



1
00:01:12,760 --> 00:00:47,980
I Gatorade oh bugger luck kurama hi

2
00:01:18,110 --> 00:01:15,650
welcome to this edition of NASA images

3
00:01:20,330 --> 00:01:18,120
I'm Lynn Bondurant during this show

4
00:01:23,000 --> 00:01:20,340
we're focusing on historic NASA footage

5
00:01:25,910 --> 00:01:23,010
showing down-to-earth uses of space

6
00:01:28,609 --> 00:01:25,920
technology our first clip from early

7
00:01:34,520 --> 00:01:28,619
nineteen seventy three shows how a moon

8
00:01:36,469 --> 00:01:34,530
rock analyzer benefits medicine this

9
00:01:39,380 --> 00:01:36,479
ambulance arriving at a hospital in

10
00:01:41,180 --> 00:01:39,390
Boston has something in common with

11
00:01:43,880 --> 00:01:41,190
these astronauts collecting lunar

12
00:01:45,650 --> 00:01:43,890
samples on the moon the two come

13
00:01:47,840 --> 00:01:45,660

together as a result of the work being

14

00:01:49,540 --> 00:01:47,850

done here a chemistry lab at the

15

00:01:51,920 --> 00:01:49,550

Massachusetts Institute of Technology

16

00:01:54,230 --> 00:01:51,930

when unconscious patients without

17

00:01:56,749 --> 00:01:54,240

medical identification arrive at Boston

18

00:01:59,870 --> 00:01:56,759

hospitals blood samples or other body

19

00:02:02,210 --> 00:01:59,880

fluids are sent to the MIT lab using

20

00:02:03,950 --> 00:02:02,220

sophisticated equipment researchers are

21

00:02:06,740 --> 00:02:03,960

able to tell if the patient has had an

22

00:02:08,930 --> 00:02:06,750

overdose of drugs or other poisons the

23

00:02:11,660 --> 00:02:08,940

procedure takes two hours in the past

24

00:02:13,280 --> 00:02:11,670

two days was not uncommon the new

25

00:02:16,450 --> 00:02:13,290

technique can determine which of several

26
00:02:19,010 --> 00:02:16,460
hundred drugs the patient may have taken

27
00:02:21,740 --> 00:02:19,020
Ness originally purchased the mass

28
00:02:24,949 --> 00:02:21,750
spectrometer set up for us as part of

29
00:02:27,620 --> 00:02:24,959
the project to analyze rocks brought

30
00:02:29,030 --> 00:02:27,630
back from the moon since this equipment

31
00:02:31,790 --> 00:02:29,040
was available to us here in the

32
00:02:34,309 --> 00:02:31,800
laboratory we decided to utilize it for

33
00:02:35,870 --> 00:02:34,319
the purpose of analyzing body fluids and

34
00:02:38,960 --> 00:02:35,880
has worked out very well for this

35
00:02:41,360 --> 00:02:38,970
purpose also dr. Kathryn Costello is

36
00:02:45,559 --> 00:02:41,370
responsible for the hospital project at

37
00:02:49,670 --> 00:02:45,569
MIT we do samples on an emergency basis

38
00:02:52,820 --> 00:02:49,680

24 hours a day on call for any hospital

39

00:02:54,470 --> 00:02:52,830

which requests such an analysis there is

40

00:02:58,100 --> 00:02:54,480

no charge to the hospitals for this

41

00:02:59,960 --> 00:02:58,110

service we ask dr. Costello to describe

42

00:03:02,020 --> 00:02:59,970

the analysis process

43

00:03:05,870 --> 00:03:02,030

if the sample which we receive is blood

44

00:03:08,480 --> 00:03:05,880

then it must first be centrifuged this

45

00:03:11,030 --> 00:03:08,490

separates the heavier red blood cells

46

00:03:15,770 --> 00:03:11,040

from the serum layer which will contain

47

00:03:18,500 --> 00:03:15,780

the drug and which we analyze after it's

48

00:03:21,290 --> 00:03:18,510

placed in the centrifuge the upper layer

49

00:03:24,050 --> 00:03:21,300

contains the serum and this is removed

50

00:03:26,840 --> 00:03:24,060

and placed into a small separatory

51
00:03:29,390 --> 00:03:26,850
funnel solvent is then added to this

52
00:03:32,120 --> 00:03:29,400
funnel and after it shakes it's

53
00:03:34,400 --> 00:03:32,130
separated and the drugs the drug

54
00:03:36,980 --> 00:03:34,410
metabolites will be contained in the

55
00:03:40,850 --> 00:03:36,990
lower layer which is the organic solvent

56
00:03:42,920 --> 00:03:40,860
this is then removed and brought down to

57
00:03:46,610 --> 00:03:42,930
a very small volume with a rotary

58
00:03:49,130 --> 00:03:46,620
evaporator this concentrated solution is

59
00:03:52,250 --> 00:03:49,140
then ready for analysis by the

60
00:03:55,010 --> 00:03:52,260
instrumental senate a small amount of

61
00:03:57,680 --> 00:03:55,020
this is injected into the gas

62
00:04:00,940 --> 00:03:57,690
chromatograph which now separates this

63
00:04:04,070 --> 00:04:00,950

complex mixture into single components

64

00:04:06,770 --> 00:04:04,080

these pass directly into the mass

65

00:04:09,290 --> 00:04:06,780

spectrometer where the analysis is done

