1
00:00:00,000 --> 00:00:10,260
a polarimetry Explorer mission

2
00:00:10,270 --> 00:00:32,510
[Music]

3
00:00:46,190 --> 00:00:33,620
foreign

4
00:00:46,200 --> 00:00:49,750
[Music]

5
00:00:55,549 --> 00:00:52,729
s this SpaceX Falcon 9 rocket will

6
00:00:58,189 --> 00:00:55,559
launch XP giving us a new set of eyes to

7
00:01:00,470 --> 00:00:58,199
explore outer space over a two-year

8
00:01:02,689 --> 00:01:00,480
Mission it will use its unique x-ray

9
00:01:05,450 --> 00:01:02,699
vision to study some of the most

10
00:01:06,469 --> 00:01:05,460
mysterious and Powerful objects in our

11
00:01:08,030 --> 00:01:06,479
universe

12
00:01:09,890 --> 00:01:08,040
thank you for joining us this morning

13
00:01:12,050 --> 00:01:09,900

live from Kennedy Space Center in

14
00:01:14,870 --> 00:01:12,060
Florida I'm Megan Cruz and I'm Marie

15
00:01:17,510 --> 00:01:14,880
Lewis liftoff is set for one o'clock AM

16
00:01:21,170 --> 00:01:17,520
sharp eastern time from just behind us

17
00:01:23,929 --> 00:01:21,180
at historic launch complex 39a ixby is

18
00:01:26,390 --> 00:01:23,939
NASA's first mission to study polarized

19
00:01:28,969 --> 00:01:26,400
x-rays simply put it will help us

20
00:01:31,310 --> 00:01:28,979
understand how the universe works the

21
00:01:34,609 --> 00:01:31,320
mission will focus on objects like black

22
00:01:37,490 --> 00:01:34,619
holes and exploded Stars honing in on

23
00:01:39,230 --> 00:01:37,500
their Cosmic x-rays these Rays originate

24
00:01:41,929 --> 00:01:39,240
from places where matter is under

25
00:01:45,050 --> 00:01:41,939
extreme conditions violent collisions

26
00:01:48,289 --> 00:01:45,060
enormous explosions 10 million degree

27
00:01:50,450 --> 00:01:48,299
temperatures and fast rotations and XP

28
00:01:51,950 --> 00:01:50,460
is unique because it will pinpoint x-ray

29
00:01:54,649 --> 00:01:51,960
polarization

30
00:01:56,389 --> 00:01:54,659
soon after launching XP will deploy its

31
00:01:59,330 --> 00:01:56,399
solar arrays which will power the

32
00:02:03,410 --> 00:01:59,340
spacecraft after about a week in space

33
00:02:05,389 --> 00:02:03,420
XP will extend its boom lengthening the

34
00:02:07,910 --> 00:02:05,399
spacecraft to about the size of a

35
00:02:10,010 --> 00:02:07,920
minivan there that boom goes about a

36
00:02:12,229 --> 00:02:10,020
month after launch XP will begin its

37
00:02:14,210 --> 00:02:12,239
two-year Mission using three identical

38
00:02:16,309 --> 00:02:14,220

telescopes each for the set of mirrors

39
00:02:18,530 --> 00:02:16,319
those mirrors have corresponding

40
00:02:21,170 --> 00:02:18,540
detectors on the opposite end of the

41
00:02:23,630 --> 00:02:21,180
Boom the mirrors collect x-rays from the

42
00:02:25,490 --> 00:02:23,640
celestial objects and focus them on the

43
00:02:27,610 --> 00:02:25,500
detectors which make an image of those

44
00:02:30,470 --> 00:02:27,620
X-rays and measure polarization

45
00:02:33,229 --> 00:02:30,480
polarization is a property of light like

46
00:02:35,750 --> 00:02:33,239
brightness and color x-rays are a form

47
00:02:38,449 --> 00:02:35,760
of high energy light that's invisible to

48
00:02:40,910 --> 00:02:38,459
the human eye by studying the polarized

49
00:02:42,710 --> 00:02:40,920
X-rays of these powerful objects we can

50
00:02:45,410 --> 00:02:42,720
learn more about what they're made of

51
00:02:47,030 --> 00:02:45,420
and how they work today's launch is

52
00:02:49,610 --> 00:02:47,040
managed by NASA's launch Services

53
00:02:51,589 --> 00:02:49,620
Program in cooperation with the agency's

54
00:02:54,170 --> 00:02:51,599
Marshall space flight center the Italian

55
00:02:55,729 --> 00:02:54,180
space space agency and ball Aerospace

56
00:02:58,490 --> 00:02:55,739
and here are some other interesting

57
00:03:00,410 --> 00:02:58,500
facts about XP by the Numbers the bottom

58
00:03:03,890 --> 00:03:00,420
of the observatory called the spacecraft

59
00:03:05,869 --> 00:03:03,900
bus is nearly four feet in diameter up

60
00:03:08,570 --> 00:03:05,879
top is the mirror module support

61
00:03:11,149 --> 00:03:08,580
structure deck that's almost five feet

62
00:03:13,369 --> 00:03:11,159
in diameter the Boom is 12 feet long

63
00:03:17,210 --> 00:03:13,379

bringing the fully extended Observatory

64
00:03:19,850 --> 00:03:17,220
height to 17 feet XP solar array

65
00:03:23,089 --> 00:03:19,860
wingspan is eight feet put it all

66
00:03:26,089 --> 00:03:23,099
together and ixb weighs 727 pounds

67
00:03:28,430 --> 00:03:26,099
roughly the same as a polar bear it will

68
00:03:30,710 --> 00:03:28,440
study about 40 celestial objects during

69
00:03:33,110 --> 00:03:30,720
its first year in space with more

70
00:03:34,070 --> 00:03:33,120
detailed follow-up observations in its

71
00:03:36,050 --> 00:03:34,080
second year

72
00:03:38,149 --> 00:03:36,060
and Bixby arrived at Cape Canaveral

73
00:03:41,030 --> 00:03:38,159
space force station on November 5th for

74
00:03:43,430 --> 00:03:41,040
final pre-launch testing teams attached

75
00:03:45,710 --> 00:03:43,440
it to the Falcon 9 rocket last week and

76
00:03:47,949 --> 00:03:45,720
now here we are stacked and vertical on

77
00:03:50,210 --> 00:03:47,959
the pad ready for launch in just about

78
00:03:51,890 --> 00:03:50,220
26 minutes

79
00:03:54,410 --> 00:03:51,900
throughout this broadcast we will show

80
00:03:56,750 --> 00:03:54,420
you exactly how polarization works and

81
00:03:58,910 --> 00:03:56,760
why measuring it will be a game changer

82
00:04:00,710 --> 00:03:58,920
for astrophysics that's right and we

83
00:04:02,449 --> 00:04:00,720
will also introduce you to some of the

84
00:04:04,970 --> 00:04:02,459
key people who made this Mission

85
00:04:07,250 --> 00:04:04,980
possible NASA's Jasmine Hopkins will be

86
00:04:09,110 --> 00:04:07,260
interviewing those guests live but first

87
00:04:11,210 --> 00:04:09,120
let's bring in our launch commentators

88
00:04:13,309 --> 00:04:11,220

for today's Mission NASA's Daryl nail

89
00:04:14,990 --> 00:04:13,319
and Mick woltman sitting inside with the

90
00:04:17,030 --> 00:04:15,000
launch Team Daryl and Mick how's it

91
00:04:18,469 --> 00:04:17,040
going well it's going great Megan and

92
00:04:20,569 --> 00:04:18,479
Marie and welcome inside the mission

93
00:04:23,150 --> 00:04:20,579
director Center here at Hangar AE with

94
00:04:24,890 --> 00:04:23,160
Mick Wolfman engineer extraordinaire for

95
00:04:26,990 --> 00:04:24,900
launch Services Program going to be

96
00:04:29,450 --> 00:04:27,000
giving us his expertise tonight we've

97
00:04:31,189 --> 00:04:29,460
had a very clean countdown so far which

98
00:04:34,070 --> 00:04:31,199
is great the launch vehicle is healthy

99
00:04:36,530 --> 00:04:34,080
the spacecraft is healthy the range is

100
00:04:39,469 --> 00:04:36,540
clear and the weather is only getting

101
00:04:41,749 --> 00:04:39,479
better looking Fantastic look outside at

102
00:04:44,390 --> 00:04:41,759
the rocket and you can see it is a

103
00:04:46,730 --> 00:04:44,400
beautiful shot starting to fuel Mick

104
00:04:49,010 --> 00:04:46,740
just a few minutes ago we had a poll

105
00:04:51,350 --> 00:04:49,020
that kicked everything into motion yeah

106
00:04:52,790 --> 00:04:51,360
NASA's launch manager Tim done pulled

107
00:04:55,249 --> 00:04:52,800
the NASA engineering team the spacecraft

108
00:04:57,950 --> 00:04:55,259
team to verify they were good to start

109
00:04:59,689 --> 00:04:57,960
propellant loading and get ready for

110
00:05:01,790 --> 00:04:59,699
launch this morning and that was great

111
00:05:04,490 --> 00:05:01,800
Tim said that everything looks favorable

112
00:05:06,710 --> 00:05:04,500
and we are go for propellant loading and

113
00:05:09,409 --> 00:05:06,720

go for launch and once that propellant

114
00:05:12,110 --> 00:05:09,419
load started and it continues to start

115
00:05:14,689 --> 00:05:12,120
now and it continues to go on as we

116
00:05:17,270 --> 00:05:14,699
speak that also eliminated something

117
00:05:18,770 --> 00:05:17,280
that was true about an hour ago but is

118
00:05:20,689 --> 00:05:18,780
no longer true and that is we had a 90

119
00:05:22,670 --> 00:05:20,699
minute window it's no longer the case

120
00:05:24,950 --> 00:05:22,680
that's true Daryl once we started

121
00:05:26,629 --> 00:05:24,960
propellant loading we committed to a

122
00:05:29,270 --> 00:05:26,639
specific time in that window and that is

123
00:05:30,770 --> 00:05:29,280
1am this morning for xp's liftoff and

124
00:05:33,469 --> 00:05:30,780
that's due to the fact that we're using

125
00:05:35,749 --> 00:05:33,479
densified or super chilled locks on

126
00:05:37,370 --> 00:05:35,759
board the Falcon 9 at minus 340 degrees

127
00:05:39,710 --> 00:05:37,380
we need to keep it at that temperature

128
00:05:42,290 --> 00:05:39,720
because it warms up pretty fast and if

129
00:05:44,450 --> 00:05:42,300
we can't do that then we we miss our

130
00:05:46,969 --> 00:05:44,460
opportunity so we have committed to this

131
00:05:48,710 --> 00:05:46,979
and we're heading for a t0 at 1am and

132
00:05:51,230 --> 00:05:48,720
you can see that lock starting to fill

133
00:05:53,510 --> 00:05:51,240
because it's chilling the bottom part of

134
00:05:55,370 --> 00:05:53,520
the rocket where it is condensing and

135
00:05:57,590 --> 00:05:55,380
making that white cloud that you see

136
00:05:59,390 --> 00:05:57,600
there this rocket has an interesting

137
00:06:01,850 --> 00:05:59,400
ground track in order to get this

138
00:06:04,730 --> 00:06:01,860

satellite into orbit let's take a look

139
00:06:06,409 --> 00:06:04,740
at that now once it launches here uh

140
00:06:08,330 --> 00:06:06,419
from the cape can at Kennedy Space

141
00:06:10,790 --> 00:06:08,340
Center you see that red line that's the

142
00:06:13,370 --> 00:06:10,800
powered flight then it goes into a coast

143
00:06:15,950 --> 00:06:13,380
over the Atlantic Ocean but what's

144
00:06:18,830 --> 00:06:15,960
interesting is what happens next after

145
00:06:22,249 --> 00:06:18,840
it passes over West Africa it gets close

146
00:06:25,189 --> 00:06:22,259
to the equator it does this bang a 28

147
00:06:27,590 --> 00:06:25,199
degree turn why is that yeah so that

148
00:06:29,930 --> 00:06:27,600
that last burn of the second stage gives

149
00:06:32,450 --> 00:06:29,940
us that 28 degree plane change which

150
00:06:33,650 --> 00:06:32,460
puts XP into an equatorial orbit which

151
00:06:35,570 --> 00:06:33,660
is very important for the science

152
00:06:37,670 --> 00:06:35,580
Mission and Daryl we'll talk about that

153
00:06:40,189 --> 00:06:37,680
later we're going to talk about that as

154
00:06:42,550 --> 00:06:40,199
well as this historic pad right here

155
00:06:44,930 --> 00:06:42,560
launch pad 39a with the first ever

156
00:06:46,610 --> 00:06:44,940
dedicated science Mission launching from

157
00:06:48,650 --> 00:06:46,620
here we'll also talk about the history

158
00:06:51,170 --> 00:06:48,660
of that booster but for now back to

159
00:06:52,610 --> 00:06:51,180
Megan and Marie all right thanks Daryl

160
00:06:54,890 --> 00:06:52,620
and Mick uh we want to bring in now

161
00:06:56,629 --> 00:06:54,900
NASA's Jasmine Hopkins who is at a

162
00:06:58,070 --> 00:06:56,639
nearby viewing location yeah she's there

163
00:07:00,230 --> 00:06:58,080

with the director of NASA's Marshall

164
00:07:01,610 --> 00:07:00,240
space flight center in Alabama which is

165
00:07:04,670 --> 00:07:01,620
the lead center for the mission right

166
00:07:06,230 --> 00:07:04,680
Jasmine that is correct Megan and we're

167
00:07:07,610 --> 00:07:06,240
gonna have a great view of launch from

168
00:07:09,589 --> 00:07:07,620
right here at the balcony of the

169
00:07:11,990 --> 00:07:09,599
operations and support building at

170
00:07:13,610 --> 00:07:12,000
Kennedy and I am so glad to welcome Jody

171
00:07:15,469 --> 00:07:13,620
singer thank you so much for being here

172
00:07:17,930 --> 00:07:15,479
well thank you so much for having me

173
00:07:20,330 --> 00:07:17,940
this is a fantastic time an exciting

174
00:07:21,950 --> 00:07:20,340
moment it is we're very excited and Jody

175
00:07:23,990 --> 00:07:21,960
tell me Marshall has been at the heart

176
00:07:26,089 --> 00:07:24,000
of the XP Mission how are you feeling to

177
00:07:27,830 --> 00:07:26,099
be here for launch well it's one of

178
00:07:30,170 --> 00:07:27,840
those things that you know you see all

179
00:07:33,650 --> 00:07:30,180
the excitement you see the sacrifices

180
00:07:35,450 --> 00:07:33,660
you see how much energy our our team and

181
00:07:37,189 --> 00:07:35,460
it's our team it's Marshall but it's in

182
00:07:39,469 --> 00:07:37,199
our Italian space agency and ball

183
00:07:41,870 --> 00:07:39,479
Aerospace as well as many other folks

184
00:07:43,909 --> 00:07:41,880
but our Marshall team is extremely

185
00:07:45,589 --> 00:07:43,919
excited about the science that we're

186
00:07:47,809 --> 00:07:45,599
going to get out of it the new

187
00:07:50,570 --> 00:07:47,819
discoveries and you know we haven't done

188
00:07:52,670 --> 00:07:50,580

this before so we'll not know what we'll

189
00:07:54,950 --> 00:07:52,680
find until we actually get it in

190
00:07:57,469 --> 00:07:54,960
operation but it's just really exciting

191
00:07:58,969 --> 00:07:57,479
time and a lot of Pride it is it is and

192
00:08:00,170 --> 00:07:58,979
you know we're very excited with you

193
00:08:02,450 --> 00:08:00,180
we're all going to discover these things

194
00:08:04,550 --> 00:08:02,460
together um but can you tell me what is

195
00:08:06,230 --> 00:08:04,560
been doing to prepare for the XP Mission

196
00:08:08,390 --> 00:08:06,240
and what will operations look like over

197
00:08:09,830 --> 00:08:08,400
the next few years well definitely I'll

198
00:08:12,350 --> 00:08:09,840
tell you there's been a lot of hard work

199
00:08:15,830 --> 00:08:12,360
for sure but a lot of our scientists

200
00:08:17,330 --> 00:08:15,840
engineers working with our partners but

201
00:08:18,830 --> 00:08:17,340
definitely working hard you know

202
00:08:21,189 --> 00:08:18,840
particularly Marshall space flight

203
00:08:24,650 --> 00:08:21,199
center is responsible for the mirrors

204
00:08:27,110 --> 00:08:24,660
there's over 72 mirrors on it and those

205
00:08:29,869 --> 00:08:27,120
mirrors are very critical to be able to

206
00:08:31,369 --> 00:08:29,879
see the light that is coming from the

207
00:08:33,589 --> 00:08:31,379
different objects that we'll be pointing

208
00:08:35,630 --> 00:08:33,599
at right and then sending it down to the

209
00:08:37,550 --> 00:08:35,640
detector and being able then to

210
00:08:40,250 --> 00:08:37,560
understand what we're seeing and so it's

211
00:08:42,649 --> 00:08:40,260
just a unimaginable a lot of the things

212
00:08:45,290 --> 00:08:42,659
you know from Deep stars to a lot of the

213
00:08:47,449 --> 00:08:45,300

energy seeing what's we don't even know

214
00:08:49,130 --> 00:08:47,459
what we'll be seeing so right so that's

215
00:08:50,810 --> 00:08:49,140
going to be fantastic and and there'll

216
00:08:53,630 --> 00:08:50,820
be a lot of hard work

217
00:08:56,930 --> 00:08:53,640
um you know when the XB is commissioned

218
00:08:58,370 --> 00:08:56,940
in about a month it will you know it has

219
00:09:00,290 --> 00:08:58,380
to go through its different stages and

220
00:09:02,750 --> 00:09:00,300
check out right to be operational in

221
00:09:04,490 --> 00:09:02,760
space but once it's there it'll be a

222
00:09:05,570 --> 00:09:04,500
two-year Mission there's going to be a

223
00:09:07,910 --> 00:09:05,580
lot of the things that we'll be looking

224
00:09:10,190 --> 00:09:07,920
at neutron stars understanding how

225
00:09:13,310 --> 00:09:10,200
planets were formed understanding all

226
00:09:14,930 --> 00:09:13,320
about things that we don't even imagine

227
00:09:16,730 --> 00:09:14,940
that we're going to see because we've

228
00:09:18,110 --> 00:09:16,740
never seen it before exactly we've

229
00:09:20,470 --> 00:09:18,120
estimated what it would be like but

230
00:09:23,509 --> 00:09:20,480
getting to see it and then they'll be

231
00:09:27,050 --> 00:09:23,519
continuous research that will be done

232
00:09:29,630 --> 00:09:27,060
and it's over 12 countries and over 120

233
00:09:31,310 --> 00:09:29,640
more scientists from all across the

234
00:09:33,290 --> 00:09:31,320
world that'll be getting this

235
00:09:34,730 --> 00:09:33,300
information and that's something that's

236
00:09:36,829 --> 00:09:34,740
great for the United States but it's

237
00:09:39,050 --> 00:09:36,839
also great for Partnerships We Go

238
00:09:40,790 --> 00:09:39,060

Together learning about our universes

239
00:09:42,949 --> 00:09:40,800
and understanding our world right right

240
00:09:44,509 --> 00:09:42,959
