explained exactly

307

00:12:34,850 --> 00:12:32,579

how long it will take before we know if

308

00:12:37,130 --> 00:12:34,860

Dart was successful in pushing this

309

00:12:38,569 --> 00:12:37,140

asteroid off its current orbit we know

310

00:12:40,730 --> 00:12:38,579

the impact was successful tonight

311

00:12:42,829 --> 00:12:40,740

congratulations but if you can just walk

312

00:12:46,009 --> 00:12:42,839

us through the timing of that second

313

00:12:48,230 --> 00:12:46,019

piece one more time and finally uh I'd

314

00:12:51,410 --> 00:12:48,240

also like to know if you think that all

315

00:12:54,170 --> 00:12:51,420

earthlings should rest a little easier

316

00:12:56,810 --> 00:12:54,180

tonight thank you um yeah no problem

317

00:12:59,629 --> 00:12:56,820

thank you for that question so uh we are

318

00:13:01,610 --> 00:12:59,639

going to be seeing additional data over

319

00:13:03,470 --> 00:13:01,620

then so of course the ground-based

320

00:13:05,030 --> 00:13:03,480

observatories are already taking data

321

00:13:08,030 --> 00:13:05,040

right now they're looking at the ejecta

322

00:13:10,910 --> 00:13:08,040

of course the jwsd and all these other

323

00:13:13,970 --> 00:13:10,920

missions are really concentrating on

324

00:13:15,530 --> 00:13:13,980

um on didymus and dimorphous but what

325

00:13:16,970 --> 00:13:15,540

we're going to be seeing probably in the

326

00:13:21,290 --> 00:13:16,980

next couple of months we're actually

327

00:13:23,389 --> 00:13:21,300

going to get a confirmation of exact uh

328

00:13:26,210 --> 00:13:23,399

period change that we made so it's not

329

00:13:29,090 --> 00:13:26,220

going to be tomorrow I'm sorry but it is

330

00:13:31,730 --> 00:13:29,100

going we might see some Legion Cube

331

00:13:33,769 --> 00:13:31,740

cubesat images coming up in the next day

332

00:13:36,710 --> 00:13:33,779

or two which was a little cubesat that

333

00:13:37,610 --> 00:13:36,720

we let go of about 15 days ago it should

334

00:13:40,850 --> 00:13:37,620

have

335

00:13:43,310 --> 00:13:40,860

flown by by now and took some images of

336

00:13:45,410 --> 00:13:43,320

the plume that we created so we're going

337

00:13:46,850 --> 00:13:45,420

to be seeing that data come down soon in

338

00:13:48,350 --> 00:13:46,860

the next couple of days and then over

339

00:13:51,230 --> 00:13:48,360

the next two months we're going to see

340

00:13:52,910 --> 00:13:51,240

more information from the investigation

341

00:13:54,230 --> 00:13:52,920

team on what period change did we

342

00:13:56,329 --> 00:13:54,240

actually make because that's our number

343

00:13:58,250 --> 00:13:56,339

two goal number one was hit the asteroid

344

00:14:00,290 --> 00:13:58,260

which we've done but now number two is

345

00:14:02,750 --> 00:14:00,300

really measure that period change and

346

00:14:05,810 --> 00:14:02,760

characterize how much ejecta we actually

347

00:14:07,490 --> 00:14:05,820

put out and I can't remember the second

348

00:14:09,230 --> 00:14:07,500

question okay so just to clarify you say

349

00:14:10,910 --> 00:14:09,240

about two months before yeah about two

350

00:14:13,850 --> 00:14:10,920

months roughly two months my second

351

00:14:15,530 --> 00:14:13,860

question was just should I'm sorry what

352

00:14:17,629 --> 00:14:15,540

was that I would say a couple of months

353

00:14:20,329 --> 00:14:17,639

for the full quantitative answer you

354

00:14:22,910 --> 00:14:20,339

know some things will likely come out in

355

00:14:25,250 --> 00:14:22,920

even days maybe weeks to say this is

356

00:14:26,990 --> 00:14:25,260

what such is such a Observatory saw or

357

00:14:28,430 --> 00:14:27,000

this is what Ouija Cube saw I know that

358

00:14:30,530 --> 00:14:28,440

they've planned to download images the

359

00:14:33,410 --> 00:14:30,540

next couple of days so we'll get some

360

00:14:35,629 --> 00:14:33,420

pieces of that answer soon but the I

361

00:14:40,210 --> 00:14:35,639

would say the quantitative full answer a

362

00:14:45,050 --> 00:14:42,710

should all earthlings sleep a little

363

00:14:46,970 --> 00:14:45,060