66

00:04:13,670 --> 00:04:09,300

and a fingerprint pattern is obtained

67

00:04:15,320 --> 00:04:13,680

for each compound now the computer is

68

00:04:17,570 --> 00:04:15,330

printing out the results of its search

69

00:04:20,319 --> 00:04:17,580

and what will give us as a list of the

70

00:04:24,170 --> 00:04:20,329

drugs which this person is ingested

71

00:04:26,240 --> 00:04:24,180

his head rested oh now it also appears

72

00:04:31,100 --> 00:04:26,250

that he's ingested the drugs

73

00:04:33,170 --> 00:04:31,110

methaqualone the computer system used

74

00:04:35,149 --> 00:04:33,180

originally to search for organic

75

00:04:37,309 --> 00:04:35,159

compounds on the moon was developed by

76
00:04:41,330 --> 00:04:37,319
dr. Klaus Beeman professor of chemistry

77
00:04:44,210 --> 00:04:41,340
at MIT I think it is worthwhile to point

78
00:04:46,339 --> 00:04:44,220
out that this is an excellent example we

79
00:04:48,619 --> 00:04:46,349
are basically search conducted in a

80
00:04:50,570 --> 00:04:48,629
university laboratory and supported by

81
00:04:53,600 --> 00:04:50,580
various governmental agencies in this

82
00:04:56,180 --> 00:04:53,610
case this NASA and national institutes

83
00:04:58,969 --> 00:04:56,190
of health has contributed to the

84
00:05:01,920 --> 00:04:58,979
generation of the instrumental system

85
00:05:05,460 --> 00:05:01,930
that can

86
00:05:08,520 --> 00:05:05,470
be used for the benefit of the general

87
00:05:13,409 --> 00:05:08,530
public in this case to help individuals

88
00:05:15,779 --> 00:05:13,419

that profound reason another in an

89

00:05:22,439 --> 00:05:15,789

emergency situation and need help

90

00:05:24,810 --> 00:05:22,449

rapidly reliably and cheaply Moonrock

91

00:05:30,240 --> 00:05:24,820

analyzer getting doctors a new

92

00:05:34,110 --> 00:05:30,250

diagnostic tool our next historic clip

93

00:05:41,879 --> 00:05:34,120

from 1974 shows how space sensors help

94

00:05:44,010 --> 00:05:41,889

children with cerebral palsy body

95

00:05:46,080 --> 00:05:44,020

sensors used in studies for spaceflight

96

00:05:48,330 --> 00:05:46,090

at NASA's Ames Research Center in

97

00:05:50,520 --> 00:05:48,340

California are now being put to good use

98

00:05:53,279 --> 00:05:50,530

at the Children's Hospital Stanford

99

00:05:54,510 --> 00:05:53,289

University Marty these are electrodes

100

00:05:56,760 --> 00:05:54,520

that I'm gonna put in your tennis shoes

101
00:05:58,740 --> 00:05:56,770
the purpose to better understand and

102
00:06:00,570 --> 00:05:58,750
acquire more precise measurements of the

103
00:06:03,089 --> 00:06:00,580
walking patterns of youngsters with

104
00:06:04,920 --> 00:06:03,099
cerebral palsy we have the beginning to

105
00:06:07,110 --> 00:06:04,930
the gait analysis laboratory which we're

106
00:06:08,550 --> 00:06:07,120
in study children with several palsy the

107
00:06:11,129 --> 00:06:08,560
way they walk in the way their muscles

108
00:06:13,110 --> 00:06:11,139
act during walking you'll want to know

109
00:06:14,640 --> 00:06:13,120
which muscles are acting during stance

110
00:06:16,170 --> 00:06:14,650
and that's when they're the challenge

111
00:06:17,370 --> 00:06:16,180
foot is on the ground and we want to

112
00:06:19,170 --> 00:06:17,380
know which muscles are working during

113
00:06:22,170 --> 00:06:19,180

swing that's when the towels foot is in

114

00:06:24,029 --> 00:06:22,180

the air Fran Ford is an orthopaedic

115

00:06:26,189 --> 00:06:24,039

research associate at the Children's

116

00:06:27,870 --> 00:06:26,199

Hospital the young man she is working

117

00:06:31,560 --> 00:06:27,880

with is three and one half year old

118

00:06:33,719 --> 00:06:31,570

Marty melero up ok that's where you're

119

00:06:36,240 --> 00:06:33,729

most less so that's play what place will

120

00:06:39,149 --> 00:06:36,250

test you know you could help me you'd

121

00:06:41,520 --> 00:06:39,159

lie see these blue tabs you can pull

122

00:06:43,469 --> 00:06:41,530

this off the paper for me cuz I'll need

123

00:06:45,729 --> 00:06:43,479

one pretty soon

124

00:06:47,529 --> 00:06:45,739

Marty these are the surface electrodes

125

00:06:48,790 --> 00:06:47,539

that we're going to put on you they're

126
00:06:51,729 --> 00:06:48,800
going to tell me what your muscles are

127
00:06:54,639 --> 00:06:51,739
doing as you're walking girls learning

128
00:06:57,249 --> 00:06:54,649
modules are like radio stations to see

129
00:06:58,929 --> 00:06:57,259
my antenna over there miss Ford asked

130