we absolutely go together I love I love

241
00:09:46,310 --> 00:09:44,519
that statement and you know the Marshall

242
00:09:47,990 --> 00:09:46,320
team has been working behind the scenes

243
00:09:49,310 --> 00:09:48,000
on this to uncover the mysteries of the

244
00:09:51,350 --> 00:09:49,320
universe so what do you want the world

245
00:09:54,350 --> 00:09:51,360
to know about your team at Marshall well

246
00:09:56,269 --> 00:09:54,360
I think they're pretty special yeah it's

247
00:09:59,110 --> 00:09:56,279
a great team great team of scientists

248
00:10:02,329 --> 00:09:59,120
and Engineers uh working hard dedicated

249
00:10:06,530 --> 00:10:02,339
and you know really just giving it their

250
00:10:09,230 --> 00:10:06,540
all and really excited about the unknown

251
00:10:10,730 --> 00:10:09,240
possibilities understanding our world in

252
00:10:13,069 --> 00:10:10,740
addition to that Marshall space flight

253
00:10:14,930 --> 00:10:13,079
center you know lifting off of from the

254
00:10:17,449 --> 00:10:14,940
surface of the Earth traveling to and

255
00:10:19,970 --> 00:10:17,459
through living and understanding in our

256
00:10:22,430 --> 00:10:19,980
world and now you know the unknown

257
00:10:24,050 --> 00:10:22,440
mysteries of our universe so you know

258
00:10:26,329 --> 00:10:24,060
it's just going to be a lot of fun it's

259
00:10:27,949 --> 00:10:26,339
so bright the future yeah you know it's

260
00:10:30,050 --> 00:10:27,959
not just about us it's about the Next

261
00:10:31,670 --> 00:10:30,060
Generation understanding our world and

262
00:10:34,130 --> 00:10:31,680
where we're going so absolutely the

263
00:10:35,990 --> 00:10:34,140

future is so bright yes it is Jody thank

264
00:10:37,370 --> 00:10:36,000
you so much for being here and now we're

265
00:10:39,530 --> 00:10:37,380
going to get a forecast from our launch

266
00:10:42,290 --> 00:10:39,540
weather officer will ulwick of the space

267
00:10:44,150 --> 00:10:42,300
launch Delta 45 over to you will

268
00:10:45,769 --> 00:10:44,160
thanks to husband conditions look

269
00:10:47,269 --> 00:10:45,779
excellent for an early morning launch

270
00:10:49,009 --> 00:10:47,279
this morning despite the fact that we

271
00:10:51,350 --> 00:10:49,019
have some clouds moving overhead the

272
00:10:53,449 --> 00:10:51,360
state and that's thanks in part to a

273
00:10:56,150 --> 00:10:53,459
weak cool front that we're slowly seeing

274
00:10:58,009 --> 00:10:56,160
sag South uh over the area a live look

275
00:10:59,630 --> 00:10:58,019
at satellite imagery shows those clouds

276
00:11:02,449 --> 00:10:59,640
moving from the Eastern Gulf of Mexico

277
00:11:03,829 --> 00:11:02,459
and into the Western Atlantic Ocean now

278
00:11:06,050 --> 00:11:03,839
my colleagues at the 45th weather

279
00:11:08,090 --> 00:11:06,060
Squadron are actively evaluating nine

280
00:11:10,310 --> 00:11:08,100
lightning launch commit criteria to

281
00:11:11,810 --> 00:11:10,320
ensure those clouds pose no threat of

282
00:11:13,550 --> 00:11:11,820
both natural and Rocket triggered

283
00:11:15,050 --> 00:11:13,560
lightning and the good news is that

284
00:11:17,690 --> 00:11:15,060
since we started evaluating the weather

285
00:11:19,910 --> 00:11:17,700
at L minus two hours conditions look

286
00:11:21,350 --> 00:11:19,920
very favorable now Mike mcaleen and the

287
00:11:23,569 --> 00:11:21,360
launch weather officer for this Mission

288
00:11:25,310 --> 00:11:23,579

just gave his final weather brief at L

289
00:11:27,470 --> 00:11:25,320
minus one hours and gave a greater than

290
00:11:29,150 --> 00:11:27,480
90 percent go for weather and the good

291
00:11:31,190 --> 00:11:29,160
news is that should we need to utilize

292
00:11:32,870 --> 00:11:31,200
tomorrow's backup window weather

293
00:11:35,030 --> 00:11:32,880
conditions remain the same within 80

294
00:11:36,829 --> 00:11:35,040
percent go for weather Marie and Megan

295
00:11:38,810 --> 00:11:36,839
back to you

296
00:11:41,269 --> 00:11:38,820
all right thank you will uh great to

297
00:11:43,430 --> 00:11:41,279
hear fantastic news about the weather uh

298
00:11:45,590 --> 00:11:43,440
it is currently T-minus 18 minutes from

299
00:11:47,690 --> 00:11:45,600
liftoff yeah previous NASA missions have

300
00:11:50,090 --> 00:11:47,700
studied Cosmic x-rays before but never

301
00:11:52,250 --> 00:11:50,100
the way that ixby will it's a new set of

302
00:11:56,030 --> 00:11:52,260
eyes and space that could unlock secrets

303
00:12:00,650 --> 00:11:58,430
to answer some of the biggest questions

304
00:12:03,290 --> 00:12:00,660
about what's out there in the universe

305
00:12:06,650 --> 00:12:03,300
and what it all means we need powerful

306
00:12:09,650 --> 00:12:06,660
telescopes NASA unravels the mysteries

307
00:12:11,150 --> 00:12:09,660
of the cosmos using observatories in

308
00:12:14,449 --> 00:12:11,160
space that study the different

309
00:12:17,930 --> 00:12:14,459
wavelengths and properties of light the

310
00:12:20,810 --> 00:12:17,940
Imaging x-ray polar imagery Explorer or

311
00:12:23,269 --> 00:12:20,820
ixb will study x-rays from some of the

312
00:12:27,050 --> 00:12:23,279
most extreme objects in the universe

313
00:12:29,569 --> 00:12:27,060

like black holes in a new way

314
00:12:32,030 --> 00:12:29,579
XP will look at a special property of

315
00:12:36,110 --> 00:12:32,040
x-rays that has gone mostly unexplored

316
00:12:38,449 --> 00:12:36,120
until now it's called polarization

317
00:12:41,710 --> 00:12:38,459
x-rays come from the hottest places in

318
00:12:45,290 --> 00:12:41,720
the Universe imagine powerful explosions

319
00:12:48,650 --> 00:12:45,300
violent collisions and strong magnetic

320
00:12:50,210 --> 00:12:48,660
fields creating chaos in the darkness of

321
00:12:53,269 --> 00:12:50,220
deep space

322
00:12:56,509 --> 00:12:53,279
x-ray telescopes can trace clouds of gas

323
00:12:59,629 --> 00:12:56,519
heated to millions of degrees and detect

324
00:13:01,610 --> 00:12:59,639
the shower of particles fueled by a

325
00:13:04,129 --> 00:13:01,620
feeding black hole

326
00:13:06,650 --> 00:13:04,139
building on the discoveries of NASA's

327
00:13:09,410 --> 00:13:06,660
Chandra x-ray Observatory and other

328
00:13:11,690 --> 00:13:09,420
space telescopes XP measures the

329
00:13:14,509 --> 00:13:11,700
orientation of x-rays from some of the

330
00:13:17,449 --> 00:13:14,519
most brilliant and bizarre objects in

331
00:13:20,090 --> 00:13:17,459
space like all forms of light x-rays

332
00:13:23,509 --> 00:13:20,100
consist of moving electric and magnetic

333
00:13:26,170 --> 00:13:23,519
waves usually the Peaks and valleys of

334
00:13:29,090 --> 00:13:26,180
these waves move in random directions

335
00:13:31,670 --> 00:13:29,100
polarized light is more organized with

336
00:13:33,170 --> 00:13:31,680
the two types of waves vibrating in the

337
00:13:34,970 --> 00:13:33,180
same direction

338
00:13:37,730 --> 00:13:34,980

you might have heard of polarized

339
00:13:40,069 --> 00:13:37,740
sunglasses boaters and fishermen use

340
00:13:42,610 --> 00:13:40,079
these lenses to reduce glare from

341
00:13:45,530 --> 00:13:42,620
sunlight across a body of water

342
00:13:48,410 --> 00:13:45,540
reflects light in a way that causes some

343
00:13:50,449 --> 00:13:48,420
of it to vibrate in a direction parallel

344
00:13:52,790 --> 00:13:50,459
to the water surface

345
00:13:56,210 --> 00:13:52,800
polarized lenses block light moving

346
00:13:58,730 --> 00:13:56,220
horizontally but let other light through

347
00:14:01,550 --> 00:13:58,740
much like the way light changes when it

348
00:14:03,650 --> 00:14:01,560
bounces off of water in space light

349
00:14:06,350 --> 00:14:03,660
becomes polarized depending on where it

350
00:14:08,990 --> 00:14:06,360
comes from and what it passes through

351
00:14:12,590 --> 00:14:09,000
by measuring the amount and direction of

352
00:14:15,470 --> 00:14:12,600
polarization XP gives us clues about the

353
00:14:17,930 --> 00:14:15,480
shapes structures and inner workings of

354
00:14:20,389 --> 00:14:17,940
all types of objects that shine in

355
00:14:23,389 --> 00:14:20,399
bright x-rays

356
00:14:27,129 --> 00:14:23,399
the XP Observatory has three identical

357
00:14:30,769 --> 00:14:27,139
telescopes with three main parts mirrors

358
00:14:32,870 --> 00:14:30,779
detectors and an extendable Mast or boom

359
00:14:36,829 --> 00:14:32,880
that separates them

360
00:14:40,069 --> 00:14:36,839
each mirror assembly contains 24 nested

361
00:14:42,530 --> 00:14:40,079
mirrors that collect and focus x-rays

362
00:14:45,590 --> 00:14:42,540
located at the focal point of the

363
00:14:48,590 --> 00:14:45,600

mirrors sensitive detectors made with

364
00:14:51,350 --> 00:14:48,600
International Partners in Italy are the

365
00:14:53,810 --> 00:14:51,360
secret behind ixb's unique x-ray vision

366
00:14:56,689 --> 00:14:53,820
they track and measure all four

367
00:14:59,990 --> 00:14:56,699
properties of incoming light its arrival

368
00:15:02,689 --> 00:15:00,000
time Direction energy and most

369
00:15:04,970 --> 00:15:02,699
importantly polarization

370
00:15:07,430 --> 00:15:04,980
over the two years of its Prime mission

371
00:15:10,910 --> 00:15:07,440
Bixby will observe more than 50

372
00:15:14,509 --> 00:15:10,920
brilliant objects like the leftovers of

373
00:15:17,030 --> 00:15:14,519
huge stars that exploded into supernovae

374
00:15:19,850 --> 00:15:17,040
the supermassive black hole at the heart

375
00:15:22,850 --> 00:15:19,860
of our own Milky Way galaxy

376
00:15:24,889 --> 00:15:22,860
and pulsars the dense remains of stars

377
00:15:27,290 --> 00:15:24,899
that once were

378
00:15:29,810 --> 00:15:27,300
these observations will help scientists

379
00:15:32,629 --> 00:15:29,820
tackle long-standing puzzles like

380
00:15:35,569 --> 00:15:32,639
testing competing theories about pulsars

381
00:15:38,990 --> 00:15:35,579
and the details of how Einstein's theory

382
00:15:41,329 --> 00:15:39,000
of general relativity works new insights

383
00:15:44,269 --> 00:15:41,339
from ixb will help us paint a fuller

384
00:15:47,210 --> 00:15:44,279
picture of the universe confirming or

385
00:15:49,790 --> 00:15:47,220
confounding our thinking in the years to

386
00:15:53,629 --> 00:15:51,889
really such a fascinating Mission I

387
00:15:54,949 --> 00:15:53,639
can't wait to see what they uncover and

388
00:15:57,110 --> 00:15:54,959

as you heard in that video the Italian

389
00:15:59,030 --> 00:15:57,120
space agency built an important part of

390
00:16:00,350 --> 00:15:59,040
Bixby let's get back over to Jasmine

391
00:16:03,590 --> 00:16:00,360
who's with the agency's president

392
00:16:05,870 --> 00:16:03,600
Jasmine thanks Megan yes now I am joined

393
00:16:07,850 --> 00:16:05,880
by Giorgio saccoccia president of the

394
00:16:10,430 --> 00:16:07,860
Italian space agency thanks so much for

395
00:16:12,410 --> 00:16:10,440
being here thanks to you yeah absolutely

396
00:16:13,970 --> 00:16:12,420
so there's a lot of science that is

397
00:16:16,009 --> 00:16:13,980
going into the XP Mission can you tell

398
00:16:18,410 --> 00:16:16,019
me what is the Italian space agency's

399
00:16:20,930 --> 00:16:18,420
biggest contribution to ixb

400
00:16:23,090 --> 00:16:20,940
well we have provided the detectors

401
00:16:24,310 --> 00:16:23,100
which are quite a are quite an

402
00:16:27,889 --> 00:16:24,320
Innovative

403
00:16:30,769 --> 00:16:27,899
development and some other elements of

404
00:16:35,210 --> 00:16:30,779
the of the payload units we also provide

405
00:16:37,970 --> 00:16:35,220
the main uh tracking station in a is a

406
00:16:40,430 --> 00:16:37,980
site we have in Africa and Kenya and

407
00:16:42,530 --> 00:16:40,440
some other elements also okay great

408
00:16:44,329 --> 00:16:42,540
that's really fascinating very exciting

409
00:16:45,889 --> 00:16:44,339
so can you also tell me about the

410
00:16:48,290 --> 00:16:45,899
partnership between the Italian space

411
00:16:49,210 --> 00:16:48,300
agency and NASA what makes that so

412
00:16:51,530 --> 00:16:49,220
important

413
00:16:54,050 --> 00:16:51,540

we're talking here about something which

414
00:16:56,569 --> 00:16:54,060
is really historical for us it goes back

415
00:17:01,129 --> 00:16:56,579
to the very beginning of Italian space

416
00:17:03,829 --> 00:17:01,139
space history our first launch in 64 our

417
00:17:06,289 --> 00:17:03,839
first satellite was launched thanks to a

418
00:17:08,689 --> 00:17:06,299
collaboration with NASA and this has

419
00:17:10,909 --> 00:17:08,699
developed over the years on many

420
00:17:12,590 --> 00:17:10,919
exciting Mission

421
00:17:15,429 --> 00:17:12,600
um contribution to the International

422
00:17:18,350 --> 00:17:15,439
Space Station that our country

423
00:17:21,829 --> 00:17:18,360
with a lot of modules pressurized mode

424
00:17:24,370 --> 00:17:21,839
wheels of course you want to now have a

425
00:17:27,110 --> 00:17:24,380
big contribution to to the Artemis

426
00:17:29,630 --> 00:17:27,120
program which we are already doing

427
00:17:32,450 --> 00:17:29,640
through the European space agency and we

428
00:17:35,270 --> 00:17:32,460
will do also indirect collaboration with

429
00:17:37,190 --> 00:17:35,280
NASA so it's really for us outside

430
00:17:38,870 --> 00:17:37,200
Europe the main importance it will

431
00:17:40,370 --> 00:17:38,880
always be right right and of course

432
00:17:41,950 --> 00:17:40,380
we're always glad to partner with you

433
00:17:45,409 --> 00:17:41,960
thank you so much for being here Giorgio

434
00:17:47,810 --> 00:17:45,419
Let's cross the finger yes yes abs

435
00:17:50,630 --> 00:17:47,820
Andy Tran from SpaceX headquarters in

436
00:17:53,029 --> 00:17:50,640
Hawthorne California over to you Andy

437
00:17:54,890 --> 00:17:53,039
today marks the fifth Flight of the

438
00:17:57,289 --> 00:17:54,900

SpaceX booster we are using the fly X

439
00:17:58,970 --> 00:17:57,299
speed of space and its third flight on a

440
00:18:00,289 --> 00:17:58,980
national Mission you can tell by the

441
00:18:01,730 --> 00:18:00,299
re-entry set on the bottom of the

442
00:18:03,830 --> 00:18:01,740
vehicle that this booster has flown

443
00:18:06,110 --> 00:18:03,840
before just over a year ago this

444
00:18:07,909 --> 00:18:06,120
20-story tall Falcon 9 launched crew

445
00:18:10,190 --> 00:18:07,919
dragon and NASA's four crew and

446
00:18:12,049 --> 00:18:10,200
astronauts into the night sky and onto

447
00:18:13,909 --> 00:18:12,059
the International Space Station for a

448
00:18:15,470 --> 00:18:13,919
six-month Mission the launch was

449
00:18:18,110 --> 00:18:15,480
historic because it marked the first

450
00:18:19,909 --> 00:18:18,120
operational flight of crew Dragon about

451
00:18:21,590 --> 00:18:19,919
nine minutes into flight the first stage

452
00:18:23,750 --> 00:18:21,600
or the bottom two-thirds of the vehicle

453
00:18:25,430 --> 00:18:23,760
returned from space and landed on our

454
00:18:27,830 --> 00:18:25,440
drone ship just read the instructions

455
00:18:29,390 --> 00:18:27,840
off the Atlantic coast of Florida five

456
00:18:31,310 --> 00:18:29,400
months later the flight proven booster

457
00:18:33,350 --> 00:18:31,320
returned to pattern and for another

458
00:18:36,049 --> 00:18:33,360
night launch this time launching the

459
00:18:37,850 --> 00:18:36,059
four astronauts of crew 2. the booster

460
00:18:39,890 --> 00:18:37,860
returned once again to Earth and landed

461
00:18:42,110 --> 00:18:39,900
this time on our drone ship of course I

462
00:18:44,210 --> 00:18:42,120
still love you those two flights plus a

463
00:18:46,850 --> 00:18:44,220

mission for Sirius XM and another for

464
00:18:49,310 --> 00:18:46,860
NASA's cargo respite mission 23 brings

465
00:18:52,130 --> 00:18:49,320
us to today the fifth flight for this

466
00:18:54,230 --> 00:18:52,140
first stage booster carrying XP to space

467
00:18:56,390 --> 00:18:54,240
tonight the flight proven booster is

468
00:18:58,430 --> 00:18:56,400
back at path 39a to launch its very

469
00:19:00,049 --> 00:18:58,440
first science Mission from NASA and also

470
00:19:02,210 --> 00:19:00,059
marks the fifth NASA science Mission

471
00:19:04,370 --> 00:19:02,220
overall for SpaceX for this launch the

472
00:19:05,690 --> 00:19:04,380
booster will send HP Skyward out over

473
00:19:07,549 --> 00:19:05,700
the Atlantic for about two and a half

474
00:19:09,110 --> 00:19:07,559
minutes and will return back to the

475
00:19:10,610 --> 00:19:09,120
Drone ship just read the instructions

476
00:19:13,130 --> 00:19:10,620
about nine and a half minutes after

477
00:19:14,990 --> 00:19:13,140
liftoff and for the Drone ships to give

478
00:19:17,450 --> 00:19:15,000
some perspective they are quite large

479