easier tonight I definitely think that

364

00:14:49,430 --> 00:14:46,980

as far as we can tell our first

365

00:14:51,110 --> 00:14:49,440

planetary defense test was a success and

366

00:14:56,230 --> 00:14:51,120

I think we can collapse with that to

367

00:15:01,990 --> 00:14:58,490

yeah I think that our things should

368

00:15:04,750 --> 00:15:02,000

sleep better and definitely I will yeah

369

00:15:06,650 --> 00:15:04,760

we're definitely going to sleep better

370

00:15:10,970 --> 00:15:06,660

thank you

371

00:15:12,889 --> 00:15:10,980

your times

372

00:15:13,910 --> 00:15:12,899

um did anything go wrong tonight I was

373

00:15:15,350 --> 00:15:13,920

just wondering did you have to make any

374

00:15:21,590 --> 00:15:15,360

adjustments during the last four hours

375

00:15:25,490 --> 00:15:23,090

we have straight down the middle of what

376

00:15:29,150 --> 00:15:25,500

our expectations were and uh there were

377

00:15:30,889 --> 00:15:29,160

no adjustments needed no zero

378

00:15:33,170 --> 00:15:30,899

I it was actually kind of disappointing

379

00:15:35,509 --> 00:15:33,180

we prepared for these 21 contention

380

00:15:37,490 --> 00:15:35,519

scenes and then we did none of

381

00:15:39,769 --> 00:15:37,500

none of but we were ready to do them you

382

00:15:42,290 --> 00:15:39,779

plan them so you don't exactly exactly

383

00:15:44,449 --> 00:15:42,300

so that's wonderful

384

00:15:47,030 --> 00:15:44,459

thank you yes

385

00:15:50,090 --> 00:15:47,040

hi Marina corn with the Atlantic now

386

00:15:52,129 --> 00:15:50,100

that you have gotten a good-ish look at

387

00:15:53,689 --> 00:15:52,139

the surface of this asteroid can you

388

00:15:55,730 --> 00:15:53,699

tell us in more detail what exactly

389

00:15:58,550 --> 00:15:55,740

happened to the spacecraft Beyond it was

390

00:16:01,490 --> 00:15:58,560

smashed to bits like in graphic detail

391

00:16:02,930 --> 00:16:01,500

like where are some of the bits and

392

00:16:04,250 --> 00:16:02,940

pieces are they kind of floating off in

393

00:16:06,170 --> 00:16:04,260

space are they embedded in this new

394

00:16:07,430 --> 00:16:06,180

crater if you could hover over the

395

00:16:09,110 --> 00:16:07,440

Ashford right now what would you be

396

00:16:10,970 --> 00:16:09,120

seeing thank you

397

00:16:14,569 --> 00:16:10,980

oh my goodness that's a good question

398

00:16:16,370 --> 00:16:14,579

I'll let Carolyn down thank you I would

399

00:16:18,110 --> 00:16:16,380

say uh if you could hover over it right

400

00:16:20,030 --> 00:16:18,120

now you probably there could even still

401  
00:16:22,069 --> 00:16:20,040  
be ejecta coming out because the gravity

402  
00:16:23,810 --> 00:16:22,079  
of this thing is so low that it actually

403  
00:16:25,730 --> 00:16:23,820  
takes quite a while for things to fall

404  
00:16:27,230 --> 00:16:25,740  
back if they do so you might still see a

405  
00:16:29,870 --> 00:16:27,240  
cloud of ejecta out there for a while

406  
00:16:33,769 --> 00:16:29,880  
yeah um we expect to create over about

407  
00:16:35,689 --> 00:16:33,779  
10 to 20 meters right yeah so if if this

408  
00:16:37,850 --> 00:16:35,699  
is really a rubble pile it means that

409  
00:16:40,610 --> 00:16:37,860  
it's pretty low in strength and that

410  
00:16:41,689 --> 00:16:40,620  
means you will get a lot of ejecta

411  
00:16:44,269 --> 00:16:41,699  
um and

412  
00:16:46,610 --> 00:16:44,279  
that means you know the spacecraft is

413  
00:16:48,650 --> 00:16:46,620

kabut right we lost signal at the

414

00:16:50,509 --> 00:16:48,660

expected times that clearly broke

415

00:16:52,490 --> 00:16:50,519

um you could find some pieces in the

416

00:16:53,930 --> 00:16:52,500

crater you could find pieces they'd

417

00:16:56,990 --> 00:16:53,940

probably be pretty shattered you could

418

00:16:58,189 --> 00:16:57,000

find debris leaving also so

419

00:16:59,569 --> 00:16:58,199

um I don't know that you would recognize

420

00:17:01,790 --> 00:16:59,579

them I'll have to see when Hera gets

421

00:17:03,230 --> 00:17:01,800

there in 2026 if there's anything left

422

00:17:05,150 --> 00:17:03,240