00:07:00,939 --> 00:06:58,939
NASA engineers for help after

131
00:07:03,969 --> 00:07:00,949
experiencing problems with the test

132
00:07:05,859 --> 00:07:03,979
equipment she had been using it tells

133
00:07:07,989 --> 00:07:05,869
dr. black good things about me okay

134
00:07:09,790 --> 00:07:07,999
before the shoulder work directly cabled

135
00:07:11,489 --> 00:07:09,800
into the machinery in other words el

136
00:07:13,929 --> 00:07:11,499
wire work from the surface electrodes

137
00:07:15,850 --> 00:07:13,939
right over across the floor and into the

138
00:07:17,169 --> 00:07:15,860

machinery itself this creates a great

139

00:07:19,179 --> 00:07:17,179

deal of fear within the child because

140

00:07:21,219 --> 00:07:19,189

he's connected to a machine also

141

00:07:23,529 --> 00:07:21,229

children cerebral palsy have great

142

00:07:25,779 --> 00:07:23,539

balance problems and having the wires

143

00:07:27,879 --> 00:07:25,789

trailing along behind adding excess

144

00:07:29,949 --> 00:07:27,889

weight also created many many problems

145

00:07:31,540 --> 00:07:29,959

with their balance so I don't feel that

146

00:07:33,489 --> 00:07:31,550

I was getting a true reading from their

147

00:07:35,559 --> 00:07:33,499

muscles where your muscle was back here

148

00:07:38,709 --> 00:07:35,569

so I want you to push your foot down 20

149

00:07:41,679 --> 00:07:38,719

down toward the ground that's right very

150

00:07:44,949 --> 00:07:41,689

good do it again push really hard down

151
00:07:47,169 --> 00:07:44,959
toward the ground now connect your tiny

152
00:07:49,089 --> 00:07:47,179
impulses from marty's leg muscles are

153
00:07:50,919 --> 00:07:49,099
transmitted by other sensors through a

154
00:07:56,199 --> 00:07:50,929
radio transmitter which he wears around

155
00:07:57,850 --> 00:07:56,209
his waist to this receiver recorder here

156
00:07:59,439 --> 00:07:57,860
we have to wait a second look at all the

157
00:08:02,619 --> 00:07:59,449
scrip of wines your muscles are making

158
00:08:04,469 --> 00:08:02,629
isn't that fantastic your muscles are so

159
00:08:06,790 --> 00:08:04,479
strong that they're going off my paper

160
00:08:08,379 --> 00:08:06,800
these are the action potential for

161
00:08:10,329 --> 00:08:08,389
Marty's muscles as you can see there's

162
00:08:12,969 --> 00:08:10,339
some who are continuously active some of

163
00:08:15,100 --> 00:08:12,979

active and Schmidt early here's off this

164

00:08:19,749 --> 00:08:15,110

is all timed with his foot sequence the

165

00:08:22,029 --> 00:08:19,759

stance his swing phases using

166

00:08:24,639 --> 00:08:22,039

preamplifiers surface electrodes and

167

00:08:26,980 --> 00:08:24,649

cabling already developed for NASA Fran

168

00:08:29,379 --> 00:08:26,990

ford began getting good test results in

169

00:08:31,149 --> 00:08:29,389

her own work we think the equipment the

170

00:08:32,559 --> 00:08:31,159

testing itself and equipment helps the

171

00:08:35,079 --> 00:08:32,569

youngsters by teaching them more about

172

00:08:36,579 --> 00:08:35,089

their body not just giving us data that

173

00:08:38,980 --> 00:08:36,589

we can put in an article for the

174

00:08:41,350 --> 00:08:38,990

classify under research teaches him more

175

00:08:43,120 --> 00:08:41,360

which muscles are acting as he's walking

176

00:08:45,189 --> 00:08:43,130

and which muscles are quiet as he's

177

00:08:47,499 --> 00:08:45,199

walking and he can try and more control

178

00:08:50,379 --> 00:08:47,509

this to make his walk more like a normal

179

00:08:53,620 --> 00:08:50,389

person's walk would be the equipment

180

00:08:56,130 --> 00:08:53,630

should also prove useful to others very

181

00:08:58,810 --> 00:08:56,140

definitely useful in fact we hope to

182

00:09:01,540 --> 00:08:58,820

have this equipment so simplified that

183

00:09:03,220 --> 00:09:01,550

mini therapist untrained therapists can

184

00:09:04,720 --> 00:09:03,230

use this equipment out in the say

185

00:09:06,310 --> 00:09:04,730

crippled children schools all over the

186

00:09:08,860 --> 00:09:06,320

state of California all over the United

187

00:09:10,480 --> 00:09:08,870

States that so the children don't have

188

00:09:11,710 --> 00:09:10,490

to be sent into a medical center they

189

00:09:14,410 --> 00:09:11,720

don't have to leave their parents are

190

00:09:16,330 --> 00:09:14,420

make a long journey into the US okay

191

00:09:20,450 --> 00:09:16,340

centralized location for this kind of

192

00:09:24,860 --> 00:09:20,460