00:19:19,909 --> 00:19:17,460
each are the size of a football field

480
00:19:21,409 --> 00:19:19,919
and that does it for here for us here at

481
00:19:23,750 --> 00:19:21,419
spacex's headquarters in Hawthorne

482
00:19:25,430 --> 00:19:23,760
California now back to you at Kennedy

483
00:19:27,770 --> 00:19:25,440
Space Center

484
00:19:29,990 --> 00:19:27,780
thanks Andy always great to see you we

485
00:19:32,150 --> 00:19:30,000
are now about 10 minutes from liftoff of

486
00:19:34,310 --> 00:19:32,160
a Falcon 9 rocket with NASA's ixvia

487
00:19:36,470 --> 00:19:34,320
board so let's bring back in Jasmine who

488
00:19:38,570 --> 00:19:36,480

is with our NASA administrator Jasmine

489
00:19:40,610 --> 00:19:38,580
thanks so much Marie yes I am honored to

490
00:19:42,230 --> 00:19:40,620
be joined by our NASA administrator Bill

491
00:19:44,710 --> 00:19:42,240
Nelson thank you so much for being here

492
00:19:48,770 --> 00:19:44,720
oh what a pleasure what a great night

493
00:19:51,350 --> 00:19:48,780
and and it's almost down to the final

494
00:19:53,210 --> 00:19:51,360
minutes yes yes we're really excited to

495
00:19:54,950 --> 00:19:53,220
have you here and Bixby is an exciting

496
00:19:56,150 --> 00:19:54,960
Mission so how is NASA going to benefit

497
00:20:00,830 --> 00:19:56,160
from it

498
00:20:04,130 --> 00:20:00,840
well as we try to explore the Heavens to

499
00:20:06,950 --> 00:20:04,140
understand ultimately who we are why are

500
00:20:08,990 --> 00:20:06,960
we here how did we get here

501
00:20:11,390 --> 00:20:09,000
we go out and we try to understand

502
00:20:14,930 --> 00:20:11,400
things that we don't really understand

503
00:20:19,970 --> 00:20:14,940
yet like black holes

504
00:20:21,950 --> 00:20:19,980
black holes emit x-rays so this

505
00:20:25,549 --> 00:20:21,960
scientific mission

506
00:20:29,649 --> 00:20:25,559
is going to go out and capture those

507
00:20:32,990 --> 00:20:29,659
x-rays to understand giant holes

508
00:20:38,750 --> 00:20:33,000
and neutrons

509
00:20:42,950 --> 00:20:38,760
and when they spin they become pulsars

510
00:20:46,430 --> 00:20:42,960
and so these are phenomenon that emit

511
00:20:48,590 --> 00:20:46,440
X-rays and we can get to other galaxies

512
00:20:52,010 --> 00:20:48,600
and see

513
00:20:53,810 --> 00:20:52,020

how that x-ray is being emitted and try

514
00:20:56,810 --> 00:20:53,820
to understand

515
00:20:58,190 --> 00:20:56,820
what this phenomena is right right we're

516
00:21:00,770 --> 00:20:58,200
hoping to learn a lot of new information

517
00:21:02,570 --> 00:21:00,780
from ixb this mission is also a great

518
00:21:04,490 --> 00:21:02,580
example of both our commercial and our

519
00:21:05,990 --> 00:21:04,500
International partnership so can you

520
00:21:08,210 --> 00:21:06,000
tell me how our partners help us

521
00:21:11,510 --> 00:21:08,220
complete our missions oh they are

522
00:21:14,750 --> 00:21:11,520
absolutely important to us of the

523
00:21:18,710 --> 00:21:14,760
International Space Station has some 30

524
00:21:21,289 --> 00:21:18,720
International Partners In this case the

525
00:21:24,130 --> 00:21:21,299
Italian space agency is a major partner

526
00:21:26,590 --> 00:21:24,140
it was on our last mission called Dart

527
00:21:30,230 --> 00:21:26,600
intercepting an asteroid

528
00:21:32,930 --> 00:21:30,240
uh we have astronauts that are Italian

529
00:21:34,250 --> 00:21:32,940
there's a German astronaut up there on

530
00:21:36,470 --> 00:21:34,260
the space station

531
00:21:40,430 --> 00:21:36,480
the Russians have been our partners

532
00:21:43,010 --> 00:21:40,440
since 1975 so our International partners

533
00:21:49,130 --> 00:21:43,020
are very important right right a lot of

534
00:21:52,130 --> 00:21:50,690
with our partners as

535
00:21:55,909 --> 00:21:52,140
and now we're going to take it back to

536
00:22:00,110 --> 00:21:57,710
thank you Jasmine thanks administrator

537
00:22:01,789 --> 00:22:00,120
we now have only about seven minutes to

538
00:22:03,409 --> 00:22:01,799

go before launch before we see it lift

539
00:22:05,210 --> 00:22:03,419
off right here behind us so let's bring

540
00:22:07,370 --> 00:22:05,220
back Daryl and Mick to walk us through

541
00:22:09,529 --> 00:22:07,380
the final moments of the countdown guys

542
00:22:11,630 --> 00:22:09,539
yeah that's right uh Megan uh things

543
00:22:13,669 --> 00:22:11,640
really getting exciting here as we count

544
00:22:17,090 --> 00:22:13,679
down to the last few minutes before

545
00:22:18,950 --> 00:22:17,100
liftoff from historic launch complex 39a

546
00:22:21,950 --> 00:22:18,960
the first time for a dedicated science

547
00:22:23,870 --> 00:22:21,960
Mission as we look up at ixb contained

548
00:22:25,970 --> 00:22:23,880
inside the Fairing and you know the

549
00:22:28,310 --> 00:22:25,980
booster that's taking it up today Mick

550
00:22:30,110 --> 00:22:28,320
has some history and it's really

551
00:22:32,570 --> 00:22:30,120
interesting all the different missions

552
00:22:35,409 --> 00:22:32,580
it's flown it's flown four prior

553
00:22:41,950 --> 00:22:35,419
missions and there you see them crew one

554
00:22:45,350 --> 00:22:41,960
Crew 2 Sirius xm8 and CRS 23 for in all

555
00:22:47,570 --> 00:22:45,360
and uh it's been reused now for today's

556
00:22:50,149 --> 00:22:47,580
flight with XP yes we heard from Andy

557
00:22:52,010 --> 00:22:50,159
Tran earlier this booster 1061 first

558
00:22:53,630 --> 00:22:52,020
stage uh this will be the fifth flight

559
00:22:56,450 --> 00:22:53,640
for ixby and Daryl as you mentioned

560
00:22:59,570 --> 00:22:56,460
those those flights before were historic

561
00:23:02,690 --> 00:22:59,580
off of 39a here three of them anyway and

562
00:23:05,390 --> 00:23:02,700
of those three crew one two and crs-23

563
00:23:06,710 --> 00:23:05,400

LSP launch Services Program was very

564
00:23:08,450 --> 00:23:06,720
happy to partner with the commercial

565
00:23:10,909 --> 00:23:08,460
crew program RAM and the commercial

566
00:23:12,350 --> 00:23:10,919
resupply program to provide advisory

567
00:23:14,270 --> 00:23:12,360
services so we're very familiar with

568
00:23:16,250 --> 00:23:14,280
this booster very happy to be flying

569
00:23:18,230 --> 00:23:16,260
this for XP it's our second time flying

570
00:23:20,149 --> 00:23:18,240
a previously flown booster you and I

571
00:23:22,490 --> 00:23:20,159
just got to witness our first time on

572
00:23:24,770 --> 00:23:22,500
dart on the west coast but today we're

573
00:23:26,450 --> 00:23:24,780
here for XP with this booster did you

574
00:23:28,070 --> 00:23:26,460
notice something about all those shots

575
00:23:31,070 --> 00:23:28,080
and this particular flight tonight

576
00:23:33,350 --> 00:23:31,080
they're all in the evening oh that's

577
00:23:37,930 --> 00:23:33,360
correct or early morning this is a night

578
00:23:45,230 --> 00:23:41,029
all right there we heard a milestone of

579
00:23:47,510 --> 00:23:45,240
uh rp1 load complete yeah on stage one

580
00:23:49,669 --> 00:23:47,520
we heard earlier stage two was completed

581
00:23:51,649 --> 00:23:49,679
so that rocket propellant one is now

582
00:23:54,049 --> 00:23:51,659
loaded into the second stage and first

583
00:23:56,510 --> 00:23:54,059
stage tanks that's a great thing to hear

584
00:24:00,769 --> 00:23:56,520
as the team continues to load that super

585
00:24:02,870 --> 00:24:00,779
chill densified liquid oxygen into the

586
00:24:05,570 --> 00:24:02,880
first stage and second stage and we will

587
00:24:08,269 --> 00:24:05,580
continue that uh for quite a while right

588
00:24:10,490 --> 00:24:08,279

down to the final minutes here Daryl as

589
00:24:12,649 --> 00:24:10,500
they top off those tanks to get as much

590
00:24:14,990 --> 00:24:12,659
propellant in there that they can for

591
00:24:17,450 --> 00:24:15,000
the ascent of XP on its Mission but also

592
00:24:19,610 --> 00:24:17,460
to bring this booster back a fifth time

593
00:24:21,830 --> 00:24:19,620
that's right this booster landing on the

594
00:24:24,169 --> 00:24:21,840
Drone ship just read the instructions

595
00:24:26,750 --> 00:24:24,179
which got out into the middle of the

596
00:24:30,350 --> 00:24:26,760
Atlantic Ocean at its holding position

597
00:24:32,570 --> 00:24:30,360
at 10 A.M this morning Eastern time we

598
00:24:35,930 --> 00:24:32,580
are counting down five minutes and 20

599
00:24:39,890 --> 00:24:35,940
seconds until liftoff of ixby on a

600
00:24:42,230 --> 00:24:39,900
falcon 9 rocket at 1am Eastern time here

601
00:24:44,029 --> 00:24:42,240
at the Kennedy Space Center and we're

602
00:24:46,190 --> 00:24:44,039
also counting down to another big

603
00:24:48,409 --> 00:24:46,200
milestone at five minutes when that

604
00:25:06,169 --> 00:24:48,419
spacecraft goes on internal power let's

605
00:25:11,930 --> 00:25:08,769
so Daryl we just heard the spacecraft

606
00:25:13,730 --> 00:25:11,940
SMD over on the nlm net report out to

607
00:25:15,409 --> 00:25:13,740
NASA's launch manager Tim Dunn that the

608
00:25:17,330 --> 00:25:15,419
spacecraft is on eternal power they are

609
00:25:19,250 --> 00:25:17,340
ready for launch this morning that's a

610
00:25:22,250 --> 00:25:19,260
big milestone to make sure that XP is

611
00:25:24,110 --> 00:25:22,260
prepared and ready to get going at 1am

612
00:25:26,630 --> 00:25:24,120
this morning for liftoff that's right we

613
00:25:28,909 --> 00:25:26,640

didn't hear it on the public net that

614
00:25:31,010 --> 00:25:28,919
was something that we heard on the

615
00:25:33,289 --> 00:25:31,020
communications between the launch teams

616
00:25:35,930 --> 00:25:33,299
now we're looking for that strong back

617
00:25:38,029 --> 00:25:35,940
the structure that brought the rocket

618
00:25:40,370 --> 00:25:38,039
out and put it vertical on the pad from

619
00:25:42,110 --> 00:25:40,380
a horizontal position to lean back a

620
00:25:44,269 --> 00:25:42,120
little bit we're also seeing some

621
00:25:46,370 --> 00:25:44,279
venting look at the top towards the top

622
00:25:48,649 --> 00:25:46,380
of that rocket you can see some of the

623
00:25:50,930 --> 00:25:48,659
pressure from that super cool liquid

624
00:25:52,970 --> 00:25:50,940
oxygen starting to boil when it gets

625
00:25:55,070 --> 00:25:52,980
into that warm atmosphere of the rocket

626
00:25:56,390 --> 00:25:55,080
and also venting it off since we're

627
00:25:58,130 --> 00:25:56,400
pretty close to fueling this thing all

628
00:25:59,930 --> 00:25:58,140
the way yeah as we get the propellant

629
00:26:02,930 --> 00:25:59,940
tanks loaded and we get near the top of

630
00:26:05,750 --> 00:26:02,940
those as you said that that super cooled

631
00:26:08,390 --> 00:26:05,760
locks at minus 340 degrees starts to

632
00:26:09,590 --> 00:26:08,400
boil off or warm up very quickly and we

633
00:26:11,390 --> 00:26:09,600
have to relieve some of that pressure

634
00:26:13,070 --> 00:26:11,400
from the tanks and that's what you see

635
00:26:14,750 --> 00:26:13,080
that venting as you mentioned and so

636
00:26:16,789 --> 00:26:14,760
that will continue on right up to the

637
00:26:18,710 --> 00:26:16,799
final minutes before we lift off this

638
00:26:20,750 --> 00:26:18,720

morning and the team will then close off

639
00:26:23,330 --> 00:26:20,760
those vent Valves and bring the tanks up

640
00:26:26,269 --> 00:26:23,340
to flight pressures getting ready to

641
00:26:28,490 --> 00:26:26,279
light the nine Merlin engines we just

642
00:26:31,970 --> 00:26:28,500
heard the SpaceX chief engineer poll

643
00:26:33,350 --> 00:26:31,980
they gave the go for launch at T minus

644
00:26:34,610 --> 00:26:33,360
four minutes that was just a few seconds

645
00:26:36,769 --> 00:26:34,620
ago

646
00:26:38,570 --> 00:26:36,779
yeah the team continues to work Daryl

647
00:26:40,190 --> 00:26:38,580
we're down there in the in the final

648
00:26:41,870 --> 00:26:40,200
minutes to making sure that propellant

649
00:26:44,390 --> 00:26:41,880
loading is finalized the flight

650
00:26:46,450 --> 00:26:44,400
termination system is armed and ready to

651
00:26:49,010 --> 00:26:46,460
go uh

652
00:26:50,570 --> 00:26:49,020
and there we just heard stage one Lock's

653
00:26:52,970 --> 00:26:50,580
load is complete that's a another

654
00:26:54,769 --> 00:26:52,980
Milestone to get that tank to its full

655
00:26:58,190 --> 00:26:54,779
potential they'll continue to top that

656
00:27:01,130 --> 00:26:58,200
off as they continue to load uh stage

657
00:27:04,370 --> 00:27:01,140
two and once we get to a stage two load

658
00:27:06,350 --> 00:27:04,380
complete here in about 50 seconds uh

659
00:27:09,350 --> 00:27:06,360
stage one and two will continue topping

660
00:27:10,970 --> 00:27:09,360
and then we will shut those vent valves

661
00:27:13,190 --> 00:27:10,980
and bring the pressure up in the tanks

662
00:27:14,510 --> 00:27:13,200
getting ready again to bring as I said

663
00:27:17,870 --> 00:27:14,520

earlier to bring those nine Merlin

664
00:27:20,090 --> 00:27:17,880
engines up uh to to speed and get ready

665
00:27:21,730 --> 00:27:20,100
to lift Falcon 9 and XP off the pad and

666
00:27:24,710 --> 00:27:21,740
there you can see at the white

667
00:27:28,070 --> 00:27:24,720
condensation clouds from the icy cold

668
00:27:30,169 --> 00:27:28,080
rocket and that super chilled minus 400

669
00:27:31,850 --> 00:27:30,179
something degrees I I would say the

670
00:27:34,010 --> 00:27:31,860
engineer knows the exact number the

671
00:27:36,889 --> 00:27:34,020
super chilled locks is around they super

672
00:27:39,110 --> 00:27:36,899
chill it down to my minus 340 degrees F

673
00:27:53,570 --> 00:27:39,120
that's right it's super cold it's super

674
00:27:57,470 --> 00:27:55,970
stage two lock float is complete that's

675
00:27:59,750 --> 00:27:57,480
the call we were looking for there Daryl

676
00:28:01,909 --> 00:27:59,760
stage two locks load complete so stage

677
00:28:05,690 --> 00:28:01,919
one and two now have uh full tanks of

678
00:28:06,950 --> 00:28:05,700
liquid oxygen on board and rp1 uh rocket

679
00:28:10,190 --> 00:28:06,960
propellant one

680
00:28:13,370 --> 00:28:10,200
and the team will continue to top those

681
00:28:15,169 --> 00:28:13,380
off and get ready for liftoff here in

682
00:28:18,169 --> 00:28:15,179
about a minute and 40 seconds and since

683
00:28:19,909 --> 00:28:18,179
we are in a nighttime launch look

684
00:28:21,590 --> 00:28:19,919
towards the base of the rocket right

685
00:28:25,789 --> 00:28:21,600
around two seconds you'll see a green

686
00:28:29,210 --> 00:28:25,799
flash that's a mixture of hypergolic or

687
00:28:31,430 --> 00:28:29,220
ignition uh with some chemicals that

688
00:28:33,049 --> 00:28:31,440

basically help fire the rocket up yeah

689
00:28:34,909 --> 00:28:33,059
we have some gas generators that start

690
00:28:37,310 --> 00:28:34,919
the engines up to help basically provide

691
00:28:38,810 --> 00:28:37,320
that ignition you know uh talking about

692
00:28:40,970 --> 00:28:38,820
your little science right there it's

693
00:28:43,909 --> 00:28:40,980
it's basically a fire triangle right we

694
00:28:46,310 --> 00:28:43,919
have rp1 as a fuel liquid oxygen as an

695
00:28:48,289 --> 00:28:46,320
oxidizer we just need to provide a spark

696
00:28:51,409 --> 00:28:48,299
to get the engines going and that's what

697
00:28:53,570 --> 00:28:51,419
you'll see there just prior to liftoff

698
00:28:55,669 --> 00:28:53,580
T minus one minute and Counting

699
00:28:57,529 --> 00:28:55,679
falconism startup

700
00:29:00,529 --> 00:28:57,539
and now you heard the startup which

701
00:29:03,230 --> 00:29:00,539
means the computers on board Falcon 9

702
00:29:05,029 --> 00:29:03,240
are now in control of terminal count

703
00:29:07,430 --> 00:29:05,039
that's correct Daryl and we should be

704
00:29:09,889 --> 00:29:07,440
hearing the final go here uh from the

705
00:29:11,630 --> 00:29:09,899
team maybe go for XP launch and there we

706
00:29:14,210 --> 00:29:11,640
just heard lunch director giving the go

707
00:29:17,330 --> 00:29:14,220
for the XP launch so things are

708
00:29:19,730 --> 00:29:17,340
beginning to ramp up here and as we will

709
00:29:22,490 --> 00:29:19,740
see that the vent valves get closed the

710
00:29:32,990 --> 00:29:22,500
team is ready to go and ixb will be on

711
00:29:39,470 --> 00:29:35,510
T minus 20 seconds and counting until

712
00:29:46,190 --> 00:29:42,830
okay and here we go

713
00:29:52,310 --> 00:29:46,200

10. nine eight

714
00:29:54,110 --> 00:29:52,320
seven six five four three two one

715
00:29:57,950 --> 00:29:54,120
ignition

716
00:30:01,370 --> 00:29:57,960
and liftoff lift off of Falcon 9 and

717
00:30:05,230 --> 00:30:01,380
ixby a new set of X-ray eyes to view the

718
00:30:09,610 --> 00:30:07,190
[Music]