but my guess is that was such a fast

423

00:17:07,429 --> 00:17:05,160

impact that you won't be able to see and

424

00:17:10,250 --> 00:17:07,439

we were also carrying a lot of hydrazine

425

00:17:12,230 --> 00:17:10,260

and Xenon on board so we're actually as

426

00:17:14,329 --> 00:17:12,240

Engineers we're discussing in the

427

00:17:16,549 --> 00:17:14,339

control room uh would we actually see

428

00:17:18,470 --> 00:17:16,559

some sort of brightening just based on

429

00:17:22,069 --> 00:17:18,480

the fact that we just if you know

430

00:17:24,110 --> 00:17:22,079

evaporate a whole bunch of Xena too

431

00:17:26,270 --> 00:17:24,120

thank you yes

432

00:17:28,610 --> 00:17:26,280

hi my name is Maya I'm here with the

433

00:17:30,710 --> 00:17:28,620

NASA social from Cal State Long Beach I

434

00:17:32,390 --> 00:17:30,720

wanted to ask can you describe like the

435

00:17:34,070 --> 00:17:32,400

Bittersweet feeling of this Dart project

436

00:17:36,289 --> 00:17:34,080

that you've been working on for so many

437

00:17:38,090 --> 00:17:36,299

years like do its job and impact the

438

00:17:41,330 --> 00:17:38,100

asteroid but also be destroyed at the

439

00:17:46,190 --> 00:17:43,669

I don't have a Bittersweet feeling like

440

00:17:53,090 --> 00:17:46,200

we

441

00:17:55,730 --> 00:17:53,100

know and you focus on the goal and

442

00:18:00,110 --> 00:17:55,740

I I don't think any of us named the

443

00:18:02,210 --> 00:18:00,120

spacecraft so like we we achieved the

444

00:18:05,150 --> 00:18:02,220

requirement we achieved the goal and

445

00:18:08,330 --> 00:18:05,160

that and it and it was a it was yeah we

446

00:18:10,669 --> 00:18:08,340

did a methodical process to

447

00:18:13,789 --> 00:18:10,679

develop the design that could do that

448

00:18:15,830 --> 00:18:13,799

and it's it's to me it's more just

449

00:18:18,890 --> 00:18:15,840

satisfaction that

450

00:18:21,230 --> 00:18:18,900

the process worked and we achieved the

451  
00:18:23,390 --> 00:18:21,240  
goal and

452  
00:18:25,669 --> 00:18:23,400  
um yeah you always think like well if we

453  
00:18:27,590 --> 00:18:25,679  
missed we you know the spacecraft lives

454  
00:18:29,990 --> 00:18:27,600  
and we can do but it's like now we

455  
00:18:32,870 --> 00:18:30,000  
didn't achieve the goal and so

456  
00:18:36,529 --> 00:18:32,880  
I I'm I

457  
00:18:40,130 --> 00:18:36,539  
I will relish this moment and I'm

458  
00:18:42,169 --> 00:18:40,140  
I am happy with the outcome

459  
00:18:44,270 --> 00:18:42,179  
yeah and I'd like to add that I think

460  
00:18:45,590 --> 00:18:44,280  
the part that we will miss the most as

461  
00:18:47,690 --> 00:18:45,600  
the people who have worked on this for a

462  
00:18:50,990 --> 00:18:47,700  
long period of time is the team the team

463  
00:18:54,169 --> 00:18:51,000

we had was amazing and we really enjoyed

464

00:18:55,970 --> 00:18:54,179

working as a team together we had fun we

465

00:18:58,730 --> 00:18:55,980

built a spacecraft during covet you know

466

00:19:01,310 --> 00:18:58,740

we bonded over that and I feel like that

467

00:19:02,870 --> 00:19:01,320

made us stronger going forward so the

468

00:19:04,310 --> 00:19:02,880

bittersweet Part will really come in

469

00:19:06,289 --> 00:19:04,320

with the fact that the whole team is

470

00:19:07,850 --> 00:19:06,299

going to be disbanding now moving on to

471

00:19:09,890 --> 00:19:07,860

different projects and we all hope that

472

00:19:12,049 --> 00:19:09,900

we get to work together again at some

473

00:19:15,110 --> 00:19:12,059

point but the point is that the dart

474

00:19:16,730 --> 00:19:15,120

team as the engineering team and its

475

00:19:18,950 --> 00:19:16,740

management team I think we're kind of

476

00:19:21,169 --> 00:19:18,960

done and we're moving on to other things

477

00:19:23,330 --> 00:19:21,179

I think the other part of that is it

478

00:19:25,430 --> 00:19:23,340

like Ed sort of said this is the goal

479

00:19:27,409 --> 00:19:25,440

this is what it was supposed to do so we

480

00:19:28,909 --> 00:19:27,419

didn't have years and years of it in

