

1

00:00:00,000 --> 00:00:08,000

Music

2

00:00:08,000 --> 00:00:09,000

Music

3

00:00:09,000 --> 00:00:14,000

On this episode of Mythbusters, was the moon landing a hoax?

4

00:00:14,000 --> 00:00:18,000

Yep, the team are tackling the tallest tale of all.

5

00:00:18,000 --> 00:00:20,000

Did NASA fake the Apollo moon mission?

6

00:00:20,000 --> 00:00:22,000

That's 100% wacky right there.

7

00:00:22,000 --> 00:00:25,000

Adam and Jamie first focus on the photos.

8

00:00:25,000 --> 00:00:27,000

Behold our moon landing set.

9

00:00:27,000 --> 00:00:34,000

Do these stills prove Neil Armstrong took his small step in a studio taking the shot?

10

00:00:34,000 --> 00:00:40,000

Then they investigate the myth that to fabricate the classic look of lunar landings,

11

00:00:40,000 --> 00:00:43,000

NASA simply slowed down the film.

12

00:00:43,000 --> 00:00:45,000

And finally, Carrie Grant and Tori...

13

00:00:45,000 --> 00:00:48,000

Oh my god, these are all vacuum chambers?

14

00:00:48,000 --> 00:00:53,000

...take on claims that in a vacuum, flags don't flap and foot don't print.

15

00:00:53,000 --> 00:00:55,000

Your face!

16

00:00:55,000 --> 00:00:57,000

You're as serious as I am.

17

00:00:57,000 --> 00:00:59,000

Music

18

00:00:59,000 --> 00:01:01,000

Who are the Mythbusters?

19

00:01:01,000 --> 00:01:03,000

Did you know what was lurking in your basement?

20

00:01:03,000 --> 00:01:04,000

Adam Savage.

21

00:01:04,000 --> 00:01:06,000

This is the best cooking show ever!

22

00:01:06,000 --> 00:01:08,000

And Jamie Heinemann.

23

00:01:08,000 --> 00:01:10,000

Is that beautiful or what?

24

00:01:10,000 --> 00:01:15,000

Between them more than 30 years of special effects experience.

25

00:01:15,000 --> 00:01:16,000

Wow!

26

00:01:16,000 --> 00:01:19,000

Joining them, Grant Imahara.

27

00:01:19,000 --> 00:01:21,000

That was crazy.

28

00:01:21,000 --> 00:01:22,000

Carrie Byron.

29

00:01:22,000 --> 00:01:23,000

Let's go!

30

00:01:23,000 --> 00:01:25,000

And Tori Bellachy.

31

00:01:25,000 --> 00:01:27,000

Is this as disturbing as I think it is?

32

00:01:27,000 --> 00:01:32,000

They don't just tell the Myths, they put them to the test.

33

00:01:32,000 --> 00:01:46,000

Music

34

00:01:46,000 --> 00:01:51,000

So do you like buying a new costume for every myth we do?

35

00:01:51,000 --> 00:01:56,000

Sometimes, but in this case, I had my own space suit in my personal collection

36

00:01:56,000 --> 00:01:58,000

and just brought it out because it was appropriate.

37

00:01:58,000 --> 00:01:59,000

Of course you did.

38

00:01:59,000 --> 00:02:02,000

Well, let me guess, we're doing what?

39

00:02:02,000 --> 00:02:03,000

Moon landing myths?

40

00:02:03,000 --> 00:02:04,000

We are!

41

00:02:04,000 --> 00:02:08,000

Perhaps one of the biggest myths of all is that NASA faked the moon landing

42

00:02:08,000 --> 00:02:10,000

and perpetrated a hoax on the American people.

43

00:02:10,000 --> 00:02:15,000

So pervasive is this myth that 20% of Americans today still believe it.

44

00:02:15,000 --> 00:02:17,000

And we're taking a nod.

45

00:02:17,000 --> 00:02:19,000

Well, how are we going to do that?

46

00:02:19,000 --> 00:02:21,000

The number of claims are massive.

47

00:02:21,000 --> 00:02:26,000

I mean, they range from photographs to heat signatures to footprints.

48

00:02:26,000 --> 00:02:27,000

I know, there's a lot of them.

49

00:02:27,000 --> 00:02:31,000

I think what we should do is cherry pick the most common ones

50

00:02:31,000 --> 00:02:33,000

and piece the truth together as best we can.

51

00:02:33,000 --> 00:02:35,000

Like a jigsaw puzzle.

52

00:02:35,000 --> 00:02:36,000

Exactly.



53

00:02:37,000 --> 00:02:39,000

This is launch control.

54

00:02:39,000 --> 00:02:42,000

We passed the six-minute mark in our countdown for Apollo 11.

55

00:02:42,000 --> 00:02:45,000

The flight to land at the first men on the moon.

56

00:02:45,000 --> 00:02:47,000

Good luck and Godspeed.

57

00:02:47,000 --> 00:02:52,000

Ten, nine, ignition sequence starts.

58

00:02:52,000 --> 00:02:58,000

On July the 16th, 1969, the world watched,

59

00:02:58,000 --> 00:03:04,000

wondered and worried as three brave astronauts headed for the moon.

60

00:03:04,000 --> 00:03:07,000

The Houston thrusts go, all engines are looking good.

61

00:03:07,000 --> 00:03:11,000

Then five days later came that extraordinary moment in time

62

00:03:11,000 --> 00:03:17,000

when Neil Armstrong took those first tentative extraterrestrial steps.

63

00:03:17,000 --> 00:03:20,000

That's one small step for man.

64

00:03:20,000 --> 00:03:25,000

One giant leap for mankind.

65

00:03:25,000 --> 00:03:28,000

Eleven men followed in Armstrong's footsteps,

66

00:03:28,000 --> 00:03:32,000

each stride filling the earthbound audience with pride

67

00:03:32,000 --> 00:03:35,000

and confidence in scientific endeavor.

68

00:03:35,000 --> 00:03:36,000

What are you, isn't it John?

69

00:03:36,000 --> 00:03:38,000

It's absolutely unreal.

70

00:03:38,000 --> 00:03:41,000

But did we really leap into the future?

71

00:03:41,000 --> 00:03:45,000

Or were we pushed into believing a giant PR stunt?

72

00:03:45,000 --> 00:03:50,000

Did NASA pull off the greatest cover-up in human history?

73

00:03:53,000 --> 00:03:55,000

Oh, yeah, perfect.

74

00:03:55,000 --> 00:03:57,000

Crile like a tiger.

75

00:03:57,000 --> 00:03:59,000

Mule like a kitten.

76

00:03:59,000 --> 00:04:01,000

Guess what our first myth is?

77

00:04:01,000 --> 00:04:03,000

Still photography?

78

00:04:03,000 --> 00:04:05,000

Yes.

79

00:04:05,000 --> 00:04:08,000

Most of the alleged evidence that NASA faked the moon-landings

80

00:04:08,000 --> 00:04:10,000

comes from NASA's own photography,

81

00:04:10,000 --> 00:04:13,000

which theorists claim shows clear evidence

82

00:04:13,000 --> 00:04:15,000

the moon-landing was faked in the studio

83

00:04:15,000 --> 00:04:17,000

and could not have been filmed on the moon.

84

00:04:17,000 --> 00:04:18,000

Say hoax.

85

00:04:18,000 --> 00:04:19,000

Hoax!

86

00:04:19,000 --> 00:04:22,000

So these are the photos the guys will focus on.

87

00:04:22,000 --> 00:04:24,000

According to Apollo Hoax advocates,

88

00:04:24,000 --> 00:04:26,000

this shot was taken in a studio

89

00:04:26,000 --> 00:04:29,000

because the shadows are not parallel.

90

00:04:29,000 --> 00:04:32,000

Supposedly, that's something that could only happen

91

00:04:32,000 --> 00:04:34,000

with multiple light sources.

92

00:04:34,000 --> 00:04:37,000

Then there's this image of an artfully lit astronaut.

93

00:04:37,000 --> 00:04:39,000

Conspiracy cheerleaders claim

94

00:04:39,000 --> 00:04:42,000

if he really was standing in the shadow of the moon module,

95

00:04:42,000 --> 00:04:45,000

you wouldn't be able to see him so clearly.

96

00:04:46,000 --> 00:04:49,000

You know what, let's do parallel shadows first.

97

00:04:49,000 --> 00:04:50,000

How do you want to test it?

98

00:04:50,000 --> 00:04:52,000

I think we should do a large miniature

99

00:04:52,000 --> 00:04:55,000

because we can test the placement of all the various elements.

100

00:04:55,000 --> 00:04:57,000

It's kind of a complex thing.

101

00:04:57,000 --> 00:04:59,000

We need a lot of control over those elements.

102

00:04:59,000 --> 00:05:00,000

Exactly.

103

00:05:00,000 --> 00:05:01,000

Alright, let's do it.

104

00:05:01,000 --> 00:05:03,000

So first up, the guys need a single,



105

00:05:03,000 --> 00:05:07,000

super-sized light source to stand in for the sun.

106

00:05:07,000 --> 00:05:08,000

Amy!

107

00:05:08,000 --> 00:05:11,000

I'd like to introduce you to your son.

108

00:05:11,000 --> 00:05:15,000

And BrightSparkAdam has found a monster studio light

109

00:05:15,000 --> 00:05:18,000

that's pretty bright to illuminate the experiment.

110

00:05:18,000 --> 00:05:21,000

Here I look like one of the aliens in Close Encounters.

111

00:05:21,000 --> 00:05:27,000

That's the solar now for the lunar.

112

00:05:27,000 --> 00:05:31,000

Cue the build montage because Jamie's making a moon.

113

00:05:31,000 --> 00:05:33,000

I've got a good first start on my lunar set.

114

00:05:33,000 --> 00:05:36,000

It's just spandex and let's see,

115

00:05:36,000 --> 00:05:38,000

Portland cement with a little bone black,

116

00:05:38,000 --> 00:05:40,000

which is basically black powder.