testing I strikes the plexus

193

00:09:27,060 --> 00:09:24,870

yeah what is that yeah what we could do

194

00:09:34,200 --> 00:09:29,280

certainly are being a big boy I'm a very

195

00:09:37,140 --> 00:09:34,210

cooperative another use for space

196

00:09:43,380 --> 00:09:37,150

technology may affect bridge safety as

197

00:09:45,330 --> 00:09:43,390

this 1974 clip shows there are nearly

198

00:09:46,970 --> 00:09:45,340

half a million bridges in this country

199

00:09:49,440 --> 00:09:46,980

although infrequently they do

200

00:09:51,540 --> 00:09:49,450

occasionally collapse causing injury and

201
00:09:53,760 --> 00:09:51,550
death such was the case on December

202
00:09:55,500 --> 00:09:53,770
fifteenth nineteen sixty seven when the

203
00:09:57,480 --> 00:09:55,510
silver bridge in Point Pleasant West

204
00:10:00,570 --> 00:09:57,490
Virginia collapsed from a structural

205
00:10:04,820 --> 00:10:00,580
defect in fell into the Ohio River 48

206
00:10:07,320 --> 00:10:04,830
people lost their lives some

207
00:10:09,450 --> 00:10:07,330
surveillance techniques such as is

208
00:10:14,340 --> 00:10:09,460
represented by random deck could very

209
00:10:16,260 --> 00:10:14,350
well have foretold the structural

210
00:10:18,060 --> 00:10:16,270
failure before it happened and that's

211
00:10:21,120 --> 00:10:18,070
exactly what we're trying to do with

212
00:10:23,790 --> 00:10:21,130
random deck we want to be able to keep

213
00:10:26,100 --> 00:10:23,800

very close track or lock poker trachten

214

00:10:29,400 --> 00:10:26,110

has been possible in the past of the

215

00:10:31,470 --> 00:10:29,410

structural integrity of bridges Horace

216

00:10:33,270 --> 00:10:31,480

Emerson is in the office of Technology

217

00:10:35,700 --> 00:10:33,280

utilization at NASA's Ames Research

218

00:10:39,320 --> 00:10:35,710

Center in California the land of Jack

219

00:10:42,270 --> 00:10:39,330

technique is the means of obtaining

220

00:10:44,310 --> 00:10:42,280

random vibrational inputs to a structure

221

00:10:47,880 --> 00:10:44,320

such as this Ridge that I'm standing

222

00:10:50,460 --> 00:10:47,890

there and processing those signals

223

00:10:53,310 --> 00:10:50,470

through an analyzer to obtain a

224

00:10:56,550 --> 00:10:53,320

signature for the structure now that

225

00:10:58,500 --> 00:10:56,560

signature won't change with time unless

226

00:11:01,020 --> 00:10:58,510

something happens to the structure

227

00:11:03,270 --> 00:11:01,030

itself of the bridge tiding

228

00:11:05,580 --> 00:11:03,280

accelerometers that sense vibrations and

229

00:11:08,070 --> 00:11:05,590

NASA wind tunnels are used along with

230

00:11:09,420 --> 00:11:08,080

the computer for analysis the joint

231

00:11:11,880 --> 00:11:09,430

study with the Federal Highway

232

00:11:14,160 --> 00:11:11,890

Administration is an attempt to find out

233

00:11:17,130 --> 00:11:14,170

if the technique is feasible for use on

234

00:11:20,010 --> 00:11:17,140

bridges all over the US Horace Emerson

235

00:11:21,750 --> 00:11:20,020

describes how the tests are made well we

236

00:11:23,640 --> 00:11:21,760

started out here with the portable

237

00:11:24,879 --> 00:11:23,650

equipment that we need in the back of a

238

00:11:28,599 --> 00:11:24,889

station wagon

239

00:11:33,669 --> 00:11:28,609

and then the engineers climb up the hill

240

00:11:37,329 --> 00:11:33,679

and to fix the accelerometers two studs

241

00:11:40,030 --> 00:11:37,339

that have been previously glued to the

242

00:11:42,280 --> 00:11:40,040

structural members of the bread this has

243

00:11:44,169 --> 00:11:42,290

two advantages one you don't damage the

244

00:11:47,169 --> 00:11:44,179

bridge at all and you can always go back

245

00:11:50,349 --> 00:11:47,179

for the same exact same location with

246

00:11:51,699 --> 00:11:50,359

your accelerometer then the wire that

247

00:11:53,439 --> 00:11:51,709

will carry the signal from the

248

00:11:56,049 --> 00:11:53,449

accelerometer is attached to the

249

00:11:58,840 --> 00:11:56,059

accelerometer and carried back down the

250

00:12:01,599 --> 00:11:58,850

hill and plugged in to the tape

251
00:12:03,460 --> 00:12:01,609
recording equipment dr. Robert Reed of

252
00:12:06,460 --> 00:12:03,470
Nielsen engineering and research is

253
00:12:08,769 --> 00:12:06,470
making the on-site measurements here we

254
00:12:11,710 --> 00:12:08,779
have a portable oscilloscope which

255
00:12:14,559 --> 00:12:11,720
actually shows the vibration that's

256
00:12:17,590 --> 00:12:14,569