481

00:19:30,350 --> 00:19:28,919

orbit about something and then it

482

00:19:31,970 --> 00:19:30,360

crashed and you remember those good

483

00:19:33,350 --> 00:19:31,980

times oh those are great times you know

484

00:19:35,450 --> 00:19:33,360

the good times were right then we just

485

00:19:36,529 --> 00:19:35,460

saw them and uh and it was its job it

486

00:19:38,990 --> 00:19:36,539

was supposed to do that to get those

487

00:19:40,730 --> 00:19:39,000

good times yeah yeah this was the moment

488

00:19:44,029 --> 00:19:40,740

yeah for the spacecraft

489

00:19:46,549 --> 00:19:44,039

I have to say I said this here when I

490

00:19:48,350 --> 00:19:46,559

you know the last image that um didn't

491

00:19:50,330 --> 00:19:48,360

come out fully

492

00:19:53,210 --> 00:19:50,340

um you know there's a lot of emotion and

493

00:19:55,010 --> 00:19:53,220

in those critical time and we had some

494

00:19:57,830 --> 00:19:55,020

surprises in the last few weeks and a

495

00:20:00,230 --> 00:19:57,840

lot of teamwork going on and so

496

00:20:04,250 --> 00:20:00,240

um you know there's a lot of um

497

00:20:06,110 --> 00:20:04,260

friendship that's being built so it was

498

00:20:08,390 --> 00:20:06,120

I believe to see that it went so well

499

00:20:10,549 --> 00:20:08,400

and from a navigation perspective it

500

00:20:13,070 --> 00:20:10,559

really went very well and we were you

501  
00:20:15,049 --> 00:20:13,080  
know heading straight to uh did a mouse

502  
00:20:17,390 --> 00:20:15,059  
and you know we were very happy and

503  
00:20:20,810 --> 00:20:17,400  
relieved that smart nav didn't have to

504  
00:20:22,430 --> 00:20:20,820  
do that much until it saw them offers so

505  
00:20:24,710 --> 00:20:22,440  
there's relief but then yeah at the end

506  
00:20:27,890 --> 00:20:24,720  
it's just I shed it here and it's just

507  
00:20:29,510 --> 00:20:27,900  
the emotion that comes up

508  
00:20:30,950 --> 00:20:29,520  
thank you we're ready for the next

509  
00:20:33,590 --> 00:20:30,960  
question

510  
00:20:35,690 --> 00:20:33,600  
hi I'm Brittany Brockington upgrading BB

511  
00:20:37,310 --> 00:20:35,700  
on Tick Tock my question is how are you

512  
00:20:40,730 --> 00:20:37,320  
going to go about calculating the new

513  
00:20:43,789 --> 00:20:40,740

orbit or trajectory of dimorphos

514

00:20:45,770 --> 00:20:43,799

I guess I'll take that one so it's all

515

00:20:47,930 --> 00:20:45,780

the ground-based observing um they've

516

00:20:50,270 --> 00:20:47,940

been observing the system for years

517

00:20:52,669 --> 00:20:50,280

before now to get a good Baseline as to

518

00:20:54,230 --> 00:20:52,679

what was the pre-impact situation and

519

00:20:56,390 --> 00:20:54,240

they'll be observing over the next days

520

00:20:58,130 --> 00:20:56,400

and weeks and comparing that to what was

521

00:21:00,430 --> 00:20:58,140

there before

522

00:21:04,970 --> 00:21:03,529

yes so um we cannot see the two bodies

523

00:21:07,130 --> 00:21:04,980

from the earth they just appear almost

524

00:21:09,049 --> 00:21:07,140

like a star it's a point source but we

525

00:21:10,789 --> 00:21:09,059

can tell much like when you discover an

526

00:21:12,770 --> 00:21:10,799

exoplanet and you can tell that it's

527

00:21:14,990 --> 00:21:12,780

there just by the Light dimming as it

528

00:21:16,669 --> 00:21:15,000

goes in front of the star

529

00:21:19,070 --> 00:21:16,679

um it's similar for the Dynamo system so

530

00:21:20,810 --> 00:21:19,080

you get eclipses between the main and

531

00:21:22,789 --> 00:21:20,820

the moon and so you're measuring the

532

00:21:27,289 --> 00:21:22,799

timing of those eclipses and that's what

533

00:21:31,850 --> 00:21:29,870

thank you yes yeah yeah I saw a moment

534

00:21:34,190 --> 00:21:31,860

from AFP um just to piggyback on a

535

00:21:36,770 --> 00:21:34,200

college question for Carolyn um you

536

00:21:38,270 --> 00:21:36,780

mentioned it looked cute to you uh were

537

00:21:40,070 --> 00:21:38,280

there any sort of other adjectives that

538

00:21:41,810 --> 00:21:40,080

came to mind what would you describe its