117

00:05:40,000 --> 00:05:42,000

As luck would have it,

118

00:05:42,000 --> 00:05:44,000

we just happen to have one of these sitting around the shop

119

00:05:44,000 --> 00:05:46,000

and it's perfect for a miniature set.

120

00:05:46,000 --> 00:05:48,000

It's 176th scale.

121

00:05:48,000 --> 00:05:50,000

That could not be better.

122

00:05:50,000 --> 00:05:52,000

What do you say we turn on the lights

123

00:05:52,000 --> 00:05:54,000

and see what our shadows look like?

124

00:05:54,000 --> 00:05:56,000

Yeah, let's see the light. Let's turn it around.

125

00:05:56,000 --> 00:06:01,000

I'm spinning around. Let's your eyes.

126

00:06:01,000 --> 00:06:02,000

What do you think?

127

00:06:02,000 --> 00:06:03,000

Works for me.

128

00:06:03,000 --> 00:06:06,000

We've had the lights and there's been plenty of action.

129

00:06:06,000 --> 00:06:08,000

So where's the...

130

00:06:08,000 --> 00:06:10,000

This is the camera that we're going to use.

131

00:06:10,000 --> 00:06:12,000

It's a Hasselblad that's very similar to the one

132

00:06:12,000 --> 00:06:13,000

that was used on the moon,

133

00:06:13,000 --> 00:06:16,000

except that we put a digital feed out the back

134

00:06:16,000 --> 00:06:19,000

so that we can look at the images in real time

135

00:06:19,000 --> 00:06:22,000

on a monitor and make comparisons to the original shots.

136

00:06:22,000 --> 00:06:24,000

All right, with our sun in place, man,

137

00:06:24,000 --> 00:06:26,000

in addition to looking totally freaking awesome,

138

00:06:26,000 --> 00:06:27,000

it's pretty clear here,

139

00:06:27,000 --> 00:06:29,000

but the ship and the rocks,

140

00:06:29,000 --> 00:06:30,000

both on a flat surface,

141

00:06:30,000 --> 00:06:32,000

that their shadows are totally parallel.

142

00:06:32,000 --> 00:06:34,000

And that is what the myth proponents say

143

00:06:34,000 --> 00:06:37,000

the NASA photo should look like.

144

00:06:37,000 --> 00:06:40,000

Instead, you can see the rock and landing module shadows

145

00:06:40,000 --> 00:06:42,000

are in different planes.

146

00:06:42,000 --> 00:06:44,000

Now we need to figure out what it would take

147

00:06:44,000 --> 00:06:46,000

to make them not parallel.

148

00:06:46,000 --> 00:06:48,000

Yeah, let's play with the topography underneath it

149

00:06:48,000 --> 00:06:49,000

and see what we can get.

150

00:06:49,000 --> 00:06:52,000

Conspiracy theorists say there's only one explanation for this.

151

00:06:52,000 --> 00:06:53,000

Two light sources.

152

00:06:53,000 --> 00:06:55,000

And since there's only one light source on the moon,

153

00:06:55,000 --> 00:06:56,000

and that's the sun...

154

00:06:56,000 --> 00:06:58,000

That's really kicking it forward.

155

00:06:58,000 --> 00:07:00,000

This has to be shot in a studio.

156

00:07:00,000 --> 00:07:03,000

We're positing that it's the topography of the moon



157

00:07:03,000 --> 00:07:05,000

causing these shadows of the rocks

158

00:07:05,000 --> 00:07:06,000

to look like they're not parallel,

159

00:07:06,000 --> 00:07:07,000

when in fact they are,

160

00:07:07,000 --> 00:07:09,000

and that's what we're trying to imitate here.

161

00:07:09,000 --> 00:07:12,000

It's all just about adjusting this directly to the light.

162

00:07:12,000 --> 00:07:14,000

What Adam and Jamie have done

163

00:07:14,000 --> 00:07:16,000

is simply give the miniature lunar landscape

164

00:07:16,000 --> 00:07:19,000

some realistic contours and imperfections.

165

00:07:19,000 --> 00:07:20,000

That's perfect.

166

00:07:20,000 --> 00:07:21,000

Is it?

167

00:07:21,000 --> 00:07:22,000

Yeah.

168

00:07:22,000 --> 00:07:24,000

Ha ha ha ha ha ha ha.

169

00:07:24,000 --> 00:07:27,000

And the shadows appear to move out of their parallel path.

170

00:07:27,000 --> 00:07:29,000

And Adam, happy?

171

00:07:29,000 --> 00:07:31,000

Ha ha ha.

172

00:07:31,000 --> 00:07:33,000

Dude, you said it looks perfect.

173

00:07:33,000 --> 00:07:34,000

Takes a snap.

174

00:07:34,000 --> 00:07:36,000

Taking the shot.

175

00:07:36,000 --> 00:07:38,000

So I can hear what you're saying.

176

00:07:38,000 --> 00:07:39,000

You're saying,

177

00:07:39,000 --> 00:07:43,000

but you guys replicated the moon shot on a set

178

00:07:43,000 --> 00:07:44,000

and your special effects artisans.

179

00:07:44,000 --> 00:07:46,000

In fact, you're exactly the guys that would have hired

180

00:07:46,000 --> 00:07:48,000

to do this kind of thing in the first place.

181

00:07:48,000 --> 00:07:49,000

That's not the point.

182

00:07:49,000 --> 00:07:52,000

The point is we're addressing the specific claim

183

00:07:52,000 --> 00:07:53,000

by conspiracy theorists

184

00:07:53,000 --> 00:07:56,000

that this photo has only one explanation

185

00:07:56,000 --> 00:07:57,000

and that's two light sources.

186

00:07:57,000 --> 00:08:00,000

We've demonstrated here two shadows which are parallel

187

00:08:00,000 --> 00:08:02,000

from a single light source,

188

00:08:02,000 --> 00:08:05,000

which we've made look far off parallel

189

00:08:05,000 --> 00:08:07,000

using only the topography that they're sitting on.

190

00:08:07,000 --> 00:08:09,000

And I guess that means it's busted.

191

00:08:09,000 --> 00:08:10,000

Totally busted.

192

00:08:10,000 --> 00:08:13,000

You can achieve shadows that do not look parallel,

193

00:08:13,000 --> 00:08:15,000

but with a single light source.

194

00:08:25,000 --> 00:08:30,000

In a vacuum, stay puffed spacemen don't stay puffed for long.

195

00:08:30,000 --> 00:08:33,000

That's what happens to you in space if you don't have a space to.

196

00:08:33,000 --> 00:08:35,000

Oh, it's like a raisin.

197

00:08:35,000 --> 00:08:38,000

Well, as much as I love busting out the vacuum chamber,

198

00:08:38,000 --> 00:08:41,000

what does the marshmallow astronaut have to do with the moon?

199

00:08:41,000 --> 00:08:44,000

Okay, well, as we know, the surface of the moon is a vacuum

200

00:08:44,000 --> 00:08:46,000

and some of the conspiracy theories contend

201

00:08:46,000 --> 00:08:48,000

that the moon landing footage is fake

202

00:08:48,000 --> 00:08:50,000

because some of the things that they did

203

00:08:50,000 --> 00:08:52,000

are impossible to do in a vacuum.

204

00:08:52,000 --> 00:08:54,000

That's right. There's the one theory about the flag.

205

00:08:54,000 --> 00:08:57,000

A lot of people think it looks like it's flapping in the wind.

206

00:08:57,000 --> 00:08:59,000

Now, that would be impossible in a vacuum

207

00:08:59,000 --> 00:09:00,000

because no air, no wind.

208

00:09:00,000 --> 00:09:03,000

Someone actually told me a good one about the footprints.



209

00:09:03,000 --> 00:09:05,000

The idea is that the astronauts

210

00:09:05,000 --> 00:09:07,000

couldn't leave such distinct footprints on the moon

211

00:09:07,000 --> 00:09:10,000

because there's no moisture in a vacuum

212

00:09:10,000 --> 00:09:12,000

and the moisture is what holds the footprint together.

213

00:09:12,000 --> 00:09:14,000

So how are we going to test this one?

214

00:09:14,000 --> 00:09:16,000

I think we're going to need a bigger vacuum.

215

00:09:16,000 --> 00:09:18,000

And like way more marshmallows.

216

00:09:18,000 --> 00:09:21,000

These vacuum theories are some of the more convincing

217

00:09:21,000 --> 00:09:23,000

in the conspiracy canon.

218

00:09:23,000 --> 00:09:25,000

After all, it appears logical

219

00:09:25,000 --> 00:09:27,000

that the breeze that fluttered the flag

220

00:09:27,000 --> 00:09:29,000

just couldn't be there on the moon.

221

00:09:29,000 --> 00:09:31,000

And anyone who's taken a walk on a beach

222

00:09:31,000 --> 00:09:35,000

knows only wet sand leaves a definite footprint.

223

00:09:35,000 --> 00:09:37,000

So with no moisture on the moon,

224

00:09:37,000 --> 00:09:40,000

then these images must be faking.

225

00:09:40,000 --> 00:09:42,000

Okay, so we're going to have to replicate the conditions

226

00:09:42,000 --> 00:09:44,000

of the moon as close as possible here on Earth.

227

00:09:44,000 --> 00:09:46,000

Well, I think the closest we're going to get

228

00:09:46,000 --> 00:09:48,000

are the vacuum chambers in Alabama at NASA.

229

00:09:48,000 --> 00:09:50,000

Yeah, but we're not allowed to go into the vacuum chambers.

230

00:09:50,000 --> 00:09:52,000

So the experiments that we make,

231

00:09:52,000 --> 00:09:54,000

they're all going to have to be operated remotely.

232

00:09:54,000 --> 00:09:56,000

Okay, well, I'd like to do the flag test

233

00:09:56,000 --> 00:09:59,000

and build it to the original NASA specifications

234

00:09:59,000 --> 00:10:02,000

and then figure out some way to turn it like the astronauts did.

235

00:10:02,000 --> 00:10:05,000

All right, well, I'm going to take care of the footprint myth.

236

00:10:05,000 --> 00:10:07,000

I was wondering if you could help me with an experiment

237

00:10:07,000 --> 00:10:09,000

to demonstrate the whole theory behind the Smith.

