
Google+
Lockney
Fred

1
00:00:06,150 --> 00:00:04,390
hi good afternoon uh my name is dan

2
00:00:07,670 --> 00:00:06,160
lockney i'm the technology transfer

3
00:00:08,950 --> 00:00:07,680
program executive out of nasa

4
00:00:10,470 --> 00:00:08,960
headquartered

5
00:00:12,470 --> 00:00:10,480
uh thank you for joining us we have a

6
00:00:14,629 --> 00:00:12,480
really exciting uh

7
00:00:16,790 --> 00:00:14,639
show for you today uh then over the next

8
00:00:19,750 --> 00:00:16,800
one hour we're going to hear about um

9
00:00:21,029 --> 00:00:19,760
some potential secondary uses of nasa

10
00:00:23,029 --> 00:00:21,039
technology

11
00:00:24,470 --> 00:00:23,039
we have two inventors online um mike

12
00:00:26,470 --> 00:00:24,480
tinker and fred tram who are going to

13
00:00:28,550 --> 00:00:26,480

talk about some of their technologies

14
00:00:30,790 --> 00:00:28,560
uh and then also a fellow from a company

15
00:00:33,270 --> 00:00:30,800
called marbler dan perez who's going to

16
00:00:36,229 --> 00:00:33,280
talk to us about crowdsourcing and ways

17
00:00:37,990 --> 00:00:36,239
to find other uses for our technology

18
00:00:40,470 --> 00:00:38,000
so as a quick overview

19
00:00:41,430 --> 00:00:40,480
nasa has a long-standing mandate to find

20
00:00:43,590 --> 00:00:41,440
these

21
00:00:45,910 --> 00:00:43,600
spin-off applications for uh the

22
00:00:47,270 --> 00:00:45,920
mission-driven technologies so when

23
00:00:49,510 --> 00:00:47,280
congress gives us the money for a

24
00:00:51,910 --> 00:00:49,520
mission it says don't just blast the

25
00:00:53,910 --> 00:00:51,920
money into space make sure that that the

26
00:00:55,750 --> 00:00:53,920
dollars come back down to earth in the

27
00:00:57,270 --> 00:00:55,760
form of practical technologies and

28
00:00:59,510 --> 00:00:57,280
applications that benefit us here on

29
00:01:01,430 --> 00:00:59,520
earth uh we've been doing this regularly

30
00:01:03,349 --> 00:01:01,440
for the past 50 years and we've got some

31
00:01:06,230 --> 00:01:03,359
great examples of ways that we've done

32
00:01:07,750 --> 00:01:06,240
this successfully for example the um

33
00:01:09,109 --> 00:01:07,760
little camera

34
00:01:11,270 --> 00:01:09,119
in your cell phone

35
00:01:12,870 --> 00:01:11,280
was developed by a guy named eric fossum

36
00:01:13,990 --> 00:01:12,880
out of our jet propulsion laboratory at

37
00:01:16,310 --> 00:01:14,000
caltech

38
00:01:18,070 --> 00:01:16,320

um he was working on digital imaging for

39
00:01:19,910 --> 00:01:18,080
deep space photography

40
00:01:21,670 --> 00:01:19,920
so that that became one of our spin-offs

41
00:01:23,350 --> 00:01:21,680
so all of you have a little nasa

42
00:01:27,190 --> 00:01:23,360
technology in your pocket

43
00:01:28,789 --> 00:01:27,200
uh similarly um uh the examples of

44
00:01:30,149 --> 00:01:28,799
technology transfer are are quite

45
00:01:31,350 --> 00:01:30,159
ubiquitous

46
00:01:32,550 --> 00:01:31,360
um

47
00:01:34,789 --> 00:01:32,560
the uh

48
00:01:36,149 --> 00:01:34,799
infant formula for example

49
00:01:38,710 --> 00:01:36,159
little babies everywhere around the

50
00:01:40,630 --> 00:01:38,720
world are drinking nasa technology

51
00:01:43,350 --> 00:01:40,640
during long-duration experiment

52
00:01:44,710 --> 00:01:43,360
spaceflight experiments for um

53
00:01:46,550 --> 00:01:44,720
food sources we were growing different

54
00:01:49,270 --> 00:01:46,560
algaes and testing them for nutritional

55
00:01:50,789 --> 00:01:49,280
content and we discovered a um a

56
00:01:53,030 --> 00:01:50,799
nutrient that had previously only been

57
00:01:55,270 --> 00:01:53,040
found in human breast milk uh it says

58
00:01:57,270 --> 00:01:55,280
fatty uh substance omega threes and

59
00:01:58,550 --> 00:01:57,280
sixes combination it's believed to be

60
00:02:00,469 --> 00:01:58,560
important in the development of the eyes

61
00:02:02,389 --> 00:02:00,479
and the brain um and have previously

62
00:02:05,030 --> 00:02:02,399
never been isolated or manufactured

63
00:02:06,870 --> 00:02:05,040

before and now after the nasa discovery

64
00:02:08,309 --> 00:02:06,880
uh it's in everything

65
00:02:12,630 --> 00:02:08,319
you can find in olive oil and peanut

66
00:02:14,470 --> 00:02:12,640
butter in yogurt in in milk and you can

67
00:02:16,710 --> 00:02:14,480
of course find it in uh the infant

68
00:02:18,229 --> 00:02:16,720
formula sold all around the world so

69
00:02:20,550 --> 00:02:18,239
those are two kind of far-reaching

70
00:02:22,869 --> 00:02:20,560
examples um the cell phone camera and

71
00:02:24,229 --> 00:02:22,879
the infant formula um but but you'll

72
00:02:26,150 --> 00:02:24,239
find us everywhere

73
00:02:28,869 --> 00:02:26,160
you cannot get on an airplane today that

74
00:02:32,309 --> 00:02:28,879
hasn't benefited from nasa research uh

75
00:02:33,910 --> 00:02:32,319
biomedical advances uh including um

76
00:02:37,030 --> 00:02:33,920
advanced ultrasound

77
00:02:40,949 --> 00:02:37,040
protocols and techniques for our ability

78
00:02:45,509 --> 00:02:43,670
materials sciences

79
00:02:48,790 --> 00:02:45,519
every package that gets delivered today

80
00:02:50,390 --> 00:02:48,800
from fedex or ups benefits somehow from

81
00:02:52,150 --> 00:02:50,400
from nasa's technology

82
00:02:54,150 --> 00:02:52,160
knowledge provided by

83
00:02:55,670 --> 00:02:54,160
our our spacecraft

84
00:02:57,589 --> 00:02:55,680
whether it's earth sensing or weather

85
00:02:59,589 --> 00:02:57,599
satellites um all of these have

86
00:03:01,110 --> 00:02:59,599
benefited from our investment in the

87
00:03:02,470 --> 00:03:01,120
nation's um

88
00:03:03,670 --> 00:03:02,480

the nation's investment in aerospace

89
00:03:05,750 --> 00:03:03,680
technologies

90
00:03:07,990 --> 00:03:05,760
so

91
00:03:10,229 --> 00:03:08,000
as we develop these technologies we have

92
00:03:12,710 --> 00:03:10,239
a specific drive for why we're doing it

93
00:03:14,710 --> 00:03:12,720
but we don't always know what we can do

94
00:03:16,229 --> 00:03:14,720
also with it that that's not always

95
00:03:17,910 --> 00:03:16,239
something that we're that we're as good

96
00:03:19,270 --> 00:03:17,920
at you know you get you bring a

97
00:03:21,270 --> 00:03:19,280
technology and you say you know what

98
00:03:22,710 --> 00:03:21,280
what else what else can you make of this

99
00:03:24,630 --> 00:03:22,720
and it's like a piece of paper you can

100
00:03:26,390 --> 00:03:24,640
turn it into a hat you can fold it into

101
00:03:27,910 --> 00:03:26,400
a boat you can turn it into an airplane

102
00:03:30,309 --> 00:03:27,920
um you do all kinds of things with it

103
00:03:32,149 --> 00:03:30,319
but but we often don't have all of those

104
00:03:35,110 --> 00:03:32,159
ideas and that's why we've we've worked

105
00:03:38,470 --> 00:03:35,120
with the company marveller to help us uh

106
00:03:40,789 --> 00:03:38,480
tap into the untapped cognitive surplus

107
00:03:42,869 --> 00:03:40,799
that exists in in in the world there are

108
00:03:46,869 --> 00:03:42,879
a lot of people with other ideas for how

109
00:03:49,670 --> 00:03:46,879
they can use our technologies be they

110
00:03:52,550 --> 00:03:49,680
sensors or or mechanical

111
00:03:54,229 --> 00:03:52,560
devices or software

112
00:03:55,949 --> 00:03:54,239
so for a full listing of all the

113
00:03:58,630 --> 00:03:55,959

technologies we have available

114
00:04:00,630 --> 00:03:58,640
technology.nasa.gov is your best source

115
00:04:02,470 --> 00:04:00,640
for a rundown on two of your

116
00:04:04,309 --> 00:04:02,480
technologies the two of the technologies

117
00:04:06,149 --> 00:04:04,319
that that we've got available right now

118
00:04:07,509 --> 00:04:06,159
you're in the right place uh the first

119
00:04:09,589 --> 00:04:07,519
one is going to be from a guy named mike

120
00:04:11,670 --> 00:04:09,599
tinker at a marshall space flight center

121
00:04:13,589 --> 00:04:11,680
who developed a technology for

122
00:04:15,589 --> 00:04:13,599
inflatable structures that are rigidized

123
00:04:17,189 --> 00:04:15,599
with with foam and he'll talk to you

124
00:04:18,469 --> 00:04:17,199
about that and some of the ideas that

125
00:04:20,629 --> 00:04:18,479
we've come up with for how that can be

126
00:04:21,990 --> 00:04:20,639
used and then fred schramm also from

127
00:04:24,070 --> 00:04:22,000
marshall space flight center will talk

128
00:04:26,790 --> 00:04:24,080
to you about a reliable two-component

129
00:04:28,310 --> 00:04:26,800
tagging system keeping track of things

130
00:04:29,749 --> 00:04:28,320
like like like a bar code but a little

131
00:04:31,350 --> 00:04:29,759
bit more reliable

132
00:04:34,070 --> 00:04:31,360
so each of those guys is gonna have five

133
00:04:37,030 --> 00:04:34,080
minutes uh to explain their technology

134
00:04:38,230 --> 00:04:37,040
uh first mike and then and then fred but

135
00:04:39,749 --> 00:04:38,240
between the two of them there's gonna be

136
00:04:41,270 --> 00:04:39,759
a ten minute question and answer period

137
00:04:42,550 --> 00:04:41,280
so that you guys can can ask any

138
00:04:44,550 --> 00:04:42,560

questions you've got they'll come in to

139
00:04:46,950 --> 00:04:44,560
me i'll ask the questions they'll

140
00:04:48,550 --> 00:04:46,960
respond to them uh after mike and fred

141
00:04:50,230 --> 00:04:48,560
have talked we'll turn it over to dan

142
00:04:52,550 --> 00:04:50,240
perez from marbler and he'll talk to you

143
00:04:54,710 --> 00:04:52,560
about crowdsourcing marbler the nasa

144
00:04:57,110 --> 00:04:54,720
relationship that's about another five

145
00:04:59,030 --> 00:04:57,120
minutes then i think we have maybe 15-20

146
00:05:00,870 --> 00:04:59,040
minutes left at the top of the hour for

147
00:05:02,950 --> 00:05:00,880
general questions and those will come in

148
00:05:04,870 --> 00:05:02,960
from um from you

149
00:05:06,310 --> 00:05:04,880
uh we'll you can send them to us through

150
00:05:07,749 --> 00:05:06,320
twitter through

151
00:05:09,350 --> 00:05:07,759
google

152
00:05:11,029 --> 00:05:09,360
plus

153
00:05:13,270 --> 00:05:11,039
and we will answer them and if you don't

154
00:05:15,590 --> 00:05:13,280
get answers to your questions now we all

155
00:05:17,350 --> 00:05:15,600
exist outside of this framework you can

156
00:05:18,870 --> 00:05:17,360
contact us too and we'll put contact

157
00:05:22,070 --> 00:05:18,880
information up as well

158
00:05:24,310 --> 00:05:22,080
so now without further um delay i'd like

159
00:05:25,670 --> 00:05:24,320
to turn it over to mike tinker from

160
00:05:27,350 --> 00:05:25,680
marshall space flight center to talk

161
00:05:31,029 --> 00:05:27,360
about his technology

162
00:05:36,550 --> 00:05:33,430
hello i'm the deputy center chief

163
00:05:38,150 --> 00:05:36,560

technologist at nasa marshall and this

164
00:05:40,310 --> 00:05:38,160
morning i'd like to talk to you about a

165
00:05:42,790 --> 00:05:40,320
technology that we've been developing

166
00:05:45,189 --> 00:05:42,800
for a number of years here at marshall

167
00:05:47,350 --> 00:05:45,199
but first i'd like to acknowledge andrew

168
00:05:50,070 --> 00:05:47,360
schnell who is my co-inventor for this

169
00:05:51,830 --> 00:05:50,080
technology he's an engineer in the

170
00:05:53,189 --> 00:05:51,840
advanced concepts office here at

171
00:05:55,029 --> 00:05:53,199
marshall

172
00:05:57,270 --> 00:05:55,039
but this technology deals with

173
00:05:59,670 --> 00:05:57,280
inflatables i'm sure many of you can

174
00:06:01,830 --> 00:05:59,680
imagine why nasa would be interested in

175
00:06:02,870 --> 00:06:01,840
inflatable structures

176
00:06:04,390 --> 00:06:02,880
first

177
00:06:05,590 --> 00:06:04,400
these structures are extremely

178
00:06:09,270 --> 00:06:05,600
lightweight

179
00:06:12,150 --> 00:06:09,280
compared to metals most composites

180
00:06:14,150 --> 00:06:12,160
and secondly inflatables can be packaged

181
00:06:16,150 --> 00:06:14,160
into a very small container such as a

182
00:06:18,550 --> 00:06:16,160
cylinder or a box

183
00:06:19,909 --> 00:06:18,560
launched into space and then deployed in

184
00:06:22,070 --> 00:06:19,919
orbit

185
00:06:24,870 --> 00:06:22,080
often making a very large structure for

186
00:06:27,430 --> 00:06:24,880
various applications there

187
00:06:29,029 --> 00:06:27,440
however there's also a very significant

188
00:06:31,830 --> 00:06:29,039

disadvantage