719
00:30:11,630 --> 00:30:09,620
hear the garage speakers

720
00:30:13,430 --> 00:30:11,640
cleared off and we're hearing nominal

721
00:30:15,049 --> 00:30:13,440
chamber pressures on all nine Merlin

722
00:30:17,990 --> 00:30:15,059
engines

723
00:30:28,190 --> 00:30:18,000
beautiful shot there showing the VAB and

724
00:30:37,909 --> 00:30:31,549
I was switching down range

725
00:30:37,919 --> 00:30:41,570
power and Telemetry nominal

726
00:30:44,510 --> 00:30:42,830
because we're seeing that everything is

727
00:30:46,250 --> 00:30:44,520
performing almost so far on a falcon 9

728
00:30:47,930 --> 00:30:46,260
zero and some beautiful liftoff this

729
00:30:50,029 --> 00:30:47,940
morning is you and I get to now

730
00:30:53,330 --> 00:30:50,039
experience that Rumble from the Falcon 9

731
00:30:55,850 --> 00:30:53,340
here at the mission director Center

732
00:30:56,990 --> 00:30:55,860
things continue to perform

733
00:30:59,149 --> 00:30:57,000
well

734
00:31:02,630 --> 00:31:00,769
we hear that the vehicle is Supersonic

735
00:31:05,750 --> 00:31:02,640
in our next Milestone we're looking in

736
00:31:06,669 --> 00:31:05,760
to get through Max Q our maximum Dynamic

737
00:31:10,250 --> 00:31:06,679
pressure

738
00:31:13,310 --> 00:31:10,260

back just a little bit has that Max Q

739
00:31:21,950 --> 00:31:13,320
Milestone passes beautiful shot right

740
00:31:25,970 --> 00:31:23,570
almost made it through Max q and that's

741
00:31:28,610 --> 00:31:25,980
great to hear that's the point of

742
00:31:31,789 --> 00:31:28,620
Maximum stress on the vehicle Daryl and

743
00:31:35,090 --> 00:31:31,799
the Falcon 9 is performing well so we

744
00:31:37,669 --> 00:31:35,100
see that onboard camera in the exhaust

745
00:31:40,669 --> 00:31:37,679
and Flames from the Merlin nine Merlin

746
00:31:43,490 --> 00:31:40,679
engines on board AC continues downrange

747
00:31:46,250 --> 00:31:43,500
successfully anomaly so far a stage one

748
00:31:48,529 --> 00:31:46,260
trajectory is looking good they're

749
00:31:51,649 --> 00:31:48,539
starting to chill now the second stage

750
00:31:54,049 --> 00:31:51,659
engine get it ready to ignite everything

751
00:31:56,509 --> 00:31:54,059
flying on track we are two minutes into

752
00:32:03,350 --> 00:31:56,519
flight you see those nine Merlin D

753
00:32:07,730 --> 00:32:05,810
and in just about 20 seconds those

754
00:32:17,810 --> 00:32:07,740
engines will cut off and Rapid

755
00:32:22,130 --> 00:32:19,909
you can see the progress bar across the

756
00:32:24,409 --> 00:32:22,140
bottom of your screen there's a shot

757
00:32:28,549 --> 00:32:24,419
from inside

758
00:32:33,649 --> 00:32:31,190
first stage engine cutoff

759
00:32:35,870 --> 00:32:33,659
stage separation confirmed

760
00:32:37,789 --> 00:32:35,880
and there we have main engine cut off

761
00:32:41,870 --> 00:32:37,799
and you just saw that the stage one two

762
00:32:44,269 --> 00:32:41,880
sep on the video is a station to impact

763
00:32:46,490 --> 00:32:44,279

the engine gets ready for ignition and

764
00:32:47,630 --> 00:32:46,500
we see that we have ignition on the mvac

765
00:32:49,430 --> 00:32:47,640
D

766
00:32:52,909 --> 00:32:49,440
it's a great sign to see that engine

767
00:32:58,250 --> 00:32:52,919
glowing red hot as the first of two

768
00:33:02,870 --> 00:33:00,529
the rocket falling back to Earth the

769
00:33:05,389 --> 00:33:02,880
first stage of the rocket

770
00:33:09,470 --> 00:33:05,399
we hope to get a shot of it as it

771
00:33:11,750 --> 00:33:09,480
deploys its grid fins and prepares

772
00:33:13,669 --> 00:33:11,760
for its Landing that is on the left side

773
00:33:17,029 --> 00:33:13,679
of your screen on the right side of your

774
00:33:19,009 --> 00:33:17,039
screen is the second stage it's dark out

775
00:33:20,990 --> 00:33:19,019
so of course not going to see a whole

776
00:33:24,350 --> 00:33:21,000
lot but you will see that left side

777
00:33:26,990 --> 00:33:24,360
light up when we have that entry burn as

778
00:33:28,970 --> 00:33:27,000
the rocket booster falls back through

779
00:33:29,990 --> 00:33:28,980
Earth's atmosphere and they slow it down

780
00:33:31,730 --> 00:33:30,000
a little bit

781
00:33:34,070 --> 00:33:31,740
that we should hear fearing jettison

782
00:33:35,690 --> 00:33:34,080
here shortly which separation confirmed

783
00:33:37,850 --> 00:33:35,700
there we have fearing separation

784
00:33:41,210 --> 00:33:37,860
confirmed and we watch this and we see

785
00:33:43,549 --> 00:33:41,220
that on the video here and that now

786
00:33:46,070 --> 00:33:43,559
exposes XP to the environments of space

787
00:33:47,870 --> 00:33:46,080
it was protected by that fairing on

788
00:33:49,130 --> 00:33:47,880

Ascent for Aero Heating and loading and

789
00:33:52,310 --> 00:33:49,140
things are going well

790
00:33:54,289 --> 00:33:52,320
flight looks nominal so far

791
00:33:57,070 --> 00:33:54,299
in fact D is performing very well

792
00:34:00,350 --> 00:33:57,080
chamber pressures look good and

793
00:34:02,090 --> 00:34:00,360
continues on its course

794
00:34:05,590 --> 00:34:02,100
four minutes into flight everything

795
00:34:11,030 --> 00:34:08,210
190 000 pounds of thrust from that

796
00:34:14,750 --> 00:34:11,040
engine right there

797
00:34:22,629 --> 00:34:14,760
I call that the mvac engine

798
00:34:22,639 --> 00:34:32,089
four minutes and 30 seconds into flight

799
00:34:47,990 --> 00:34:34,069
they have a couple of different angles

800
00:34:52,129 --> 00:34:50,270
I could say Daryl as we look at this and

801
00:34:54,530 --> 00:34:52,139
we continue to watch the data and things

802
00:34:56,149 --> 00:34:54,540
perform anomaly I'm just feeling really

803
00:34:58,310 --> 00:34:56,159
excited about how second stage is

804
00:35:00,230 --> 00:34:58,320
performing I mean we had an on-time lift

805
00:35:02,150 --> 00:35:00,240
off this morning at 1am with the stage

806
00:35:04,310 --> 00:35:02,160
one and stage one continues to fall back

807
00:35:07,310 --> 00:35:04,320
to Earth we should be seeing that entry

808
00:35:09,650 --> 00:35:07,320
burn uh in you know about two two

809
00:35:12,650 --> 00:35:09,660
minutes to start the recovery of the

810
00:35:14,750 --> 00:35:12,660
first stage but stage two and this mvac

811
00:35:17,930 --> 00:35:14,760
D engine is performing extremely well

812
00:35:20,150 --> 00:35:17,940
right now and putting XP on this path

813
00:35:22,190 --> 00:35:20,160

this that circular orbit that we talked

814
00:35:24,589 --> 00:35:22,200
to to get started before we have that

815
00:35:27,109 --> 00:35:24,599
second burn so things continue to look

816
00:35:29,270 --> 00:35:27,119
good on this Mission trajectory

817
00:35:31,609 --> 00:35:29,280
there's the call out that everything is

818
00:35:35,690 --> 00:35:31,619
looking as you said great with stage two

819
00:35:42,589 --> 00:35:35,700
this the 130th launch of a Falcon 9

820
00:35:48,829 --> 00:35:45,410
first launch also from Kennedy Space

821
00:35:50,690 --> 00:35:48,839
Center's launch complex 39a yeah for

822
00:35:52,250 --> 00:35:50,700
launch Services Program as we stated

823
00:35:54,470 --> 00:35:52,260
earlier it's the first dedicated

824
00:35:56,270 --> 00:35:54,480
scientific mission for us we we are so

825
00:35:59,150 --> 00:35:56,280
excited to be launching from that

826
00:36:01,849 --> 00:35:59,160
historic pad uh with a falcon 9 where

827
00:36:04,550 --> 00:36:01,859
astronauts have launched from during

828
00:36:06,230 --> 00:36:04,560
Apollo and shuttle and now we get to

829
00:36:08,990 --> 00:36:06,240
launch one of launch sources programs

830
00:36:11,569 --> 00:36:09,000
science missions stage one FPS from

831
00:36:13,670 --> 00:36:11,579
there and everything looks great we

832
00:36:16,910 --> 00:36:13,680
heard that stage one FTS is safe that's

833
00:36:18,650 --> 00:36:16,920
a good uh sign Andrew burn startup

834
00:36:20,150 --> 00:36:18,660
and we're seeing the startup of the

835
00:36:22,190 --> 00:36:20,160
stage one entry burn you can see there

836
00:36:25,010 --> 00:36:22,200
on your left side of your screen the

837
00:36:26,750 --> 00:36:25,020
three engines that have started up to

838
00:36:28,790 --> 00:36:26,760

slow that first stage down as it

839
00:36:31,550 --> 00:36:28,800
re-enters the atmosphere along with the

840
00:36:34,130 --> 00:36:31,560
grid fins as it continues to keep the

841
00:36:36,230 --> 00:36:34,140
booster on track and steer

842
00:36:39,109 --> 00:36:36,240
and as that booster Falls this engine

843
00:36:42,349 --> 00:36:39,119
burned roughly 30 seconds long just

844
00:36:43,790 --> 00:36:42,359
basically slowing it down as it goes on

845
00:36:46,250 --> 00:36:43,800
Entry Baron shutdown

846
00:36:48,650 --> 00:36:46,260
and the stage one entry burn there is an

847
00:36:51,770 --> 00:36:48,660
out now finished looking now to stage

848
00:36:53,690 --> 00:36:51,780
two this one will cut off in about 60

849
00:36:55,849 --> 00:36:53,700
seconds

850
00:36:57,170 --> 00:36:55,859
that will complete stage two on nominal

851
00:37:06,230 --> 00:36:57,180
trajectory

852
00:37:10,970 --> 00:37:08,089
look across the bottom of your screen

853
00:37:13,490 --> 00:37:10,980
you can see engine cut off one that's

854
00:37:16,010 --> 00:37:13,500
our next Milestone look to the clock in

855
00:37:17,510 --> 00:37:16,020
the upper left hand corner 40 seconds

856
00:37:27,170 --> 00:37:17,520
from now

857
00:37:32,150 --> 00:37:30,290
we're here FTS is safe we hear from the

858
00:37:33,430 --> 00:37:32,160
team continue to look at the data Daryl

859
00:37:36,650 --> 00:37:33,440
this is

860
00:37:38,210 --> 00:37:36,660
uh still nominal and looking good stage

861
00:37:40,790 --> 00:37:38,220
two is performing very well and chamber

862
00:37:47,410 --> 00:37:40,800
pressures remain uh in within family and

863
00:37:52,550 --> 00:37:50,030

and just seconds away now from the

864
00:37:54,589 --> 00:37:52,560
cutoff of that second stage engine that

865
00:37:57,290 --> 00:37:54,599
you're watching there Burning Brightly

866
00:38:01,849 --> 00:37:57,300
carrying ixby through space into its

867
00:38:08,030 --> 00:38:04,490
stage one Landing burn

868
00:38:11,630 --> 00:38:09,650
so there we can see that the stage one

869
00:38:13,490 --> 00:38:11,640
Landing burn has started to get the

870
00:38:15,470 --> 00:38:13,500
first stage landing on just read the

871
00:38:20,690 --> 00:38:15,480
instructions and we also heard the call

872
00:38:22,609 --> 00:38:20,700
that Seco one has happened second stage

873
00:38:24,230 --> 00:38:22,619
Landing leagues have deployed and we can

874
00:38:26,569 --> 00:38:24,240
see the first stage coming down on the

875
00:38:28,609 --> 00:38:26,579
Drone ship there a little pixelated but

876
00:38:31,910 --> 00:38:28,619
that is the image from the Drone ship

877
00:38:34,069 --> 00:38:31,920
live pictures coming from spacex's just

878
00:38:35,690 --> 00:38:34,079
read the instructions and there you see

879
00:38:37,609 --> 00:38:35,700
it looks like the rocket made a great

880
00:38:38,990 --> 00:38:37,619
touchdown absolutely we just heard from

881
00:38:41,870 --> 00:38:39,000
the team they're confirming that stage

882
00:38:43,310 --> 00:38:41,880
one is down safely and that's exciting

883
00:38:45,230 --> 00:38:43,320
to be able to bring that booster back

884
00:38:47,510 --> 00:38:45,240
for a fifth time uh we'll look forward

885
00:38:49,609 --> 00:38:47,520
to see where that booster 1061 shows up

886
00:38:52,069 --> 00:38:49,619
for its next mission it did well today

887
00:38:54,530 --> 00:38:52,079
on the first stage burn getting second

888
00:38:56,990 --> 00:38:54,540

stage on its way second stage uh picked

889
00:38:59,870 --> 00:38:57,000
up but as we said nominal trajectory and

890
00:39:01,250 --> 00:38:59,880
continued to burn we are now in a coast

891
00:39:04,130 --> 00:39:01,260
phase Daryl that you had mentioned

892
00:39:07,250 --> 00:39:04,140
earlier as we head towards that uh

893
00:39:09,950 --> 00:39:07,260
western coast of Africa to get ready for

894
00:39:11,569 --> 00:39:09,960
second stage engine burn number two and

895
00:39:14,810 --> 00:39:11,579
here you see the ground tracker that

896
00:39:18,349 --> 00:39:14,820
we've completed so far and as you

897
00:39:21,230 --> 00:39:18,359
mentioned all along uh the path today

898
00:39:23,089 --> 00:39:21,240
everything looking great from launch uh

899
00:39:25,970 --> 00:39:23,099
to separation the booster coming back

900
00:39:29,630 --> 00:39:25,980
down and now in that Coast phase you can

901
00:39:32,329 --> 00:39:29,640
see there the engine Bell is now back to

902
00:39:34,970 --> 00:39:32,339
ice cold so it's not firing and that

903
00:39:36,770 --> 00:39:34,980
right there is XP the camera pointed you

904
00:39:39,950 --> 00:39:36,780
can see it's three telescopes through

905
00:39:42,530 --> 00:39:39,960
those three Curves in the front XP is in

906
00:39:44,569 --> 00:39:42,540
space and we are tracking it as it

907
00:39:45,950 --> 00:39:44,579
coasts and as it does so we're going to

908
00:39:47,870 --> 00:39:45,960
tell you a little bit more about the

909
00:39:51,710 --> 00:39:47,880
science and for that let's throw it back

910
00:39:55,250 --> 00:39:53,690
all right thank you Daryl and Mick if

911
00:39:57,770 --> 00:39:55,260
you're just joining us you are watching

912
00:40:01,310 --> 00:39:57,780
NASA's official live launch coverage of

913
00:40:03,349 --> 00:40:01,320

ixby NASA's new x-ray Observatory it

914
00:40:05,210 --> 00:40:03,359
launched about 10 minutes ago right

915
00:40:08,270 --> 00:40:05,220
behind us we had a beautiful view here

916
00:40:10,309 --> 00:40:08,280
Megan yeah wow uh just spectacular uh

917
00:40:12,109 --> 00:40:10,319
Board of Falcon 9 rocket right at the

918
00:40:13,849 --> 00:40:12,119
top of the window yeah beautiful views

919
00:40:15,710 --> 00:40:13,859
honestly it was the sound I was like

920
00:40:17,210 --> 00:40:15,720
whoa it really made like our whole host

921
00:40:19,550 --> 00:40:17,220
desk here shake it was really really

922
00:40:21,290 --> 00:40:19,560
cool to see it from out here now XP will

923
00:40:23,030 --> 00:40:21,300
spend the next two years visiting at

924
00:40:25,370 --> 00:40:23,040
least 40 celestial objects in our

925
00:40:27,710 --> 00:40:25,380
universe like black holes and exploded

926
00:40:30,470 --> 00:40:27,720
stars to unlock some of the secrets of

927
00:40:34,069 --> 00:40:32,210
and let's bring back NASA's Jasmine

928
00:40:35,630 --> 00:40:34,079
