ACTORS IN POLITICAL PROCESS

- Planetary science community
  - But controversy within space science community regarding whether advocacy for one area of space science was justified
- Public with particular interest in solar system exploration
  - But Planetary Society had organized letter-writing campaign on Halley mission and did not repeat that effort for planetary program survival
- Those who had worked with Bruce Murray in campaign to get approval for a Halley mission
  - Caltech had set up a "Trustees Committee" on the future of JPL, headed by Mary Scranton
  - Murray had gotten Caltech faculty approval for more defense work
- Those primarily interested in the health of Caltech
  - Caltech trustee Arnold Beckman in contact with Reagan chief of staff Ed Meese
  - Caltech president Marvin Goldberger made December trip to Washington

Founders of The Planetary Society

1
00:00:06,389 --> 00:00:04,950
and just as a reminder there is no break

2
00:00:08,070 --> 00:00:06,399
in the session so if you need to have a

3
00:00:10,310 --> 00:00:08,080
break the restrooms are out that door

4
00:00:12,150 --> 00:00:10,320
and you may go at your convenience

5
00:00:14,549 --> 00:00:12,160
or requirement or whatever

6
00:00:15,829 --> 00:00:14,559
our next speaker is roger hamburg he's a

7
00:00:17,510 --> 00:00:15,839
professor in the political science

8
00:00:18,630 --> 00:00:17,520
department at the university of central

9
00:00:20,790 --> 00:00:18,640
florida

10
00:00:23,509 --> 00:00:20,800
specializing in space policy national

11
00:00:24,950 --> 00:00:23,519
security policy and judicial politics

12
00:00:26,070 --> 00:00:24,960
he's written several books i'll just

13
00:00:28,470 --> 00:00:26,080

mention one of them here because it's

14
00:00:31,109 --> 00:00:28,480
got a very interesting title reinventing

15
00:00:37,430 --> 00:00:31,119
nasa and the quest for outer space

16
00:00:42,229 --> 00:00:38,790
this uh

17
00:00:46,150 --> 00:00:44,069
talk was derived from a series of books

18
00:00:48,229 --> 00:00:46,160
done by daniel greenberg

19
00:00:51,270 --> 00:00:48,239
he talked about the politics of pure

20
00:00:52,470 --> 00:00:51,280
science his were mostly attacks on

21
00:00:54,389 --> 00:00:52,480
scientists

22
00:00:55,990 --> 00:00:54,399
who he thought were

23
00:00:57,590 --> 00:00:56,000
generally beyond

24
00:00:59,270 --> 00:00:57,600
the pale because they had they

25
00:01:02,229 --> 00:00:59,280
compromised they did things they made

26
00:01:04,789 --> 00:01:02,239
deals which apparently he found someone

27
00:01:06,789 --> 00:01:04,799
offensive uh in that but he's continued

28
00:01:08,630 --> 00:01:06,799
over a 30-year period he's now

29
00:01:18,310 --> 00:01:08,640
i think his third book and third edition

30
00:01:23,830 --> 00:01:20,630
the essential tension that i'm going to

31
00:01:25,910 --> 00:01:23,840
talk about is what's built into the dna

32
00:01:27,030 --> 00:01:25,920
of the agency when the agency was

33
00:01:29,670 --> 00:01:27,040
created

34
00:01:31,830 --> 00:01:29,680
in 1958 it was built as a public

35
00:01:33,590 --> 00:01:31,840
response to sputnik

36
00:01:36,310 --> 00:01:33,600
but it had a more subtle

37
00:01:38,710 --> 00:01:36,320
connotation there because it was also a

38
00:01:41,030 --> 00:01:38,720

way to make the

39
00:01:43,510 --> 00:01:41,040
military space disappear

40
00:01:44,510 --> 00:01:43,520
uh what people always find bizarre was

41