189
00:06:33,909 --> 00:06:31,840
to the use of inflatables in space

190
00:06:35,670 --> 00:06:33,919
obviously these structures are

191
00:06:37,189 --> 00:06:35,680
susceptible to damage from

192
00:06:39,510 --> 00:06:37,199
micrometeoroids

193
00:06:41,189 --> 00:06:39,520
or debris impacts

194
00:06:42,550 --> 00:06:41,199
and such an event could puncture the

195
00:06:45,270 --> 00:06:42,560
structure

196
00:06:46,950 --> 00:06:45,280
and destroy it ending the mission

197
00:06:49,510 --> 00:06:46,960
fortunately

198
00:06:52,390 --> 00:06:49,520
this risk can be mitigated by filling

199
00:06:54,230 --> 00:06:52,400
the inflatable by phone

200
00:06:56,950 --> 00:06:54,240
therefore enabling the structure to

201
00:06:59,110 --> 00:06:56,960
survive impact from very small debris in

202
00:07:01,110 --> 00:06:59,120
the space environment and to continue

203
00:07:03,189 --> 00:07:01,120
the mission

204
00:07:05,510 --> 00:07:03,199
the use of foams

205
00:07:09,029 --> 00:07:05,520
to deploy and rigidize structures in

206
00:07:11,510 --> 00:07:09,039
space was first proposed as early as the

207
00:07:14,309 --> 00:07:11,520
1960s

208
00:07:16,070 --> 00:07:14,319
and more recently nasa the air force and

209
00:07:17,430 --> 00:07:16,080
other labs have researched this

210
00:07:19,830 --> 00:07:17,440
technology

211
00:07:21,749 --> 00:07:19,840
for space flight

212
00:07:24,870 --> 00:07:21,759
most of these investigations however

213
00:07:27,350 --> 00:07:24,880

have focused on solid cross-section

214
00:07:30,790 --> 00:07:27,360
structures such as this tube that's

215
00:07:33,110 --> 00:07:30,800
completely filled with foam the problem

216
00:07:35,350 --> 00:07:33,120
with this is that if it's a very large

217
00:07:37,270 --> 00:07:35,360
structure it can take a lot of foam to

218
00:07:39,589 --> 00:07:37,280
fill it as you can imagine and believe

219
00:07:41,589 --> 00:07:39,599
it or not a structure completely filled

220
00:07:43,990 --> 00:07:41,599
with foam could be

221
00:07:46,309 --> 00:07:44,000
too heavy for the application

222
00:07:47,990 --> 00:07:46,319
so that's where this patented technology

223
00:07:50,070 --> 00:07:48,000
comes in

224
00:07:52,230 --> 00:07:50,080
instead of completely filling the

225
00:07:53,029 --> 00:07:52,240
structure

226
00:07:57,589 --> 00:07:53,039
we

227
00:08:00,950 --> 00:07:57,599
walls of the inflatable

228
00:08:02,550 --> 00:08:00,960
but leaving the innermost cavity open

229
00:08:04,950 --> 00:08:02,560
this can yield significant weight

230
00:08:06,710 --> 00:08:04,960
savings while still maintaining the

231
00:08:09,670 --> 00:08:06,720
strength and the stiffness

232
00:08:12,070 --> 00:08:09,680
that you would need for the application

233
00:08:13,749 --> 00:08:12,080
there are a number of shapes or forms

234
00:08:17,029 --> 00:08:13,759
that this technology could take for

235
00:08:18,950 --> 00:08:17,039
space applications including tubes like

236
00:08:20,469 --> 00:08:18,960
i've shown here

237
00:08:22,629 --> 00:08:20,479
panels

238
00:08:25,189 --> 00:08:22,639

spheres domes

239
00:08:26,550 --> 00:08:25,199
trusses and a number of other shapes

240
00:08:27,749 --> 00:08:26,560
that could be used in the space

241
00:08:29,909 --> 00:08:27,759
environment

242
00:08:32,709 --> 00:08:29,919
and for space applications what we're

243
00:08:34,709 --> 00:08:32,719
interested in is satellite structures

244
00:08:36,070 --> 00:08:34,719
solar concentrators for power and

245
00:08:37,670 --> 00:08:36,080
propulsion

246
00:08:40,070 --> 00:08:37,680
habitats

247
00:08:43,350 --> 00:08:40,080
and others

248
00:08:45,350 --> 00:08:43,360
so how does this innovation work

249
00:08:48,870 --> 00:08:45,360
first the structure is packaged in a

250
00:08:50,630 --> 00:08:48,880
container such as a cylinder or a box

251
00:08:53,750 --> 00:08:50,640
then the structure is deployed by

252
00:08:55,190 --> 00:08:53,760
pressurizing the innermost cavity such

253
00:08:56,389 --> 00:08:55,200
as the structure comes out of the

254
00:08:57,990 --> 00:08:56,399
container

255
00:09:00,870 --> 00:08:58,000
and then finally the structure is

256
00:09:03,190 --> 00:09:00,880
completed by injecting foam between the

257
00:09:05,269 --> 00:09:03,200
inner and outer walls

258
00:09:06,790 --> 00:09:05,279
the foam is allowed to completely fill

259
00:09:08,630 --> 00:09:06,800
the structure

260
00:09:11,430 --> 00:09:08,640
producing a system that can be used in

261
00:09:15,670 --> 00:09:13,829
inlet ports and hoses are needed to

262
00:09:16,790 --> 00:09:15,680
inflate the structure and to inject the

263
00:09:18,790 --> 00:09:16,800

foam

264
00:09:21,430 --> 00:09:18,800
and then exhaust ports are required at

265
00:09:23,110 --> 00:09:21,440
the other end to allow gases to escape

266
00:09:25,350 --> 00:09:23,120
that have been produced

267
00:09:28,710 --> 00:09:25,360
during the distribution and curing of

268
00:09:28,720 --> 00:09:31,590
all right

269
00:09:37,269 --> 00:09:34,070
in keeping with the theme of this google

270
00:09:38,870 --> 00:09:37,279
hangout event i'd also like to mention

271
00:09:40,550 --> 00:09:38,880
some commercial

272
00:09:44,470 --> 00:09:40,560
earth-based applications for this

273
00:09:46,949 --> 00:09:44,480
technology the theme of this event being

274
00:09:48,949 --> 00:09:46,959
discover new uses for out of this world

275
00:09:51,030 --> 00:09:48,959
technologies

276
00:09:54,070 --> 00:09:51,040
some of those could include components

277
00:09:56,630 --> 00:09:54,080
of very lightweight aircraft

278
00:09:59,350 --> 00:09:56,640
storage shelters

279
00:10:02,150 --> 00:09:59,360
housing including emergency shelters

280
00:10:03,590 --> 00:10:02,160
after natural disasters

281
00:10:05,990 --> 00:10:03,600
containers

282
00:10:06,949 --> 00:10:06,000
even sales displays

283
00:10:09,190 --> 00:10:06,959
and

284
00:10:11,430 --> 00:10:09,200
people involved in in the process of

285
00:10:13,990 --> 00:10:11,440
having us think about this

286
00:10:15,590 --> 00:10:14,000
have come up with many other ideas for

287
00:10:18,150 --> 00:10:15,600
the technology

288
00:10:20,550 --> 00:10:18,160

and in closing i'd like to refer you to

289
00:10:22,870 --> 00:10:20,560
the marbler website where you can go

290
00:10:25,350 --> 00:10:22,880
read more about the technology better

291
00:10:26,389 --> 00:10:25,360
understand the details and learn more

292
00:10:30,069 --> 00:10:26,399
about

293
00:10:31,750 --> 00:10:30,079
used

294
00:10:33,430 --> 00:10:31,760
and with that

295
00:10:38,710 --> 00:10:33,440
willing to take some questions from

296
00:10:43,190 --> 00:10:41,190
so thanks mike have there been to date

297
00:10:44,389 --> 00:10:43,200
any um

298
00:10:47,110 --> 00:10:44,399
commercial applications of this

299
00:10:48,710 --> 00:10:47,120
technology any any spin-offs or tech

300
00:10:51,190 --> 00:10:48,720
transfer related to

301
00:10:55,990 --> 00:10:53,829
uh we're currently involved in

302
00:10:57,750 --> 00:10:56,000
discussions uh

303
00:10:59,670 --> 00:10:57,760
with marbler and

304
00:11:02,630 --> 00:10:59,680
with others including small companies

305
00:11:03,670 --> 00:11:02,640
that have sbir contracts and that type

306
00:11:05,430 --> 00:11:03,680
thing

307
00:11:08,470 --> 00:11:05,440
and there's been a lot of interest in

308
00:11:11,990 --> 00:11:08,480
the technology and just really within

309
00:11:13,990 --> 00:11:12,000
the last few weeks or a couple of months

310
00:11:15,670 --> 00:11:14,000
we've entered into discussions with

311
00:11:17,829 --> 00:11:15,680
those folks

312
00:11:22,310 --> 00:11:17,839
to apply the technology for development

313
00:11:26,790 --> 00:11:24,150

so we have a question coming in from

314
00:11:29,430 --> 00:11:26,800
from twitter

315
00:11:34,069 --> 00:11:29,440
from rob c and the question is can you

316
00:11:40,230 --> 00:11:37,750
i do think it's possible i recently

317
00:11:42,790 --> 00:11:40,240
had someone ask me could you fill these

318
00:11:45,110 --> 00:11:42,800
structures with concrete

319
00:11:46,389 --> 00:11:45,120
and there's no reason why you couldn't

320
00:11:47,750 --> 00:11:46,399
you know

321
00:11:50,389 --> 00:11:47,760
you could inject

322
00:11:52,230 --> 00:11:50,399
concrete made from

323
00:11:54,389 --> 00:11:52,240
lunar materials or

324
00:11:56,710 --> 00:11:54,399
or whatever kind of material you wanted

325
00:11:59,110 --> 00:11:56,720
to explore but the answer is yes i mean

326
00:12:00,150 --> 00:11:59,120
the foam does not have to be a polymer

327
00:12:02,550 --> 00:12:00,160
per se

328
00:12:04,550 --> 00:12:02,560
but as long as it has a substance such

329
00:12:07,590 --> 00:12:04,560
that you can can either inject it

330
00:12:10,470 --> 00:12:07,600
between the walls or pour it in

331
00:12:13,030 --> 00:12:10,480
you can certainly build a structure

332
00:12:14,550 --> 00:12:13,040
using this technology

333
00:12:18,230 --> 00:12:14,560
thank you sir we have another question

334
00:12:20,389 --> 00:12:18,240
just came in uh from google plus

335
00:12:22,150 --> 00:12:20,399
are these inflatable structures in any

336
00:12:24,470 --> 00:12:22,160
way related to the work that bigelow

337
00:12:27,430 --> 00:12:24,480
aerospace is doing

338
00:12:29,829 --> 00:12:27,440

are you familiar with

339
00:12:31,509 --> 00:12:29,839
yes i'm very familiar with the with the

340
00:12:33,110 --> 00:12:31,519
bigelow

341
00:12:35,910 --> 00:12:33,120
space station

342
00:12:37,750 --> 00:12:35,920
the technologies are similar

343
00:12:39,750 --> 00:12:37,760
uh in that

344
00:12:41,030 --> 00:12:39,760
both are based on inflatables where you

345
00:12:41,829 --> 00:12:41,040
deploy

346
00:12:51,670 --> 00:12:41,839
a

347
00:12:53,350 --> 00:12:51,680
differences come in the types of

348
00:12:55,190 --> 00:12:53,360
materials that are used for the

349
00:12:57,990 --> 00:12:55,200
inflatables

350
00:13:01,509 --> 00:12:58,000
bigelow space station of course would

351
00:13:03,430 --> 00:13:01,519
would not utilize a a film

352
00:13:05,990 --> 00:13:03,440
on the outer surface most likely like

353
00:13:08,710 --> 00:13:06,000
we're showing here

354
00:13:11,110 --> 00:13:08,720
the the space station would have a

355
00:13:14,230 --> 00:13:11,120
material on the outside

356
00:13:15,350 --> 00:13:14,240
that can withstand

357
00:13:17,829 --> 00:13:15,360
uv

358
00:13:21,110 --> 00:13:17,839
impacts from small debris

359
00:13:23,350 --> 00:13:21,120
things that nature provide insulation

360
00:13:25,269 --> 00:13:23,360
so so the materials used to make the

361
00:13:26,870 --> 00:13:25,279
walls in the space station could be

362
00:13:29,110 --> 00:13:26,880
significantly different than what we're

363
00:13:32,389 --> 00:13:29,120

talking about here but there are great

364
00:13:34,710 --> 00:13:32,399
similarities in the technologies

365
00:13:36,069 --> 00:13:34,720
one other difference is that for bigelow

366
00:13:37,990 --> 00:13:36,079
space station

367
00:13:39,509 --> 00:13:38,000
i don't think they're injecting foam

368
00:13:42,069 --> 00:13:39,519
between the walls

369
00:13:45,350 --> 00:13:42,079
uh as we're proposing uh in this

370
00:13:49,269 --> 00:13:47,990
so um speaking of the the material it's

371
00:13:50,710 --> 00:13:49,279
made out of but another question just

372
00:13:53,110 --> 00:13:50,720
came in uh

373
00:13:56,870 --> 00:13:53,120
it asks is is that structure is the film

374
00:14:05,110 --> 00:14:00,470
uh the film is a polyamide

375
00:14:08,310 --> 00:14:05,120
uh and the foam uh is polyurethane

376
00:14:10,069 --> 00:14:08,320
okay um so so that opens up a good

377
00:14:12,069 --> 00:14:10,079
discussion though i mean the the

378
00:14:13,829 --> 00:14:12,079
external material could be a film it

379
00:14:17,189 --> 00:14:13,839
could be a fabric

380
00:14:19,750 --> 00:14:17,199
uh it could be foil it could be for

381
00:14:22,470 --> 00:14:19,760
example a reinforced composite flexible

382
00:14:24,230 --> 00:14:22,480
composite that's uh

383
00:14:26,470 --> 00:14:24,240
that's deployable there are a number of

384
00:14:29,110 --> 00:14:26,480
materials that could be used but in this

385
00:14:30,470 --> 00:14:29,120
case the foam that fills the walls is

386
00:14:32,710 --> 00:14:30,480
polyurethane

387
00:14:34,470 --> 00:14:32,720
it can be a one part

388
00:14:36,230 --> 00:14:34,480

foam it can be two part

389
00:14:37,829 --> 00:14:36,240