238

00:10:09,000 --> 00:10:10,000

Voice boys, don't fight.

239

00:10:10,000 --> 00:10:12,000

Play me to go around.

240

00:10:12,000 --> 00:10:14,000

Outside M7,

241

00:10:14,000 --> 00:10:17,000

Tori sets up the demo with the closest thing he can find

242

00:10:17,000 --> 00:10:19,000

to lunar dust.

243

00:10:19,000 --> 00:10:23,000

I decided to borrow my grandfather for this experiment.

244

00:10:23,000 --> 00:10:25,000

And, uh...

245

00:10:25,000 --> 00:10:27,000

I don't think my grandma will mind,

246

00:10:27,000 --> 00:10:29,000

because, well, there's my grandma.

247

00:10:29,000 --> 00:10:31,000

Actually, it's plain old sand,

248

00:10:31,000 --> 00:10:33,000

one half of which Tori moistened.

249

00:10:33,000 --> 00:10:36,000

Now, conspiracy theorists say that this clean of an imprint

250

00:10:36,000 --> 00:10:38,000

is impossible because you need moisture,

251

00:10:38,000 --> 00:10:40,000

and since there's no moisture on the moon,

252

00:10:40,000 --> 00:10:42,000

this could not happen.

253

00:10:42,000 --> 00:10:44,000

Now, I'm going to demonstrate what they're talking about

254

00:10:44,000 --> 00:10:45,000

with the sand here.

255

00:10:45,000 --> 00:10:47,000

I have dry sand and I have wet sand.

256

00:10:47,000 --> 00:10:49,000

We're going to have Kerry put on a moon boot.

257

00:10:49,000 --> 00:10:51,000

You know how to moonwalk?

258

00:10:53,000 --> 00:10:54,000

Okay, so the answer is no.

259

00:10:54,000 --> 00:10:55,000

She's going to step in both,

260

00:10:55,000 --> 00:10:58,000

and we're going to see what kind of impression is left behind.



261

00:10:58,000 --> 00:10:59,000

Okay, ready?

262

00:10:59,000 --> 00:11:00,000

Yep.

263

00:11:01,000 --> 00:11:03,000

All right, do the wet.

264

00:11:05,000 --> 00:11:08,000

The wet sand is definitely cleaner than the dry sand.

265

00:11:08,000 --> 00:11:11,000

Yeah, you've got some really good hard lines in the wet sand.

266

00:11:11,000 --> 00:11:13,000

Yep, the moisture makes the difference.

267

00:11:13,000 --> 00:11:16,000

Without it, the imprint is indistinct,

268

00:11:16,000 --> 00:11:19,000

and nothing like Buzz Aldrin's famous boot print.

269

00:11:19,000 --> 00:11:21,000

Now, all we need to do is go to the moon,

270

00:11:21,000 --> 00:11:23,000

try this for real.

271

00:11:23,000 --> 00:11:25,000

I'm just kidding. We don't have the budget.

272

00:11:25,000 --> 00:11:27,000

To the moon, Tori! To the moon!

273

00:11:31,000 --> 00:11:34,000

Across the web, there's a host of hoax theories

274

00:11:34,000 --> 00:11:36,000

claiming NASA faked this footage.

275

00:11:36,000 --> 00:11:38,000

Look at the size of that rock!

276

00:11:38,000 --> 00:11:41,000

And a ton of TV covering the conspiracy claims.

277

00:11:41,000 --> 00:11:44,000

But no one has actually taken the time to test them.

278

00:11:44,000 --> 00:11:46,000

Until now.

279

00:11:46,000 --> 00:11:50,000

We'd like to dedicate the first step of Apollo 17

280

00:11:50,000 --> 00:11:53,000

to all those who made it possible.

281

00:11:53,000 --> 00:11:57,000

The next task in our moon myth-busting is this photo here.

282

00:11:57,000 --> 00:12:00,000

What conspiracy theorists say is that he's too well lit.

283

00:12:00,000 --> 00:12:06,000

You can see him clearly, yet he's in this black, black shadow of the limb.

284

00:12:06,000 --> 00:12:08,000

There's only one light source on the moon.

285

00:12:08,000 --> 00:12:09,000

That's the sun.

286

00:12:09,000 --> 00:12:13,000

Conspiracy theorists claim there must be a second one making him visible,

287

00:12:13,000 --> 00:12:14,000

and we're going to find out.

288

00:12:14,000 --> 00:12:18,000

And to do just that, the guys are going to shine a substitute sun

289

00:12:18,000 --> 00:12:21,000

on the very model of a modern miniature landing module.

290

00:12:21,000 --> 00:12:24,000

Oh, and a surprisingly talkative toy astronaut.

291

00:12:24,000 --> 00:12:27,000

This is my one-sixth scale model of Neil Armstrong.

292

00:12:27,000 --> 00:12:31,000

I can tell it's Neil because he's got the red commander of the mission

293

00:12:31,000 --> 00:12:32,000

stripes on his suit.

294

00:12:32,000 --> 00:12:33,000

What's that, Neil?

295

00:12:33,000 --> 00:12:35,000

We really went to the moon!

296

00:12:35,000 --> 00:12:36,000

I know.

297

00:12:36,000 --> 00:12:40,000

But the thing is, is that in order to prove that we've got to take some photographs

298

00:12:40,000 --> 00:12:42,000

and to take some accurate photographs, I've got to make a ship for you,

299

00:12:42,000 --> 00:12:43,000

a home for you.

300

00:12:43,000 --> 00:12:44,000

Okay.

301

00:12:44,000 --> 00:12:48,000

So these rolls of paper behind me are actually a lunar landing module

302

00:12:48,000 --> 00:12:51,000

in Potentia, which I'm about to slap together.

303

00:12:51,000 --> 00:12:57,000

And courtesy of what's known in the editing biz as a few jump cuts, here it is.

304

00:12:57,000 --> 00:13:02,000

Conspiracy theorists are saying that the shot had to have been fake using a filled light.

305

00:13:02,000 --> 00:13:05,000

Personally, I think it's because the moon's surface is reflective.

306

00:13:05,000 --> 00:13:09,000

And when you think about it, you look at the moon on a clear night,

307

00:13:09,000 --> 00:13:12,000

it's obviously reflecting light back at you.

308

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

That's why you see it.

309

00:13:13,000 --> 00:13:17,000

The question here is, is it enough to create this shot?

310

00:13:17,000 --> 00:13:24,000

To test Jamie's hypothesis that the mythical fill-in light is simply sunlight bouncing back off the moon's surface,

311

00:13:24,000 --> 00:13:26,000

the guys black out the set.

312

00:13:26,000 --> 00:13:28,000

Behold our moon landing set.



313

00:13:28,000 --> 00:13:32,000

Because it's all about reflectivity, we put blacks all around the shop,

314

00:13:32,000 --> 00:13:36,000

covered the whole set to eliminate any spill, any reflected light

315

00:13:36,000 --> 00:13:38,000

that's not coming directly from our moon's surface.

316

00:13:38,000 --> 00:13:43,000

That's the landing module, astronaut, lights, and camera sorted.

317

00:13:43,000 --> 00:13:44,000

Dude, this looks so cool.

318

00:13:44,000 --> 00:13:51,000

The only missing component is a moon dust analog that accurately reflects the reflective quality of the real stuff.

319

00:13:51,000 --> 00:13:54,000

The dust that covers the moon is called regolith.

320

00:13:54,000 --> 00:14:02,000

When the sunlight shines upon the moon, regolith reflects a certain amount of sunlight back towards Earth.

321

00:14:02,000 --> 00:14:05,000

That reflective quality is called its albedo.

322

00:14:05,000 --> 00:14:10,000

Now the albedo of moon dust is between 7 and 10 percent,

323

00:14:10,000 --> 00:14:12,000

according to our sources at NASA.

324

00:14:12,000 --> 00:14:16,000

To make our version of regolith, we used Portland cement and charcoal powder.

325

00:14:16,000 --> 00:14:23,000

Now, to measure the albedo or reflected light coming off of it, we used a light meter and our fake sun.

326

00:14:23,000 --> 00:14:25,000

8 percent, dude, that is perfect.

327

00:14:25,000 --> 00:14:32,000

What we just showed with this test is that our sample regolith has a reflective index of about 8 percent,

328

00:14:32,000 --> 00:14:34,000

which makes it ideal for us to test with.

329

00:14:34,000 --> 00:14:39,000

The best part about working with Jamie is that he doesn't need to use a lot of the light.

330

00:14:39,000 --> 00:14:41,000

He doesn't need a dust mask.

331

00:14:41,000 --> 00:14:45,000

The reason he's not wearing one is because this mustache provides all the particle filtering he needs.

332

00:14:45,000 --> 00:14:50,000

The mock-up moon is ready for its close-up, so it's probably time to up the jeopardy.

333

00:14:50,000 --> 00:14:52,000

Q.R. Resonant Drama King.

334

00:14:52,000 --> 00:14:54,000

This is the moment of truth.

335

00:14:54,000 --> 00:14:57,000

We've got an accurately shaped and textured moon lander,

336

00:14:57,000 --> 00:15:04,000

and we've concocted an accurate moon surface that has the same reflectivity index as the actual moon.

337

00:15:04,000 --> 00:15:06,000

The myth is to be believed.

338

00:15:06,000 --> 00:15:14,000

Our astronaut on the dark side in the shadow of the lander is going to just fade to total black when we try and take a picture of him.

339

00:15:14,000 --> 00:15:15,000

All right, you ready?

340

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

I'm set.

341

00:15:16,000 --> 00:15:17,000

All right, here we go.

342

00:15:17,000 --> 00:15:18,000

Taking the photo.

343

00:15:20,000 --> 00:15:21,000

Let's see.

344

00:15:21,000 --> 00:15:22,000

There it is.

345

00:15:22,000 --> 00:15:23,000

Well, there you go.

346

00:15:23,000 --> 00:15:26,000

He's standing full on in the shadow, and you'd think he wouldn't be able to see him.