Hopkins now she got to watch the launch

929
00:40:37,370 --> 00:40:35,640
with the associate administrator for

930
00:40:40,130 --> 00:40:37,380
NASA's science Mission directorate

931
00:40:42,230 --> 00:40:40,140
Jasmine thanks so much Megan what a

932
00:40:44,030 --> 00:40:42,240
beautiful launch and now I'm joined by

933
00:40:47,450 --> 00:40:44,040
Dr Thomas cerbukin what'd you think of

934
00:40:49,069 --> 00:40:47,460
that oh it's it never gets old I loved

935
00:40:50,990 --> 00:40:49,079
it right right it really doesn't ever

936
00:40:52,790 --> 00:40:51,000
get old we love seeing it over and over

937
00:40:54,710 --> 00:40:52,800
again so now that Bixby is soaring high

938
00:40:56,390 --> 00:40:54,720

above us let's talk science what are we

939
00:40:59,270 --> 00:40:56,400
hoping to learn from this astrophysics

940
00:41:00,829 --> 00:40:59,280
Mission you know it's really rare that

941
00:41:02,690 --> 00:41:00,839
we can build a mission in which we look

942
00:41:05,450 --> 00:41:02,700
at the universe in an entirely new way

943
00:41:08,270 --> 00:41:05,460
and by doing that we're going to learn

944
00:41:11,089 --> 00:41:08,280
about the most amazing objects of the

945
00:41:13,790 --> 00:41:11,099
universe like black holes these pulsars

946
00:41:15,890 --> 00:41:13,800
and exploding Stars really high

947
00:41:17,329 --> 00:41:15,900
energetic violent parts of the universe

948
00:41:19,309 --> 00:41:17,339
we're going to learn about in a way

949
00:41:20,329 --> 00:41:19,319
we've never had before right when we're

950
00:41:23,450 --> 00:41:20,339
really excited about this new purse

951
00:41:25,730 --> 00:41:23,460
perspective Ipsy was chosen back in 2017

952
00:41:26,630 --> 00:41:25,740
as a small Explorer Mission but by what

953
00:41:28,190 --> 00:41:26,640
you're saying I mean there's nothing

954
00:41:29,990 --> 00:41:28,200
small about the science we're doing here

955
00:41:33,290 --> 00:41:30,000
so what does that classification small

956
00:41:35,450 --> 00:41:33,300
Explorer mean we have multiple Missions

957
00:41:38,030 --> 00:41:35,460
at different sizes of course we have

958
00:41:39,609 --> 00:41:38,040
large strategic scale missions and the

959
00:41:42,230 --> 00:41:39,619
small explorers are around

960
00:41:44,809 --> 00:41:42,240
150 million dollars so it really talks

961
00:41:46,309 --> 00:41:44,819
about the cost of the mission overall

962
00:41:48,109 --> 00:41:46,319
and that's what a small Explorer is

963
00:41:50,690 --> 00:41:48,119

about very successful missions right

964
00:41:53,690 --> 00:41:50,700
some of the most amazing missions uh

965
00:41:55,309 --> 00:41:53,700
frankly that we know about con are small

966
00:41:57,349 --> 00:41:55,319
explorers initially right right we're

967
00:41:59,210 --> 00:41:57,359
really looking forward to the success of

968
00:42:00,589 --> 00:41:59,220
XP and this has been a big year for the

969
00:42:03,050 --> 00:42:00,599
science Mission directorate you know

970
00:42:05,030 --> 00:42:03,060
with Earth Science and asteroid research

971
00:42:06,230 --> 00:42:05,040
and James Webb is right around the

972
00:42:08,089 --> 00:42:06,240
corner so what do you think about that

973
00:42:10,970 --> 00:42:08,099
well I think we have had two course

974
00:42:12,829 --> 00:42:10,980
dinner here that's the appetizer the

975
00:42:15,410 --> 00:42:12,839
main dish is coming in two weeks we're

976
00:42:17,990 --> 00:42:15,420
gonna launch the web Space Telescope it

977
00:42:19,670 --> 00:42:18,000
has been 20 years in the making and uh

978
00:42:22,670 --> 00:42:19,680
we couldn't be more excited you know at

979
00:42:24,650 --> 00:42:22,680
ginormous a telescope much much bigger

980
00:42:28,069 --> 00:42:24,660
the area once it's deployed the area of

981
00:42:30,530 --> 00:42:28,079
tennis court and in size six and a half

982
00:42:33,050 --> 00:42:30,540
meters of mirror right just it's an

983
00:42:35,270 --> 00:42:33,060
incredible telescope a strategic scale

984
00:42:37,250 --> 00:42:35,280
Mission yeah absolutely very excited uh

985
00:42:39,349 --> 00:42:37,260
for James Webb coming right up and can

986
00:42:40,849 --> 00:42:39,359
you tell me what sets XP apart from

987
00:42:41,630 --> 00:42:40,859
other astrophysics missions that we've

988
00:42:44,150 --> 00:42:41,640

done

989
00:42:47,750 --> 00:42:44,160
well it's it's Unique perspective it's

990
00:42:49,910 --> 00:42:47,760
very targeted towards uh x-ray the X-ray

991
00:42:51,890 --> 00:42:49,920
sky and very targeted with that new

992
00:42:54,170 --> 00:42:51,900
methodology to look at the sky in a new

993
00:42:56,329 --> 00:42:54,180
way so XP is different from that

994
00:42:58,790 --> 00:42:56,339
perspective but it will you know when

995
00:43:00,950 --> 00:42:58,800
you look at any object in in this in the

996
00:43:02,630 --> 00:43:00,960
sky look at black holes we know that

997
00:43:05,390 --> 00:43:02,640
black holes are the center of galaxies

998
00:43:07,730 --> 00:43:05,400
so often we look uh you you know the

999
00:43:09,589 --> 00:43:07,740
images of the Hubble Space Telescope of

1000
00:43:11,690 --> 00:43:09,599
some of these galaxies so if you really

1001
00:43:13,430 --> 00:43:11,700
want to understand a given object you

1002
00:43:15,290 --> 00:43:13,440
need to look in many different ways XP

1003
00:43:17,569 --> 00:43:15,300
will be very complementary very

1004
00:43:20,150 --> 00:43:17,579
important view to add to the other views

1005
00:43:21,530 --> 00:43:20,160
exactly so XP is encouraging us to keep

1006
00:43:23,329 --> 00:43:21,540
looking up thank you so much for being

1007
00:43:26,930 --> 00:43:23,339
here Dr zerbugen and now we're going to

1008
00:43:31,010 --> 00:43:29,210
all right thank you so much Jasmine uh

1009
00:43:33,530 --> 00:43:31,020
joining us now we have the privilege of

1010
00:43:36,109 --> 00:43:33,540
having Dr Sarah lipsey uh with ball

1011
00:43:39,349 --> 00:43:36,119
Aerospace you're the deputy director for

1012
00:43:41,089 --> 00:43:39,359
uh civil civil space for new business

1013
00:43:42,290 --> 00:43:41,099

excuse me that was a bit of a tongue

1014
00:43:43,490 --> 00:43:42,300
twister for me

1015
00:43:45,829 --> 00:43:43,500
um thanks for being here and

1016
00:43:48,470 --> 00:43:45,839
congratulations to you thank you so much

1017
00:43:49,790 --> 00:43:48,480
we are so proud at ball airspace of the

1018
00:43:53,569 --> 00:43:49,800
launch that just occurred that you all

1019
00:43:55,069 --> 00:43:53,579
watched years in the making uh and my

1020
00:43:56,809 --> 00:43:55,079
goodness that feeling you ladies were

1021
00:43:58,069 --> 00:43:56,819
just talking about when it hits you it

1022
00:44:00,349 --> 00:43:58,079
hits you

1023
00:44:02,510 --> 00:44:00,359
um that was really fun so thank you

1024
00:44:04,730 --> 00:44:02,520
yeah it's really great to see you know

1025
00:44:08,030 --> 00:44:04,740
that you partnered with NASA and the

1026
00:44:09,710 --> 00:44:08,040
Italian space agency to to make XP come

1027
00:44:11,690 --> 00:44:09,720
to life how does it feel seeing it now

1028
00:44:13,430 --> 00:44:11,700
on its way embarking on its two-year

1029
00:44:15,050 --> 00:44:13,440
Mission so excited right the science

1030
00:44:16,670 --> 00:44:15,060
from this mission is just going to

1031
00:44:19,670 --> 00:44:16,680
change textbooks it's going to be

1032
00:44:22,130 --> 00:44:19,680
groundbreaking and we are so proud of

1033
00:44:23,930 --> 00:44:22,140
our Partnerships with NASA with the

1034
00:44:25,790 --> 00:44:23,940
Marshall space flight center of course

1035
00:44:28,069 --> 00:44:25,800
with the Italian Partners we could not

1036
00:44:29,450 --> 00:44:28,079
have done this without them and even

1037
00:44:31,250 --> 00:44:29,460
smaller Partners various Hardware

1038
00:44:33,230 --> 00:44:31,260

Partners our partners at the University

1039
00:44:35,990 --> 00:44:33,240
of Colorado who will bring the data to

1040
00:44:38,030 --> 00:44:36,000
the ground and process it for us too and

1041
00:44:40,550 --> 00:44:38,040
Sarah we have some video that you shared

1042
00:44:42,829 --> 00:44:40,560
with us of uh ball Aerospace when you're

1043
00:44:45,170 --> 00:44:42,839
still in the the testing phase and of

1044
00:44:46,910 --> 00:44:45,180
the Boom in particular on that's really

1045
00:44:48,230 --> 00:44:46,920
impressive when we see it stretch all

1046
00:44:49,849 --> 00:44:48,240
the way up there's some video of it

1047
00:44:51,950 --> 00:44:49,859
there can you kind of talk us through

1048
00:44:54,890 --> 00:44:51,960
what we're looking at here yeah sure so

1049
00:44:57,109 --> 00:44:54,900
to fit in uh the

1050
00:44:59,510 --> 00:44:57,119
um the size casing that this needs to go

1051
00:45:02,450 --> 00:44:59,520
in we had to squish up this four meter

1052
00:45:04,430 --> 00:45:02,460
about 12 feet boom and so it gets

1053
00:45:06,470 --> 00:45:04,440
twisted down in and when you push the

1054
00:45:09,470 --> 00:45:06,480
button the Jack in the Box pops right

1055
00:45:12,050 --> 00:45:09,480
open it turns around three times as it

1056
00:45:14,450 --> 00:45:12,060
extends and so this will happen on orbit

1057
00:45:17,329 --> 00:45:14,460
in about seven days somebody down here

1058
00:45:19,250 --> 00:45:17,339
will push a button and pop it goes and

1059
00:45:21,349 --> 00:45:19,260
extend those telescopes out you can see

1060
00:45:23,329 --> 00:45:21,359
the three identical round telescopes

1061
00:45:25,309 --> 00:45:23,339
they're going up into our clean room

1062
00:45:27,530 --> 00:45:25,319
there in in Boulder Colorado

1063
00:45:29,030 --> 00:45:27,540

um the Boom is is important right

1064
00:45:31,069 --> 00:45:29,040
because the mirrors of the detectors

1065
00:45:33,650 --> 00:45:31,079
have to be a certain amount of feet away

1066
00:45:35,750 --> 00:45:33,660
that's exactly right yeah it's really

1067
00:45:38,030 --> 00:45:35,760
important to have the alignment very

1068
00:45:40,130 --> 00:45:38,040
precise and to have that separation

1069
00:45:42,410 --> 00:45:40,140
between the detectors and the telescope

1070
00:45:44,510 --> 00:45:42,420
so that you get just the right

1071
00:45:47,809 --> 00:45:44,520
um collection of these x-rays that we're

1072
00:45:49,730 --> 00:45:47,819
looking for so now that XP is is safely

1073
00:45:51,650 --> 00:45:49,740
on its way I've still got a little a

1074
00:45:53,089 --> 00:45:51,660
little ways to go before a spacecraft

1075
00:45:55,609 --> 00:45:53,099
separation but what's next for ball

1076
00:45:59,270 --> 00:45:55,619
Aerospace oh we're working on NASA's

1077
00:46:02,230 --> 00:45:59,280
next missions too lots of work to do we

1078
00:46:04,130 --> 00:46:02,240
work in all of NASA's areas so x-ray

1079
00:46:05,930 --> 00:46:04,140
astronomy is just one of the fields

1080
00:46:07,849 --> 00:46:05,940
we're working on other astronomy

1081
00:46:10,010 --> 00:46:07,859
missions earth science heliophysics

1082
00:46:11,390 --> 00:46:10,020
planetary science we've got everything

1083
00:46:13,069 --> 00:46:11,400
covered

1084
00:46:15,109 --> 00:46:13,079
um we'll be watching of course for XP

1085
00:46:17,569 --> 00:46:15,119
over the next month as the mission gets

1086
00:46:20,030 --> 00:46:17,579
commissioned and then starts to turn on

1087
00:46:21,890 --> 00:46:20,040
to cassay our first science Target all

1088
00:46:23,809 --> 00:46:21,900

right Dr Sarah lipsey thank you so much

1089
00:46:26,630 --> 00:46:23,819
for joining us congratulations once

1090
00:46:29,030 --> 00:46:26,640
again we want to send it over to Jasmine

1091
00:46:31,430 --> 00:46:29,040
Hopkins now she is with the principal

1092
00:46:34,490 --> 00:46:31,440
investigator from our Italian partner

1093
00:46:37,190 --> 00:46:34,500
Jasmine thank you so much yes now I am

1094
00:46:39,349 --> 00:46:37,200
joined by Paulo sofita the Italian space

1095
00:46:41,630 --> 00:46:39,359
agency provided the detectors that are

1096
00:46:43,250 --> 00:46:41,640
on ixby and Paulo is joining us from the

1097
00:46:44,750 --> 00:46:43,260
Italian National Institute for

1098
00:46:46,670 --> 00:46:44,760
astrophysics thank you so much for being

1099
00:46:48,349 --> 00:46:46,680
here back to you for inviting me

1100
00:46:51,410 --> 00:46:48,359
absolutely what did you think of launch

1101
00:46:53,930 --> 00:46:51,420
it was great a fantastic really really

1102
00:46:55,490 --> 00:46:53,940
exciting right right very beautiful uh

1103
00:46:57,230 --> 00:46:55,500
can you tell me how did you and your

1104
00:46:59,809 --> 00:46:57,240
team develop bixby's polarization

1105
00:47:01,910 --> 00:46:59,819
detectors actually I started to work on

1106
00:47:06,170 --> 00:47:01,920
x-ray polarimetry back in the late 80s

1107
00:47:08,710 --> 00:47:06,180
with Enrico Costa and we at the first

1108
00:47:11,990 --> 00:47:08,720
worked on the so-called classical

1109
00:47:14,030 --> 00:47:12,000
techniques to measure polarization and

1110
00:47:15,470 --> 00:47:14,040
then we actually understood the

1111
00:47:18,650 --> 00:47:15,480
immediately that we have to change

1112
00:47:20,109 --> 00:47:18,660
technique to arrive to the sensitivity

1113
00:47:23,089 --> 00:47:20,119

needed for

1114
00:47:26,210 --> 00:47:23,099
astrophysical sources so we went to

1115
00:47:28,370 --> 00:47:26,220
visit Ronaldo belazine in Pisa and that

1116
00:47:31,490 --> 00:47:28,380
was the of the infan and that was the

1117
00:47:33,470 --> 00:47:31,500
key of the success yeah we are here we

1118
00:47:36,650 --> 00:47:33,480
imagine the detector in order to do this

1119
00:47:39,470 --> 00:47:36,660
measurement Ronaldo made these little

1120
00:47:41,569 --> 00:47:39,480
things here that is actually a Nazi

1121
00:47:44,270 --> 00:47:41,579
cassimos chip that makes the image of

1122
00:47:47,569 --> 00:47:44,280
the photoelectron track and the laws to

1123
00:47:50,089 --> 00:47:47,579
measure polarization we also built all

1124
00:47:52,069 --> 00:47:50,099
the facility that allowed to calibrate

1125
00:47:54,049 --> 00:47:52,079
the detector and to know what is the

1126
00:47:56,089 --> 00:47:54,059
real response of our of the detector

1127
00:47:57,589 --> 00:47:56,099
that has been built right so you have

1128
00:47:59,210 --> 00:47:57,599
you know a pretty long experience with

1129
00:48:01,010 --> 00:47:59,220
this you mentioned working on it back in

1130
00:48:02,930 --> 00:48:01,020
the 80s so what are you looking forward

1131
00:48:07,190 --> 00:48:02,940
to learning the most from XP

1132
00:48:09,290 --> 00:48:07,200