uh and the

390
00:14:39,829 --> 00:14:37,839
the properties of that foam can be

391
00:14:41,670 --> 00:14:39,839
varied depending on the design of the

392
00:14:43,350 --> 00:14:41,680
structure

393
00:14:44,790 --> 00:14:43,360
so in in the

394
00:14:45,990 --> 00:14:44,800
uh this isn't my question there's

395
00:14:48,389 --> 00:14:46,000
another one that came in through through

396
00:14:50,389 --> 00:14:48,399
the google plus uh in in its current

397
00:14:52,389 --> 00:14:50,399
application for space application how

398
00:14:55,990 --> 00:14:52,399
how long does it take to inflate how

399
00:14:59,430 --> 00:14:58,389
it completely depends on the size of the

400
00:15:04,069 --> 00:14:59,440
structure

401
00:15:05,670 --> 00:15:04,079
could be deployed

402
00:15:08,069 --> 00:15:05,680
in a matter of

403
00:15:10,389 --> 00:15:08,079
minutes and you would want to do it in a

404
00:15:11,750 --> 00:15:10,399
slow control process to avoid damaging

405
00:15:13,670 --> 00:15:11,760
the structure

406
00:15:15,269 --> 00:15:13,680
but if you were deploying a very large

407
00:15:16,949 --> 00:15:15,279
structure in space

408
00:15:19,990 --> 00:15:16,959
deployment

409
00:15:22,310 --> 00:15:20,000
could could take up to an hour

410
00:15:23,910 --> 00:15:22,320
or hours you just want to do it in a

411
00:15:25,590 --> 00:15:23,920
very controlled

412
00:15:27,430 --> 00:15:25,600
process so that you don't damage the

413
00:15:30,470 --> 00:15:27,440

structure and lose the mission it

414
00:15:32,870 --> 00:15:30,480
completely depends on the size

415
00:15:35,189 --> 00:15:32,880
thanks uh another quick note before the

416
00:15:36,870 --> 00:15:35,199
next question is we have a sixth grade

417
00:15:39,110 --> 00:15:36,880
class that's joining us

418
00:15:40,310 --> 00:15:39,120
um we'd like to welcome them to the

419
00:15:43,110 --> 00:15:40,320
event that's kind of fun we've got some

420
00:15:44,710 --> 00:15:43,120
kids in here great

421
00:15:47,430 --> 00:15:44,720
so it looks like they're working on an

422
00:15:49,749 --> 00:15:47,440
engineering design uh curriculum so this

423
00:15:51,509 --> 00:15:49,759
will be right in involved with uh with

424
00:15:52,870 --> 00:15:51,519
that line of um

425
00:15:56,150 --> 00:15:52,880
uh

426
00:15:58,230 --> 00:15:56,160
inquiry so if if i could

427
00:15:59,590 --> 00:15:58,240
uh they have a question i'd like to ask

428
00:16:02,790 --> 00:15:59,600
uh of you and then i have my own

429
00:16:05,189 --> 00:16:02,800
question for them the first one is is

430
00:16:08,150 --> 00:16:05,199
can you summarize again what what this

431
00:16:11,030 --> 00:16:08,160
technology will do for nasa this is from

432
00:16:12,710 --> 00:16:11,910
sure

433
00:16:14,389 --> 00:16:12,720
uh

434
00:16:17,269 --> 00:16:14,399
nasa has been interested in this

435
00:16:20,470 --> 00:16:17,279
technology for for many years

436
00:16:22,710 --> 00:16:20,480
and uh the initial interest

437
00:16:25,350 --> 00:16:22,720
was to use it to build

438
00:16:27,910 --> 00:16:25,360

satellite structures in space and in

439
00:16:29,829 --> 00:16:27,920
particular we were looking at solar

440
00:16:31,990 --> 00:16:29,839
concentrators

441
00:16:33,990 --> 00:16:32,000
that that would be very large

442
00:16:35,749 --> 00:16:34,000
could be packaged in a container

443
00:16:38,230 --> 00:16:35,759
launched into space

444
00:16:40,790 --> 00:16:38,240
inflated and deployed there to make a

445
00:16:44,470 --> 00:16:40,800
large concentrator that structure would

446
00:16:45,670 --> 00:16:44,480
focus sunlight down to a point and use

447
00:16:47,829 --> 00:16:45,680
it either

448
00:16:50,310 --> 00:16:47,839
for electrical power

449
00:16:51,269 --> 00:16:50,320
or to heat a propellant for a rocket

450
00:16:53,749 --> 00:16:51,279
engine

451
00:16:56,069 --> 00:16:53,759
this was our initial interest at nasa

452
00:16:58,629 --> 00:16:56,079
marshall for this technology

453
00:17:00,710 --> 00:16:58,639
but but many researchers have also

454
00:17:04,470 --> 00:17:00,720
realized the technology could have many

455
00:17:06,390 --> 00:17:04,480
applications including habitats uh such

456
00:17:09,429 --> 00:17:06,400
as on the moon surface

457
00:17:11,429 --> 00:17:09,439
maybe on mars surface in the future even

458
00:17:12,230 --> 00:17:11,439
on an asteroid

459
00:17:13,590 --> 00:17:12,240
so

460
00:17:17,110 --> 00:17:13,600
there are a number of potential

461
00:17:19,750 --> 00:17:17,120
applications that nasa is interested in

462
00:17:22,470 --> 00:17:19,760
but again we started out looking at it

463
00:17:24,230 --> 00:17:22,480

uh for propulsion and power applications

464
00:17:27,270 --> 00:17:24,240
uh from national nasa marshall's

465
00:17:31,750 --> 00:17:29,430
thanks mike um and then one more

466
00:17:34,150 --> 00:17:31,760
question that for for mr carter's class

467
00:17:35,350 --> 00:17:34,160
um and this is a question i'm making up

468
00:17:37,909 --> 00:17:35,360
uh

469
00:17:40,070 --> 00:17:37,919
so how do you get to work for nasa it's

470
00:17:41,669 --> 00:17:40,080
off the technology question side but but

471
00:17:43,430 --> 00:17:41,679
just there's a group of secretaries

472
00:17:47,270 --> 00:17:43,440
listening and how do you get to work for

473
00:17:52,470 --> 00:17:49,350
absolutely i'd love to answer that

474
00:17:55,110 --> 00:17:52,480
question uh i have three kids of my own

475
00:17:57,990 --> 00:17:55,120
and and we've tried to encourage them to

476
00:18:00,870 --> 00:17:58,000
to prepare themselves for good careers

477
00:18:02,870 --> 00:18:00,880
but i think the first step uh if you're

478
00:18:06,070 --> 00:18:02,880
interested in working for nasa i'll

479
00:18:08,789 --> 00:18:06,080
speak from an engineer's perspective

480
00:18:11,350 --> 00:18:08,799
uh you need to have a strong interest in

481
00:18:14,390 --> 00:18:11,360
math physics uh and and the other

482
00:18:16,870 --> 00:18:14,400
sciences any of those other sciences you

483
00:18:18,950 --> 00:18:16,880
need to enjoy those type subjects in

484
00:18:19,990 --> 00:18:18,960
school and if you do if you find

485
00:18:21,590 --> 00:18:20,000
yourself

486
00:18:23,350 --> 00:18:21,600
really enjoying

487
00:18:25,669 --> 00:18:23,360
math and science

488
00:18:26,870 --> 00:18:25,679

excuse me uh in your in your school

489
00:18:28,470 --> 00:18:26,880
classes that's a that's a good

490
00:18:30,390 --> 00:18:28,480
indication

491
00:18:32,789 --> 00:18:30,400
from there you would need to go into

492
00:18:34,230 --> 00:18:32,799
college of course and obtain

493
00:18:36,470 --> 00:18:34,240
a degree

494
00:18:38,710 --> 00:18:36,480
in a math or science or engineering

495
00:18:41,029 --> 00:18:38,720
field and then that would position you

496
00:18:43,110 --> 00:18:41,039
very well for an engineering or science

497
00:18:45,669 --> 00:18:43,120
career at nasa

498
00:18:47,830 --> 00:18:45,679
but we do a lot more than science and

499
00:18:52,150 --> 00:18:47,840
engineering if some of the students are

500
00:18:55,110 --> 00:18:52,160
interested in being a reporter

501
00:18:56,870 --> 00:18:55,120
you know in in public affairs

502
00:18:59,909 --> 00:18:56,880
in graphic arts

503
00:19:01,990 --> 00:18:59,919
all of those are services that nasa

504
00:19:04,710 --> 00:19:02,000
requires as well and we have

505
00:19:07,510 --> 00:19:04,720
professionals who are very good at

506
00:19:10,070 --> 00:19:07,520
producing art or graphics or news

507
00:19:12,390 --> 00:19:10,080
articles for us so it's it's wide open

508
00:19:15,110 --> 00:19:12,400
as far as careers go

509
00:19:17,669 --> 00:19:15,120
but i just encourage the kids to pursue

510
00:19:19,669 --> 00:19:17,679
what they really enjoy doing

511
00:19:23,029 --> 00:19:19,679
and and hopefully that would lead them

512
00:19:25,110 --> 00:19:23,039
to a career within nasa

513
00:19:27,430 --> 00:19:25,120

uh thank you sir that's a

514
00:19:28,549 --> 00:19:27,440
very nice thoughtful answer uh very much

515
00:19:29,430 --> 00:19:28,559
appreciated

516
00:19:30,789 --> 00:19:29,440
uh

517
00:19:32,870 --> 00:19:30,799
we have a couple more questions on this

518
00:19:34,310 --> 00:19:32,880
particular technology but we're gonna

519
00:19:36,310 --> 00:19:34,320
move on to the next one and then save

520
00:19:38,870 --> 00:19:36,320
some of those questions for the q a uh

521
00:19:39,750 --> 00:19:38,880
session at the top of the hour um

522
00:19:42,230 --> 00:19:39,760
so

523
00:19:45,110 --> 00:19:42,240
uh thank you mike and now we'll move

524
00:19:46,950 --> 00:19:45,120
over to uh fred tram who's developed a

525
00:19:47,830 --> 00:19:46,960
different technology this is a tagging

526
00:19:51,750 --> 00:19:47,840
system

527
00:19:53,270 --> 00:19:51,760
for um inventorying um uh items and

528
00:19:55,430 --> 00:19:53,280
he'll give you much more detail than i

529
00:19:57,909 --> 00:19:55,440
could uh and now we'll turn it over to

530
00:20:00,710 --> 00:19:57,919
fred and uh

531
00:20:08,070 --> 00:20:04,070
thank you daniel i am fred tram

532
00:20:11,190 --> 00:20:08,080
i was a an engineer with nasa for 30

533
00:20:13,350 --> 00:20:11,200
years and retired two years ago

534
00:20:14,950 --> 00:20:13,360
and one of the focuses that i had while

535
00:20:16,070 --> 00:20:14,960
i was there one of the technology

536
00:20:19,270 --> 00:20:16,080
focuses

537
00:20:22,150 --> 00:20:19,280
uh was in automatic identification

538
00:20:23,590 --> 00:20:22,160

there was uh we found that uh there was

539
00:20:46,390 --> 00:20:23,600
a

540
00:20:49,669 --> 00:20:46,400
25

541
00:20:52,470 --> 00:20:49,679
normal grocery stores so a lot of data

542
00:20:54,950 --> 00:20:52,480
errors were taking place and we looked

543
00:20:57,029 --> 00:20:54,960
for ways to improve our accuracy in

544
00:20:59,430 --> 00:20:57,039
collecting data so people wouldn't be

545
00:21:01,590 --> 00:20:59,440
writing down the wrong numbers typing in

546
00:21:03,029 --> 00:21:01,600
the wrong numbers and what that led us

547
00:21:05,350 --> 00:21:03,039
to barcode

548
00:21:08,070 --> 00:21:05,360
that led us to marking

549
00:21:09,350 --> 00:21:08,080
little barcodes like data matrix symbols

550
00:21:10,549 --> 00:21:09,360
on parts

551
00:21:14,070 --> 00:21:10,559
directly

552
00:21:16,789 --> 00:21:14,080
and then that let us led me into some

553
00:21:19,350 --> 00:21:16,799
some specialty technologies such as this

554
00:21:21,909 --> 00:21:19,360
one of reading these

555
00:21:22,710 --> 00:21:21,919
symbols which is the identity of the

556
00:21:25,350 --> 00:21:22,720
part

557
00:21:27,990 --> 00:21:25,360
through things like paint through

558
00:21:30,549 --> 00:21:28,000
films paints uh

559
00:21:33,270 --> 00:21:30,559
and other coatings so

560
00:21:35,190 --> 00:21:33,280
that that led us into some some really

561
00:21:36,870 --> 00:21:35,200
interesting technologies

562
00:21:41,830 --> 00:21:36,880
uh

563
00:21:45,190 --> 00:21:41,840

beyond just reading through paint it is

564
00:21:47,190 --> 00:21:45,200
a uh it is a verification process

565
00:21:50,230 --> 00:21:47,200
so uh

566
00:21:52,710 --> 00:21:50,240
let me let me uh call your attention to

567
00:21:55,430 --> 00:21:52,720
the marbler website which

568
00:21:58,390 --> 00:21:55,440
which describes the technology very well

569
00:22:00,310 --> 00:21:58,400
in summary fashion also has a link to

570
00:22:03,750 --> 00:22:00,320
the pattern there and you'll see there

571
00:22:06,310 --> 00:22:03,760
are two aspects to this technology

572
00:22:07,669 --> 00:22:06,320
one is a micro aspect and the other is

573
00:22:11,510 --> 00:22:07,679
macro

574
00:22:12,470 --> 00:22:11,520
so my and the micro uh

575
00:22:15,029 --> 00:22:12,480
aspect

576
00:22:17,830 --> 00:22:15,039
you can imagine uh we were we were

577
00:22:18,870 --> 00:22:17,840
seeing some problems with

578
00:22:22,149 --> 00:22:18,880
uh

579
00:22:24,789 --> 00:22:22,159
counterfeit electronics at that time

580
00:22:29,350 --> 00:22:24,799
sometimes nasa has electronic

581
00:22:34,149 --> 00:22:32,230
for a design need other times they buy

582
00:22:35,110 --> 00:22:34,159
electronics like pc boards and other

583
00:22:37,669 --> 00:22:35,120
things

584
00:22:39,990 --> 00:22:37,679
off the shelf or from commercial sources

585
00:22:41,590 --> 00:22:40,000
out of warehouses and so on there were

586
00:22:42,710 --> 00:22:41,600
there were there were some problems at