347

00:15:26,000 --> 00:15:28,000

He'd be dark, but he's not.

348

00:15:28,000 --> 00:15:29,000

He's in brightest day.

349

00:15:29,000 --> 00:15:38,000

The myth here is that you would not be able to see this astronaut this clearly unless there was a secondary fill light illuminating him.

350

00:15:38,000 --> 00:15:42,000

Because he's in the shadow and there's only one light source on the moon, he would by definition be black.

351

00:15:42,000 --> 00:15:49,000

Our photo here proves just the opposite, that with a single light source, with the surface of the same reflectivity as the moon,

352

00:15:49,000 --> 00:15:53,000

our astronaut is clearly visible, busting that myth.

353

00:15:54,000 --> 00:15:59,000

Well, I think we have enough evidence to wrap up the photography portion of our moon myth testing.

354

00:15:59,000 --> 00:16:00,000

I agree.

355

00:16:00,000 --> 00:16:08,000

I mean, the conspiracy theorists had a lot of interesting ideas, but by the time you boil away all the hocus pocus, the explanation is really simple.

356

00:16:08,000 --> 00:16:13,000

And in our experience, the simplest explanation is usually the correct one.

357

00:16:13,000 --> 00:16:14,000

Exactly. Busted.

358

00:16:14,000 --> 00:16:15,000

Busted.

359

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

Music

360

00:16:21,000 --> 00:16:26,000

Carrie Grant and Tori are taking on tales from Moonhook's HQ.

361

00:16:26,000 --> 00:16:34,000

Conspiracy theorists believe the vacuum in space means these footprints are fake, and that flag shouldn't be flapping.

362

00:16:34,000 --> 00:16:42,000



This whole idea that the conspiracy theorists have is based on the fact that there is no wind or atmosphere in a vacuum.

363

00:16:42,000 --> 00:16:44,000

Nothing to blow the flag around.

364

00:16:44,000 --> 00:16:47,000

And they would be right about that fact.

365

00:16:47,000 --> 00:16:48,000

Sorry.

366

00:16:48,000 --> 00:16:51,000

The shaft is a little tight in the hole.

367

00:16:51,000 --> 00:17:02,000

My belief is that the astronauts moved the flag around as they were planting it in the surface of the moon, and that momentum is actually what they saw as a breeze.

368

00:17:02,000 --> 00:17:06,000

So to test this, I'll be building a replica of the lunar flag assembly.

369

00:17:06,000 --> 00:17:12,000

And then we'll put that in a vacuum, and I'll build a mechanism to rotate it the same way the astronauts did.

370

00:17:12,000 --> 00:17:15,000

Then we'll see if we get the same flapping motion.

371

00:17:15,000 --> 00:17:27,000

With the remote-controlled flag waiver and footprint maker almost complete, Carrie, inspired by footage from the Apollo 15 mission, adds one more test to the agenda.

372

00:17:27,000 --> 00:17:35,000

The really cool thing about a vacuum is that since there's no air resistance, something as light as a feather is going to drop the same rate as something as heavy as a hammer.

373

00:17:35,000 --> 00:17:44,000

So I should be able to put these in the vacuum and see them both hit the ground at the same time if it is a true vacuum.

374

00:17:44,000 --> 00:17:50,000

When we left hand, I have a feather. In my right hand, a hammer.

375

00:17:50,000 --> 00:17:59,000

Commander David Scott carried out his famous test to prove Galileo's hypothesis that all objects are affected equally by gravity.

376

00:17:59,000 --> 00:18:02,000

With no air resistance, they should fall at the same speed.

377

00:18:02,000 --> 00:18:06,000

How about that? Was it Mr. Galileo was correct?

378

00:18:06,000 --> 00:18:14,000

So as a control to confirm visually they're working with a vacuum, Carrie rigs a clamp to drop them at the same time.

379

00:18:14,000 --> 00:18:22,000

And with both remote-controlled devices ready to go, the team heads for the George Marshall Space Center in Alabama.

380

00:18:22,000 --> 00:18:27,000

Oh my God! These are all vacuum chambers? How great is that?

381

00:18:27,000 --> 00:18:34,000

It's always that NASA is opening their doors to let us come in and test this myth. That's how confident they are that this is a myth.

382

00:18:34,000 --> 00:18:38,000

Alright, close the door. Let's see if we can pull our feelings out.

383

00:18:38,000 --> 00:18:44,000

You know, I heard this was actually a fuel tank from a 7.5 rocket that they converted into a vacuum chamber.

384

00:18:44,000 --> 00:18:47,000

They're just like us. They recycle their old stuff.

385

00:18:47,000 --> 00:18:53,000

And to show us their recycled stuff is NASA vacuum technician Michael Terry.

386

00:18:53,000 --> 00:18:54,000

So you know how to use this thing?

387

00:18:54,000 --> 00:18:55,000

Oh yeah.

388

00:18:55,000 --> 00:18:57,000

And you're actually going to let us use it?

389

00:18:57,000 --> 00:19:00,000

Yeah. I think I will. Let's just be careful.

390

00:19:00,000 --> 00:19:03,000

He's obviously never seen the show before.

391

00:19:09,000 --> 00:19:13,000

Look at it. It's like they cut the arms off of a space suit.

392

00:19:13,000 --> 00:19:16,000

Wait, did your head go here?

393

00:19:16,000 --> 00:19:18,000

Yeah, that's where it goes.

394

00:19:18,000 --> 00:19:19,000

That's awesome.

395

00:19:19,000 --> 00:19:25,000

Yep, reaching inside a vacuum doesn't come cheap. These are essentially genuine space suit parts.

396

00:19:25,000 --> 00:19:27,000

How much are these gloves worth?

397

00:19:27,000 --> 00:19:30,000

Approximately they're worth almost a half a million dollars.

398

00:19:30,000 --> 00:19:33,000

Michael really hasn't seen the show before.

399

00:19:33,000 --> 00:19:35,000

Cap out! Cap out!

400

00:19:35,000 --> 00:19:37,000

It's a portable hug.

401

00:19:37,000 --> 00:19:39,000

So you're going to show us how to use these?

402

00:19:39,000 --> 00:19:43,000

Sure. I'll try to do my best. Get you guys to do your hand check.

403

00:19:43,000 --> 00:19:46,000

Fingernails need to be shortened up and clipped.

404

00:19:46,000 --> 00:19:53,000

The arms are everything I expected. They're all 1950s pop space movie looking kind of robot arms.

405

00:19:53,000 --> 00:19:56,000

The only downside is, I've got to cut my fingernails.

406

00:19:58,000 --> 00:20:03,000

After the mandatory hand check and fitting, the testing can begin for real.

407

00:20:03,000 --> 00:20:06,000

And first up, Carrie's hammer and feather rig.

408

00:20:06,000 --> 00:20:09,000

It's good enough. It's not like it's rocket science.

409

00:20:09,000 --> 00:20:11,000

I don't think you can say that around here.

410

00:20:11,000 --> 00:20:12,000

I guess you're right.

411

00:20:12,000 --> 00:20:17,000

The teams seal the chamber, but for this control, they don't create a vacuum.

412

00:20:17,000 --> 00:20:21,000

Atmospheric pressure in three, two, one.



413

00:20:22,000 --> 00:20:25,000

Cool. The hammer hit first. Perfect.

414

00:20:25,000 --> 00:20:27,000

So the laws of physics still apply.

415

00:20:27,000 --> 00:20:31,000

I dropped the hammer and the feather at atmospheric pressure exactly at the same time.

416

00:20:31,000 --> 00:20:34,000

Hammer hit first, feather glided down and hit last.

417

00:20:34,000 --> 00:20:39,000

So after the air is removed from the chamber, Carrie is ready to repeat the drop.

418

00:20:39,000 --> 00:20:42,000

In three, two, one.

419

00:20:45,000 --> 00:20:47,000

That is so cool.

420

00:20:47,000 --> 00:20:55,000

Yep. When there's no air resistance or drag, all objects are equally affected by gravity and fall at the same rate.

421

00:20:55,000 --> 00:20:58,000

So we do indeed have a vacuum.

422

00:20:58,000 --> 00:21:00,000

All right. Well, let's move on to our first moon test.

423

00:21:00,000 --> 00:21:02,000

All right. You got your boot? Yeah, I got my boot.

424

00:21:02,000 --> 00:21:03,000

All right.

425

00:21:10,000 --> 00:21:18,000

You know, one of the other ways that conspiracy theorists claim NASA botched up their faking of the moon landing

426

00:21:18,000 --> 00:21:23,000

is evident, they say, in the movie footage of the astronauts jumping around in the moon's gravitational force.

427

00:21:23,000 --> 00:21:25,000

They say it was all done with camera trickery.

428

00:21:25,000 --> 00:21:27,000

Like messing around with the frame rates and stuff.

429

00:21:27,000 --> 00:21:32,000

Yeah. Which falls into the category of special effects, which should be a cinch for us to test.

430

00:21:32,000 --> 00:21:33,000

I agree.

431

00:21:33,000 --> 00:21:34,000

Let's do it.

432

00:21:35,000 --> 00:21:40,000

The myth states that this famous footage was faked by slowing it down.

433

00:21:40,000 --> 00:21:45,000

The astronauts are simply skipping around on a film set in slow motion.

434

00:21:45,000 --> 00:21:51,000

So are these iconic images full speed fact or slow motion fake?

435

00:21:54,000 --> 00:21:57,000

Specifically, what are the conspiracy guys saying?

436

00:21:57,000 --> 00:22:02,000

Well, they're claiming that when you look at the footage of the astronauts hopping around slowly in the moon's gravitational field,

437

00:22:02,000 --> 00:22:08,000

which is one sixth that of Earth, that that movement was achieved not by going to the moon,

438

00:22:08,000 --> 00:22:12,000

but by using a special camera which filmed the astronauts at a higher speed than normal

439

00:22:12,000 --> 00:22:18,000

so that when it was projected back at a normal frame rate, the astronauts' movements were slowed down,

440

00:22:18,000 --> 00:22:20,000

imitating the way it would look on the moon.