well I we the XP will open a new window

1133
00:48:11,870 --> 00:48:09,300
next race we will measure polarization

1134
00:48:14,510 --> 00:48:11,880
from almost all the classes of celestial

1135
00:48:17,089 --> 00:48:14,520
source that emitics race but basically

1136
00:48:19,790 --> 00:48:17,099
one measurement that can be very

1137
00:48:23,329 --> 00:48:19,800
exciting is the mystery in the center of

1138
00:48:25,790 --> 00:48:23,339

our galaxy but we have in the vicinity

1139
00:48:28,370 --> 00:48:25,800
of our Galaxy's molecular clouds that

1140
00:48:32,150 --> 00:48:28,380
are cold but there are shining X-rays

1141
00:48:34,490 --> 00:48:32,160
and there are no bright Source nearby to

1142
00:48:36,950 --> 00:48:34,500
understand why they are emitting today

1143
00:48:40,730 --> 00:48:36,960
so the the

1144
00:48:44,270 --> 00:48:40,740
the model here is was what was done back

1145
00:48:46,010 --> 00:48:44,280
in the 90s by Rashid sunayev that said

1146
00:48:48,170 --> 00:48:46,020
that what we are looking

1147
00:48:52,370 --> 00:48:48,180
from the molecular counts is the

1148
00:48:54,650 --> 00:48:52,380
radiation reflected by them for uh that

1149
00:48:57,049 --> 00:48:54,660
was emitted in the past by our Center of

1150
00:48:59,870 --> 00:48:57,059
Galaxy that is a supermassive black hole

1151
00:49:02,510 --> 00:48:59,880
now the supermassive vehicle is very dim

1152
00:49:04,970 --> 00:49:02,520
like our some place at the center of the

1153
00:49:10,809 --> 00:49:04,980
Galaxy but a few hundred years ago it

1154
00:49:16,970 --> 00:49:14,450
so basically we can measure polarization

1155
00:49:20,150 --> 00:49:16,980
from this molecular clouds and set the

1156
00:49:22,910 --> 00:49:20,160
time when our was our Center of uh

1157
00:49:24,650 --> 00:49:22,920
Galaxy was an AGM right right so thank

1158
00:49:26,089 --> 00:49:24,660
you so much uh Palo I really appreciate

1159
00:49:28,309 --> 00:49:26,099
you being here and now we're gonna get

1160
00:49:30,770 --> 00:49:28,319
back to Marie

1161
00:49:33,170 --> 00:49:30,780
all right thank you so much Jasmine now

1162
00:49:36,109 --> 00:49:33,180
some of the more mysterious subjects XP

1163
00:49:38,329 --> 00:49:36,119

will study are magnetars neutron stars

1164
00:49:40,130 --> 00:49:38,339
the size of a city with the strongest

1165
00:49:42,049 --> 00:49:40,140
known magnetic fields isn't that crazy

1166
00:49:47,390 --> 00:49:42,059
an event last year involving one such

1167
00:49:52,549 --> 00:49:49,670
a high energy Outburst seen in April

1168
00:49:54,290 --> 00:49:52,559
2020 confirmed the surprising range of

1169
00:49:56,089 --> 00:49:54,300
super magnetized objects called

1170
00:49:58,490 --> 00:49:56,099
magnetars

1171
00:49:59,930 --> 00:49:58,500
this blast of X-rays and gamma rays

1172
00:50:02,390 --> 00:49:59,940
triggered instruments on several

1173
00:50:04,849 --> 00:50:02,400
spacecraft the eruption was over in the

1174
00:50:08,150 --> 00:50:04,859
blink of an eye and originated from a

1175
00:50:10,250 --> 00:50:08,160
Galaxy about 11 million light years away

1176
00:50:13,190 --> 00:50:10,260
magnetars are part of the family of

1177
00:50:15,770 --> 00:50:13,200
compact objects known as neutron stars

1178
00:50:16,790 --> 00:50:15,780
the crushed leftover cores of exploded

1179
00:50:19,250 --> 00:50:16,800
Stars

1180
00:50:21,890 --> 00:50:19,260
what makes magnetar special are their

1181
00:50:23,809 --> 00:50:21,900
incredibly strong magnetic fields up to

1182
00:50:25,430 --> 00:50:23,819
1 000 times stronger than a typical

1183
00:50:27,230 --> 00:50:25,440
neutron stars

1184
00:50:29,150 --> 00:50:27,240
sudden changes to this Ultra strong

1185
00:50:31,250 --> 00:50:29,160
field are thought to drive brief

1186
00:50:32,750 --> 00:50:31,260
enormously powerful outbursts called

1187
00:50:34,790 --> 00:50:32,760
giant flares

1188
00:50:37,609 --> 00:50:34,800

one giant flare in our own Galaxy

1189
00:50:41,329 --> 00:50:37,619
affected Earth's upper atmosphere from

1190
00:50:44,750 --> 00:50:41,339
28 000 light years away

1191
00:50:47,930 --> 00:50:44,760
on April 15th detectors on NASA's Fermi

1192
00:50:49,970 --> 00:50:47,940
Swift Mars Odyssey and wind missions as

1193
00:50:52,250 --> 00:50:49,980
well as on the European space agency's

1194
00:50:55,430 --> 00:50:52,260
integral satellite picked up a rapid

1195
00:50:57,349 --> 00:50:55,440
surge of X-rays and gamma rays using the

1196
00:50:59,690 --> 00:50:57,359
arrival times of the signal at different

1197
00:51:04,069 --> 00:50:59,700
spacecraft astronomers pinned the burst

1198
00:51:06,470 --> 00:51:04,079
to NGC 253 a bright nearby Galaxy

1199
00:51:09,589 --> 00:51:06,480
from start to finish the event lasted

1200
00:51:11,210 --> 00:51:09,599
just 140 milliseconds as fast as a

1201
00:51:14,210 --> 00:51:11,220
finger snap

1202
00:51:16,609 --> 00:51:14,220
astronomers see gamma-ray bursts or grvs

1203
00:51:18,650 --> 00:51:16,619
almost every day we know that at least

1204
00:51:20,930 --> 00:51:18,660
some of the shortest grbs come from

1205
00:51:23,210 --> 00:51:20,940
merging neutron stars more than 100

1206
00:51:25,549 --> 00:51:23,220
million light years away

1207
00:51:28,730 --> 00:51:25,559
the April blast initially looked similar

1208
00:51:30,829 --> 00:51:28,740
to these events but a grb located in our

1209
00:51:32,750 --> 00:51:30,839
own Galactic neighborhood should have

1210
00:51:35,089 --> 00:51:32,760
appeared much brighter

1211
00:51:37,309 --> 00:51:35,099
as astronomers explored this new burst

1212
00:51:40,490 --> 00:51:37,319
in detail they found it looked less like

1213
00:51:42,349 --> 00:51:40,500

a short grb and more like a magnetar

1214
00:51:44,390 --> 00:51:42,359
giant flare

1215
00:51:46,790 --> 00:51:44,400
astronomers have recorded two such

1216
00:51:49,549 --> 00:51:46,800
flares inside our own Galaxy and a third

1217
00:51:51,770 --> 00:51:49,559
in a satellite Galaxy all of these

1218
00:51:54,650 --> 00:51:51,780
bursts displayed a spiky tail as they

1219
00:51:56,990 --> 00:51:54,660
faded out the spikes form as the Flare's

1220
00:51:58,609 --> 00:51:57,000
Hot Spot spins in and out of view like a

1221
00:52:00,530 --> 00:51:58,619
lighthouse beam

1222
00:52:02,150 --> 00:52:00,540
current instruments can't detect this

1223
00:52:05,390 --> 00:52:02,160
feature in flares located at Great

1224
00:52:06,950 --> 00:52:05,400
distances but other characteristics such

1225
00:52:11,089 --> 00:52:06,960
as their extremely fast rise in

1226
00:52:13,190 --> 00:52:11,099
brightness are unmatched by short grbs

1227
00:52:15,530 --> 00:52:13,200
this fueled astronomers growing

1228
00:52:17,809 --> 00:52:15,540
suspicions that short grbs associated

1229
00:52:20,329 --> 00:52:17,819
with galaxies in our neighborhood might

1230
00:52:23,809 --> 00:52:20,339
really be magnetar giant flares

1231
00:52:25,849 --> 00:52:23,819
now the precise localization of the 2020

1232
00:52:29,329 --> 00:52:25,859
event to the disk of the sculptor galaxy

1233
00:52:31,790 --> 00:52:29,339
has unmasked them at last astronomers

1234
00:52:35,049 --> 00:52:31,800
suspect that a few percent of observed

1235
00:52:37,370 --> 00:52:35,059
short trbs May in fact be giant flares

1236
00:52:40,309 --> 00:52:37,380
high-powered eruptions in our Galactic

1237
00:52:45,730 --> 00:52:40,319
backyard produced by the strongest

1238
00:52:50,390 --> 00:52:48,290

now XP will be able to study

1239
00:52:52,190 --> 00:52:50,400
polarization from events like the one we

1240
00:52:54,170 --> 00:52:52,200
just showed you that will allow

1241
00:52:56,569 --> 00:52:54,180
scientists to map these super strong

1242
00:52:58,970 --> 00:52:56,579
magnetic fields figure out just how

1243
00:53:02,150 --> 00:52:58,980
strong they are and reveal the physics

1244
00:53:04,010 --> 00:53:02,160
behind those spectacular fireworks and

1245
00:53:05,930 --> 00:53:04,020
the man at the center of the XP mission

1246
00:53:08,089 --> 00:53:05,940
is principal investigator Dr Martin

1247
00:53:10,190 --> 00:53:08,099
weiskopf of Marshall space flight center

1248
00:53:11,930 --> 00:53:10,200
again in Alabama Martin congratulations

1249
00:53:13,309 --> 00:53:11,940
how are you feeling you just got to

1250
00:53:16,190 --> 00:53:13,319
watch this gorgeous launch with your

1251
00:53:18,710 --> 00:53:16,200
family it was I can't swear so I just

1252
00:53:21,290 --> 00:53:18,720
said it was awesome

1253
00:53:25,190 --> 00:53:21,300
I've seen many launches in my career

1254
00:53:28,069 --> 00:53:25,200
this was picture perfect and it means so

1255
00:53:30,290 --> 00:53:28,079
much to me I just I almost can't

1256
00:53:32,990 --> 00:53:30,300
describe the feeling it's just I'm numb

1257
00:53:35,690 --> 00:53:33,000
with the excitement oh my God and I'm

1258
00:53:37,790 --> 00:53:35,700
looking forward to the next 30 days when

1259
00:53:40,790 --> 00:53:37,800
we make sure that everything works and

1260
00:53:43,430 --> 00:53:40,800
start taking data but this was a

1261
00:53:45,589 --> 00:53:43,440
beautiful launch of SpaceX people just

1262
00:53:48,829 --> 00:53:45,599
did a marvelous job

1263
00:53:51,829 --> 00:53:48,839

as everybody having to do with XP has

1264
00:53:53,329 --> 00:53:51,839
been a wonderful team effort with us and

1265
00:53:56,150 --> 00:53:53,339
the Italians

1266
00:53:59,809 --> 00:53:56,160
other unit places in the United States

1267
00:54:02,150 --> 00:53:59,819
just ball Aerospace fabulous just

1268
00:54:04,730 --> 00:54:02,160
fabulous I don't know what else to say

1269
00:54:07,609 --> 00:54:04,740
awesome well we're lucky enough to also

1270
00:54:09,710 --> 00:54:07,619
have a model of ixby uh right here with

1271
00:54:10,790 --> 00:54:09,720
us for anyone who's just joining us we

1272
00:54:12,890 --> 00:54:10,800
would love to have our principal

1273
00:54:14,809 --> 00:54:12,900
investigator kind of walk us through the

1274
00:54:16,730 --> 00:54:14,819
pieces of what we're looking at and why

1275
00:54:19,130 --> 00:54:16,740
is this spacecraft so special to you

1276
00:54:21,410 --> 00:54:19,140
well I okay let me walk through the

1277
00:54:26,089 --> 00:54:21,420
pieces first and then I'll tell you why

1278
00:54:28,430 --> 00:54:26,099
it's so fantastic to be special to me so

1279
00:54:31,790 --> 00:54:28,440
there are three separate systems that

1280
00:54:34,490 --> 00:54:31,800
are identical at the top there are three

1281
00:54:36,530 --> 00:54:34,500
x-ray telescopes and their purpose is

1282
00:54:39,289 --> 00:54:36,540
simply to

1283
00:54:41,750 --> 00:54:39,299
as x-rays come into them they're brought

1284
00:54:44,089 --> 00:54:41,760
to a focus down below and they're

1285
00:54:46,010 --> 00:54:44,099
brought to a focus on three separate

1286
00:54:48,829 --> 00:54:46,020
x-ray detectors

1287
00:54:51,530 --> 00:54:48,839
but these are very special Detectors of

1288
00:54:54,530 --> 00:54:51,540

the kind that we haven't built before or

1289
00:54:56,690 --> 00:54:54,540
certainly not flown before these

1290
00:54:58,430 --> 00:54:56,700
detectors will not only measure the

1291
00:55:01,130 --> 00:54:58,440
energy of the X-ray

1292
00:55:04,849 --> 00:55:01,140
they will not only measure from where in

1293
00:55:07,910 --> 00:55:04,859
the sky the X-ray came from we time tag

1294
00:55:09,530 --> 00:55:07,920
the x-rays so it'll measure the time of

1295
00:55:11,630 --> 00:55:09,540
timing

1296
00:55:13,490 --> 00:55:11,640
and the one thing that they will do that

1297
00:55:15,770 --> 00:55:13,500
nobody else has done they will also

1298
00:55:19,130 --> 00:55:15,780
measure a property of the x-rays

1299
00:55:21,770 --> 00:55:19,140
property of all light polarization

1300
00:55:24,170 --> 00:55:21,780
and that's adding a new piece of

1301
00:55:27,890 --> 00:55:24,180
information to our what I call our

1302
00:55:30,890 --> 00:55:27,900
astrophysics toolkit along with all the

1303
00:55:35,690 --> 00:55:30,900
other three spectroscopy AE energy

1304
00:55:38,390 --> 00:55:35,700
position in time now polarimetry to try

1305
00:55:41,750 --> 00:55:38,400
to figure out how do these sources work

1306
00:55:44,569 --> 00:55:41,760
and they're fabulous sources my God we

1307
00:55:47,870 --> 00:55:44,579
talked you talked about magnetars the

1308
00:55:48,849 --> 00:55:47,880
neutron stars tiny we made as much as

1309
00:55:52,069 --> 00:55:48,859
the sun

1310
00:55:54,770 --> 00:55:52,079
has super strong magnetic fields we

1311
00:55:58,789 --> 00:55:54,780
think with it magnetic fields 10 to the

1312
00:56:00,950 --> 00:55:58,799
15th Gauss This Is 50 more than 15

1313
00:56:03,650 --> 00:56:00,960

orders of magnitude more than the

1314
00:56:06,289 --> 00:56:03,660
Earth's field so this is how

1315
00:56:08,329 --> 00:56:06,299
achandra right because Chandra studies

1316
00:56:10,130 --> 00:56:08,339
x-rays but adding all of

1317
00:56:12,829 --> 00:56:10,140
this described with XP that's how we're

1318
00:56:15,410 --> 00:56:12,839
going to advance exactly we don't have

1319
00:56:17,990 --> 00:56:15,420
as good angular resolution as Chandra

1320
00:56:20,270 --> 00:56:18,000
but of course we spent a couple hundred

1321
00:56:22,609 --> 00:56:20,280
million to build Bixby and a couple

1322
00:56:25,270 --> 00:56:22,619
billion to build Chandra

1323
00:56:29,390 --> 00:56:25,280
but Chandra is the world's greatest

1324
00:56:32,270 --> 00:56:29,400
x-ray telescope in terms of Sharp Images

1325
00:56:34,430 --> 00:56:32,280
but xb's images are not as sharp as

1326
00:56:37,010 --> 00:56:34,440
chandras but XP will measure

1327
00:56:39,470 --> 00:56:37,020
polarization right which Chandra can't

1328
00:56:41,630 --> 00:56:39,480
do so they complement each other right

1329
00:56:43,490 --> 00:56:41,640
wonderful Dr Martin weiskopf thank you

1330
00:56:44,930 --> 00:56:43,500
so much for joining us and we're so glad

1331
00:56:46,849 --> 00:56:44,940
you got to enjoy the launch with your

1332
00:56:48,589 --> 00:56:46,859
family you mentioned that uh one of your

1333
00:56:50,270 --> 00:56:48,599
grandkids was six months old when

1334
00:56:52,130 --> 00:56:50,280
Chandra launched and now they're back

1335
00:56:54,230 --> 00:56:52,140
here again to and got to watch XP launch

1336
00:56:56,990 --> 00:56:54,240
with you so congrats congratulations

1337
00:56:59,870 --> 00:56:57,000
once again excuse me thank you very much

1338
00:57:03,289 --> 00:56:59,880

I'm just so excited I don't know what to

1339
00:57:04,849 --> 00:57:03,299
say which is unusual for me oh thank you