539

00:21:45,289 --> 00:21:41,820

shape as for me it looked like you do a

540

00:21:46,490 --> 00:21:45,299

bread bun or an egg what sort of

541

00:21:49,669 --> 00:21:46,500

thoughts came to your mind yeah every

542

00:21:52,970 --> 00:21:49,679

Oscar is a potato right yeah no

543

00:21:55,610 --> 00:21:52,980

um yeah I mean and it's amazing right

544

00:21:57,049 --> 00:21:55,620

um it is awfully egg-shaped though

545

00:22:00,529 --> 00:21:57,059

um compared to other things that we've

546

00:22:02,930 --> 00:22:00,539

seen that Moon looked very uh

547

00:22:04,909 --> 00:22:02,940

not ellipsoidal quite but um you know

548

00:22:06,710 --> 00:22:04,919

like egg shaped with a bunch of Boulders

549

00:22:07,909 --> 00:22:06,720

clearly on the top like it's a pile of

550

00:22:09,110 --> 00:22:07,919

rubble

551  
00:22:11,270 --> 00:22:09,120  
um I was actually a little surprised by

552  
00:22:13,909 --> 00:22:11,280  
the shape of didimos too

553  
00:22:16,669 --> 00:22:13,919  
um we had a radar model which was

554  
00:22:18,110 --> 00:22:16,679  
um good and it got the bulk shape but it

555  
00:22:20,090 --> 00:22:18,120  
actually was more elongated than I

556  
00:22:21,649 --> 00:22:20,100  
thought of course you cannot see details

557  
00:22:23,750 --> 00:22:21,659  
um with that radar model that we have

558  
00:22:25,250 --> 00:22:23,760  
and so you could start to see oh I think

559  
00:22:26,930 --> 00:22:25,260  
that oh that's a boulder oh you can see

560  
00:22:28,730 --> 00:22:26,940  
it oh it's a crater oh my gosh is that a

561  
00:22:30,830 --> 00:22:28,740  
smooth patch that's amazing so we're

562  
00:22:33,049 --> 00:22:30,840  
going to be able to tell a lot about how

563  
00:22:35,570 --> 00:22:33,059

the system formed

564

00:22:38,690 --> 00:22:35,580

um and what it has experienced over time

565

00:22:40,610 --> 00:22:38,700

um as we look at these images closely

566

00:22:41,990 --> 00:22:40,620

thank you I believe we now have a

567

00:22:44,630 --> 00:22:42,000

question from one of our reporters

568

00:22:48,409 --> 00:22:46,250

hi yes these are the questions from the

569

00:22:50,029 --> 00:22:48,419

phone bridge I do have two uh the first

570

00:22:52,789 --> 00:22:50,039

is from Stephen Clark at space flight

571

00:22:55,610 --> 00:22:52,799

now uh he's looking to know if we have

572

00:22:57,409 --> 00:22:55,620

confirmation from let's see a cube uh in

573

00:22:59,630 --> 00:22:57,419

terms of taking any photos taking any

574

00:23:02,990 --> 00:22:59,640

pictures and what would be the earliest

575

00:23:04,130 --> 00:23:03,000

opportunity uh for a downlink and seeing

576

00:23:07,549 --> 00:23:04,140

those that's the first question I'll

577

00:23:15,049 --> 00:23:11,870

okay so we did like 40 minutes before

578

00:23:17,750 --> 00:23:15,059

impact we we did get a short email from

579

00:23:20,270 --> 00:23:17,760

our our Italian colleagues and they were

580

00:23:22,669 --> 00:23:20,280

they were shooting to get a a an

581

00:23:25,190 --> 00:23:22,679

extended pass about

582

00:23:28,190 --> 00:23:25,200

three hours from now that would be that

583

00:23:31,070 --> 00:23:28,200

would be the very first opportunity and

584

00:23:33,409 --> 00:23:31,080

so it's it's just a matter of can the

585

00:23:35,330 --> 00:23:33,419

DSN schedule the pass and can they just

586

00:23:38,450 --> 00:23:35,340

coordinate in addition to other

587

00:23:40,909 --> 00:23:38,460

Telemetry getting the image down but it

588

00:23:42,950 --> 00:23:40,919

is a priority for them

589

00:23:45,289 --> 00:23:42,960

okay great thank you one other question

590

00:23:48,529 --> 00:23:45,299

from the phone bridge for now uh Jim

591

00:23:50,750 --> 00:23:48,539

Siegel with mass attacked uh the

592

00:23:53,690 --> 00:23:50,760

question is that uh he understands that

593

00:23:57,470 --> 00:23:53,700

JPL keeps a Sentry risk table of objects

594

00:23:58,970 --> 00:23:57,480

and are there other asteroids or other

595

00:24:03,890 --> 00:23:58,980

objects that have already been

596

00:24:08,149 --> 00:24:06,649

so I can jump in here yeah for any