441

00:22:20,000 --> 00:22:23,000

Well, we should do exactly that and see what it looks like.

442

00:22:23,000 --> 00:22:26,000

That's exactly what I was thinking. Let's do it.

443

00:22:27,000 --> 00:22:33,000

And to recreate their very own moonwalk, they're back at the Alameda Naval Base and building 24.

444

00:22:33,000 --> 00:22:34,000

You ready?

445

00:22:34,000 --> 00:22:35,000

Ready isn't gonna be.

446

00:22:35,000 --> 00:22:39,000

Here they've been wet and wild while running in the rain.

447

00:22:39,000 --> 00:22:42,000

Oh, I gotta tell you, I'm pretty happy about this thing right now.

448

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

They've gone up like a lead balloon.

449

00:22:44,000 --> 00:22:46,000

It's time to burn for science.

450

00:22:46,000 --> 00:22:51,000

And blazed up burning trail, but this time they're shooting for the moon.

451

00:22:51,000 --> 00:22:54,000

So, welcome to Myths and Control.

452

00:22:54,000 --> 00:22:57,000

Here at Command Central, we're gonna take us our jumping off point.

453

00:22:57,000 --> 00:23:03,000

In testing this, Myth, NASA's actual footage of the moon landing.

454

00:23:03,000 --> 00:23:09,000

We're gonna try and replicate several of the gestures we see the astronauts doing on the moon,

455

00:23:09,000 --> 00:23:12,000

and the three we've narrowed it down to are jumping straight up into the air.

456

00:23:12,000 --> 00:23:15,000

Come on out here and give me a salute.

457

00:23:15,000 --> 00:23:17,000

Big Davies salute.

458

00:23:17,000 --> 00:23:19,000

Off the ground, on the floor.

459

00:23:19,000 --> 00:23:22,000

Skipping, which is kind of a two leg hop.

460

00:23:22,000 --> 00:23:25,000

Notice he puts both feet on the ground at the same time with each jump,

461

00:23:25,000 --> 00:23:28,000

and it looks like it's a really efficient way to move around.

462

00:23:28,000 --> 00:23:31,000

The third is just a straight leg over leg run.

463

00:23:31,000 --> 00:23:36,000

We're gonna match the camera angle and match the techniques supposedly used to fake it and see what we get.



464

00:23:36,000 --> 00:23:41,000

With those three actions and camera angles in mind, we can begin phase one of the test.

465

00:23:41,000 --> 00:23:45,000

As point of comparison, Adam will simply recreate the myth.

466

00:23:45,000 --> 00:23:50,000

In full costume, he'll run, jump, and skip as if he's bounding around on the moon,

467

00:23:50,000 --> 00:23:53,000

and then we'll slow down the tape and take a look.

468

00:23:53,000 --> 00:23:55,000

This is called the Snoopy Cat.

469

00:23:55,000 --> 00:23:57,000

It's the Mythbuster model.

470

00:23:57,000 --> 00:24:00,000

If it's worth doing, it's worth overdoing.

471

00:24:09,000 --> 00:24:12,000

Let me take you on a little tour of what I'm wearing.

472

00:24:12,000 --> 00:24:16,000

This is in fact a wedding present from my crew a few years ago,

473

00:24:16,000 --> 00:24:19,000

but when I got it, it was lovely but not quite accurate enough.

474

00:24:19,000 --> 00:24:24,000

So I redid the gloves, I added my label, I did a wrist checklist, I did the correct watch,

475

00:24:24,000 --> 00:24:29,000

I added all the hardware attachments, all the labeling on the front pack and the back pack.

476

00:24:29,000 --> 00:24:32,000

I decided to make myself the mission captain with the red stripes,

477

00:24:32,000 --> 00:24:35,000

and this is the first time I've ever gotten to wear it all at once.

478

00:24:35,000 --> 00:24:38,000

I've got a lot of tools and gadgets and stuff.

479

00:24:38,000 --> 00:24:40,000

Adam has space suits.

480

00:24:40,000 --> 00:24:43,000

By the way, I should point out this is not a real space suit.

481

00:24:43,000 --> 00:24:46,000

It's just my wear-around town space suit.

482

00:24:50,000 --> 00:24:53,000

Come on out here and give me a salute.

483

00:24:54,000 --> 00:24:59,000

Carrie Grant and Tori are tackling the moon landing hoax theories that involve a vacuum.

484

00:25:01,000 --> 00:25:07,000

Some of the first words spoken from the moon's surface answered the simple but powerful question.

485

00:25:07,000 --> 00:25:09,000

It's almost like a powder.

486

00:25:09,000 --> 00:25:11,000

What did it feel like?

487

00:25:11,000 --> 00:25:19,000

I had the same footprints of my boots and they find them in the particles.

488

00:25:19,000 --> 00:25:23,000

But did Buzz Aldrin really make such an impression on the moon?

489

00:25:23,000 --> 00:25:28,000

To find out if moon boots make boot prints, Tori's borrowed the real deal.

490

00:25:28,000 --> 00:25:29,000

Look what I got.

491

00:25:29,000 --> 00:25:30,000

A real moon boot.

492

00:25:30,000 --> 00:25:31,000

Wow.

493

00:25:31,000 --> 00:25:32,000

Isn't that cool?

494

00:25:32,000 --> 00:25:33,000

That looks just like Adams.

495

00:25:33,000 --> 00:25:34,000

Yeah.

496

00:25:34,000 --> 00:25:35,000

So this is the actual article.

497

00:25:35,000 --> 00:25:36,000

Yep.

498

00:25:36,000 --> 00:25:40,000

Now all we have to do is put it on the moon stopper, smash it in some dust and see if it leaves a footprint.

499

00:25:40,000 --> 00:25:42,000

This conspiracy theory is pretty interesting.

500

00:25:42,000 --> 00:25:46,000

They say that because there's a vacuum on the moon and there's no water vapor.

501

00:25:46,000 --> 00:25:47,000

Does that fit?

502

00:25:47,000 --> 00:25:48,000

You feel your toe there?

503

00:25:48,000 --> 00:25:54,000

You can't leave a clear imprint from your boots the way they did in the photos from the lunar landing.

504

00:25:55,000 --> 00:25:57,000

I'm not so sure about that.

505

00:25:57,000 --> 00:26:05,000

With just 840 pounds of lunar material returned to Earth from all of the Apollo missions, there's not much of it to go around.

506

00:26:05,000 --> 00:26:10,000

So for this test, NASA has given us a lunar regolith simulant.

507

00:26:10,000 --> 00:26:14,000

It's a manufacturer to test equipment that is going to the moon.

508

00:26:14,000 --> 00:26:18,000

It's very similar to lunar dust and the fact that each particle is very sharp.

509

00:26:18,000 --> 00:26:22,000

Dirt on Earth has been weathered so it's very smooth.

510

00:26:22,000 --> 00:26:25,000

So this is as close to lunar dust as we can get.

511

00:26:25,000 --> 00:26:27,000

That's likely to be the key to this myth.

512

00:26:27,000 --> 00:26:32,000

A comparison of the physical properties of sand and lunar regolith.

513

00:26:32,000 --> 00:26:39,000

Down here, a footprint in dry sand collapses because the weathered particles can't bind together without water.

514

00:26:39,000 --> 00:26:51,000

But up on the moon, other bonding agents are at work, one of which the irregular and jagged shapes of lunar dust could cause it to stick together in those famous boot prints.



515

00:26:51,000 --> 00:26:59,000

Will the irregular shape of lunar regolith in conjunction with the vacuum result in a clean boot print and bust the myth?

516

00:26:59,000 --> 00:27:02,000

Alright, so this is the myth buster's first step on the moon.

517

00:27:02,000 --> 00:27:04,000

So it's one giant leap for myth time.

518

00:27:04,000 --> 00:27:07,000

Oh, I think we just went like 20 steps backwards.

519

00:27:07,000 --> 00:27:09,000

Give it a shot.

520

00:27:09,000 --> 00:27:15,000

The rig is ready to take its one-legged step and the vacuum chamber has been vacuumed.

521

00:27:15,000 --> 00:27:18,000

Boot stop vacuum. Here we go.

522

00:27:18,000 --> 00:27:22,000

In three, two, one.

523

00:27:23,000 --> 00:27:26,000

Yeah! Take that!

524

00:27:26,000 --> 00:27:28,000

Yeah!

525

00:27:28,000 --> 00:27:31,000

It works! In your face, conspiracy theorist!

526

00:27:31,000 --> 00:27:33,000

Yep, it really does work.

527

00:27:33,000 --> 00:27:36,000

Moon landing one, conspiracy theorist zero.

528

00:27:36,000 --> 00:27:42,000

That's one small step for man, one giant leap for myth time.

529

00:27:42,000 --> 00:27:47,000

So it seems you can make a clean, stable footprint in a vacuum.

530

00:27:47,000 --> 00:27:50,000

Look at that. We made a footprint inside of a vacuum.

531

00:27:50,000 --> 00:27:54,000

And there was no water vapor, which is what this conspiracy theory is all about.

532

00:27:54,000 --> 00:27:58,000

Gravity is six times stronger on Earth than it is on the moon, so if we made a footprint here,

533

00:27:58,000 --> 00:28:00,000

we're definitely making one on the moon.

534

00:28:00,000 --> 00:28:02,000

So I guess this conspiracy theory is busting.

535

00:28:02,000 --> 00:28:03,000

Busted.

536

00:28:03,000 --> 00:28:04,000

Busted.

537

00:28:04,000 --> 00:28:06,000

Now NASA will let us out of here.

538

00:28:13,000 --> 00:28:18,000

We choose to go to the moon in this decade and do the other things.

539

00:28:18,000 --> 00:28:22,000

Not because they are easy, but because they are hard.

540

00:28:22,000 --> 00:28:26,000

John F. Kennedy started the race to the moon in a speech he gave in 1961,

541

00:28:26,000 --> 00:28:31,000

famously challenging the nation's finest minds to shoot for another world.

542

00:28:31,000 --> 00:28:38,000

Less than a decade later, they succeeded and eventually 12 astronauts left their mark on the moon's surface.