587
00:22:45,590 --> 00:22:42,720
the time

588
00:22:46,470 --> 00:22:45,600

with some of these electronics having

589
00:22:48,950 --> 00:22:46,480
been

590
00:22:51,190 --> 00:22:48,960
scrapped at some point cleaned up and

591
00:22:53,110 --> 00:22:51,200
then recycled and you really couldn't

592
00:22:55,669 --> 00:22:53,120
tell the difference and you were buying

593
00:22:58,549 --> 00:22:55,679
old electronics that look new

594
00:23:00,950 --> 00:22:58,559
the the uh the application here is to

595
00:23:04,470 --> 00:23:00,960
put an identity

596
00:23:06,070 --> 00:23:04,480
on the electronic uh component

597
00:23:09,110 --> 00:23:06,080
back when it was new

598
00:23:11,830 --> 00:23:09,120
in a way that that uh if that couldn't

599
00:23:14,630 --> 00:23:11,840
be destroyed and could be detected if it

600
00:23:18,789 --> 00:23:14,640
were recycled as a counterfeit

601
00:23:21,190 --> 00:23:18,799
and uh that that process was uh twofold

602
00:23:24,390 --> 00:23:21,200
and you can read there in the summary

603
00:23:26,710 --> 00:23:24,400
one was to apply a symbol such as a data

604
00:23:29,190 --> 00:23:26,720
matrix barcode or whatever

605
00:23:31,029 --> 00:23:29,200
printed directly on it and the other was

606
00:23:32,789 --> 00:23:31,039
to apply a

607
00:23:36,070 --> 00:23:32,799
an invisible mark

608
00:23:38,070 --> 00:23:36,080
one that involved a chemical tag or just

609
00:23:39,190 --> 00:23:38,080
a chemical that had different elements

610
00:23:41,590 --> 00:23:39,200
in it like

611
00:23:43,750 --> 00:23:41,600
bromine or or

612
00:23:45,270 --> 00:23:43,760
a copper or anything like that in a

613
00:23:47,190 --> 00:23:45,280

certain amount

614
00:23:48,710 --> 00:23:47,200
that when read with an x-ray

615
00:23:51,669 --> 00:23:48,720
fluorescence

616
00:23:54,310 --> 00:23:51,679
device a handheld device

617
00:23:56,710 --> 00:23:54,320
it would give a particular signature

618
00:24:00,149 --> 00:23:56,720
and that would be matched to the to the

619
00:24:02,470 --> 00:24:00,159
serial number on the component so you'd

620
00:24:03,750 --> 00:24:02,480
have two identifying

621
00:24:06,630 --> 00:24:03,760
uh

622
00:24:08,950 --> 00:24:06,640
aspects of the technology on that one

623
00:24:11,750 --> 00:24:08,960
component you have the

624
00:24:13,830 --> 00:24:11,760
bar code or the data matrix which has

625
00:24:15,110 --> 00:24:13,840
the part number and serial number

626
00:24:16,870 --> 00:24:15,120
encoded

627
00:24:19,669 --> 00:24:16,880
and then you have the

628
00:24:22,390 --> 00:24:19,679
uh the signature of the invisible mark

629
00:24:25,350 --> 00:24:22,400
which is a chemical tag it could be just

630
00:24:27,510 --> 00:24:25,360
put on somewhere on the on the on the

631
00:24:30,549 --> 00:24:27,520
let's call it the pc board

632
00:24:32,630 --> 00:24:30,559
or you could have it painted over

633
00:24:35,510 --> 00:24:32,640
and where you couldn't see it and then

634
00:24:37,909 --> 00:24:35,520
read it with that handheld device

635
00:24:40,549 --> 00:24:37,919
uh you could also

636
00:24:43,110 --> 00:24:40,559
within that device since since it is

637
00:24:45,750 --> 00:24:43,120
designed to have a camera and an x-ray

638
00:24:49,029 --> 00:24:45,760

fluorescent capability you could

639
00:24:50,710 --> 00:24:49,039
register the relative locations of the

640
00:24:52,950 --> 00:24:50,720
mark that you could see

641
00:24:55,350 --> 00:24:52,960
and the one that you couldn't see

642
00:24:57,269 --> 00:24:55,360
you could include a third

643
00:24:59,430 --> 00:24:57,279
third aspect

644
00:25:02,549 --> 00:24:59,440
as far as a

645
00:25:05,669 --> 00:25:02,559
feature on the pc board that you could

646
00:25:07,990 --> 00:25:05,679
triangulate with those and make sure

647
00:25:09,269 --> 00:25:08,000
even a defect on it you could include

648
00:25:12,549 --> 00:25:09,279
that in the

649
00:25:14,470 --> 00:25:12,559
in the verification process as as

650
00:25:17,430 --> 00:25:14,480
registering the complete

651
00:25:20,470 --> 00:25:17,440
unique identity of that compound

652
00:25:21,350 --> 00:25:20,480
uh an x-ray fluorescent handheld is

653
00:25:23,269 --> 00:25:21,360
is

654
00:25:25,350 --> 00:25:23,279
like a barcode scanner

655
00:25:26,950 --> 00:25:25,360
with a handle on it

656
00:25:29,510 --> 00:25:26,960
and a

657
00:25:30,310 --> 00:25:29,520
and it has it would have a camera in it

658
00:25:31,590 --> 00:25:30,320
so

659
00:25:33,669 --> 00:25:31,600
we have had

660
00:25:36,470 --> 00:25:33,679
one company build

661
00:25:37,990 --> 00:25:36,480
one of those without a camera we've had

662
00:25:39,590 --> 00:25:38,000
another company

663
00:25:41,669 --> 00:25:39,600

uh build

664
00:25:44,470 --> 00:25:41,679
something like that with a camera

665
00:25:46,710 --> 00:25:44,480
neither company finished the product but

666
00:25:49,909 --> 00:25:46,720
we've had we've had some development in

667
00:25:52,710 --> 00:25:49,919
both both directions so we were

668
00:25:54,630 --> 00:25:52,720
partially there uh in the in in the

669
00:25:57,590 --> 00:25:54,640
aerospace application

670
00:26:00,630 --> 00:25:57,600
but that was the micro application

671
00:26:02,310 --> 00:26:00,640
uh and and to the to scan

672
00:26:03,350 --> 00:26:02,320
x-ray fluorescence it takes a few

673
00:26:05,669 --> 00:26:03,360
seconds

674
00:26:08,070 --> 00:26:05,679
for the x-rays to determine what the

675
00:26:10,470 --> 00:26:08,080
material is that you're you're uh

676
00:26:12,630 --> 00:26:10,480
reading and develop a signature so it's

677
00:26:13,990 --> 00:26:12,640
not real fast it's a verification

678
00:26:15,590 --> 00:26:14,000
process

679
00:26:19,110 --> 00:26:15,600
the macro

680
00:26:21,510 --> 00:26:19,120
application was the example we gave was

681
00:26:23,830 --> 00:26:21,520
was lunar at the time we were we were

682
00:26:25,430 --> 00:26:23,840
doing a lot of lunar development and one

683
00:26:28,630 --> 00:26:25,440
of the one of the opportunities that

684
00:26:31,029 --> 00:26:28,640
they were looking for is can we mine the

685
00:26:33,350 --> 00:26:31,039
materials we need to make fuel

686
00:26:35,110 --> 00:26:33,360
to go on to mars

687
00:26:38,230 --> 00:26:35,120
uh

688
00:26:39,510 --> 00:26:38,240

and we had even approached ames research

689
00:26:42,149 --> 00:26:39,520
center on this

690
00:26:45,430 --> 00:26:42,159
you use x-ray fluorescent handheld to

691
00:26:46,950 --> 00:26:45,440
determine what was in the rock or in the

692
00:26:49,430 --> 00:26:46,960
in the material

693
00:26:51,990 --> 00:26:49,440
on the moon's surface and if you found a

694
00:26:53,990 --> 00:26:52,000
material or a vein of material that was

695
00:26:56,789 --> 00:26:54,000
that was of interest

696
00:26:58,549 --> 00:26:56,799
for making fuel you could determine that

697
00:27:01,190 --> 00:26:58,559
with the with the

698
00:27:01,990 --> 00:27:01,200
x-ray fluorescence mounted on the end of

699
00:27:03,350 --> 00:27:02,000
a

700
00:27:09,669 --> 00:27:03,360
robot

701
00:27:12,470 --> 00:27:09,679
could uh our macro application was

702
00:27:15,510 --> 00:27:12,480
what if you find several places on the

703
00:27:17,029 --> 00:27:15,520
moon surface that have interesting

704
00:27:20,630 --> 00:27:17,039
material

705
00:27:23,750 --> 00:27:20,640
what if you leave and some and later

706
00:27:24,549 --> 00:27:23,760
come back either the same astronaut

707
00:27:27,510 --> 00:27:24,559
or

708
00:27:29,430 --> 00:27:27,520
later

709
00:27:31,669 --> 00:27:29,440
with with another

710
00:27:33,669 --> 00:27:31,679
with another landing how do you find

711
00:27:36,470 --> 00:27:33,679
those same locations

712
00:27:38,070 --> 00:27:36,480
so we said you can find you can find the

713
00:27:40,950 --> 00:27:38,080

coordinates easily enough but how do you

714
00:27:43,510 --> 00:27:40,960
find the exact place on that rock or in

715
00:27:44,470 --> 00:27:43,520
that case we said you could use the same

716
00:27:48,470 --> 00:27:44,480
system

717
00:27:51,830 --> 00:27:48,480
to to with the camera to register

718
00:27:54,470 --> 00:27:51,840
the some shape or form on that

719
00:27:55,350 --> 00:27:54,480
particular surface as a registration

720
00:27:57,110 --> 00:27:55,360
point

721
00:27:59,430 --> 00:27:57,120
use that as your as part of your

722
00:28:02,549 --> 00:27:59,440
identity and then know within that

723
00:28:06,230 --> 00:28:02,559
triangulate over to the exact spot where

724
00:28:08,630 --> 00:28:06,240
you originally uh analyzed the material

725
00:28:09,990 --> 00:28:08,640
there and that's one way of finding the

726
00:28:11,590 --> 00:28:10,000
exact spot

727
00:28:14,389 --> 00:28:11,600
now

728
00:28:16,470 --> 00:28:14,399
that has that also has a

729
00:28:18,870 --> 00:28:16,480
has an earth application

730
00:28:21,430 --> 00:28:18,880
in that if you were looking for

731
00:28:22,470 --> 00:28:21,440
corrosion in pipelines

732
00:28:23,590 --> 00:28:22,480
and

733
00:28:26,230 --> 00:28:23,600
uh

734
00:28:29,430 --> 00:28:26,240
the corrosion is under paint you find

735
00:28:31,510 --> 00:28:29,440
that corrosion using the handheld x-ray

736
00:28:34,549 --> 00:28:31,520
fluorescence because

737
00:28:35,510 --> 00:28:34,559
uh steel will have a different signature

738
00:28:41,669 --> 00:28:35,520

than

739
00:28:42,789 --> 00:28:41,679
you find that through your paint

740
00:28:46,149 --> 00:28:42,799
uh

741
00:28:48,870 --> 00:28:46,159
you can mark near it a symbol

742
00:28:50,630 --> 00:28:48,880
uh you can register that location and

743
00:28:53,029 --> 00:28:50,640
you can come back to that same spot

744
00:28:55,510 --> 00:28:53,039
later on and see if that corrosion has

745
00:28:57,350 --> 00:28:55,520
gotten any worse uh you could do it with

746
00:28:58,870 --> 00:28:57,360
the same person you could deal with a

747
00:29:00,149 --> 00:28:58,880
different person you could do it ten

748
00:29:03,190 --> 00:29:00,159
years later

749
00:29:05,350 --> 00:29:03,200
and and without registration uh come

750
00:29:06,870 --> 00:29:05,360
back to the same spot and do this do a

751
00:29:08,870 --> 00:29:06,880
re-analysis

752
00:29:11,190 --> 00:29:08,880
same way with things like

753
00:29:14,149 --> 00:29:11,200
if you had if you had forensics in a

754
00:29:15,990 --> 00:29:14,159
room marking a place on the carpet or

755
00:29:17,990 --> 00:29:16,000
anything like that it's being able to

756
00:29:21,590 --> 00:29:18,000
come back to the same spot

757
00:29:22,630 --> 00:29:21,600
and and identify what is there the same

758
00:29:23,909 --> 00:29:22,640
way

759
00:29:28,950 --> 00:29:23,919
so

760
00:29:32,710 --> 00:29:31,110
thanks fred fred

761
00:29:34,789 --> 00:29:32,720
great summer great overview really

762
00:29:35,990 --> 00:29:34,799
appreciate it uh also good to hear about

763
00:29:37,350 --> 00:29:36,000

some of the potential commercial

764
00:29:38,310 --> 00:29:37,360
applications

765
00:29:39,190 --> 00:29:38,320
uh

766
00:29:41,830 --> 00:29:39,200
so

767
00:29:43,350 --> 00:29:41,840
one question that came through here is

768
00:29:44,870 --> 00:29:43,360
you're being retired and all and i don't

769
00:29:47,830 --> 00:29:44,880
know the answer to this one

770
00:29:49,110 --> 00:29:47,840
if somebody were interested in

771
00:29:50,870 --> 00:29:49,120
taking this technology and

772
00:29:54,149 --> 00:29:50,880
commercializing it would they still have

773
00:29:56,630 --> 00:29:54,159
access to you

774
00:29:59,350 --> 00:29:56,640
first of all if they licensed it through

775
00:30:00,630 --> 00:29:59,360
nasa which which they would

776
00:30:03,430 --> 00:30:00,640
then uh

777
00:30:06,230 --> 00:30:03,440
as a nasa and once a nasa inventor

778
00:30:08,870 --> 00:30:06,240
always in that same manner so yes they

779
00:30:10,789 --> 00:30:08,880
would have access to me through nasa

780
00:30:11,990 --> 00:30:10,799
to work for them

781
00:30:13,029 --> 00:30:12,000
okay

782
00:30:14,149 --> 00:30:13,039
excellent

783
00:30:16,230 --> 00:30:14,159
um

784
00:30:18,630 --> 00:30:16,240
and what you mentioned that a couple

785
00:30:21,830 --> 00:30:18,640
companies had taken interest in this and

786
00:30:23,430 --> 00:30:21,840
and moved in some directions uh uh in

787
00:30:25,430 --> 00:30:23,440
the aerospace realm

788
00:30:28,070 --> 00:30:25,440

um but weren't successful in bringing

789
00:30:29,510 --> 00:30:28,080