1340
00:57:07,069 --> 00:57:04,859
Baron thank you so much

1341
00:57:09,049 --> 00:57:07,079
and uh we are now coming up on the next

1342
00:57:10,430 --> 00:57:09,059
operational milestone for XP Daryl and

1343
00:57:12,230 --> 00:57:10,440
Mick why don't you take it away all

1344
00:57:14,690 --> 00:57:12,240
right thank you Megan and Marie great to

1345
00:57:16,789 --> 00:57:14,700
hear Dr Martin weiskov get so excited to

1346
00:57:18,950 --> 00:57:16,799
be speechless meanwhile we are watching

1347
00:57:21,530 --> 00:57:18,960
the second stage carry that XP

1348
00:57:23,450 --> 00:57:21,540
spacecraft you can see it there uh you

1349
00:57:26,150 --> 00:57:23,460
look at the upper uh part of the picture

1350
00:57:27,370 --> 00:57:26,160
it is priming that engine to light in

1351
00:57:30,230 --> 00:57:27,380
just a few seconds

1352
00:57:32,270 --> 00:57:30,240
ixby and the second stage have flown

1353
00:57:34,789 --> 00:57:32,280
into the light you can see the

1354
00:57:36,170 --> 00:57:34,799
illuminated earth below and so this is

1355
00:57:40,250 --> 00:57:36,180
going to be really neat we have a

1356
00:57:42,410 --> 00:57:40,260
successful liftoff at 1am Eastern Time a

1357
00:57:45,109 --> 00:57:42,420
successful separation from the first

1358
00:57:48,109 --> 00:57:45,119
stage and now we are flying but here

1359
00:57:50,210 --> 00:57:48,119
comes a really cool moment in this

1360
00:57:52,250 --> 00:57:50,220
flight and that is the second burn of

1361
00:57:54,049 --> 00:57:52,260
this second stage take a look at this

1362
00:57:56,750 --> 00:57:54,059
graphic we want to show you the track

1363
00:57:59,750 --> 00:57:56,760

that this is going to take uh when it

1364
00:58:02,569 --> 00:57:59,760
makes this turn we left of course uh the

1365
00:58:05,690 --> 00:58:02,579
Kennedy Space Center at 1am you can see

1366
00:58:08,450 --> 00:58:05,700
the track in red and now green as XB

1367
00:58:11,270 --> 00:58:08,460
flew over the Atlantic Ocean approaching

1368
00:58:13,309 --> 00:58:11,280
western Africa the track then gets us

1369
00:58:16,130 --> 00:58:13,319
near the equator and you'll see this

1370
00:58:18,710 --> 00:58:16,140
right here that turn bam right there

1371
00:58:21,349 --> 00:58:18,720
that's 28 degrees to get to an

1372
00:58:23,329 --> 00:58:21,359
equatorial orbit that's about to happen

1373
00:58:24,710 --> 00:58:23,339
in just a few seconds from now Mick Yep

1374
00:58:26,630 --> 00:58:24,720
this burn we're coming up on will make

1375
00:58:28,309 --> 00:58:26,640
that happen and make that 28 degree

1376
00:58:31,370 --> 00:58:28,319
plane change and get us in that

1377
00:58:34,250 --> 00:58:31,380
equatorial orbit which is amazing for XP

1378
00:58:36,710 --> 00:58:34,260
science it allows XP to study those

1379
00:58:38,450 --> 00:58:36,720
polarization x-rays with the least

1380
00:58:41,150 --> 00:58:38,460
amount of background noise in the

1381
00:58:43,970 --> 00:58:41,160
secretarial orbit and it also allows

1382
00:58:45,470 --> 00:58:43,980
them to do a startup download data each

1383
00:58:47,630 --> 00:58:45,480
time they go over the malindi ground

1384
00:58:49,430 --> 00:58:47,640
station every orbit that's right and so

1385
00:58:52,670 --> 00:58:49,440
we just heard that that engine as you

1386
00:58:55,490 --> 00:58:52,680
can see there it's firing up

1387
00:58:58,549 --> 00:58:55,500
this is a 60-second burn

1388
00:59:04,309 --> 00:58:58,559

and we should see some rotation here as

1389
00:59:09,589 --> 00:59:07,130
glowing red

1390
00:59:11,690 --> 00:59:09,599
just heard the call for full thrust yep

1391
00:59:13,430 --> 00:59:11,700
that means impact D is up and going this

1392
00:59:16,130 --> 00:59:13,440
will be a full 60 second burn as you

1393
00:59:18,410 --> 00:59:16,140
said to make that 28 degree plane change

1394
00:59:20,210 --> 00:59:18,420
and that's a very important maneuver to

1395
00:59:22,430 --> 00:59:20,220
get us into that equatorial orbit and

1396
00:59:25,010 --> 00:59:22,440
Mick when they show that shot from the

1397
00:59:27,710 --> 00:59:25,020
second stage with the Earth behind it

1398
00:59:29,450 --> 00:59:27,720
you can see the plane change you can see

1399
00:59:31,910 --> 00:59:29,460
there you can see it moving it appears

1400
00:59:34,549 --> 00:59:31,920
to be my sideways it's that left-hand

1401
00:59:36,470 --> 00:59:34,559
turn we talked about right it's not it's

1402
00:59:39,410 --> 00:59:36,480
not the first turn at the Daytona 500

1403
00:59:41,750 --> 00:59:39,420
but it is a turn that's correct and and

1404
00:59:45,770 --> 00:59:41,760
this is very important so that XP can be

1405
00:59:47,390 --> 00:59:45,780
in that equatorial orbit to allow uh for

1406
00:59:49,069 --> 00:59:47,400
that science that Dr weiskopf was

1407
00:59:51,289 --> 00:59:49,079
talking about and you know it was

1408
00:59:53,410 --> 00:59:51,299
amazing to talk to him earlier and hear

1409
00:59:56,270 --> 00:59:53,420
about why this is important

1410
00:59:58,970 --> 00:59:56,280
there we see the call in and on the

1411
01:00:00,890 --> 00:59:58,980
screen the terminal uh cut off engine

1412
01:00:04,069 --> 01:00:00,900
cut off or impact D so that burn is

1413
01:00:05,510 --> 01:00:04,079

complete and we will now uh Coast for

1414
01:00:08,270 --> 01:00:05,520
just a few more minutes about three

1415
01:00:10,250 --> 01:00:08,280
minutes away from spacecraft nation and

1416
01:00:12,470 --> 01:00:10,260
we just heard nominal orbit insertion

1417
01:00:14,150 --> 01:00:12,480
which is a great call out you look at

1418
01:00:16,849 --> 01:00:14,160
the bottom of your screen you see the

1419
01:00:19,430 --> 01:00:16,859
timer there until spacecraft separation

1420
01:00:21,470 --> 01:00:19,440
of course that's a big moment so one of

1421
01:00:23,690 --> 01:00:21,480
the lightest spacecrafts ever launched

1422
01:00:25,309 --> 01:00:23,700
by Falcon 9 but they needed a lot of

1423
01:00:27,530 --> 01:00:25,319
performance to get it into that right

1424
01:00:29,930 --> 01:00:27,540
there that equatorial orbit we'll be

1425
01:00:31,849 --> 01:00:29,940
back for spacecraft separation in just a

1426
01:00:33,230 --> 01:00:31,859
few minutes in the meantime back to

1427
01:00:34,430 --> 01:00:33,240
Megan and Marie

1428
01:00:37,190 --> 01:00:34,440
mm-hmm

1429
01:00:39,890 --> 01:00:37,200
thanks Daryl anemic the first of ixb's

1430
01:00:42,170 --> 01:00:39,900
40 plus Celestial observations will be a

1431
01:00:44,329 --> 01:00:42,180
supernova Remnant called Cassiopeia a

1432
01:00:46,250 --> 01:00:44,339
which is located about 11 000 light

1433
01:00:50,329 --> 01:00:46,260
years from Earth so a long way that's

1434
01:00:53,170 --> 01:00:50,339
right and the original Star a a behemoth

1435
01:00:56,870 --> 01:00:53,180
at least 15 times as massive as the Sun

1436
01:00:59,450 --> 01:00:56,880
exploded more than 300 years ago Chandra

1437
01:01:03,410 --> 01:00:59,460
revealed concentrations of iron sulfur

1438
01:01:05,569 --> 01:01:03,420

silicon magnesium neon and oxygen in

1439
01:01:08,210 --> 01:01:05,579
cassiopeia's debris Cloud you see there

1440
01:01:11,329 --> 01:01:08,220
meaning that when the star exploded it

1441
01:01:13,549 --> 01:01:11,339
turned itself inside out after ixpy

1442
01:01:15,589 --> 01:01:13,559
soaks up some rays from Cassiopeia a the

1443
01:01:17,690 --> 01:01:15,599
spacecraft will move on to the fifth

1444
01:01:20,690 --> 01:01:17,700
brightest galaxy in the sky called

1445
01:01:24,289 --> 01:01:20,700
Centaurus a and then a little later XP

1446
01:01:26,510 --> 01:01:24,299
will Zero in on Sagittarius A star the

1447
01:01:29,569 --> 01:01:26,520
supermassive black hole at the center of

1448
01:01:31,910 --> 01:01:29,579
our Milky Way galaxy this black hole has

1449
01:01:35,089 --> 01:01:31,920
about 4 million times the mass of our

1450
01:01:38,210 --> 01:01:35,099
sun and at just 26 000 light years from

1451
01:01:40,609 --> 01:01:38,220
Earth Sagittarius A star is one of very

1452
01:01:42,770 --> 01:01:40,619
few black holes in the universe where we

1453
01:01:44,930 --> 01:01:42,780
can actually witness the flow of matter

1454
01:01:46,309 --> 01:01:44,940
nearby

1455
01:01:48,170 --> 01:01:46,319
and we are now closing in on

1456
01:01:49,609 --> 01:01:48,180
spacecraft's separation to guide us

1457
01:01:51,770 --> 01:01:49,619
through that Milestone let's head on

1458
01:01:53,809 --> 01:01:51,780
over to you know who Daryl and Mick in

1459
01:01:56,150 --> 01:01:53,819
the mission director Center Daryl all

1460
01:01:58,190 --> 01:01:56,160
right thank you Megan we are back just a

1461
01:02:00,890 --> 01:01:58,200
few minutes later as we mentioned in

1462
01:02:04,010 --> 01:02:00,900
just about uh 70 seconds away from

1463
01:02:06,650 --> 01:02:04,020

spacecraft separation a big moment for

1464
01:02:08,210 --> 01:02:06,660
the ixby team for the Falcon 9 team in

1465
01:02:10,789 --> 01:02:08,220
SpaceX and of course launch Services

1466
01:02:13,069 --> 01:02:10,799
Program it's all coming down to this

1467
01:02:14,630 --> 01:02:13,079
yeah Gerald I was telling you just a few

1468
01:02:16,849 --> 01:02:14,640
minutes ago how excited I am for this

1469
01:02:18,770 --> 01:02:16,859
how well second stage performed you know

1470
01:02:22,010 --> 01:02:18,780
we were trying to get that 600 kilometer

1471
01:02:24,230 --> 01:02:22,020
by 600 kilometer equatorial orbit and we

1472
01:02:27,650 --> 01:02:24,240
have nailed it SpaceX did an excellent

1473
01:02:30,349 --> 01:02:27,660
job delivering that there to to a proper

1474
01:02:32,390 --> 01:02:30,359
insertion and I'm excited to see the

1475
01:02:35,990 --> 01:02:32,400
spacecraft ship I'm probably as excited

1476
01:02:37,970 --> 01:02:36,000
as Dr weiskopf is but uh uh he was so

1477
01:02:39,650 --> 01:02:37,980
excited he almost cursed yeah this but

1478
01:02:42,230 --> 01:02:39,660
this is going to be great we're about 30

1479
01:02:43,849 --> 01:02:42,240
seconds from spacecraft sip this is an

1480
01:02:46,130 --> 01:02:43,859
incredible Mission as we see this

1481
01:02:48,170 --> 01:02:46,140
beautiful view of XP on the front of

1482
01:02:51,230 --> 01:02:48,180
that Falcon 9 second stage in space

1483
01:02:54,250 --> 01:02:51,240
getting ready to start its Mission you

1484
01:02:57,230 --> 01:02:54,260
got the sun in front and ixb to the left

1485
01:02:59,150 --> 01:02:57,240
those are the telescopes you can see the

1486
01:03:01,849 --> 01:02:59,160
three rounded areas of the three

1487
01:03:04,250 --> 01:03:01,859
telescopes you can see the dark squares

1488
01:03:06,829 --> 01:03:04,260

those are the solar panels on this

1489
01:03:10,130 --> 01:03:06,839
particular spacecraft and in just a few

1490
01:03:21,049 --> 01:03:10,140
seconds we're gonna see this release and

1491
01:03:28,270 --> 01:03:24,109
and payload separation confirmed

1492
01:03:34,609 --> 01:03:32,029
now in space in orbit around the equator

1493
01:03:37,190 --> 01:03:34,619
ready to take in science and there go

1494
01:03:39,829 --> 01:03:37,200
the solar arrays yeah that is incredible

1495
01:03:41,870 --> 01:03:39,839
to be able to see that uh happen right

1496
01:03:44,630 --> 01:03:41,880
after separation solar arrays are

1497
01:03:47,870 --> 01:03:44,640
starting to deploy that is a great for

1498
01:03:50,329 --> 01:03:47,880
the XP spacecraft as they begin to start

1499
01:03:53,029 --> 01:03:50,339
all their operation checkouts and

1500
01:04:05,210 --> 01:03:53,039
getting XP ready over the next 30 days

1501
01:04:10,190 --> 01:04:08,270
XP continues to move away from second

1502
01:04:11,270 --> 01:04:10,200
stage there and Daryl what's unique

1503
01:04:14,329 --> 01:04:11,280
about this even though we've had

1504
01:04:17,329 --> 01:04:14,339
spacecraft separation is to take care of

1505
01:04:20,029 --> 01:04:17,339
that second stage uh Falcon 9 second

1506
01:04:22,609 --> 01:04:20,039
stage will perform a third burn using

1507
01:04:25,370 --> 01:04:22,619
the mvac D and we call that a d orbit

1508
01:04:28,190 --> 01:04:25,380
burn to be able to get the second stage

1509
01:04:30,650 --> 01:04:28,200
out of orbit and try to reduce some of

1510
01:04:33,890 --> 01:04:30,660
that space junk that we have up there so

1511
01:04:35,029 --> 01:04:33,900
you know doing our part uh the to make

1512
01:04:37,010 --> 01:04:35,039
sure that we don't leave anything there

1513
01:04:39,770 --> 01:04:37,020

but I'm telling you that is a beautiful

1514
01:04:41,510 --> 01:04:39,780
shot to watch XP go on its way away from

1515
01:04:43,789 --> 01:04:41,520
that second stage and look the solar

1516
01:04:45,770 --> 01:04:43,799
panels uh flexed out a little bit more

1517
01:04:48,170 --> 01:04:45,780
look at them going straight

1518
01:04:50,450 --> 01:04:48,180
and that's to get that sunlight and get

1519
01:04:52,010 --> 01:04:50,460
that power going into those batteries I

1520
01:04:52,849 --> 01:04:52,020
love that we can see the view for this

1521
01:04:55,309 --> 01:04:52,859
long

1522
01:04:58,010 --> 01:04:55,319
yeah this is this is amazing I am I'm so

1523
01:05:00,490 --> 01:04:58,020
happy to see this I'm sure Dr weiskoff

1524
01:05:03,710 --> 01:05:00,500
is is just uh

1525
01:05:06,230 --> 01:05:03,720
Overjoyed watching this this video right

1526
01:05:08,029 --> 01:05:06,240
now of their of his spacecraft on its

1527
01:05:10,609 --> 01:05:08,039
way if he was speechless before I can

1528
01:05:14,029 --> 01:05:10,619
only imagine how he's feeling now we are

1529
01:05:16,549 --> 01:05:14,039
now awaiting the XP acquisition of

1530
01:05:19,130 --> 01:05:16,559
signal this is the communication that

1531
01:05:23,329 --> 01:05:19,140
happens between a ground station in

1532
01:05:25,910 --> 01:05:23,339
malindi off the coast of Kenya and uh

1533
01:05:28,490 --> 01:05:25,920
and the actual XP spacecraft and it will

1534
01:05:29,690 --> 01:05:28,500
tell us a little bit about how XP is

1535
01:05:31,609 --> 01:05:29,700
doing

1536
01:05:33,289 --> 01:05:31,619
yeah that's right Daryl and that's a key

1537
01:05:34,849 --> 01:05:33,299
point for the spacecraft team to be able

1538
01:05:36,950 --> 01:05:34,859

to know that they've got communication

1539
01:05:38,930 --> 01:05:36,960
with the spacecraft getting them into

1540
01:05:41,930 --> 01:05:38,940
the proper orbit allowing that ground

1541
01:05:43,910 --> 01:05:41,940
station to download some data and make

1542
01:05:46,789 --> 01:05:43,920
sure that the spacecraft is healthy of

1543
01:05:49,309 --> 01:05:46,799