597

00:24:10,010 --> 00:24:08,159

questions related to any future

598

00:24:11,750 --> 00:24:10,020

planetary defense efforts please reach

599

00:24:15,830 --> 00:24:11,760

out to NASA's office of communications

600

00:24:17,870 --> 00:24:15,840

for response thank you next question I'm

601  
00:24:19,730 --> 00:24:17,880  
Gretel Bennis Chuck and I attended the

602  
00:24:20,690 --> 00:24:19,740  
NASA social and I'm a student at Embry

603  
00:24:22,970 --> 00:24:20,700  
Riddle

604  
00:24:25,250 --> 00:24:22,980  
my question is and how an Android hit

605  
00:24:27,710 --> 00:24:25,260  
Mars last Friday I think

606  
00:24:30,409 --> 00:24:27,720  
I think and I I just didn't know if if

607  
00:24:33,770 --> 00:24:30,419  
that was a when we say that planet

608  
00:24:35,990 --> 00:24:33,780  
planetary defense is it just Earth

609  
00:24:37,990 --> 00:24:36,000  
at this point I mean I know it's really

610  
00:24:40,549 --> 00:24:38,000  
pressure

611  
00:24:42,590 --> 00:24:40,559  
that's that's I just when I when I read

612  
00:24:44,270 --> 00:24:42,600  
that last week I was like there's

613  
00:24:46,789 --> 00:24:44,280

there's stuff everywhere every planet

614

00:24:49,730 --> 00:24:46,799

gets hit the moon gets hit everything

615

00:24:53,090 --> 00:24:49,740

else asteroids get hit not just by Dart

616

00:24:56,450 --> 00:24:53,100

um you know all the time and

617

00:24:58,490 --> 00:24:56,460

we often use those craters to tell us

618

00:25:00,049 --> 00:24:58,500

more about how what happened in history

619

00:25:01,549 --> 00:25:00,059

a lot of that history on Earth is gone

620

00:25:03,409 --> 00:25:01,559

and so we can look at those other

621

00:25:04,730 --> 00:25:03,419

planets you know the moon and other

622

00:25:06,289 --> 00:25:04,740

planets around us to know like what

623

00:25:08,149 --> 00:25:06,299

happened in the beginning to get us to

624

00:25:10,250 --> 00:25:08,159

where we are now but oh my gosh there's

625

00:25:12,049 --> 00:25:10,260

a lot of craters there so a lot of stuff

626  
00:25:14,149 --> 00:25:12,059  
happened but now not so much a lot of

627  
00:25:16,730 --> 00:25:14,159  
time has gone by um but in terms of

628  
00:25:18,770 --> 00:25:16,740  
Defense we're the only place with with

629  
00:25:20,090 --> 00:25:18,780  
life right now right so we're that's

630  
00:25:22,130 --> 00:25:20,100  
what we're really primarily worried

631  
00:25:24,950 --> 00:25:22,140  
about yeah but planetary defense office

632  
00:25:27,409 --> 00:25:24,960  
does actually look at all of these

633  
00:25:29,930 --> 00:25:27,419  
impacts and really assesses what happens

634  
00:25:33,289 --> 00:25:29,940  
and that's part of the planetary defense

635  
00:25:35,390 --> 00:25:33,299  
office strategy is to characterize you

636  
00:25:37,909 --> 00:25:35,400  
know other objects in the solar system

637  
00:25:39,529 --> 00:25:37,919  
to and characterize the threat

638  
00:25:41,510 --> 00:25:39,539

understand what they're made out of

639

00:25:43,789 --> 00:25:41,520

because you know as we mentioned today

640

00:25:46,070 --> 00:25:43,799

we bring it back to dimorphous and

641

00:25:47,870 --> 00:25:46,080

didimos you know what are they made out

642

00:25:49,510 --> 00:25:47,880

of did you see their gen Rubble pile you

643

00:25:52,250 --> 00:25:49,520

know what is it actually going to create

644

00:25:54,230 --> 00:25:52,260

and will that impact actually move the

645

00:25:55,850 --> 00:25:54,240

asteroid as much as the would expect in

646

00:25:57,529 --> 00:25:55,860

understanding these craters on the moon

647

00:25:59,930 --> 00:25:57,539

and Mars really kind of helps you with

648

00:26:01,310 --> 00:25:59,940

that yeah like the whole solar system is

649

00:26:02,630 --> 00:26:01,320

the laboratory experiment and you have

650

00:26:06,289 --> 00:26:02,640

to look at all of the data to understand

651  
00:26:11,570 --> 00:26:08,210  
thank you so much we have time for one

652  
00:26:13,730 --> 00:26:11,580  
more question yes yeah hi David ariosto

653  
00:26:15,890 --> 00:26:13,740  
Canal Doubleday polishing uh you had