occurring on the bridge when a car comes

257
00:12:21,240 --> 00:12:17,600
over the bridge here comes a

258
00:12:23,079 --> 00:12:21,250
small car now you'll see a burst of

259
00:12:27,280 --> 00:12:23,089
vibration

260
00:12:29,470 --> 00:12:27,290
yeah the car is above it when the tape

261
00:12:31,569 --> 00:12:29,480
recorders brought back from the bridge

262
00:12:35,139 --> 00:12:31,579
the data is played back through our

263
00:12:37,900 --> 00:12:35,149

analysis equipment which we can see your

264

00:12:39,819 --> 00:12:37,910

coal also abuse on engineering processes

265

00:12:42,100 --> 00:12:39,829

the bridge data through the random that

266

00:12:44,530 --> 00:12:42,110

computer it reforms here and each time

267

00:12:48,450 --> 00:12:44,540

you see it flash it means that the car

268

00:12:55,170 --> 00:12:52,830

now as this signature forms it will take

269

00:12:57,210 --> 00:12:55,180

a definite shape and we can compare that

270

00:13:00,300 --> 00:12:57,220

when it's complete with a signature

271

00:13:02,790 --> 00:13:00,310

taken from a previous month now when we

272

00:13:06,300 --> 00:13:02,800

overlap the signature from this month

273

00:13:08,460 --> 00:13:06,310

and the one from last month we notice

274

00:13:11,340 --> 00:13:08,470

that there are no changes our riff

275

00:13:12,510 --> 00:13:11,350

change did occur then we could would

276

00:13:16,140 --> 00:13:12,520

have to go back to the bridge and

277

00:13:18,210 --> 00:13:16,150

inspect it more thoroughly it would look

278

00:13:22,350 --> 00:13:18,220

like this if there were a crack or other

279

00:13:24,960 --> 00:13:22,360

structural problems on the bridge today

280

00:13:26,880 --> 00:13:24,970

bridges are visually inspected in the

281

00:13:29,610 --> 00:13:26,890

future these same bridges may be

282

00:13:32,070 --> 00:13:29,620

reliably and inexpensively monitored for

283

00:13:35,040 --> 00:13:32,080

structural defects long before damage

284

00:13:40,620 --> 00:13:35,050

occurs using techniques from Aeronautics

285

00:13:43,230 --> 00:13:40,630

and Space Research in another clip we

286

00:13:49,110 --> 00:13:43,240

see how a quadriplegic is aided by a

287

00:13:51,600 --> 00:13:49,120

space device an electronic device

288

00:13:54,030 --> 00:13:51,610

designed originally to activate controls

289

00:13:56,220 --> 00:13:54,040

in a spacecraft in case astronauts lost

290

00:13:58,890 --> 00:13:56,230

the use of their limbs is now being used

291

00:14:01,500 --> 00:13:58,900

at Jackson Memorial Hospital Miami and

292

00:14:03,780 --> 00:14:01,510

other places by people like 18 year old

293

00:14:06,990 --> 00:14:03,790

George Cunningham George was injured

294

00:14:09,480 --> 00:14:07,000

playing football on November 21st 1973

295

00:14:13,500 --> 00:14:09,490

as a result he's paralyzed from the neck

296

00:14:15,960 --> 00:14:13,510

down new life as it is called is built

297

00:14:18,810 --> 00:14:15,970

by scientific systems international and

298

00:14:21,510 --> 00:14:18,820

combines two small video display screens

299

00:14:24,030 --> 00:14:21,520

and a miniature computer with a huff and

300

00:14:27,840 --> 00:14:24,040

a puff George can do for himself what

301

00:14:30,540 --> 00:14:27,850

others had to do before this is panel

302

00:14:32,700 --> 00:14:30,550

here with 19 different things I can do

303

00:14:35,550 --> 00:14:32,710

and on the left side I have different

304

00:14:37,440 --> 00:14:35,560

numbers okay on the right side the 19

305

00:14:40,740 --> 00:14:37,450

different things are called channels

306

00:14:43,340 --> 00:14:40,750

that's a picket channel I inhale on this

307

00:14:46,410 --> 00:14:43,350

thing like I'm going to number two I

308

00:14:49,490 --> 00:14:46,420

inhaled one was on zero and the numbers

309

00:14:52,740 --> 00:14:49,500

flash by and I inhaled on two now to

310

00:14:55,570 --> 00:14:52,750

work it I brought it to get the dial

311

00:15:04,360 --> 00:14:59,180

and it's on zero and I born 02 start the

312

00:15:13,199 --> 00:15:07,940

now what somebody answers I just talking

313

00:15:29,160 --> 00:15:25,019

oh hello Connie yeah this is George I

314

00:15:31,889 --> 00:15:29,170

hire van are you fine art are you coming

315

00:15:35,879 --> 00:15:31,899

to hospital tonight yeah yeah what time

316

00:15:37,410 --> 00:15:35,889

can you get here now visiting hours are

317

00:15:39,840 --> 00:15:37,420

over at eight-thirty could he make it

318

00:15:42,269 --> 00:15:39,850