course what we will see is uh that

1544
01:05:51,049 --> 01:05:49,319
acquisition signal can vary anywhere

1545
01:05:54,289 --> 01:05:51,059
from four to seven minutes after sep

1546
01:05:55,910 --> 01:05:54,299
here due to the fact that the low rate

1547
01:05:57,770 --> 01:05:55,920
data or the data coming from the

1548
01:06:00,230 --> 01:05:57,780
spacecraft depending on where it's at

1549
01:06:02,329 --> 01:06:00,240
and then we may not get full Health Data

1550
01:06:04,670 --> 01:06:02,339
until a full orbit around Earth but

1551
01:06:06,770 --> 01:06:04,680
we're waiting to hear that we do get

1552
01:06:08,410 --> 01:06:06,780
this acquisition signal at least to make

1553
01:06:10,990 --> 01:06:08,420
sure we've no know that we've

1554
01:06:14,809 --> 01:06:11,000
established also signal the bone

1555
01:06:16,910 --> 01:06:14,819
communication with the ixb spacecraft

1556
01:06:19,609 --> 01:06:16,920
and as you can see from that track right

1557
01:06:22,010 --> 01:06:19,619
there uh that's the location of stage

1558
01:06:25,190 --> 01:06:22,020
two it gives you a rough approximation

1559
01:06:26,630 --> 01:06:25,200
of where XP is as it continues on is on

1560
01:06:29,150 --> 01:06:26,640
its orbit

1561
01:06:31,309 --> 01:06:29,160
um Kenya of course uh just right there

1562
01:06:33,950 --> 01:06:31,319
at the edge of that track that's where

1563
01:06:37,010 --> 01:06:33,960

our ground station is if for some reason

1564
01:06:40,190 --> 01:06:37,020
we can't pull it in through malindi we

1565
01:06:42,170 --> 01:06:40,200
have a backup station in Singapore yeah

1566
01:06:45,289 --> 01:06:42,180
that's true we've got ground stations

1567
01:06:46,730 --> 01:06:45,299
all across the orbit to make sure that

1568
01:06:49,010 --> 01:06:46,740
we can communicate with this spacecraft

1569
01:06:51,470 --> 01:06:49,020
while it's on orbit but the the primary

1570
01:06:52,910 --> 01:06:51,480
ground station being that one in melendi

1571
01:06:55,730 --> 01:06:52,920
as we talked about earlier this

1572
01:06:58,370 --> 01:06:55,740
equatorial orbit allows them to orbit

1573
01:07:00,230 --> 01:06:58,380
around Earth and every time they make an

1574
01:07:02,210 --> 01:07:00,240
orbit around Earth they come over that

1575
01:07:04,250 --> 01:07:02,220
same ground station in malindi they're

1576
01:07:07,670 --> 01:07:04,260
able to download their scientific data

1577
01:07:10,789 --> 01:07:07,680
and share that with the community it

1578
01:07:14,329 --> 01:07:10,799
allows them to continue getting more

1579
01:07:16,309 --> 01:07:14,339
data each time and making sure that they

1580
01:07:19,370 --> 01:07:16,319
have everything they need and checking

1581
01:07:22,250 --> 01:07:19,380
on the spacecraft every single orbit

1582
01:07:28,010 --> 01:07:22,260
for those just joining us we are T minus

1583
01:07:40,609 --> 01:07:31,130
and 30 seconds into flight

1584
01:07:45,890 --> 01:07:42,049
so we're still waiting to hear about

1585
01:07:49,430 --> 01:07:45,900
acquisition as signal as they

1586
01:07:52,789 --> 01:07:49,440
they continue to work their processes

1587
01:07:56,210 --> 01:07:52,799
and procedures the spacecraft team is uh

1588
01:07:58,430 --> 01:07:56,220

actively waiting to hear from XP as they

1589
01:08:00,109 --> 01:07:58,440
communicate with it

1590
01:08:03,349 --> 01:08:00,119
we are actually listening to

1591
01:08:05,890 --> 01:08:03,359
Communications between the spacecraft

1592
01:08:09,109 --> 01:08:05,900
team and the launch Team

1593
01:08:12,770 --> 01:08:09,119
monitoring them to see when that

1594
01:08:15,249 --> 01:08:12,780
acquisition of signal comes through

1595
01:08:19,970 --> 01:08:17,870
as you can see there

1596
01:08:21,649 --> 01:08:19,980
on the graph

1597
01:08:25,010 --> 01:08:21,659
that

1598
01:08:28,490 --> 01:08:25,020
stage 2 continue

1599
01:08:34,970 --> 01:08:28,500
and XB continues to move on its way

1600
01:08:40,070 --> 01:08:37,910
and for those uh who haven't heard the

1601
01:08:44,630 --> 01:08:40,080
early part of the show Bixby stands for

1602
01:08:47,930 --> 01:08:44,640
Imaging x-ray polarimetry Explorer

1603
01:08:50,329 --> 01:08:47,940
this is a spacecraft that for the first

1604
01:08:52,550 --> 01:08:50,339
time will help astronomers discover

1605
01:08:56,090 --> 01:08:52,560
hidden details of some of the hottest

1606
01:08:59,030 --> 01:08:56,100
densest and most extreme Cosmic sources

1607
01:09:01,729 --> 01:08:59,040
from neutrons stars and black holes

1608
01:09:05,809 --> 01:09:01,739
through supernova

1609
01:09:07,490 --> 01:09:05,819
and active Galactic nuclei

1610
01:09:10,630 --> 01:09:07,500
I think that's going to become a popular

1611
01:09:13,970 --> 01:09:10,640
pop culture phrase

1612
01:09:15,349 --> 01:09:13,980
active Galactic nuclei I do I think I

1613
01:09:16,490 --> 01:09:15,359

think scientists are going to make that

1614
01:09:20,570 --> 01:09:16,500
come back

1615
01:09:22,370 --> 01:09:20,580
the AGN yes but I'm so happy for the

1616
01:09:25,249 --> 01:09:22,380
science team and I know they're excited

1617
01:09:27,829 --> 01:09:25,259
to to study all of this and as we

1618
01:09:29,209 --> 01:09:27,839
continue to monitor the spacecraft team

1619
01:09:31,149 --> 01:09:29,219
and they're following all their

1620
01:09:36,050 --> 01:09:31,159
procedures following the checklist

1621
01:09:42,050 --> 01:09:36,060
waiting to confirm acquisition of signal

1622
01:09:47,390 --> 01:09:44,809
got some good news

1623
01:09:49,669 --> 01:09:47,400
yep that is correct Daryl we are hearing

1624
01:09:51,410 --> 01:09:49,679
from the spacecraft team as they are

1625
01:09:53,689 --> 01:09:51,420
talking to NASA's launch manager Tim

1626
01:09:56,330 --> 01:09:53,699
Dunn that they have acquired the signal

1627
01:09:58,970 --> 01:09:56,340
of XP from the ground station and

1628
01:10:01,310 --> 01:09:58,980
everything looks good on board so

1629
01:10:03,470 --> 01:10:01,320
congratulations to the ixb spacecraft

1630
01:10:05,510 --> 01:10:03,480
team that was a moment I know they were

1631
01:10:07,130 --> 01:10:05,520
waiting for and I'm so happy to hear

1632
01:10:09,350 --> 01:10:07,140
that they are communicating with their

1633
01:10:11,390 --> 01:10:09,360
spacecraft yeah we uh waited for that

1634
01:10:14,689 --> 01:10:11,400
confirmation to come through we could

1635
01:10:17,570 --> 01:10:14,699
hear the spacecraft team and our audio

1636
01:10:19,970 --> 01:10:17,580
Loops as they call them uh celebrating

1637
01:10:21,830 --> 01:10:19,980
there is a round of applause there was

1638
01:10:23,810 --> 01:10:21,840

some clapping

1639
01:10:25,790 --> 01:10:23,820
um certainly a neat moment to hear sorry

1640
01:10:27,530 --> 01:10:25,800
we couldn't share that with you but uh

1641
01:10:30,110 --> 01:10:27,540
it's certainly something we can tell you

1642
01:10:31,790 --> 01:10:30,120
about and it was a fair bit of Revel

1643
01:10:33,950 --> 01:10:31,800
reading absolutely spacecraft team was

1644
01:10:36,110 --> 01:10:33,960
very excited that that happened and as

1645
01:10:38,030 --> 01:10:36,120
we got to watch the solar rays come and

1646
01:10:40,310 --> 01:10:38,040
everything I'm I'm just very pleased

1647
01:10:42,410 --> 01:10:40,320
this launch today and let the spacecraft

1648
01:10:44,390 --> 01:10:42,420
team is doing well congratulations to

1649
01:10:46,790 --> 01:10:44,400
the launch Services Program team and of

1650
01:10:48,770 --> 01:10:46,800
course the ixb team as well well and all

1651
01:10:50,810 --> 01:10:48,780
those who contributed and thanks to you

1652
01:10:52,430 --> 01:10:50,820
partner for giving us all that

1653
01:10:54,530 --> 01:10:52,440
professional analysis all the way

1654
01:10:56,390 --> 01:10:54,540
through launch and Stage separation and

1655
01:10:58,070 --> 01:10:56,400
acquisition of signal it's always great

1656
01:10:59,090 --> 01:10:58,080
to have your expertise on hand Daryl

1657
01:11:00,830 --> 01:10:59,100
thanks for having me it's always great

1658
01:11:02,689 --> 01:11:00,840
to be with you and uh appreciate it this

1659
01:11:04,490 --> 01:11:02,699
was a great launch today absolutely and

1660
01:11:06,229 --> 01:11:04,500
with that we'll send it back to Megan

1661
01:11:08,149 --> 01:11:06,239
and Marie

1662
01:11:10,430 --> 01:11:08,159
great job guys now joining us now is

1663
01:11:12,649 --> 01:11:10,440

NASA launch manager Omar Baez glad to

1664
01:11:15,530 --> 01:11:12,659
have you here you know we just watched

1665
01:11:17,330 --> 01:11:15,540
uh acquisition of signal unfolding in

1666
01:11:18,649 --> 01:11:17,340
front of us here how was this launch in

1667
01:11:21,410 --> 01:11:18,659
your perspective

1668
01:11:25,070 --> 01:11:21,420
well everything went smooth uh we we

1669
01:11:28,130 --> 01:11:25,080
entered the count uh working no issues

1670
01:11:29,510 --> 01:11:28,140
um barely anything to talk through uh

1671
01:11:32,270 --> 01:11:29,520
throughout the countdown so everything

1672
01:11:33,350 --> 01:11:32,280
went very smoothly

1673
01:11:36,110 --> 01:11:33,360
um launched right at the beginning

1674
01:11:37,970 --> 01:11:36,120
opening of the window

1675
01:11:39,669 --> 01:11:37,980
um we just crossed over Africa and

1676
01:11:43,189 --> 01:11:39,679
acquired signal on the spacecraft

1677
01:11:45,470 --> 01:11:43,199
they'll start uh exposing their solar

1678
01:11:48,070 --> 01:11:45,480
arrays and doing their deployments so we

1679
01:11:51,410 --> 01:11:48,080
can't ask for any better than that right

1680
01:11:53,390 --> 01:11:51,420
the launch Services Program has had four

1681
01:11:57,169 --> 01:11:53,400
missions in less than the last four

1682
01:11:59,450 --> 01:11:57,179
months he had landsat Lucy Dart now ixby

1683
01:12:02,149 --> 01:11:59,460
almost back to back and Rapid succession

1684
01:12:06,110 --> 01:12:02,159
and you make it look so easy what's

1685
01:12:07,790 --> 01:12:06,120
ahead for LSP in 2022 so yeah you

1686
01:12:09,709 --> 01:12:07,800
mentioned the four missions back to back

1687
01:12:12,590 --> 01:12:09,719
two weeks ago we were launching from the

1688
01:12:15,649 --> 01:12:12,600

the opposite Coast so a phenomenal year

1689
01:12:18,950 --> 01:12:15,659
for LSP and and for a customer and our

1690
01:12:22,310 --> 01:12:18,960
next mission now into the New Year's is

1691
01:12:25,850 --> 01:12:22,320
with the ghost Mission uh March 1st

1692
01:12:28,370 --> 01:12:25,860
which is going to a geostationary orbit

1693
01:12:31,189 --> 01:12:28,380
and looking at our Earth surface weather

1694
01:12:34,729 --> 01:12:31,199
and and so forth and so forth part of

1695
01:12:38,689 --> 01:12:34,739
that replenishing that constellation and

1696
01:12:41,990 --> 01:12:38,699
then we come back here for a um August

1697
01:12:44,990 --> 01:12:42,000
first launch of psyche a heavy from the

1698
01:12:48,130 --> 01:12:45,000
same launch pad uh two o'clock in the

1699
01:12:51,110 --> 01:12:48,140
afternoon ought to be pretty cool

1700
01:12:52,610 --> 01:12:51,120
psyche's gonna be well summertime two

1701
01:12:53,510 --> 01:12:52,620
o'clock in the afternoon you know how

1702
01:12:54,530 --> 01:12:53,520
that goes

1703
01:12:55,790 --> 01:12:54,540
um

1704
01:12:59,510 --> 01:12:55,800
but

1705
01:13:01,430 --> 01:12:59,520
uh it's gonna be cool heavy so three of

1706
01:13:05,030 --> 01:13:01,440
those sticks that you just saw there

1707
01:13:07,130 --> 01:13:05,040
today uh put together and this mission

1708
01:13:10,729 --> 01:13:07,140
is going to be looking at our metal

1709
01:13:14,810 --> 01:13:10,739
asteroids that um that

1710
01:13:17,030 --> 01:13:14,820
um orbit near Mars and Jupiter and so

1711
01:13:21,070 --> 01:13:17,040
that's a pretty cool Mission that'll be

1712
01:13:25,250 --> 01:13:21,080
followed up by jpss on the west coast

1713
01:13:27,890 --> 01:13:25,260

at the end of September and uh then

1714
01:13:30,229 --> 01:13:27,900
we'll follow up with our

1715
01:13:34,010 --> 01:13:30,239
uh swap Mission which is the surface

1716
01:13:37,010 --> 01:13:34,020
water observation uh Mission out of the

1717
01:13:41,149 --> 01:13:37,020
West Coast and that'll be uh November

1718
01:13:42,410 --> 01:13:41,159
15th so we have a full summer to fall

1719
01:13:45,470 --> 01:13:42,420
again

1720
01:13:48,050 --> 01:13:45,480
um so but even before all that is P

1721
01:13:51,770 --> 01:13:48,060
advising on the James Webb yes we are so

1722
01:13:55,250 --> 01:13:53,149
correct are you looking forward to that

1723
01:13:57,950 --> 01:13:55,260
one as well yeah we're looking at you

1724
01:14:00,590 --> 01:13:57,960
know jwst has been around the first time

1725
01:14:03,770 --> 01:14:00,600
I went to Peru was uh like 20 years ago

1726
01:14:07,310 --> 01:14:03,780
almost and that was The Scouting

1727
01:14:09,410 --> 01:14:07,320
missions just prior to jwst so it'll be

1728
01:14:11,870 --> 01:14:09,420
nice to see that mission in orbit

1729
01:14:13,850 --> 01:14:11,880
finally all right right or Omar Baez

1730
01:14:15,890 --> 01:14:13,860
launch manager with NASA's launch

1731
01:14:17,330 --> 01:14:15,900
Services Program congratulations to you

1732
01:14:19,610 --> 01:14:17,340
and your team and thanks for being here

1733
01:14:22,490 --> 01:14:19,620
thank you and thanks thanks to you at

1734
01:14:24,169 --> 01:14:22,500
home for watching this morning and we

1735
01:14:25,729 --> 01:14:24,179
leave you now with a replay of xp's

1736
01:14:29,990 --> 01:14:25,739
launch from Kennedy Space Center here

1737
01:14:39,590 --> 01:14:33,410
10. nine eight

1738
01:14:41,209 --> 01:14:39,600

seven six five four three two one

1739
01:14:45,830 --> 01:14:41,219
ignition

1740
01:14:48,649 --> 01:14:45,840
and liftoff liftoff of Falcon 9 and ixby

1741
01:14:52,420 --> 01:14:48,659
a new set of X-ray eyes to view the

1742
01:14:52,430 --> 01:14:56,709
[Music]

1743
01:15:00,350 --> 01:14:58,729
cleared off and we're hearing nominal

1744
01:15:12,590 --> 01:15:00,360
chamber pressures on all nine American

1745
01:15:41,390 --> 01:15:39,070
[Music]

1746
01:15:43,910 --> 01:15:41,400
replacing a space station Communications

1747
01:15:46,610 --> 01:15:43,920
antenna another round of testing for our

1748
01:15:49,310 --> 01:15:46,620
lunar roving robot and discussing space

1749
01:15:51,050 --> 01:15:49,320
policy and priorities a few of the

1750
01:15:53,450 --> 01:15:51,060
stories to tell you about this week at

1751
01:15:58,070 --> 01:15:53,460
NASA

1752
01:15:59,570 --> 01:15:58,080
marshburn and Caleb Aaron ventured