654  
00:26:18,289 --> 00:26:15,900  
some somewhat new technology on aboard

655  
00:26:21,649 --> 00:26:18,299  
this spacecraft as well the the solar

656  
00:26:23,570 --> 00:26:21,659  
powered uh ion propulsion I wanted to

657  
00:26:26,090 --> 00:26:23,580  
know if you could address how that went

658  
00:26:28,669 --> 00:26:26,100  
and also how this relates to Future

659  
00:26:31,070 --> 00:26:28,679  
missions oh yeah I love to talk about

660  
00:26:33,350 --> 00:26:31,080  
new technology on dark number one our

661  
00:26:35,450 --> 00:26:33,360  
solar panels work beautifully

662  
00:26:37,370 --> 00:26:35,460  
um that was a hair-raising moment for us

663  
00:26:39,710 --> 00:26:37,380

early on in launch when we had to deploy

664

00:26:41,690 --> 00:26:39,720

them autonomously and they worked

665

00:26:44,090 --> 00:26:41,700

wonderfully they provided us as much

666

00:26:46,190 --> 00:26:44,100

power as we expected and the whole

667

00:26:48,470 --> 00:26:46,200

mechanism deployment mechanism worked

668

00:26:50,269 --> 00:26:48,480

extremely well and it will be extremely

669

00:26:52,549 --> 00:26:50,279

important for future missions to outer

670

00:26:55,430 --> 00:26:52,559

planets because of the mass savings you

671

00:26:56,690 --> 00:26:55,440

get with these rolled up panels so we

672

00:26:59,210 --> 00:26:56,700

thought the solar panels worked

673

00:27:01,190 --> 00:26:59,220

wonderfully the next SEA engine we did

674

00:27:04,690 --> 00:27:01,200

demonstrated in flight for about two

675

00:27:06,649 --> 00:27:04,700

hours we did fired it worked as expected

676  
00:27:09,169 --> 00:27:06,659  
however there was a little bit of

677  
00:27:12,649 --> 00:27:09,179  
interaction with the spacecraft as well

678  
00:27:15,190 --> 00:27:12,659  
that was not anticipated and we have

679  
00:27:17,930 --> 00:27:15,200  
since then not fired the iron Thruster

680  
00:27:21,470 --> 00:27:17,940  
as part of our miscontingency was

681  
00:27:22,970 --> 00:27:21,480  
actually firing it up again but thank

682  
00:27:24,169 --> 00:27:22,980  
goodness we didn't have to do it could

683  
00:27:26,029 --> 00:27:24,179  
you elaborate a little bit of how that

684  
00:27:28,850 --> 00:27:26,039  
interacted with the spacecraft and you

685  
00:27:30,890 --> 00:27:28,860  
want to talk about yeah so so

686  
00:27:33,110 --> 00:27:30,900  
um early on in the the next SEA

687  
00:27:36,710 --> 00:27:33,120  
development is we're developing our

688  
00:27:38,810 --> 00:27:36,720

interface document we knew when you

689

00:27:40,610 --> 00:27:38,820

start it up it has a reset mode where

690

00:27:43,250 --> 00:27:40,620

there's a little bit of arcing

691

00:27:46,730 --> 00:27:43,260

and the reset mode was understood to

692

00:27:47,990 --> 00:27:46,740

introduce up to 25 amps of current that

693

00:27:49,250 --> 00:27:48,000

could go through the spacecraft

694

00:27:53,090 --> 00:27:49,260

structure

695

00:27:54,950 --> 00:27:53,100

what was discovered after after we

696

00:27:56,870 --> 00:27:54,960

launched and after we did this two hour

697

00:27:59,570 --> 00:27:56,880

demonstration when we were looking at

698

00:28:02,330 --> 00:27:59,580

our Telemetry we saw some anomalies in

699

00:28:06,110 --> 00:28:02,340

our power system and we investigated

700

00:28:07,669 --> 00:28:06,120

and it led to an investigation using the

701  
00:28:10,250 --> 00:28:07,679  
engineering model of the next SEA

702  
00:28:12,289 --> 00:28:10,260  
Thruster and lo and behold we found that

703  
00:28:15,830 --> 00:28:12,299  
there was not one but two different

704  
00:28:19,909 --> 00:28:15,840  
reset phenomenon that could occur one

705  
00:28:22,789 --> 00:28:19,919  
was the second one was rare and now it's

706  
00:28:25,130 --> 00:28:22,799  
understood but it instead of introducing

707  
00:28:27,529 --> 00:28:25,140  
up to 25 amps it introduced over 100

708  
00:28:30,110 --> 00:28:27,539  
amps and that was something that we were

709  
00:28:32,090 --> 00:28:30,120  
not we were not tested to demonstrate

710  
00:28:35,090 --> 00:28:32,100  
that we could withstand that and just