the product to market can can you

790
00:30:31,430 --> 00:30:29,520
you know without getting too much into

791
00:30:32,950 --> 00:30:31,440
the gory details give us some ideas of

792
00:30:35,430 --> 00:30:32,960
some of the challenges that are involved

793
00:30:38,950 --> 00:30:35,440
in taking this from a nasa application

794
00:30:40,230 --> 00:30:38,960
to an industrial commercial application

795
00:30:42,870 --> 00:30:40,240
sure

796
00:30:44,389 --> 00:30:42,880
one of the one of the prohibited factors

797
00:30:49,190 --> 00:30:44,399
in

798
00:30:50,870 --> 00:30:49,200
of the scanner an x-ray fluorescent

799
00:30:53,269 --> 00:30:50,880
handheld and there are many companies

800
00:30:55,590 --> 00:30:53,279
out there that provide those and do a

801
00:30:58,070 --> 00:30:55,600
real good job with the technology

802
00:31:00,549 --> 00:30:58,080
uh uh one like this is a standard it'll

803
00:31:01,909 --> 00:31:00,559
cost 15 to 20 thousand dollars for the

804
00:31:04,630 --> 00:31:01,919
scanner

805
00:31:08,149 --> 00:31:04,640
and to put a camera in does not increase

806
00:31:10,149 --> 00:31:08,159
the cost very it's it's minor really uh

807
00:31:12,630 --> 00:31:10,159
we actually have you can use a wide

808
00:31:14,230 --> 00:31:12,640
angle or you can use uh some of the

809
00:31:15,909 --> 00:31:14,240
lenses that we had in another

810
00:31:18,549 --> 00:31:15,919
application that would

811
00:31:21,510 --> 00:31:18,559
read a mark 50 feet away

812
00:31:22,310 --> 00:31:21,520
and then you could walk up to it and so

813
00:31:23,269 --> 00:31:22,320

on

814
00:31:30,710 --> 00:31:23,279
the

815
00:31:33,669 --> 00:31:30,720
of reading barcodes and data matrix

816
00:31:36,710 --> 00:31:33,679
symbols and so on uh the market is used

817
00:31:37,750 --> 00:31:36,720
to 500 or less scanners

818
00:31:41,909 --> 00:31:37,760
and to

819
00:31:46,630 --> 00:31:43,830
is fifteen to twenty thousand dollars

820
00:31:48,870 --> 00:31:46,640
but uh they would go in the sticker shop

821
00:31:51,269 --> 00:31:48,880
what they didn't realize was they would

822
00:31:52,950 --> 00:31:51,279
say they would come to me and say

823
00:31:56,149 --> 00:31:52,960
uh we have a

824
00:31:59,190 --> 00:31:56,159
problem with counterfeit pharmaceuticals

825
00:32:02,310 --> 00:31:59,200
and it's a two billion dollar problem

826
00:32:03,909 --> 00:32:02,320
uh can you solve it and unless if you

827
00:32:05,750 --> 00:32:03,919
say yeah i can solve it for twenty

828
00:32:08,470 --> 00:32:05,760
thousand dollars

829
00:32:10,310 --> 00:32:08,480
the sticker shock still existed so you

830
00:32:12,070 --> 00:32:10,320
had the question did you have a two

831
00:32:15,029 --> 00:32:12,080
billion dollar problem or did you have a

832
00:32:19,110 --> 00:32:15,039
five hundred dollar problem and that

833
00:32:23,110 --> 00:32:21,269
this is they have to realize this is not

834
00:32:26,549 --> 00:32:23,120
a production process

835
00:32:27,990 --> 00:32:26,559
it is a verification process and if it's

836
00:32:31,350 --> 00:32:28,000
you can see you don't have to have one

837
00:32:33,909 --> 00:32:31,360
at every point of sale and every every

838
00:32:36,389 --> 00:32:33,919

checkpoint only at certain control

839
00:32:38,549 --> 00:32:36,399
points do you have to verify

840
00:32:41,029 --> 00:32:38,559
uh whether your product is counterfeit

841
00:32:43,990 --> 00:32:41,039
or not not everywhere just at control

842
00:32:46,789 --> 00:32:44,000
points so although so it costs

843
00:32:49,350 --> 00:32:46,799
it's high cost to set up a station for

844
00:32:52,789 --> 00:32:49,360
reading and verifying but you don't have

845
00:32:57,350 --> 00:32:54,549
thanks so

846
00:32:59,269 --> 00:32:57,360
it sounds as if there are a couple

847
00:33:00,470 --> 00:32:59,279
challenges to overcome in getting this

848
00:33:02,149 --> 00:33:00,480
thing from

849
00:33:02,950 --> 00:33:02,159
the technology from

850
00:33:05,430 --> 00:33:02,960
uh

851
00:33:09,830 --> 00:33:05,440
the nasa application in into market can

852
00:33:12,389 --> 00:33:09,840
can you talk about the role of um

853
00:33:16,149 --> 00:33:12,399
and licensing in um

854
00:33:21,029 --> 00:33:17,590
well of course the

855
00:33:23,430 --> 00:33:21,039
first role was to take it from idea all

856
00:33:25,830 --> 00:33:23,440
the way to uh

857
00:33:28,710 --> 00:33:25,840
in through the patent process

858
00:33:30,470 --> 00:33:28,720
and then we and after the patent process

859
00:33:31,909 --> 00:33:30,480
there's something you call reduced

860
00:33:35,590 --> 00:33:31,919
practice

861
00:33:39,190 --> 00:33:35,600
uh

862
00:33:42,070 --> 00:33:39,200
when i retired

863
00:33:43,590 --> 00:33:42,080

also about that time the two companies

864
00:33:46,389 --> 00:33:43,600
we were working with

865
00:33:47,430 --> 00:33:46,399
fell prey to the economy and

866
00:33:49,909 --> 00:33:47,440
and they

867
00:33:52,870 --> 00:33:49,919
decided not to take

868
00:33:56,950 --> 00:33:52,880
take on new ventures at that time so the

869
00:33:58,389 --> 00:33:56,960
the economy was as much the blame as uh

870
00:34:04,470 --> 00:33:58,399
as uh

871
00:34:08,069 --> 00:34:06,389
thank you sir we have one more question

872
00:34:10,869 --> 00:34:08,079
this this one comes from a high school

873
00:34:11,589 --> 00:34:10,879
calculus uh class uh and the question is

874
00:34:14,069 --> 00:34:11,599
so

875
00:34:16,710 --> 00:34:14,079
overall what is novel about this

876
00:34:18,310 --> 00:34:16,720
technology that that

877
00:34:20,470 --> 00:34:18,320
makes it unique from previous

878
00:34:22,230 --> 00:34:20,480
technologies is is there one or two

879
00:34:23,909 --> 00:34:22,240
things that really sums this up that

880
00:34:25,909 --> 00:34:23,919
puts us

881
00:34:29,990 --> 00:34:25,919
above and beyond other available

882
00:34:33,669 --> 00:34:32,869
two aspects that make it low first of

883
00:34:36,869 --> 00:34:33,679
all

884
00:34:39,990 --> 00:34:36,879
the uh the use of a

885
00:34:42,069 --> 00:34:40,000
a chemical tag which may

886
00:34:44,470 --> 00:34:42,079
hold as many as 10

887
00:34:46,629 --> 00:34:44,480
elements in there

888
00:34:48,470 --> 00:34:46,639

in a in a particular

889
00:34:51,109 --> 00:34:48,480
amount for each element

890
00:34:53,349 --> 00:34:51,119
to provide a

891
00:34:55,430 --> 00:34:53,359
determined signature

892
00:34:58,310 --> 00:34:55,440
so when you your x-ray fluorescence

893
00:35:01,430 --> 00:34:58,320
reads that you will get a predetermined

894
00:35:02,390 --> 00:35:01,440
signature uh in that that's part of the

895
00:35:05,430 --> 00:35:02,400
identity

896
00:35:06,790 --> 00:35:05,440
the other uh the other novelty is

897
00:35:10,310 --> 00:35:06,800
coupling that

898
00:35:12,230 --> 00:35:10,320
with either a known identity marked on

899
00:35:14,550 --> 00:35:12,240
that particular object

900
00:35:18,950 --> 00:35:14,560
or a known feature

901
00:35:21,910 --> 00:35:18,960
uh a bump or a defect or a scrape or

902
00:35:22,790 --> 00:35:21,920
some known feature on the object itself

903
00:35:25,670 --> 00:35:22,800
near

904
00:35:29,349 --> 00:35:25,680
that particular uh

905
00:35:30,390 --> 00:35:29,359
the tagging uh the kent can be covered

906
00:35:33,430 --> 00:35:30,400
with paint

907
00:35:36,790 --> 00:35:33,440
or a film or whatever x-ray fluorescence

908
00:35:39,109 --> 00:35:36,800
will read through that much material so

909
00:35:44,630 --> 00:35:39,119
the novelty there is two technologies

910
00:35:47,910 --> 00:35:46,630
excellent well thank you so much and

911
00:35:49,750 --> 00:35:47,920
we'll we'll get back to you a little bit

912
00:35:51,109 --> 00:35:49,760
later in the hour with a couple

913
00:35:53,750 --> 00:35:51,119

additional questions

914
00:35:56,710 --> 00:35:53,760
um in the meantime though i'd like to

915
00:35:58,870 --> 00:35:56,720
turn this over to dan perez um and dan

916
00:36:00,069 --> 00:35:58,880
will talk about how he's helping nasa to

917
00:36:02,310 --> 00:36:00,079
crowd source

918
00:36:04,950 --> 00:36:02,320
ideas for some of these these and other

919
00:36:08,230 --> 00:36:04,960
technologies as you can tell we've we've

920
00:36:10,710 --> 00:36:08,240
got um these are these are two of over a

921
00:36:12,150 --> 00:36:10,720
thousand patented technologies uh and

922
00:36:14,310 --> 00:36:12,160
then past our patents we've got another

923
00:36:15,670 --> 00:36:14,320
thousand pieces of software we have so

924
00:36:17,829 --> 00:36:15,680
much technology that we're trying to

925
00:36:19,670 --> 00:36:17,839
share with industry but we don't always

926
00:36:21,430 --> 00:36:19,680
know how else they can be used and dan

927
00:36:24,069 --> 00:36:21,440
perez is helping us with that his

928
00:36:25,109 --> 00:36:24,079
company marbler is uh uh trying to tap

929
00:36:27,910 --> 00:36:25,119
into

930
00:36:30,470 --> 00:36:27,920
uh science citizen scientist communities

931
00:36:32,790 --> 00:36:30,480
and and the population in general and

932
00:36:34,790 --> 00:36:32,800
and get ideas for how we can take

933
00:36:38,150 --> 00:36:34,800
technologies like mics and like fred's

934
00:36:40,710 --> 00:36:38,160
and get them out to industry so um

935
00:36:42,950 --> 00:36:40,720
enough out of me dan perez you'd like to

936
00:36:51,589 --> 00:36:42,960
tell us about uh marvel or crowdsourcing

937
00:36:51,599 --> 00:36:57,589
and dan i think you're on mute

938
00:37:00,950 --> 00:36:59,750

there we go sorry about that so um i

939
00:37:02,950 --> 00:37:00,960
don't spend too much time talking about

940
00:37:04,230 --> 00:37:02,960
marble specifically but i did want to

941
00:37:05,829 --> 00:37:04,240
you know touch upon the you know the

942
00:37:07,829 --> 00:37:05,839
problem and the difficulties on

943
00:37:09,270 --> 00:37:07,839
commercializing technology that plays

944
00:37:10,870 --> 00:37:09,280
back into the the

945
00:37:12,710 --> 00:37:10,880
relationship and what we're doing with

946
00:37:14,950 --> 00:37:12,720
nasa and why why this is such an

947
00:37:16,630 --> 00:37:14,960
exciting initiative and why it's so

948
00:37:18,710 --> 00:37:16,640
exciting for everybody watching to get

949
00:37:21,030 --> 00:37:18,720
involved with with the nasa technologies

950
00:37:24,230 --> 00:37:21,040
that are online right now to figure out

951
00:37:25,510 --> 00:37:24,240
new ways to use it so um obviously the

952
00:37:26,710 --> 00:37:25,520
fine folks at marshall space flight

953
00:37:28,390 --> 00:37:26,720
center are constantly trying to

954
00:37:30,230 --> 00:37:28,400
commercialize their technology using

955
00:37:32,310 --> 00:37:30,240
what has been developed at nasa to find

956
00:37:34,870 --> 00:37:32,320
new ways to use these products in our

957
00:37:35,990 --> 00:37:34,880
everyday life so marbler as as a lot of

958
00:37:37,670 --> 00:37:36,000
you may know as a product development

959
00:37:38,950 --> 00:37:37,680
company and we try to turn this science

960
00:37:41,030 --> 00:37:38,960
science from nasa science from other

961
00:37:42,870 --> 00:37:41,040
people into new products and we do that

962
00:37:44,550 --> 00:37:42,880
by letting anybody around the world to

963
00:37:46,150 --> 00:37:44,560

suggest new ways that they could use the

964
00:37:48,230 --> 00:37:46,160
science now you might ask yourself you

965
00:37:51,670 --> 00:37:48,240
know why is this relevant why why would

966
00:37:52,870 --> 00:37:51,680
we need a lot of help in creating um

967
00:37:57,270 --> 00:37:52,880
uh

968
00:37:59,430 --> 00:37:57,280
there's a huge amount of research that's

969
00:38:00,790 --> 00:37:59,440
going on in the world um nasa there's

970
00:38:03,109 --> 00:38:00,800
you know billions of dollars in research

971
00:38:05,030 --> 00:38:03,119
but if you just focus just on academia

972
00:38:07,990 --> 00:38:05,040
there's about 65 billion dollars that

973
00:38:09,990 --> 00:38:08,000
was spent last year on academic r d just

974
00:38:12,710 --> 00:38:10,000
in the u.s and that resulted in about

975
00:38:15,030 --> 00:38:12,720
you know 11 000 plus patent filings but

976
00:38:16,310 --> 00:38:15,040
of those 11 000 plus patent filings less

977
00:38:18,870 --> 00:38:16,320
than five percent of them are getting

978
00:38:20,710 --> 00:38:18,880
commercialized so 19 out of every 20

979
00:38:22,470 --> 00:38:20,720
patents coming from university settings

980
00:38:24,710 --> 00:38:22,480