around seven yeah all right seeing that

319

00:15:45,509 --> 00:15:42,279

okay bye-bye and then I just blow to

320

00:15:49,710 --> 00:15:45,519

hang up George can't control the volume

321

00:15:52,439 --> 00:15:49,720

on his TV set the same way now inhale

322

00:15:57,809 --> 00:15:52,449

again forget to number four and that's

323

00:16:01,319 --> 00:15:57,819

the volume and then I blow you could

324

00:16:05,489 --> 00:16:01,329

turn it up I could blow again it'll turn

325

00:16:07,980 --> 00:16:05,499

it down to call nurse that's number one

326

00:16:10,859 --> 00:16:07,990

on my channel box all I do is inhale

327

00:16:15,319 --> 00:16:10,869

until it gets to one inhale again and

328

00:16:17,429 --> 00:16:15,329

then blow the nurses like clothes on

329

00:16:19,319 --> 00:16:17,439

when you get a minute and you give me a

330

00:16:23,039 --> 00:16:19,329

glass of water please sure I'll be in in

331

00:16:26,220 --> 00:16:23,049

just a minute then I can go and turn my

332

00:16:31,259 --> 00:16:26,230

radio on by inhaling wait until gets the

333

00:16:33,449 --> 00:16:31,269

five inhaling again then blowing that

334

00:16:39,210 --> 00:16:33,459

turns it on and then i can change

335

00:16:47,230 --> 00:16:43,389

offered with it eventually i could just

336

00:16:50,799 --> 00:16:47,240

turn it off i keep blowing I inhale

337

00:16:56,559 --> 00:16:50,809

again not blow not life behind we should

338

00:17:03,100 --> 00:16:56,569

go on young Cunningham can even open and

339

00:17:05,079 --> 00:17:03,110

close the curtains in his room we asked

340

00:17:08,159 --> 00:17:05,089

George of being able to do things for

341

00:17:11,740 --> 00:17:08,169

himself had changed his outlook oh

342

00:17:13,360 --> 00:17:11,750

definitely I pick it up gives me an idea

343

00:17:15,909 --> 00:17:13,370

of what I can do when they get out of

344

00:17:18,669 --> 00:17:15,919

here I can do many things for the

345

00:17:21,279 --> 00:17:18,679

telephone companies hiring people I can

346

00:17:25,389 --> 00:17:21,289

do different recordings and stuff like

347

00:17:27,279 --> 00:17:25,399

that and it'll help me with college with

348

00:17:30,490 --> 00:17:27,289

the help of a device developed for use

349

00:17:32,649 --> 00:17:30,500

by astronauts in space quadriplegics and

350

00:17:34,840 --> 00:17:32,659

others with great physical problems are

351

00:17:41,340 --> 00:17:34,850

being aided in their struggle for

352

00:17:50,649 --> 00:17:44,110

NASA spin-offs have been used to help

353

00:17:52,870 --> 00:17:50,659

amputees to the releasing mechanism that

354

00:17:54,789 --> 00:17:52,880

hold Saturn rockets on the pad until the

355

00:17:57,159 --> 00:17:54,799

engines reach full thrust and high

356

00:17:59,740 --> 00:17:57,169

purity carbon lining the engine nozzles

357

00:18:01,840 --> 00:17:59,750

are now being used in a pilot program to

358

00:18:06,100 --> 00:18:01,850

make better fitting quick releasing

359

00:18:07,960 --> 00:18:06,110

artificial legs and arms here a test to

360

00:18:10,000 --> 00:18:07,970

check the release mechanism that will be

361

00:18:12,549 --> 00:18:10,010

used in launching the American half of

362

00:18:21,100 --> 00:18:12,559

next year's joint us-soviet link up in

363

00:18:23,260 --> 00:18:21,110

space 3 2 1 March of last year a doctor

364

00:18:25,570 --> 00:18:23,270

from rancho las amigas hospital visited

365

00:18:29,590 --> 00:18:25,580

us to tell us about the work on the dial

366

00:18:31,899 --> 00:18:29,600

compatible carbon after the formal

367

00:18:33,880 --> 00:18:31,909

presentation we had a promise Owens is a

368

00:18:37,000 --> 00:18:33,890

design engineer at the Kennedy Space

369

00:18:39,880 --> 00:18:37,010

Center Florida during this the doctor

370

00:18:41,890 --> 00:18:39,890

asked if we could not use our experience

371

00:18:44,830 --> 00:18:41,900

on disconnects to come up with a simple

372

00:18:48,159 --> 00:18:44,840

easy way to connect an artificial limb

373

00:18:51,159 --> 00:18:48,169

to the stub of an amputee something will

374

00:18:55,020 --> 00:18:51,169

allowed dispensing of all the former

375

00:18:58,510 --> 00:18:55,030

trappings such as straps and belts we

376

00:19:03,720 --> 00:18:58,520

used our experience and came up with a

377

00:19:07,120 --> 00:19:03,730

prototype like this for a leg attachment

378

00:19:10,289 --> 00:19:07,130

one of the problems of designing a

379

00:19:14,950 --> 00:19:10,299

device which has no precedent in use is

380