711  
00:28:37,730 --> 00:28:35,100  
from a risk perspective in trying to

712  
00:28:40,730 --> 00:28:37,740  
achieve the the primary Mission which is

713  
00:28:43,070 --> 00:28:40,740

tonight hitting the asteroid we did not

714

00:28:46,130 --> 00:28:43,080

want to put that at risk and so we

715

00:28:49,789 --> 00:28:46,140

talked with NASA and came up with a

716

00:28:52,549 --> 00:28:49,799

recommendation and and a concurrence to

717

00:28:55,549 --> 00:28:52,559

just not fire it anymore but as Lena had

718

00:28:58,850 --> 00:28:55,559

said if we had missed

719

00:29:01,430 --> 00:28:58,860

um we if we had a missed approach

720

00:29:05,090 --> 00:29:01,440

um and the spacecraft was healthy

721

00:29:07,490 --> 00:29:05,100

the one of the options was we could have

722

00:29:09,529 --> 00:29:07,500

fired up you know our whole risk posture

723

00:29:12,169 --> 00:29:09,539

has changed if if you missed it on

724

00:29:15,289 --> 00:29:12,179

approach your risk posture changes

725

00:29:18,889 --> 00:29:15,299

we could have fired it up taken the risk

726

00:29:21,649 --> 00:29:18,899

of of and the you know coming over those

727

00:29:22,789 --> 00:29:21,659

couple you know that 100 amps phenomenon

728

00:29:24,529 --> 00:29:22,799

again

729

00:29:26,990 --> 00:29:24,539

and we would have fired it for about

730

00:29:29,450 --> 00:29:27,000

eight days and that would have put us on

731

00:29:31,549 --> 00:29:29,460

a on a trajectory that we would be

732

00:29:35,090 --> 00:29:31,559

coming back to the exact same asteroid

733

00:29:37,970 --> 00:29:35,100

uh two years later and I'll just add

734

00:29:39,409 --> 00:29:37,980

that uh even in the future for next e

735

00:29:41,149 --> 00:29:39,419

missions

736

00:29:42,529 --> 00:29:41,159

um we don't see a problem with that this

737

00:29:45,169 --> 00:29:42,539

could be accommodated it was just

738

00:29:47,149 --> 00:29:45,179

something that wasn't not anticipated at

739

00:29:48,970 --> 00:29:47,159

the time uh when we put the Thruster

740

00:29:51,590 --> 00:29:48,980

onto the space

741

00:29:53,149 --> 00:29:51,600

propulsion is extremely great for

742

00:29:55,250 --> 00:29:53,159

especially if you want to go visit all

743

00:29:57,169 --> 00:29:55,260

these other asteroids right you can

744

00:29:59,810 --> 00:29:57,179

actually when you were around them and

745

00:30:02,450 --> 00:29:59,820

uh yeah so we're really looking forward

746

00:30:04,610 --> 00:30:02,460

to it the Thruster the ion the next seed

747

00:30:07,010 --> 00:30:04,620

Thruster is a fine Thruster it has great

748

00:30:08,630 --> 00:30:07,020

performance it's just making sure that

749

00:30:11,690 --> 00:30:08,640

the interface between the Thruster and

750

00:30:14,750 --> 00:30:11,700

the spacecraft are properly properly

751

00:30:16,789 --> 00:30:14,760

designed thank you so much that is all

752

00:30:18,769 --> 00:30:16,799

the time that we have tonight thank you

753

00:30:20,570 --> 00:30:18,779

so much to our panelists thank you to

754

00:30:23,269 --> 00:30:20,580

our media both with us here in the room

755

00:30:26,330 --> 00:30:23,279

and on the phone bridge and thank you

756

00:30:28,789 --> 00:30:26,340

for watching our coverage of Dart the

757

00:30:30,889 --> 00:30:28,799

world's first ever test for planetary

758

00:30:32,389 --> 00:30:30,899

defense to stay updated on this

759

00:30:34,850 --> 00:30:32,399

incredible first of its kind Mission

760

00:30:37,070 --> 00:30:34,860

including to see any images returned by

761

00:30:39,830 --> 00:30:37,080

the Italian space agency's lychee Cube

762

00:30:42,350 --> 00:30:39,840

satellite and to learn when we confirm

763

00:30:44,810 --> 00:30:42,360

if dart's kinetic impact with its Target

764

00:30:48,169 --> 00:30:44,820

asteroid has changed that asteroids

765

00:30:50,690 --> 00:30:48,179

Motion in space visit nasa.gov forward

766

00:30:53,990 --> 00:30:50,700

slash Dart we're going to leave you now

767

00:30:57,409 --> 00:30:54,000

with that instant replay replay of dart's

768

00:30:59,389 --> 00:30:57,419

incredible last images before its