and from government research settings

981
00:38:26,790 --> 00:38:24,720
are often lying uncommercialized and so

982
00:38:27,670 --> 00:38:26,800
the roi and that's you know taxpayer

983
00:38:29,349 --> 00:38:27,680
money

984
00:38:30,630 --> 00:38:29,359
um especially from universities who are

985
00:38:32,870 --> 00:38:30,640
predominantly taxpayer funded and

986
00:38:34,390 --> 00:38:32,880
philanthropy funded you know the roi is

987
00:38:36,710 --> 00:38:34,400
you know usually two to two to three

988
00:38:39,270 --> 00:38:36,720

percent and there's a big gulf between

989
00:38:40,630 --> 00:38:39,280
turning science um that's happening uh

990
00:38:43,190 --> 00:38:40,640
all around us and all the universities

991
00:38:44,950 --> 00:38:43,200
in the u.s into new products and that's

992
00:38:46,630 --> 00:38:44,960
and that's where you know people at the

993
00:38:48,150 --> 00:38:46,640
at tech transfer offices step in how

994
00:38:50,150 --> 00:38:48,160
we're marvelous stepping in and this

995
00:38:51,910 --> 00:38:50,160
initiative is so people are allowed to

996
00:38:54,150 --> 00:38:51,920
post patent or we post patents on the

997
00:38:55,910 --> 00:38:54,160
platform we allow anybody to find out

998
00:38:57,270 --> 00:38:55,920
new problems that market problems that

999
00:38:59,430 --> 00:38:57,280
these patents could solve and then we

1000
00:39:01,349 --> 00:38:59,440
develop the most promising into new

1001
00:39:03,190 --> 00:39:01,359
products and

1002
00:39:05,510 --> 00:39:03,200
what's exciting about turning science

1003
00:39:07,430 --> 00:39:05,520
into new products um and for anybody

1004
00:39:09,270 --> 00:39:07,440
interested in you know developing some

1005
00:39:11,109 --> 00:39:09,280
of nasa's technologies into new new

1006
00:39:13,270 --> 00:39:11,119
products or universities technologies

1007
00:39:14,390 --> 00:39:13,280
into new products is that you know when

1008
00:39:16,069 --> 00:39:14,400
you work with something that's really

1009
00:39:17,670 --> 00:39:16,079
patented or with some

1010
00:39:19,829 --> 00:39:17,680
research that's already been done you

1011
00:39:21,030 --> 00:39:19,839
kind of get a running start uh so if you

1012
00:39:23,910 --> 00:39:21,040
approach the people that marshall

1013
00:39:25,829 --> 00:39:23,920

approach the people um at jpl or some of

1014
00:39:27,190 --> 00:39:25,839
the other uh nasa centers about some of

1015
00:39:29,190 --> 00:39:27,200
their technologies you know they've

1016
00:39:31,589 --> 00:39:29,200
already spent a lot of time exemplifying

1017
00:39:32,870 --> 00:39:31,599
it and they patented very well and so

1018
00:39:35,829 --> 00:39:32,880
you didn't have to you know worry about

1019
00:39:36,790 --> 00:39:35,839
some of that early stage r d for it you

1020
00:39:40,150 --> 00:39:36,800
also

1021
00:39:41,510 --> 00:39:40,160
the cost associated with that early

1022
00:39:43,270 --> 00:39:41,520
technology development because it's

1023
00:39:45,030 --> 00:39:43,280
already been done you also since you're

1024
00:39:47,030 --> 00:39:45,040
starting with a patented technology and

1025
00:39:48,310 --> 00:39:47,040
save your development time and

1026
00:39:49,990 --> 00:39:48,320
with the marbler initiative and what's

1027
00:39:51,510 --> 00:39:50,000
what gets me excited as well and i hope

1028
00:39:53,270 --> 00:39:51,520
gets marshall and other people excited

1029
00:39:55,990 --> 00:39:53,280
as well is that we're also engaging a

1030
00:39:59,030 --> 00:39:56,000
community to be able to come in and take

1031
00:40:01,430 --> 00:39:59,040
a look at these technologies um

1032
00:40:02,710 --> 00:40:01,440
to help us move them forward and a lot

1033
00:40:04,870 --> 00:40:02,720
of you might be wondering hey you know

1034
00:40:06,710 --> 00:40:04,880
i'm not i'm not a rocket scientist

1035
00:40:08,310 --> 00:40:06,720
obviously because i don't work at nasa i

1036
00:40:09,990 --> 00:40:08,320
work in another engineering firm or i'm

1037
00:40:11,990 --> 00:40:10,000
a school teacher i'm a student and i

1038
00:40:13,430 --> 00:40:12,000

want to you know reassure all the all

1039
00:40:14,550 --> 00:40:13,440
the students who are watching today and

1040
00:40:16,310 --> 00:40:14,560
everybody else who might not be a

1041
00:40:18,069 --> 00:40:16,320
scientist who's watching today that all

1042
00:40:21,109 --> 00:40:18,079
the technologies that are listed in all

1043
00:40:23,030 --> 00:40:21,119
the technologies

1044
00:40:24,630 --> 00:40:23,040
with nasa and everybody else we break

1045
00:40:27,030 --> 00:40:24,640
them down such that non-experts can

1046
00:40:29,589 --> 00:40:27,040
understand because our big goal with uh

1047
00:40:31,270 --> 00:40:29,599
with this initiative is to ensure that

1048
00:40:33,190 --> 00:40:31,280
um non-experts could come at the

1049
00:40:34,710 --> 00:40:33,200
technology from different angles and to

1050
00:40:36,470 --> 00:40:34,720
share their insight and come up with

1051
00:40:37,829 --> 00:40:36,480
ways to use mike tinker's technology

1052
00:40:39,430 --> 00:40:37,839
that might never would have wouldn't

1053
00:40:41,430 --> 00:40:39,440
have thought of would have come up with

1054
00:40:42,870 --> 00:40:41,440
ways to use fred's technology that fred

1055
00:40:44,790 --> 00:40:42,880
would never have thought of and that's

1056
00:40:47,270 --> 00:40:44,800
the big goal of of marbler in this whole

1057
00:40:48,870 --> 00:40:47,280
initiative is to be able to tap the

1058
00:40:50,230 --> 00:40:48,880
creativity of people from all around the

1059
00:40:52,230 --> 00:40:50,240
world and to reassure you you don't have

1060
00:40:54,550 --> 00:40:52,240
to be an expert to be able to understand

1061
00:40:55,990 --> 00:40:54,560
the technology that's been um has been

1062
00:40:58,309 --> 00:40:56,000
presented to you

1063
00:41:00,069 --> 00:40:58,319

um so yeah that's a that's a little bit

1064
00:41:01,990 --> 00:41:00,079
quite a bit about the the initiative and

1065
00:41:03,589 --> 00:41:02,000
what we're doing and for those people

1066
00:41:06,710 --> 00:41:03,599
who are looking to submit some product

1067
00:41:07,990 --> 00:41:06,720
ideas um on marbler you know

1068
00:41:11,589 --> 00:41:08,000
do do you think around you know the

1069
00:41:12,790 --> 00:41:11,599
novelty and how how your product idea um

1070
00:41:14,870 --> 00:41:12,800
would compare

1071
00:41:16,630 --> 00:41:14,880
to existing product ideas maybe maybe it

1072
00:41:18,550 --> 00:41:16,640
doesn't exist at all you know look at

1073
00:41:20,309 --> 00:41:18,560
the look at the patent for every single

1074
00:41:22,309 --> 00:41:20,319
one of the the patents on marbler we

1075
00:41:23,750 --> 00:41:22,319
linked to the to the patent on google

1076
00:41:26,470 --> 00:41:23,760
patent so look with the patent actually

1077
00:41:28,390 --> 00:41:26,480
enable that product concept um and look

1078
00:41:30,870 --> 00:41:28,400
at the technology readiness for that

1079
00:41:33,670 --> 00:41:30,880
sort of um product idea would you have

1080
00:41:35,829 --> 00:41:33,680
to significantly alter mike's technology

1081
00:41:37,270 --> 00:41:35,839
or significantly alter fred's technology

1082
00:41:38,630 --> 00:41:37,280
in order to make that happen and then

1083
00:41:41,109 --> 00:41:38,640
obviously look at the market size as

1084
00:41:42,550 --> 00:41:41,119
well but um that's

1085
00:41:44,390 --> 00:41:42,560
the the quick and dirty of what we're

1086
00:41:46,309 --> 00:41:44,400
doing with with uh with nasa here at

1087
00:41:47,990 --> 00:41:46,319
marbler and a little bit around tech

1088
00:41:53,190 --> 00:41:48,000

transfer and the problem we're trying to

1089
00:41:59,030 --> 00:41:56,630
thanks dan perez uh and thanks also to

1090
00:42:00,470 --> 00:41:59,040
uh to mike and fred

1091
00:42:02,470 --> 00:42:00,480
uh and now we're gonna open it up i

1092
00:42:04,550 --> 00:42:02,480
think we've got 18 minutes left i'd like

1093
00:42:06,230 --> 00:42:04,560
to open it up for um uh general

1094
00:42:07,349 --> 00:42:06,240
questions or we've got a couple other

1095
00:42:08,630 --> 00:42:07,359
questions that came in through twitter

1096
00:42:11,510 --> 00:42:08,640
and google plus

1097
00:42:13,430 --> 00:42:11,520
um for our two inventors and um

1098
00:42:15,190 --> 00:42:13,440
um now is the time to start shuttling

1099
00:42:17,430 --> 00:42:15,200
questions and we've got somebody sitting

1100
00:42:19,589 --> 00:42:17,440
right here with the another laptop open

1101
00:42:24,230 --> 00:42:19,599
and she's feeding his content

1102
00:42:29,430 --> 00:42:25,270
uh

1103
00:42:31,589 --> 00:42:29,440
we'll start with mike and then we'll

1104
00:42:33,109 --> 00:42:31,599
we'll move on to fred

1105
00:42:33,910 --> 00:42:33,119
and the first question

1106
00:42:38,150 --> 00:42:33,920
um

1107
00:42:42,829 --> 00:42:38,160
what's the most exciting project you've

1108
00:42:48,950 --> 00:42:46,390
nasa well sure thanks dan um

1109
00:42:50,550 --> 00:42:48,960
i i think working uh

1110
00:42:52,550 --> 00:42:50,560
two things i think working with the

1111
00:42:54,630 --> 00:42:52,560
international space station

1112
00:42:56,870 --> 00:42:54,640
and with the space shuttle

1113
00:42:59,349 --> 00:42:56,880

would have to be uh the two most

1114
00:43:00,150 --> 00:42:59,359
exciting things i've done

1115
00:43:02,550 --> 00:43:00,160
um

1116
00:43:04,230 --> 00:43:02,560
you know you can look up on a clear

1117
00:43:06,550 --> 00:43:04,240
night and if you know where to look you

1118
00:43:10,069 --> 00:43:06,560
can see the space station

1119
00:43:11,670 --> 00:43:10,079
uh passing by overhead uh you know

1120
00:43:14,069 --> 00:43:11,680
knowing that those astronauts are on

1121
00:43:15,430 --> 00:43:14,079
orbit they're conducting groundbreaking

1122
00:43:17,030 --> 00:43:15,440
research

1123
00:43:19,030 --> 00:43:17,040
and that we have this phenomenal

1124
00:43:21,349 --> 00:43:19,040
facility in space

1125
00:43:23,270 --> 00:43:21,359
with international participation that is

1126
00:43:25,349 --> 00:43:23,280
extremely exciting

1127
00:43:27,030 --> 00:43:25,359
and then of course having worked with

1128
00:43:28,710 --> 00:43:27,040
the shuttle

1129
00:43:29,670 --> 00:43:28,720
i was involved with an investigation

1130
00:43:31,190 --> 00:43:29,680
team

1131
00:43:34,069 --> 00:43:31,200
to

1132
00:43:35,990 --> 00:43:34,079
help find out why foam was coming off

1133
00:43:38,150 --> 00:43:36,000
the external tank another connection

1134
00:43:39,510 --> 00:43:38,160
with foam for me

1135
00:43:41,510 --> 00:43:39,520
but that was very interesting very

1136
00:43:43,109 --> 00:43:41,520
rewarding we were able to help solve

1137
00:43:45,589 --> 00:43:43,119
that problem help to get the shuttle

1138
00:43:48,550 --> 00:43:45,599

back on ground uh into the air

1139
00:43:52,470 --> 00:43:48,560
uh several years ago and flying again

1140
00:43:55,750 --> 00:43:52,480
uh so so doing work that leads to

1141
00:43:58,069 --> 00:43:55,760
space missions uh you know we've got

1142
00:44:00,630 --> 00:43:58,079
hardware flying in space you've got crew

1143
00:44:03,510 --> 00:44:00,640
operating that hardware

1144
00:44:10,550 --> 00:44:03,520
that's very exciting to me uh so so

1145
00:44:13,030 --> 00:44:11,510
sorry

1146
00:44:15,510 --> 00:44:13,040
trouble finding the the mute button

1147
00:44:17,349 --> 00:44:15,520
there uh i i have i have two questions

1148
00:44:18,710 --> 00:44:17,359
related to there's questions we asked

1149
00:44:22,390 --> 00:44:18,720
fred also that i want to ask you about

1150
00:44:24,309 --> 00:44:22,400
the phone um first is is can you speak

1151
00:44:26,870 --> 00:44:24,319
the cost effectiveness of of that

1152
00:44:29,829 --> 00:44:26,880
particular application and then the

1153
00:44:30,950 --> 00:44:29,839
follow-up question to that um which i

1154
00:44:31,910 --> 00:44:30,960
suppose i could just wait and ask you

1155
00:44:33,190 --> 00:44:31,920
the following question afterwards but

1156
00:44:34,309 --> 00:44:33,200
i'll give you started thinking about the

1157
00:44:37,030 --> 00:44:34,319
back of your brain

1158
00:44:38,790 --> 00:44:37,040
um is are there household applications

1159
00:44:40,230 --> 00:44:38,800
you know um uh countertop type

1160
00:44:42,230 --> 00:44:40,240
applications that you can think of for

1161
00:44:44,550 --> 00:44:42,240
this for this phone and i guess that

1162
00:44:46,630 --> 00:44:44,560