543

00:28:38,000 --> 00:28:41,000

Or did they?

544

00:28:41,000 --> 00:28:49,000

To find out, Adam and Jamie are testing the myth that to fake the footage, NASA filmed it in a studio and then slowed it down.

545

00:28:49,000 --> 00:28:54,000

And to test that claim, Adam and Jamie will do exactly the same.

546

00:28:54,000 --> 00:29:05,000

By recording at 48 frames per second and playing back the tape at the regular 24, you get beautifully smooth slow motion.

547

00:29:05,000 --> 00:29:07,000

Alright, do the run.

548

00:29:07,000 --> 00:29:11,000

With this effect, Adam's movements do have a certain weightless quality.

549

00:29:11,000 --> 00:29:17,000

But to be sure if it's the technique NASA used, we have to simulate one-sixth gravity, repeat the three actions,

550

00:29:17,000 --> 00:29:20,000

and then compare the footage.

551

00:29:20,000 --> 00:29:22,000

Now it's time to break out the gravity rig.

552

00:29:22,000 --> 00:29:26,000

And this was put together for us purpose-built by Trapeze World.

553

00:29:26,000 --> 00:29:33,000

With years of experience in designing gravity-defined circus rigs, Trapeze World are the perfect guys for this job.

554

00:29:33,000 --> 00:29:36,000

So Graham, you got the rig all set up. How's it work?

555

00:29:36,000 --> 00:29:44,000

Well, we'll have Adam in a harness, which is attached to a set of bungees, which is then attached to a tracking system that allows us to move him forward and back.

556

00:29:48,000 --> 00:29:53,000

Okay, well, I can see it worse. Let's get Adam in it.

557

00:29:53,000 --> 00:30:00,000

The gravity rig is designed to give me total freedom of motion while making me weigh exactly what an astronaut on the moon would weigh.

558

00:30:00,000 --> 00:30:05,000

That is one-sixth of what that fully loaded astronaut would have weighed on Earth.

559

00:30:05,000 --> 00:30:08,000

Well, the other thing they'll have to put on the suit and really try this.

560

00:30:08,000 --> 00:30:15,000

Now, I know before you write to complain that this suits a replica, that it's not pressurized, that I'm not doing this in a vacuum or with real moon dust around.

561

00:30:15,000 --> 00:30:21,000

I know. What we were trying to look at here is purely about the movement and gesture of the astronauts.

562

00:30:23,000 --> 00:30:35,000

We know that Neil Armstrong and all of his gear weighed about 350-360 pounds, which means if I'm going to be correctly weighted for our moon, I'm going to need to weigh just about 60 pounds.

563

00:30:37,000 --> 00:30:41,000

Ah, 62. That's close enough for me, man. Let's do it.

564

00:30:41,000 --> 00:30:47,000

So, under lunar-like gravitational conditions, Adam gets to repeat his moonwalk exercises.



565

00:30:47,000 --> 00:30:52,000

But the difference between Adam and Armstrong is NASA's rigorous training regime.

566

00:30:52,000 --> 00:30:59,000

It's a thing to wear a rig like this. It takes a lot of stamina. It's also making me quite sore in some very private places.

567

00:31:00,000 --> 00:31:06,000

Adam is discovering being in one-sixth gravity makes it simpler to moonwalk.

568

00:31:07,000 --> 00:31:13,000

It's a lot easier in this rig to match the kind of movements we see the astronauts make in the NASA footage.

569

00:31:13,000 --> 00:31:21,000

I mean, it really kind of lends itself to the weird center of gravity that happens when you weigh less, how much little movements make a big difference in how you go.

570

00:31:22,000 --> 00:31:25,000

I feel like this is looking really close to what NASA shows on the moon.

571

00:31:25,000 --> 00:31:34,000

Adam's right. On first viewing, it does appear to be a closer match. But at mythian control, the evidence is far from clear cut.

572

00:31:34,000 --> 00:31:44,000

If you take a close look at the slow-motion skip, Adam's efforts to get the correct height and distance means his helmet is jerking around in a distinctly Earth-like fashion.

573

00:31:45,000 --> 00:31:54,000

But it's equally clear the gravity rig doesn't quite work either. Adam's weight might be technically correct, but he lacks that smooth, low-gravity look.

574

00:31:56,000 --> 00:31:57,000

Check it out.

575

00:31:57,000 --> 00:32:02,000

Oh, actually, you know what? Can we review this in a blooper room? I gotta get out of this rig. I'm exhausted.

576

00:32:02,000 --> 00:32:03,000

Okay.

577

00:32:06,000 --> 00:32:07,000

Big baby.

578

00:32:08,000 --> 00:32:12,000

Back at HQ, the guys settled in to review the footage in detail.

579

00:32:13,000 --> 00:32:16,000

The lower right is much better, but it's not even close.

580

00:32:16,000 --> 00:32:20,000

But just like Sir Mick, they still can't get no satisfaction.

581

00:32:20,000 --> 00:32:23,000

Well, the slow-down frame rate doesn't match the NASA footage.

582

00:32:23,000 --> 00:32:24,000

No.

583

00:32:24,000 --> 00:32:30,000

The gravity rig, it's better, but I'd still have to say it doesn't nail it.

584

00:32:30,000 --> 00:32:36,000

Yeah, neither of them are there. I wish that we could somehow get ourselves into a moon's gravity environment.

585

00:32:36,000 --> 00:32:38,000

Then I'd feel comfortable calling this one.

586

00:32:38,000 --> 00:32:39,000

That can be arranged.

587

00:32:39,000 --> 00:32:40,000

Really?

588

00:32:40,000 --> 00:32:50,000

Yeah, there's a company called Zero G, which offers the only FAA-approved weightless experience, and they do moon gravity as well.

589

00:32:50,000 --> 00:32:53,000

That is fantastic. Let's suit up and get out there.

590

00:32:53,000 --> 00:32:54,000

Okay.

591

00:32:54,000 --> 00:33:03,000

It's iconic footage, replayed countless times across the globe.

592

00:33:03,000 --> 00:33:09,000

American astronauts planting the stars and stripes on man's newly conquered neighbor.

593

00:33:09,000 --> 00:33:12,000

It's gotta be one of the most proud moments of my life, I guarantee ya.

594

00:33:12,000 --> 00:33:20,000

To find out if it really was a PR stunt, Carrie Grantontori have breached NASA's inner sanctum.

595

00:33:20,000 --> 00:33:29,000

Now, the conspiracy theorists think that they see some sort of breeze blowing around the flag, which you wouldn't have on the moon since there's no atmosphere.

596

00:33:29,000 --> 00:33:33,000

So, I've built a replica of the lunar flag assembly.

597

00:33:33,000 --> 00:33:40,000

We're gonna put it in a vacuum chamber, pump out all the air, and see if we can move it around just like the astronauts would have done placing it on the moon.

598

00:33:40,000 --> 00:33:43,000

See if we see that back and forth motion.

599

00:33:43,000 --> 00:33:49,000

And to help us get a notion of the motion in a vacuum is NASA's very own Donna Severance.

600

00:33:49,000 --> 00:33:51,000

The oxygen deficiency alarm?

601

00:33:51,000 --> 00:33:52,000

Yeah.

602

00:33:52,000 --> 00:33:54,000

Is that something we should be concerned about?

603

00:33:54,000 --> 00:33:55,000

Only if it goes off.

604

00:33:55,000 --> 00:34:00,000

So, this is not your ordinary type of vacuum chamber. This is a clean chamber.

605

00:34:00,000 --> 00:34:02,000

We're ready for the shower.

606

00:34:02,000 --> 00:34:12,000

Which means there's no dust, no dander, nothing that will contaminate the chamber because it is designed to test things that are going into space.

607

00:34:12,000 --> 00:34:14,000

Alright, time for the flag.

608

00:34:14,000 --> 00:34:19,000

The flag assembly is an exact replica of the one used on the Apollo missions.

609

00:34:19,000 --> 00:34:25,000

The horizontal rod specifically prevents the flag collapsing in a windless environment.

610

00:34:28,000 --> 00:34:33,000

Hey Grant, this is your first rig in space.

611

00:34:33,000 --> 00:34:36,000

I gotta go.

612

00:34:36,000 --> 00:34:44,000

First off, to confirm the rig in space, is working, is the all-important control.

613

00:34:44,000 --> 00:34:45,000

You guys ready?

614

00:34:45,000 --> 00:34:46,000

Yeah.



615

00:34:46,000 --> 00:34:49,000

Alright, this is the control at regular atmospheric pressure.

616

00:34:49,000 --> 00:34:56,000

And I'm just gonna shake the flag as if I were an astronaut planting it in the surface of the moon.

617

00:34:56,000 --> 00:34:57,000

Alright, ready?

618

00:34:57,000 --> 00:34:58,000

BD Aster.

619

00:34:58,000 --> 00:34:59,000

Here we go.

620

00:34:59,000 --> 00:35:02,000

Three, two, one.

621

00:35:02,000 --> 00:35:07,000

Alright, it's moving.

622

00:35:07,000 --> 00:35:08,000

And ready.

623

00:35:11,000 --> 00:35:19,000

As expected, the momentum of the twisting and turning quickly dissipates and the flag is stationary in no time at all.

624

00:35:19,000 --> 00:35:22,000

Okay, I guess we put a vacuum on it and see what happens.

625

00:35:22,000 --> 00:35:24,000

Alright, let's start sucking the air out.

626

00:35:24,000 --> 00:35:31,000

So, vacuum tectonics turns on the pumps and with the air removed, the guys get ready to plant the stars and stripes.

627

00:35:31,000 --> 00:35:32,000

Here we go.

628

00:35:32,000 --> 00:35:37,000

This is flag waving test in a vacuum.

629

00:35:37,000 --> 00:35:41,000

Okay, planting it on the surface of the moon and stop.

630

00:35:41,000 --> 00:35:42,000

Oh, it's moving.

631

00:35:42,000 --> 00:35:43,000

It's moving a lot.

632

00:35:43,000 --> 00:35:44,000

It's moving a lot.

633

00:35:44,000 --> 00:35:45,000

It's moving a lot.