00:19:17,409 --> 00:19:14,960

that unusual designs have to be used in

381

00:19:19,750 --> 00:19:17,419

terms of the equipment dr. vert Mooney

382

00:19:22,390 --> 00:19:19,760

is chief of the amputees Center rancho

383

00:19:25,930 --> 00:19:22,400

los Amigos hospital los angeles senators

384

00:19:28,149 --> 00:19:25,940

of nasa installations and the people at

385

00:19:31,149 --> 00:19:28,159

kennedy space center heard us describe

386

00:19:34,270 --> 00:19:31,159

our difficulty in achieving a connector

387

00:19:36,789 --> 00:19:34,280

system apparently this is a problem

388

00:19:38,710 --> 00:19:36,799

which they had solved nicely for

389

00:19:41,590 --> 00:19:38,720

connective systems to their umbilical

390

00:19:43,330 --> 00:19:41,600

lines with the space shots and they

391

00:19:45,669 --> 00:19:43,340

presented their ability to solve this

392

00:19:49,360 --> 00:19:45,679

for us which indeed they did and they

393

00:19:51,620 --> 00:19:49,370

have manufactured the connector system

394

00:19:54,500 --> 00:19:51,630

in the metallic implant

395

00:19:56,180 --> 00:19:54,510

we did the general design work as to

396

00:19:59,870 --> 00:19:56,190

what we's needed but they very nicely

397

00:20:02,810 --> 00:19:59,880

accomplished the solution of it tabela

398

00:20:05,030 --> 00:20:02,820

illustrate this is an exact replica what

399

00:20:09,290 --> 00:20:05,040

was used in the first operation rancho

400

00:20:12,860 --> 00:20:09,300

las amigas in March this portion was

401
00:20:17,050 --> 00:20:12,870
implanted in the lower leg of a patient

402
00:20:22,490 --> 00:20:17,060
and this portion is being built into the

403
00:20:32,080 --> 00:20:22,500
artificial limb to attach will attach

404
00:20:37,940 --> 00:20:35,299
in less than six months NASA engineers

405
00:20:40,399 --> 00:20:37,950
built an inexpensive scaled-down version

406
00:20:42,740 --> 00:20:40,409
of the quick release mechanism parts

407
00:20:44,450 --> 00:20:42,750
made at the Kennedy Space Center include

408
00:20:47,029 --> 00:20:44,460
a special shock absorbing rubber

409
00:20:57,149 --> 00:20:47,039
isolator cast and vulcanized in the

410
00:21:04,080 --> 00:20:59,399
and the steel shaft that is eventually

411
00:21:05,759 --> 00:21:04,090
implanted into the bone attached to the

412
00:21:08,190 --> 00:21:05,769
metal shaft and protruding through the

413
00:21:10,619 --> 00:21:08,200

skin is a small high-purity carbon

414

00:21:12,899 --> 00:21:10,629

button the type of carbon developed for

415

00:21:15,060 --> 00:21:12,909

use in the space program the body

416

00:21:18,389 --> 00:21:15,070

doesn't reject carbon as it does other

417

00:21:20,700 --> 00:21:18,399

materials here surgeons at Rancho Los

418

00:21:23,129 --> 00:21:20,710

Amigos Hospital prepare to implant the

419

00:21:26,609 --> 00:21:23,139

steel shaft and carbon button into the

420

00:21:28,469 --> 00:21:26,619

lower leg of an amputee patient although

421

00:21:30,599 --> 00:21:28,479

it will be a while before the technique

422

00:21:33,210 --> 00:21:30,609

is made available for general clinical

423

00:21:35,190 --> 00:21:33,220

use doctors are optimistic about this

424

00:21:42,690 --> 00:21:35,200

space hardware that makes snap-on

425

00:21:49,600 --> 00:21:46,720

our final historical documentary report

426

00:21:52,269 --> 00:21:49,610

goes back to nineteen seventy-four as

427

00:21:55,389 --> 00:21:52,279

did all but the first of our films

428

00:21:58,210 --> 00:21:55,399

during the show this report documents

429

00:22:12,490 --> 00:21:58,220

how space technology was used to improve

430

00:22:21,250 --> 00:22:14,680

this is three and one-half year-old

431

00:22:23,310 --> 00:22:21,260

Jennifer gurashi Oh since July 1973

432

00:22:25,990 --> 00:22:23,320

jennifer has been using a unique

433

00:22:31,900 --> 00:22:26,000

rechargeable pacemaker to increase her

434

00:22:34,780 --> 00:22:31,910

heart rate from slow to near normal she

435

00:22:37,000 --> 00:22:34,790

joins some 60,000 other Americans who

436

00:22:43,840 --> 00:22:37,010

have heart pacemakers implanted every

437

00:22:45,850 --> 00:22:43,850

year developed by Johns Hopkins

438

00:22:48,760 --> 00:22:45,860

University Applied Physics Laboratory

439

00:22:51,160 --> 00:22:48,770

the pacemaker makes use of power cells

440

00:22:53,980 --> 00:22:51,170

originally used aboard satellites in

441

00:22:56,050 --> 00:22:53,990

space it is half the thickness and

442

00:22:58,660 --> 00:22:56,060

one-third the volume of earlier models