would also be a cost factor too right um

1163
00:44:47,750 --> 00:44:46,640

getting it cheap enough that you could

1164
00:44:48,950 --> 00:44:47,760
you could have it be an everyday

1165
00:44:50,630 --> 00:44:48,960
consumer item and what would that

1166
00:44:55,510 --> 00:44:50,640
consumer item be

1167
00:44:59,190 --> 00:44:56,550
sure

1168
00:45:01,109 --> 00:44:59,200
uh interestingly the particular foams

1169
00:45:03,750 --> 00:45:01,119
that we used in these experiments and as

1170
00:45:05,430 --> 00:45:03,760
you can see in this test article

1171
00:45:07,510 --> 00:45:05,440
these were off-the-shelf very

1172
00:45:10,069 --> 00:45:07,520
inexpensive phones that you can buy at

1173
00:45:12,550 --> 00:45:10,079
your local hardware store

1174
00:45:14,390 --> 00:45:12,560
so and this was a fairly small structure

1175
00:45:16,790 --> 00:45:14,400
and it didn't take a lot of foam to fill

1176
00:45:18,710 --> 00:45:16,800
it but that gives you an idea

1177
00:45:20,309 --> 00:45:18,720
of the cost

1178
00:45:24,069 --> 00:45:20,319
i think for the most part for

1179
00:45:26,309 --> 00:45:24,079
particularly for commercial applications

1180
00:45:27,589 --> 00:45:26,319
you would be looking at inexpensive

1181
00:45:30,069 --> 00:45:27,599
foams

1182
00:45:32,390 --> 00:45:30,079
that you could purchase off the shelf

1183
00:45:34,230 --> 00:45:32,400
it depends on what you would do

1184
00:45:36,950 --> 00:45:34,240
with that product

1185
00:45:38,630 --> 00:45:36,960
if you really required high strength for

1186
00:45:41,030 --> 00:45:38,640
example

1187
00:45:43,510 --> 00:45:41,040
you would probably need to involve foam

1188
00:45:44,790 --> 00:45:43,520

researchers to design the foam to have

1189
00:45:47,589 --> 00:45:44,800
the properties you needed so it would

1190
00:45:49,670 --> 00:45:47,599
get more expensive in that case

1191
00:45:51,829 --> 00:45:49,680
as far as an upfront investment in a

1192
00:45:53,510 --> 00:45:51,839
product but once the foam had been

1193
00:45:55,190 --> 00:45:53,520
developed

1194
00:45:56,950 --> 00:45:55,200
you would not need to continue that

1195
00:45:59,670 --> 00:45:56,960
investment so that would be an upfront

1196
00:46:02,390 --> 00:45:59,680
cost but for the research we did here at

1197
00:46:05,190 --> 00:46:02,400
marshall we were simply using very

1198
00:46:06,950 --> 00:46:05,200
inexpensive spray or

1199
00:46:08,470 --> 00:46:06,960
poor phones

1200
00:46:09,750 --> 00:46:08,480
that we could buy at a local hardware

1201
00:46:12,829 --> 00:46:09,760
store

1202
00:46:14,630 --> 00:46:12,839
your second question was about household

1203
00:46:16,550 --> 00:46:14,640
applications

1204
00:46:18,790 --> 00:46:16,560
one application we've thought about is

1205
00:46:21,109 --> 00:46:18,800
kind of related to plumbing

1206
00:46:22,630 --> 00:46:21,119
you know you have to insulate your pipes

1207
00:46:23,829 --> 00:46:22,640
during the winter

1208
00:46:26,710 --> 00:46:23,839
and

1209
00:46:28,950 --> 00:46:26,720
you could use this type technology for a

1210
00:46:31,109 --> 00:46:28,960
pipe insulation for example

1211
00:46:33,910 --> 00:46:31,119
and that you you would wrap the

1212
00:46:35,589 --> 00:46:33,920
structure around a pipe inject the foam

1213
00:46:38,230 --> 00:46:35,599

into it it would cure

1214
00:46:40,069 --> 00:46:38,240
and then you would have the insulation

1215
00:46:43,990 --> 00:46:40,079
left there in place

1216
00:46:45,750 --> 00:46:44,000
uh that's just one household application

1217
00:46:48,790 --> 00:46:45,760
um

1218
00:46:50,790 --> 00:46:48,800
so any other questions related to that

1219
00:46:52,150 --> 00:46:50,800
uh some of those i wouldn't want to

1220
00:46:53,829 --> 00:46:52,160
refer to dan

1221
00:46:55,910 --> 00:46:53,839
uh with marbler

1222
00:46:58,069 --> 00:46:55,920
because he's involved some very specific

1223
00:47:01,190 --> 00:46:58,079
ideas

1224
00:47:03,430 --> 00:47:01,200
so uh actually let's hop to fred next

1225
00:47:04,710 --> 00:47:03,440
and then i do have some questions for

1226
00:47:06,390 --> 00:47:04,720
and dan perez i'll give you a chance to

1227
00:47:08,309 --> 00:47:06,400
start thinking about these i want to ask

1228
00:47:10,069 --> 00:47:08,319
you also um what are some of the cool

1229
00:47:11,750 --> 00:47:10,079
ideas you've gotten for how these guys

1230
00:47:12,950 --> 00:47:11,760
technologies could be used

1231
00:47:15,270 --> 00:47:12,960
uh but in the meantime we had another

1232
00:47:18,710 --> 00:47:15,280
question come in for fred from uh google

1233
00:47:20,790 --> 00:47:18,720
plus and and this one is uh have you

1234
00:47:26,710 --> 00:47:20,800
looked at using this technology in a

1235
00:47:31,589 --> 00:47:29,430
not in a biological or medical setting

1236
00:47:34,309 --> 00:47:31,599
in the sense of a doctor's office or in

1237
00:47:39,109 --> 00:47:36,790
if it were in a hospital it would be at

1238
00:47:41,990 --> 00:47:39,119

the pharmaceutical

1239
00:47:43,030 --> 00:47:42,000
level where you'd be receiving

1240
00:47:45,030 --> 00:47:43,040
uh

1241
00:47:46,950 --> 00:47:45,040
treatment products and you would want

1242
00:47:49,349 --> 00:47:46,960
you would use this to

1243
00:47:52,950 --> 00:47:49,359
authenticate that they came from the

1244
00:47:54,470 --> 00:47:52,960
source that you ordered them rather than

1245
00:47:59,990 --> 00:47:54,480
uh

1246
00:48:01,750 --> 00:48:00,000
you hear of that happening quite a bit

1247
00:48:04,069 --> 00:48:01,760
it's it's

1248
00:48:06,950 --> 00:48:04,079
something that's in the entire

1249
00:48:10,150 --> 00:48:06,960
pharmaceutical industry uh and

1250
00:48:12,710 --> 00:48:10,160
uh your your drug stores your hospitals

1251
00:48:15,190 --> 00:48:12,720
they receive counterfeit medication

1252
00:48:16,069 --> 00:48:15,200
and this this would be a way to verify

1253
00:48:18,150 --> 00:48:16,079
um

1254
00:48:20,069 --> 00:48:18,160
the and authenticate the medication

1255
00:48:22,390 --> 00:48:20,079
they're receiving and it's what they

1256
00:48:24,790 --> 00:48:22,400
really ordered and from whom

1257
00:48:29,910 --> 00:48:24,800
otherwise it wouldn't that would be that

1258
00:48:36,710 --> 00:48:34,150
thank you sir and um

1259
00:48:38,549 --> 00:48:36,720
can you talk us through some of the the

1260
00:48:39,990 --> 00:48:38,559
cool technology uh this is some of the

1261
00:48:42,230 --> 00:48:40,000
cool ideas that you've gotten for how we

1262
00:48:45,349 --> 00:48:42,240
can use these these two technologies uh

1263
00:48:47,270 --> 00:48:45,359

or and maybe a a quick rundown on on

1264
00:48:48,870 --> 00:48:47,280
some of the other technologies that

1265
00:49:02,950 --> 00:48:48,880
we've got up on the marbler site right

1266
00:49:07,910 --> 00:49:06,549
were you are you speaking to me or

1267
00:49:09,510 --> 00:49:07,920
so that was a question that was a

1268
00:49:16,630 --> 00:49:09,520
question

1269
00:49:16,640 --> 00:49:19,910
no

1270
00:49:19,920 --> 00:49:24,390
so damn perez can you hear us

1271
00:49:27,829 --> 00:49:25,670
yes i can hear you i dropped off the

1272
00:49:30,069 --> 00:49:27,839
second on my internet but i'm back sorry

1273
00:49:30,870 --> 00:49:30,079
about that um what was your question

1274
00:49:32,950 --> 00:49:30,880
sorry

1275
00:49:34,549 --> 00:49:32,960
the question is uh can you walk us

1276
00:49:35,750 --> 00:49:34,559
through some secondary applications some

1277
00:49:37,430 --> 00:49:35,760
of the new ideas that you've gotten for

1278
00:49:39,829 --> 00:49:37,440
these two technologies

1279
00:49:41,109 --> 00:49:39,839
um uh fred and mike's technologies and

1280
00:49:42,390 --> 00:49:41,119
also what are some of the other

1281
00:49:43,670 --> 00:49:42,400
technologies that are that are up on

1282
00:49:45,030 --> 00:49:43,680
marbler now

1283
00:49:47,270 --> 00:49:45,040
from nasa that people have been

1284
00:49:49,910 --> 00:49:47,280
interested in and and and

1285
00:49:52,150 --> 00:49:49,920
new applications for them

1286
00:49:54,470 --> 00:49:52,160
sure sure thing and so one of the really

1287
00:49:56,870 --> 00:49:54,480
really exciting applications we had uh

1288
00:49:58,069 --> 00:49:56,880

for uh for mike's technology was

1289
00:49:59,750 --> 00:49:58,079
actually to use it as a rapidly

1290
00:50:01,990 --> 00:49:59,760
deployable splint in emergency

1291
00:50:04,630 --> 00:50:02,000
situations so you'd imagine given the

1292
00:50:06,230 --> 00:50:04,640
foam is comes quite compact and could

1293
00:50:09,430 --> 00:50:06,240
expand you know depending on the type of

1294
00:50:11,589 --> 00:50:09,440
foam you use anywhere from 10x to 25x

1295
00:50:12,470 --> 00:50:11,599
you can have you know

1296
00:50:54,309 --> 00:50:12,480
a

1297
00:50:56,710 --> 00:50:54,319
technology in terms of um emergency

1298
00:51:00,470 --> 00:50:56,720
situations actually you know using this

1299
00:51:03,270 --> 00:51:00,480
to quickly um lift up debris um after

1300
00:51:05,190 --> 00:51:03,280
you know a building collapses um or

1301
00:51:06,710 --> 00:51:05,200
during mine accidents you would

1302
00:51:09,510 --> 00:51:06,720
obviously need some very very strong

1303
00:51:11,829 --> 00:51:09,520
foam and as is a biochemist myself not a

1304
00:51:13,109 --> 00:51:11,839
material scientist i

1305
00:51:15,750 --> 00:51:13,119
i couldn't say if

1306
00:51:17,430 --> 00:51:15,760
it exists um that's sort of a

1307
00:51:19,589 --> 00:51:17,440
phone that would be strong enough to use

1308
00:51:21,990 --> 00:51:19,599
safely in those sorts of situations but

1309
00:51:25,430 --> 00:51:22,000
it's a very clever idea and a really

1310
00:51:28,470 --> 00:51:25,440
neat um unmet need that his technology

1311
00:51:29,430 --> 00:51:28,480
would potentially be able to solve um in

1312
00:51:31,990 --> 00:51:29,440
terms of

1313
00:51:33,750 --> 00:51:32,000

of of fred's technology and this and two

1314
00:51:35,990 --> 00:51:33,760
component tagging one of the most

1315
00:51:38,230 --> 00:51:36,000
exciting applications i've seen is

1316
00:51:39,829 --> 00:51:38,240
really and freda touched upon it as well

1317
00:51:41,829 --> 00:51:39,839
and there's one i want to really

1318
00:51:43,109 --> 00:51:41,839
emphasize because i'm i'm quite

1319
00:51:44,950 --> 00:51:43,119
interested in it it's actually in

1320
00:51:47,190 --> 00:51:44,960
counterfeit um

1321
00:51:49,670 --> 00:51:47,200
tracking counterfeits and

1322
00:51:52,390 --> 00:51:49,680
authenticating consumables but uh what

1323
00:51:53,750 --> 00:51:52,400
people might not appreciate is how much

1324
00:51:55,430 --> 00:51:53,760
of a problem this is in the

1325
00:51:57,349 --> 00:51:55,440
pharmaceutical industry there are

1326
00:51:59,829 --> 00:51:57,359
billions and billions tens of billions

1327
00:52:02,710 --> 00:51:59,839
of dollars every year worth of fake

1328
00:52:05,430 --> 00:52:02,720
drugs that are distributed um and quite

1329
00:52:07,829 --> 00:52:05,440
a few enter america as well um and these

1330
00:52:10,069 --> 00:52:07,839
these positively haven't ever or should

1331
00:52:13,270 --> 00:52:10,079
it negatively certainly have a negative

1332
00:52:15,349 --> 00:52:13,280
impact on on our health and um what

1333
00:52:17,910 --> 00:52:15,359
would be really neat is to try to stay a

1334
00:52:20,309 --> 00:52:17,920
step ahead of of criminals and criminal

1335
00:52:23,349 --> 00:52:20,319
syndicates by having this sort of uh

1336
00:52:24,630 --> 00:52:23,359
two-step authentication system and as as

1337
00:52:27,589 --> 00:52:24,640
fred mentioned it's actually quite

1338
00:52:29,270 --> 00:52:27,599

powerful you'd have um ten different uh

1339
00:52:31,829 --> 00:52:29,280
uh types of identification that you'd be

1340
00:52:34,069 --> 00:52:31,839
able to do and it's quite modular um and

1341
00:52:34,710 --> 00:52:34,079
so for certainly for for drugs which is

1342
00:52:51,349 --> 00:52:34,720
a

1343
00:52:53,750 --> 00:52:51,359
commonly counterfeited include

1344
00:52:55,589 --> 00:52:53,760
electronics as well so most of us are

1345
00:52:57,829 --> 00:52:55,599
confident that our iphone is generally

1346
00:52:59,750 --> 00:52:57,839
you know made by apple but uh but there

1347
00:53:01,670 --> 00:52:59,760
are actually huge amounts of counterfeit

1348
00:53:03,589 --> 00:53:01,680
electronics that you'll see out there

1349
00:53:06,710 --> 00:53:03,599
and so this sort of identification