634

00:35:45,000 --> 00:35:46,000

It's moving a lot.

635

00:35:46,000 --> 00:35:47,000

It's still moving.

636

00:35:47,000 --> 00:35:48,000

That's awesome.

637

00:35:48,000 --> 00:35:50,000

There you go.

638

00:35:50,000 --> 00:35:57,000

Without drag or friction from the air, the momentum of Grant's planting action lasts for a surprising amount of time.

639

00:35:57,000 --> 00:36:02,000

It could be mistaken for a breeze, but it's lower air resistance.

640

00:36:02,000 --> 00:36:08,000

Comparing it to the control in regular atmospheric pressure illustrates that theory beautifully.

641

00:36:08,000 --> 00:36:13,000

And if there was still any doubt, it looks almost identical to the NASA footage.

642

00:36:13,000 --> 00:36:16,000

So in the vacuum, the flag moved, you know, not just a little bit.

643

00:36:16,000 --> 00:36:18,000

It actually moved quite a bit.

644

00:36:18,000 --> 00:36:23,000

So that proves you don't need wind in order to move the flag in a vacuum.

645

00:36:23,000 --> 00:36:31,000

So unless someone finds a shot of the flag flapping without an astronaut manipulating the flagpole, it's myth busted.

646

00:36:31,000 --> 00:36:37,000

We've come all the way to Alabama and the NASA to find out once and for all if the conspiracy theorists were correct.

647

00:36:37,000 --> 00:36:38,000

Where are we at?

648

00:36:38,000 --> 00:36:43,000

Well, we showed that a moon boot can make a footprint in lunar dust inside of a vacuum.

649

00:36:43,000 --> 00:36:44,000

So that one's busted.

650

00:36:44,000 --> 00:36:48,000

And momentum alone will keep a flag waving in a vacuum.

651

00:36:48,000 --> 00:36:49,000

You don't need any wind.

652

00:36:49,000 --> 00:36:52,000

So NASA 2, conspiracy theorists, zero.

653

00:36:54,000 --> 00:36:56,000

NASA 2, conspiracy theorists, zero.

654

00:37:00,000 --> 00:37:06,000

Adam and Jamie have already seen that NASA didn't slow down the film to fake the Apollo mission moonwalks.

655

00:37:06,000 --> 00:37:15,000

But to conclusively confirm that the footage was shot in one-sixth gravity, they decided they had to experience the real thing.

656

00:37:15,000 --> 00:37:20,000

And here at Zero G in Florida, they get to do just that.

657

00:37:21,000 --> 00:37:23,000

In order for us to do this accurately, we need to be properly weighted.

658

00:37:23,000 --> 00:37:33,000

Since Zero G is providing us with the moon's gravity, one-sixth Earth's gravity, I need to have the exact amount of equipment weight on me that the original Apollo astronauts had on the moon.

659

00:37:33,000 --> 00:37:37,000

And that's about 180 pounds of stuff.

660

00:37:37,000 --> 00:37:39,000

And it's uncomfortable.

661

00:37:39,000 --> 00:37:42,000

Adam's struggling with the excess baggage.

662

00:37:42,000 --> 00:37:43,000

This is unpleasant.

663

00:37:43,000 --> 00:37:49,000

Jamie, on the other hand, is keen to display his alpha male suit.

664

00:37:49,000 --> 00:37:51,000

Alpha male status.

665

00:37:53,000 --> 00:37:58,000

A status damaged after being forced to join Adam, playing dress-ups.



666

00:37:58,000 --> 00:38:00,000

I never thought I'd see the day.

667

00:38:00,000 --> 00:38:07,000

With the way in complete, it's time for the pre-flight briefing with in-flight in-fall from Zero G's Elizabeth Underwood.

668

00:38:07,000 --> 00:38:12,000

Elizabeth, now that we're just about to go on, I want to know how good a simulation of zero gravity is this?

669

00:38:12,000 --> 00:38:15,000

It's not a simulation at all. It is the real deal.

670

00:38:15,000 --> 00:38:20,000

It's the exact same technique that NASA's been using to train their astronauts for the last 50 years.

671

00:38:20,000 --> 00:38:21,000

And it works like this.

672

00:38:21,000 --> 00:38:27,000

A series of parabolic arcs will give the passengers the physical sensation of weightlessness.

673

00:38:27,000 --> 00:38:42,000

And just for us, the pilot will adjust the angle of the parabola, making the microgravity in the cabin an exact match to the moon's gravitational pull, which just leaves the guys to step up, strap in, take off, and suit up.

674

00:38:42,000 --> 00:38:43,000

I look good, right?

675

00:38:43,000 --> 00:38:44,000

I look good.

676

00:38:44,000 --> 00:38:45,000

I look damn good.

677

00:38:45,000 --> 00:38:50,000

So right now, I'm loaded up with an extra 180 pounds on my body.

678

00:38:50,000 --> 00:38:55,000

In a few minutes, we're going to actually get to try this out in moon's gravity, and I've got to tell you.

679

00:38:55,000 --> 00:38:59,000

I can't wait. This is a heavy suit.

680

00:38:59,000 --> 00:39:05,000

Adam doesn't have to wait long because the guides soon have everyone into position for the first pass.

681

00:39:05,000 --> 00:39:09,000

And as G-Force 1 gently arcs into its dive...

682

00:39:09,000 --> 00:39:10,000

Ah, that feels cool.

683

00:39:10,000 --> 00:39:12,000

Adam and Jamie...

684

00:39:12,000 --> 00:39:14,000

Here it comes.

685

00:39:14,000 --> 00:39:17,000

...know what it feels like to walk on the moon.

686

00:39:17,000 --> 00:39:18,000

Whoa!

687

00:39:18,000 --> 00:39:20,000

Wow!

688

00:39:20,000 --> 00:39:27,000

That's 100% wacky right there.

689

00:39:27,000 --> 00:39:33,000

Calibrated to match the moon's gravitational pull, the guys just get time to take it all in before...

690

00:39:34,000 --> 00:39:37,000

The call goes out to hit the deck.

691

00:39:37,000 --> 00:39:42,000

Because as the plane begins to pull out of the dive, the G-Forces go into the positive.

692

00:39:42,000 --> 00:39:44,000

There is a cost to being weightless.

693

00:39:44,000 --> 00:39:50,000

The other end of the roller coaster, you've got almost twice Earth's gravity.

694

00:39:50,000 --> 00:39:52,000

It's kind of terrifying at first, isn't it?

695

00:39:52,000 --> 00:39:53,000

Yeah, it is!

696

00:39:53,000 --> 00:39:55,000

I've never experienced anything like that.

697

00:39:55,000 --> 00:40:00,000

It is really disconcerting to first-way double your weight, and then 1-6th your weight.

698

00:40:00,000 --> 00:40:04,000

In fact, at 1-6th my weight, I felt pretty much weightless.

699

00:40:04,000 --> 00:40:07,000

I felt like I could jump 10 feet in the air.

700

00:40:07,000 --> 00:40:09,000

This is at first, even for me.

701

00:40:09,000 --> 00:40:13,000

Now that the guys have their bearings, the testing can begin.

702

00:40:13,000 --> 00:40:16,000

Ready?

703

00:40:16,000 --> 00:40:24,000

Adam copies the same run and skip as before...

704

00:40:24,000 --> 00:40:29,000

This time, leaving out the jump because of height restrictions in the cabin.

705

00:40:32,000 --> 00:40:36,000

The movement felt totally natural as soon as I started doing it.

706

00:40:36,000 --> 00:40:38,000

All the NASA footage makes sense to me now.

707

00:40:38,000 --> 00:40:43,000

The skipping they did is a totally efficient way to move in that gravitational pull.

708

00:40:43,000 --> 00:40:48,000

I couldn't think of a better confirmation for the NASA footage than trying this myself.

709

00:40:48,000 --> 00:40:56,000

When Adam was walking or running, he was experiencing the exact same thing that Neil Armstrong would have on the moon.

710

00:40:56,000 --> 00:40:59,000

It was 1-6th Earth's gravity.

711

00:40:59,000 --> 00:41:02,000

Adam did a great job with the bungee cords.

712

00:41:02,000 --> 00:41:12,000

It looked pretty convincing, but being here on this plane in microgravity and watching him, it's totally different.

713

00:41:12,000 --> 00:41:17,000

Nothing really compares to what we saw here on this plane, so as far as I'm concerned,

714

00:41:17,000 --> 00:41:19,000

they went to the moon.

715

00:41:19,000 --> 00:41:25,000

Dude, that was awesome. We have been very thorough here.



716

00:41:25,000 --> 00:41:27,000

Yeah, you can't get much tidier than that.

717

00:41:27,000 --> 00:41:34,000

I mean, not only did we start out by replicating precisely the circumstances that theorists say were used to fake the moon footage.

718

00:41:34,000 --> 00:41:38,000

But we also put ourselves in a calibrated moon gravity environment.

719

00:41:38,000 --> 00:41:40,000

The theory that it's faked? Busted.

720

00:41:40,000 --> 00:41:41,000

Busted.

721

00:41:48,000 --> 00:42:01,000

When the team began their lunar-lunacy jigsaw puzzle, they knew they couldn't cover every conspiracy cheerleaders claim.

722

00:42:01,000 --> 00:42:03,000

This is the moment of truth.

723

00:42:03,000 --> 00:42:08,000

But the few pieces they have put in place, totally must tell the same story.

724

00:42:08,000 --> 00:42:11,000

In the face, conspiracy theorists!

725

00:42:11,000 --> 00:42:16,000

With a fat lady waiting impatiently in the wings, there's time for just one final test.

726

00:42:16,000 --> 00:42:22,000

And not just any old test, but the ultimate proof of man's moon mission.

727

00:42:22,000 --> 00:42:27,000

To really put the final nail in the coffin, we should build our own rocket, which we've done before,

728

00:42:27,000 --> 00:42:35,000

and go to the moon, collect some of the Apollo hardware that was left there, and come back, and we'll prove that man actually was on the moon.

729

00:42:35,000 --> 00:42:37,000

I wish we could do that.