443

00:23:01,630 --> 00:22:58,670

and can be painlessly recharged from

444

00:23:03,820 --> 00:23:01,640

outside the body for 20 years this

445

00:23:05,440 --> 00:23:03,830

eliminates the need for surgery every

446

00:23:09,670 --> 00:23:05,450

two years to remove and replace

447

00:23:11,680 --> 00:23:09,680

batteries mrs. kathleen garay she owed

448

00:23:13,690 --> 00:23:11,690

tells what the new device has meant to

449

00:23:15,760 --> 00:23:13,700

her daughter Jennifer meant a lot

450

00:23:17,560 --> 00:23:15,770

because since Jennifer's had the

451
00:23:20,560 --> 00:23:17,570
pacemaker there's been a complete change

452
00:23:22,720 --> 00:23:20,570
in her she's grown in size she's acting

453
00:23:24,610 --> 00:23:22,730
very normal we before she really

454
00:23:27,190 --> 00:23:24,620
couldn't pray or keep up with the other

455
00:23:28,600 --> 00:23:27,200
children it also means a great deal so

456
00:23:31,660 --> 00:23:28,610
was knowing that she doesn't have to be

457
00:23:34,450 --> 00:23:31,670
operated on every two years and

458
00:23:36,340 --> 00:23:34,460
also the size of it that it's small

459
00:23:45,220 --> 00:23:36,350
enough for her the other pacemakers are

460
00:23:47,320 --> 00:23:45,230
quite large what the pacemaker does is

461
00:23:49,420 --> 00:23:47,330
send an electrical impulse to the heart

462
00:23:52,480 --> 00:23:49,430
speeding up Jennifer's heartbeat from a

463
00:23:55,720 --> 00:23:52,490

slow rate of 42 a normal 72 beats a

464

00:23:57,610 --> 00:23:55,730

minute and normal she is she does nearly

465

00:23:59,950 --> 00:23:57,620

everything a healthy youngster can do

466

00:24:21,910 --> 00:23:59,960

and especially enjoys playing with her

467

00:24:23,920 --> 00:24:21,920

brothers cousins and friends her routine

468

00:24:26,110 --> 00:24:23,930

was different for only 90 minutes a week

469

00:24:29,860 --> 00:24:26,120

when she recharges the pacemaker

470

00:24:35,120 --> 00:24:29,870

batteries pacemakers charger is very

471

00:24:41,680 --> 00:24:37,640

it's convenient enough to carry you can

472

00:24:44,030 --> 00:24:41,690

take it anywhere necessary to charge her

473

00:24:45,890 --> 00:24:44,040

it's also very good if we were at a

474

00:24:49,310 --> 00:24:45,900

week's vacation we wouldn't have to take

475

00:24:51,080 --> 00:24:49,320

it with us if you mix a week you can

476
00:24:59,270 --> 00:24:51,090
catch up on it but there'd be no harm to

477
00:25:02,960 --> 00:24:59,280
Jennifer if we should not do it that

478
00:25:04,520 --> 00:25:02,970
alarm means that the charging head is

479
00:25:08,420 --> 00:25:04,530
not meeting up it lets us know that it's

480
00:25:09,770 --> 00:25:08,430
not charging when it stops the green

481
00:25:11,750 --> 00:25:09,780
light goes on and that means that she's

482
00:25:14,000 --> 00:25:11,760
being charged and when the whole

483
00:25:15,500 --> 00:25:14,010
charging period is finished a blue light

484
00:25:17,930 --> 00:25:15,510
goes on a let us know that it's the end

485
00:25:19,490 --> 00:25:17,940
of the charge this means that she's

486
00:25:24,140 --> 00:25:19,500
charged for another week and we'll have

487
00:25:25,910 --> 00:25:24,150
to do it until next week we asked mrs.

488
00:25:28,520 --> 00:25:25,920

Garagiola about the outlook for

489

00:25:30,860 --> 00:25:28,530

Jennifer's future the outlook for

490

00:25:32,420 --> 00:25:30,870

Jennifer's future is very good the

491

00:25:35,480 --> 00:25:32,430

doctors say that she can live to be a

492

00:25:45,050 --> 00:25:35,490

ripe old age and she could grow up to to

493

00:25:47,150 --> 00:25:45,060

be anything she wants to be the basic

494

00:25:49,550 --> 00:25:47,160

concept for the long life battery in

495

00:25:52,640 --> 00:25:49,560

Jennifer's pacemaker has been proven in

496

00:25:55,340 --> 00:25:52,650

over 10 years of space use a good

497

00:26:02,960 --> 00:25:55,350

example of technology for space now

498

00:26:05,690 --> 00:26:02,970

being used to help people that's all for

499

00:26:08,330 --> 00:26:05,700

this edition of NASA images but before

500

00:26:10,880 --> 00:26:08,340

we go I'd like to invite you to stop by

501

00:26:13,130 --> 00:26:10,890

and visit our visitor center here at the

502

00:26:15,470 --> 00:26:13,140

NASA Lewis Research Center in Cleveland

503

00:26:18,500 --> 00:26:15,480

and enjoy the many displays that are

504

00:26:20,720 --> 00:26:18,510

here until next time this is Lynn

505

00:27:00,450 --> 00:26:20,730

Bondurant saying goodbye from the NASA