1350
00:53:07,750 --> 00:53:06,720
system would really help um but you know

1351
00:53:09,510 --> 00:53:07,760
i'd encourage everybody to take a look

1352
00:53:11,670 --> 00:53:09,520
at marble.com

1353
00:53:14,390 --> 00:53:11,680
there's a there's dozens of and dozens

1354
00:53:16,549 --> 00:53:14,400
of other nasa um technologies and nasa

1355
00:53:19,030 --> 00:53:16,559
innovations that are um that are there

1356
00:53:21,510 --> 00:53:19,040
that are being um that that people could

1357
00:53:25,270 --> 00:53:21,520
come and and trying to commercial

1358
00:53:27,109 --> 00:53:25,280
wise um one one really neat one um that

1359
00:53:29,270 --> 00:53:27,119
i've actually really enjoyed looking at

1360
00:53:33,109 --> 00:53:29,280
so there's a nasa technology it's on

1361
00:53:35,030 --> 00:53:33,119
very robust and and um precise mirror

1362
00:53:37,030 --> 00:53:35,040
alignment so as people could uh could

1363
00:53:39,270 --> 00:53:37,040

imagine nasa does quite a bit of

1364
00:53:42,309 --> 00:53:39,280
research um in terms of mirror lineman's

1365
00:53:43,829 --> 00:53:42,319
for astronomical observations and um

1366
00:53:45,670 --> 00:53:43,839
these are usually very very large

1367
00:53:47,430 --> 00:53:45,680
devices but what nasa has done is

1368
00:53:50,470 --> 00:53:47,440
they've designed a system that is very

1369
00:53:52,390 --> 00:53:50,480
accurate very cost effective um and

1370
00:53:54,470 --> 00:53:52,400
their their curvature errors are much

1371
00:53:57,190 --> 00:53:54,480
much lower than other than other

1372
00:53:58,870 --> 00:53:57,200
technologies but uh uh in terms of some

1373
00:54:01,510 --> 00:53:58,880
of the ideas that people have found and

1374
00:54:04,150 --> 00:54:01,520
also in in setting up rapid free space

1375
00:54:05,670 --> 00:54:04,160
optical links so that is you know you're

1376
00:54:07,190 --> 00:54:05,680
in the middle of uh

1377
00:54:08,950 --> 00:54:07,200
the desert or you're just in in the

1378
00:54:09,990 --> 00:54:08,960
middle of a battle zone for military

1379
00:54:11,990 --> 00:54:10,000
applications you need to quickly

1380
00:54:13,750 --> 00:54:12,000
establish a wi-fi connection or

1381
00:54:16,150 --> 00:54:13,760
communication connection you could use

1382
00:54:18,549 --> 00:54:16,160
this device and you'll be able to to

1383
00:54:20,870 --> 00:54:18,559
amplify any sort of satellite signal

1384
00:54:24,150 --> 00:54:20,880
much much quicker and actually use it

1385
00:54:25,430 --> 00:54:24,160
for for in the field um communications

1386
00:54:27,670 --> 00:54:25,440
which is a really really clever

1387
00:54:29,829 --> 00:54:27,680
application it's a demonstration of of

1388
00:54:33,990 --> 00:54:29,839

how you could engage a wide network to

1389
00:54:35,670 --> 00:54:34,000
to identify some some different types of

1390
00:54:37,030 --> 00:54:35,680
applications that the inventors might

1391
00:54:39,030 --> 00:54:37,040
not have thought of another neat

1392
00:54:40,950 --> 00:54:39,040
technology that nasa's developed was a

1393
00:54:44,309 --> 00:54:40,960
sensor for measuring the speed of you

1394
00:54:47,030 --> 00:54:44,319
know very high temperature uh fluids um

1395
00:54:49,030 --> 00:54:47,040
somebody came in who's um who's actually

1396
00:54:51,510 --> 00:54:49,040
a researcher in wisconsin his name is

1397
00:54:54,309 --> 00:54:51,520
brian and he felt well we really need

1398
00:54:56,710 --> 00:54:54,319
application for this is to pivot it uh

1399
00:54:58,870 --> 00:54:56,720
from space and orbital applications

1400
00:55:01,670 --> 00:54:58,880
actually for flow monitoring in next

1401
00:55:03,430 --> 00:55:01,680
generation nuclear reactors um so i'm

1402
00:55:04,710 --> 00:55:03,440
not a nuclear physicist but i found this

1403
00:55:07,109 --> 00:55:04,720
application actually really really

1404
00:55:09,750 --> 00:55:07,119
interesting he attached several images

1405
00:55:11,270 --> 00:55:09,760
and i encourage all to take a look um at

1406
00:55:13,990 --> 00:55:11,280
some of the ideas for for this

1407
00:55:16,390 --> 00:55:14,000
particular technology and how you know

1408
00:55:18,950 --> 00:55:16,400
maybe you'd be able to pivot some nasa

1409
00:55:21,589 --> 00:55:18,960
innovation into uh into the nuclear

1410
00:55:23,829 --> 00:55:21,599
reactor um there's a there's various

1411
00:55:25,910 --> 00:55:23,839
other um technologies there's you know

1412
00:55:27,510 --> 00:55:25,920
that people could chew on one particular

1413
00:55:30,390 --> 00:55:27,520

that's uh that's gotten quite a bit of

1414
00:55:32,710 --> 00:55:30,400
traction is a simplifying way of storing

1415
00:55:34,549 --> 00:55:32,720
ultra low temperature fluids so you can

1416
00:55:36,549 --> 00:55:34,559
imagine with you know their fuel cells

1417
00:55:38,870 --> 00:55:36,559
and in various missions nasa has to

1418
00:55:40,710 --> 00:55:38,880
develop um technologies for mission

1419
00:55:43,349 --> 00:55:40,720
critical tasks and often you know part

1420
00:55:45,589 --> 00:55:43,359
of those tasks involve you know storing

1421
00:55:46,710 --> 00:55:45,599
ultra low temperature fluids but there's

1422
00:55:48,470 --> 00:55:46,720
a lot of

1423
00:55:50,069 --> 00:55:48,480
ways here on earth that we need to store

1424
00:55:52,230 --> 00:55:50,079
ultra

1425
00:55:55,190 --> 00:55:52,240
low temperature fluids as well in terms

1426
00:55:57,430 --> 00:55:55,200
of cryogen cryogenic storage and for

1427
00:55:59,270 --> 00:55:57,440
service providers a lot of biomedical

1428
00:56:00,630 --> 00:55:59,280
applications when it comes to freezing

1429
00:56:03,030 --> 00:56:00,640
tissues

1430
00:56:05,430 --> 00:56:03,040
for medical research um it's got

1431
00:56:06,789 --> 00:56:05,440
applications for that and so

1432
00:56:08,069 --> 00:56:06,799
those are just a few that i'm quite

1433
00:56:10,630 --> 00:56:08,079
excited about but i know i'm running out

1434
00:56:14,309 --> 00:56:10,640
of time so i should turn it back over to

1435
00:56:18,789 --> 00:56:16,470
thanks uh that's a great overview i

1436
00:56:20,710 --> 00:56:18,799
really appreciate it dan um al also as

1437
00:56:24,230 --> 00:56:20,720
as dan perez uh mentioned you're on mute

1438
00:56:28,630 --> 00:56:26,549

as dan perez mentioned uh marveller.com

1439
00:56:30,069 --> 00:56:28,640
forward slash nasa is one of the best

1440
00:56:31,589 --> 00:56:30,079
places to go hear about all these

1441
00:56:33,109 --> 00:56:31,599
technologies

1442
00:56:35,030 --> 00:56:33,119
um

1443
00:56:38,309 --> 00:56:35,040
another question just came in through

1444
00:56:40,150 --> 00:56:38,319
google plus and um

1445
00:56:41,190 --> 00:56:40,160
a handful of questions actually related

1446
00:56:43,270 --> 00:56:41,200
to so we're interested in this

1447
00:56:44,950 --> 00:56:43,280
technology now what what's the protocol

1448
00:56:45,990 --> 00:56:44,960
for licensing how do i get access to

1449
00:56:48,470 --> 00:56:46,000
this stuff

1450
00:56:51,190 --> 00:56:48,480
um and i'll i'll field that one

1451
00:56:52,309 --> 00:56:51,200
uh generally speaking uh if you find a

1452
00:56:54,069 --> 00:56:52,319
technology of nasa's that you're

1453
00:56:55,829 --> 00:56:54,079
interested in you contact that field

1454
00:56:57,190 --> 00:56:55,839
center directly and

1455
00:56:59,589 --> 00:56:57,200
there'll be a name and a contact

1456
00:57:01,430 --> 00:56:59,599
information uh listed with with any of

1457
00:57:02,710 --> 00:57:01,440
our patents with any of our technologies

1458
00:57:03,430 --> 00:57:02,720
are on this site

1459
00:57:07,510 --> 00:57:03,440
so

1460
00:57:09,349 --> 00:57:07,520
directly or contact

1461
00:57:10,950 --> 00:57:09,359
google nasa technology transfer or

1462
00:57:12,230 --> 00:57:10,960
technology.nasa.gov

1463
00:57:13,270 --> 00:57:12,240

there's a million ways to get in touch

1464
00:57:14,390 --> 00:57:13,280
with us

1465
00:57:17,030 --> 00:57:14,400
um

1466
00:57:19,510 --> 00:57:17,040
the first step is is usually a research

1467
00:57:21,190 --> 00:57:19,520
or evaluation license and we can set you

1468
00:57:23,510 --> 00:57:21,200
up with a six month or 12 month

1469
00:57:26,230 --> 00:57:23,520
exploratory period where you take the

1470
00:57:28,309 --> 00:57:26,240
technology out it's like a test drive um

1471
00:57:30,390 --> 00:57:28,319
uh you can bang on it you can see if it

1472
00:57:31,430 --> 00:57:30,400
works for you you can experiment with it

1473
00:57:33,750 --> 00:57:31,440
and

1474
00:57:35,829 --> 00:57:33,760
you you can see if it's really for you

1475
00:57:37,190 --> 00:57:35,839
if it turns out that it is for you we we

1476
00:57:39,510 --> 00:57:37,200
do the next step which is a commercial

1477
00:57:42,390 --> 00:57:39,520
license and we sit down with you uh we

1478
00:57:44,470 --> 00:57:42,400
work on some paperwork we draft we draft

1479
00:57:46,710 --> 00:57:44,480
that um an agreement that says you get

1480
00:57:47,510 --> 00:57:46,720
to use this technology for your

1481
00:57:49,910 --> 00:57:47,520
um

1482
00:57:52,950 --> 00:57:49,920
uh commercial applications and generally

1483
00:57:54,710 --> 00:57:52,960
there there is a royalty fee uh that you

1484
00:57:57,190 --> 00:57:54,720
pay us for the use of the technology and

1485
00:57:59,109 --> 00:57:57,200
that that money doesn't just you know um

1486
00:58:01,750 --> 00:57:59,119
go back into the federal treasury that

1487
00:58:03,430 --> 00:58:01,760
that those dollars go um it's a nominal

1488
00:58:05,109 --> 00:58:03,440

fee it's a couple bucks and those

1489
00:58:08,069 --> 00:58:05,119
actually go to the inventor

1490
00:58:10,230 --> 00:58:08,079
um um mostly mostly to the inventor uh

1491
00:58:12,549 --> 00:58:10,240
the other dollars get get funneled into

1492
00:58:14,549 --> 00:58:12,559
uh patents uh patent maintenance fees

1493
00:58:17,349 --> 00:58:14,559
and that that type of basic work um so

1494
00:58:20,309 --> 00:58:17,359
it's a nominal fee um it rewards the

1495
00:58:22,069 --> 00:58:20,319
inventor um which is a

1496
00:58:23,829 --> 00:58:22,079
one of our legal requirements and we're

1497
00:58:25,670 --> 00:58:23,839
happy to do it um so if you're

1498
00:58:27,750 --> 00:58:25,680
interested in the technology uh

1499
00:58:29,670 --> 00:58:27,760
innovation uh i'm sorry researcher

1500
00:58:32,710 --> 00:58:29,680
evaluation license then a commercial

1501
00:58:33,990 --> 00:58:32,720
license um uh so let's say you've got

1502
00:58:35,910 --> 00:58:34,000
the patent you've got the right to use

1503
00:58:37,750 --> 00:58:35,920
it you need some more assistance as fred

1504
00:58:39,990 --> 00:58:37,760
mentioned we're happy to provide that

1505
00:58:41,829 --> 00:58:40,000
assistance our researchers will will sit

1506
00:58:44,870 --> 00:58:41,839
down with you they'll talk you through

1507
00:58:48,710 --> 00:58:44,880
it um in some cases we'll build um test

1508
00:58:51,109 --> 00:58:48,720
platforms we'll um help you prototype um

1509
00:58:52,470 --> 00:58:51,119
and that that all gets worked out uh but

1510
00:58:53,829 --> 00:58:52,480
in general you know if you're just

1511
00:58:56,150 --> 00:58:53,839
interested in our technology give us a

1512
00:58:58,230 --> 00:58:56,160
call it would be um it's a lot easier

1513
00:58:59,670 --> 00:58:58,240

than you might think

1514
00:59:02,150 --> 00:58:59,680
um

1515
00:59:03,349 --> 00:59:02,160
so that that puts us at 12 59 eastern

1516
00:59:06,069 --> 00:59:03,359
time and i think we have until one

1517
00:59:08,309 --> 00:59:06,079
o'clock um i'll go ahead and say

1518
00:59:10,870 --> 00:59:08,319
uh thanks to everyone for joining us

1519
00:59:12,150 --> 00:59:10,880
um again i'm dan lochte from uh nasa

1520
00:59:15,990 --> 00:59:12,160
tech transfer

1521
00:59:17,349 --> 00:59:16,000
uh if you hold on

1522
00:59:19,990 --> 00:59:17,359
we didn't get to all the questions but

1523
00:59:22,390 --> 00:59:20,000
if you um uh uh hit us up uh through

1524
00:59:24,309 --> 00:59:22,400
social media we will get to them all

1525
00:59:26,470 --> 00:59:24,319
um like to thank mike tinker for

1526
00:59:28,789 --> 00:59:26,480
marshall like to take thank uh fred tram

1527
00:59:30,309 --> 00:59:28,799
for marshall i'd like to thank um uh dan

1528
00:59:32,549 --> 00:59:30,319
perez from marbler

1529
00:59:33,670 --> 00:59:32,559
so thanks everybody it's been a fun

1530
00:59:35,270 --> 00:59:33,680
hangout