730

00:42:37,000 --> 00:42:39,000

I have, however, the next best thing.

731

00:42:40,000 --> 00:42:41,000

What's this?

732

00:42:41,000 --> 00:42:42,000

A reflector.

733

00:42:42,000 --> 00:42:47,000

In fact, it's called a retro reflector, made up of many tiny prisms just like this.

734

00:42:47,000 --> 00:42:52,000

And did you further know that the Apollo astronauts were nice enough when they visited the moon to leave several of these on the surface

735

00:42:52,000 --> 00:42:59,000

so that earthbound scientists could point lasers at it and gather information about the moon?

736

00:42:59,000 --> 00:43:05,000

So what you're saying is that we get a really big laser and point it at the reflector on the moon,

737

00:43:05,000 --> 00:43:09,000

and if we get a signal back, that means that we were, in fact, there.

738

00:43:09,000 --> 00:43:11,000

Precisely.

739

00:43:11,000 --> 00:43:13,000

Okay, it breaks down like this.

740

00:43:13,000 --> 00:43:18,000

A retro reflector bounces light back at the light source, regardless of the angle.

741

00:43:18,000 --> 00:43:23,000

This differs from a mirror where the angle of incidence has to be perpendicular.

742

00:43:23,000 --> 00:43:31,000

So, if there was a retro reflector on the moon, and we knew its exact location, and we had a powerful enough laser,

743

00:43:31,000 --> 00:43:36,000

we could detect the reflection and prove there is man-made equipment on the moon.

744

00:43:36,000 --> 00:43:38,000

What are we supposed to be doing?

745

00:43:38,000 --> 00:43:41,000

Technically, we're supposed to have a conversation about where we are.

746

00:43:41,000 --> 00:43:44,000

Oh, you mean like the Apache Point Observatory?

747

00:43:44,000 --> 00:43:48,000

This thing right here is the Apache Point Observatory.

748

00:43:50,000 --> 00:43:51,000

What a view.

749

00:43:51,000 --> 00:43:57,000

And these guys have the tools that we need to put the final nail in the coffin on the moon landing hoax.

750

00:43:57,000 --> 00:44:06,000

Up here in the Sacramento Mountains, New Mexico, Adam and Jamie meet one of the observatories' top docs, Russet McMillan.

751

00:44:06,000 --> 00:44:07,000

How can I help you today?

752

00:44:07,000 --> 00:44:14,000

Well, it seems that there are some people that do not believe that man has actually been to the moon.

753

00:44:14,000 --> 00:44:15,000

I've met some of them.

754

00:44:15,000 --> 00:44:16,000

What do you think?

755

00:44:16,000 --> 00:44:17,000

I think they're crazy.

756

00:44:17,000 --> 00:44:22,000

A bold statement, but Dr. McMillan has the hardware to back it up.

757

00:44:22,000 --> 00:44:23,000

Here's the thing.

758

00:44:23,000 --> 00:44:26,000

This little laser pointer is about 10 milliwatts.

759

00:44:26,000 --> 00:44:29,000

That's great, but it's not going to make it to the moon and back.

760

00:44:29,000 --> 00:44:33,000

That thing, however, peaks at one gigawatt.

761

00:44:33,000 --> 00:44:36,000

That's a hundred billion times more powerful than this is.

762

00:44:36,000 --> 00:44:39,000

That's what you've got to have to make it to the moon and back.

763

00:44:39,000 --> 00:44:43,000

So this whole exercise is you shine the laser beam at the moon, it gets reflected back,

764

00:44:43,000 --> 00:44:46,000

and you measure the timing of the release to the return.

765

00:44:46,000 --> 00:44:48,000

So how long does that journey take?

766

00:44:48,000 --> 00:44:51,000



About 2.5 seconds, depending on the orbit of the moon.

767

00:44:51,000 --> 00:44:52,000

Cool.

768

00:44:52,000 --> 00:44:54,000

The meet and greet complete.

769

00:44:54,000 --> 00:44:57,000

All that's left to do is wait until midnight.

770

00:44:57,000 --> 00:45:03,000

Space Command has given us a one hour window when the night skies from here to the moon are clear of satellites.

771

00:45:03,000 --> 00:45:09,000

While they wait, here's Adam trying unsuccessfully to keep the lid on his inner geek.

772

00:45:09,000 --> 00:45:15,000

This is actually not a bad imitation of exactly what's on the moon that we're shining the laser into.

773

00:45:15,000 --> 00:45:20,000

In fact, the specific one we're shining into was left there by the Apollo 15 crew.

774

00:45:20,000 --> 00:45:27,000

Now, we're firing on the order of 200 quadrillion photons per laser pulse at that reflector,

775

00:45:27,000 --> 00:45:33,000

and we're getting between one and three photons back per pulse if we're lucky.

776

00:45:33,000 --> 00:45:35,000

That's not something that you can see with a naked eye.

777

00:45:35,000 --> 00:45:39,000

In fact, it's something that can only be picked up by the most sensitive of collectors,

778

00:45:39,000 --> 00:45:45,000

and hopefully when we get that photon back, we'll see a spike like that on the screen.

779

00:45:45,000 --> 00:45:48,000

I am sluing the telescope to the lunar highlands.

780

00:45:48,000 --> 00:45:49,000

Slew away.

781

00:45:49,000 --> 00:45:53,000

Test number one, shining our laser at a portion of the moon's surface

782

00:45:53,000 --> 00:46:00,000

devoid of all man-made objects, including retroreflectors known to locals as the lunar highlands.

783

00:46:00,000 --> 00:46:03,000

There's the moon. You can see the craters.

784

00:46:03,000 --> 00:46:04,000

Wow.

785

00:46:04,000 --> 00:46:08,000

With the laser pointed at a random location on the moon's surface...

786

00:46:08,000 --> 00:46:10,000

Initiating laser.

787

00:46:10,000 --> 00:46:16,000

Dr. McMillan pulses 200 quadrillion photons into the night sky.

788

00:46:16,000 --> 00:46:22,000

So we're shining the laser on the lunar highlands now, and we're getting nothing back except background light.

789

00:46:22,000 --> 00:46:28,000

As expected, the lunar regula, with its reflectivity index, or albedo, of approximately 8%,

790

00:46:28,000 --> 00:46:34,000

simply scatters the beam, and the sensors back here at the observatory detect no reflected light.

791

00:46:34,000 --> 00:46:37,000

Now I'm going to move to Apollo 15.

792

00:46:38,000 --> 00:46:41,000

Apollo 15, crewed by Scott Irwin and Warden,

793

00:46:41,000 --> 00:46:45,000

set down at the base of the lunar Apennine Mountains,

794

00:46:45,000 --> 00:46:48,000

which is where they placed the retroreflector.

795

00:46:48,000 --> 00:46:49,000

Wow.

796

00:46:49,000 --> 00:46:52,000

That's the location where Apollo 15 landed on the moon.

797

00:46:52,000 --> 00:46:54,000

That is so cool.

798

00:46:54,000 --> 00:47:00,000

Initiating laser on retroreflector from Apollo 15.

799

00:47:00,000 --> 00:47:03,000

And there's a spike beginning to stand out.

800

00:47:03,000 --> 00:47:05,000

Is that it?

801

00:47:05,000 --> 00:47:08,000

That's the return from Apollo 15.

802

00:47:08,000 --> 00:47:14,000

Light returning from the laser retroreflector at exactly the wavelength and distance that we were expecting.

803

00:47:14,000 --> 00:47:16,000

That is so cool.

804

00:47:16,000 --> 00:47:23,000

I know you do this like 100 times a year, but it's really thrilling to watch it happen in bright in front of us.

805

00:47:23,000 --> 00:47:26,000

Not just thrilling, but conclusive.

806

00:47:26,000 --> 00:47:28,000

Look, I'd love to go to the moon, but I can't.

807

00:47:28,000 --> 00:47:30,000

At least not right now.

808

00:47:30,000 --> 00:47:32,000

So we did the next best thing.

809

00:47:32,000 --> 00:47:36,000

We placed the laser at the moon on the second test, and we got a clear spike back.

810

00:47:36,000 --> 00:47:38,000

Photons came back to our receptor.

811

00:47:38,000 --> 00:47:45,000

Now, the only way that that could happen is if there was a piece of man-made equipment up on the moon to reflect them back.

812

00:47:45,000 --> 00:47:47,000

So get over it.

813

00:47:47,000 --> 00:47:49,000

There's no conspiracy here.

814

00:47:49,000 --> 00:47:51,000

We've been there. We've done that.

815

00:47:51,000 --> 00:47:55,000

So the team have busted everything before them.

816

00:47:55,000 --> 00:47:56,000

What's that, Neil?

817

00:47:56,000 --> 00:47:58,000



We really went to the moon.

818

00:47:58,000 --> 00:48:04,000

We compounded those five results with evidence of lunar-bound man-made equipment.

819

00:48:04,000 --> 00:48:08,000

This moon mystery jigsaw puzzle is complete.

820

00:48:28,000 --> 00:48:30,000

The Moon is a science fiction.

821

00:48:30,000 --> 00:48:32,000

The Moon is a science fiction.

822

00:48:32,000 --> 00:48:34,000

The Moon is a science fiction.

823

00:48:34,000 --> 00:48:36,000

The Moon is a science fiction.

824

00:48:36,000 --> 00:48:38,000

The Moon is a science fiction.

825

00:48:38,000 --> 00:48:40,000

The Moon is a science fiction.

826

00:48:40,000 --> 00:48:42,000

The Moon is a science fiction.

827

00:48:42,000 --> 00:48:44,000

The Moon is a science fiction.

828

00:48:44,000 --> 00:48:46,000

The Moon is a science fiction.

829

00:48:46,000 --> 00:48:48,000

The Moon is a science fiction.

830

00:48:48,000 --> 00:48:50,000

The Moon is a science fiction.

831

00:48:50,000 --> 00:48:52,000

The Moon is a science fiction.

832

00:48:52,000 --> 00:48:54,000

The Moon is a science fiction.

833

00:48:54,000 --> 00:48:56,000

The Moon is a science fiction.