00:01:47,670 --> 00:01:44,520
that in

42
00:01:48,870 --> 00:01:47,680
1961 kennedy classified all military

43
00:01:50,230 --> 00:01:48,880
launches

44
00:01:51,990 --> 00:01:50,240
which was funny because you go down the

45
00:01:53,590 --> 00:01:52,000
beach and watch them

46
00:01:55,109 --> 00:01:53,600
you know so there was no secrets in

47
00:01:55,990 --> 00:01:55,119
vandenberg you could see them take off

48
00:01:58,630 --> 00:01:56,000
also

49
00:02:01,590 --> 00:01:58,640
but what they were attempting to do was

50
00:02:03,350 --> 00:02:01,600
to make space the space race more of a

51
00:02:05,429 --> 00:02:03,360
civil occupation rather than a military

52
00:02:07,590 --> 00:02:05,439
one eisenhower did it because he wanted

53
00:02:10,469 --> 00:02:07,600
to control space policy he wanted troll

54
00:02:13,110 --> 00:02:10,479
budgets his great fear when he started

55
00:02:15,430 --> 00:02:13,120
originally was that he would in fact

56
00:02:16,949 --> 00:02:15,440
end up having three space programs the

57
00:02:19,589 --> 00:02:16,959
army and the navy and air force already

58
00:02:22,470 --> 00:02:19,599
had one and there were civilian uh

59
00:02:28,309 --> 00:02:22,480
groups out there also wanted it

60
00:02:32,949 --> 00:02:31,270
to this conform to the reality that

61
00:02:34,070 --> 00:02:32,959
congress at that time was controlled by

62
00:02:36,470 --> 00:02:34,080
the

63
00:02:38,710 --> 00:02:36,480

conservative

64
00:02:41,830 --> 00:02:38,720
but they saw

65
00:02:43,750 --> 00:02:41,840
nasa as political pork it also gave them

66
00:02:44,949 --> 00:02:43,760
political advantages for terms of

67
00:02:47,030 --> 00:02:44,959
reelection

68
00:02:48,070 --> 00:02:47,040
uh what most people don't realize is

69
00:02:51,430 --> 00:02:48,080
apollo

70
00:02:53,030 --> 00:02:51,440
which followed was uh in fact seen by

71
00:02:55,430 --> 00:02:53,040
many southern congressmen and

72
00:02:58,309 --> 00:02:55,440
represented senators representatives as

73
00:03:00,470 --> 00:02:58,319
a re-run of tva except it was cover

74
00:03:02,070 --> 00:03:00,480
parts of the world of the south that

75
00:03:03,670 --> 00:03:02,080
were not covered before florida

76
00:03:06,229 --> 00:03:03,680
mississippi

77
00:03:08,149 --> 00:03:06,239
texas got there got their share

78
00:03:10,869 --> 00:03:08,159
on this particular context

79
00:03:13,350 --> 00:03:10,879
back to the question of nasa nasa when

80
00:03:14,790 --> 00:03:13,360
it was founded found the clear

81
00:03:17,990 --> 00:03:14,800
mission was

82
00:03:19,430 --> 00:03:18,000
human space flight sub-text military

83
00:03:23,110 --> 00:03:19,440
space

84
00:03:25,190 --> 00:03:23,120
peripheral

85
00:03:28,710 --> 00:03:25,200
it was not what drove

86
00:03:31,270 --> 00:03:28,720
uh the people who established the agency

87
00:03:33,270 --> 00:03:31,280
uh initially space science was

88
00:03:35,190 --> 00:03:33,280

engaged our space scientists would

89
00:03:37,670 --> 00:03:35,200
engage in a controversy whether the

90
00:03:39,030 --> 00:03:37,680
national academy of sciences our nsf

91
00:03:40,630 --> 00:03:39,040
should be the one to run the space

92
00:03:43,670 --> 00:03:40,640
science program

93
00:03:45,350 --> 00:03:43,680
the decision was nasa would do it

94
00:03:47,270 --> 00:03:45,360
nasa leadership

95
00:03:49,190 --> 00:03:47,280
came in

96
00:03:50,869 --> 00:03:49,200
and basically decided

97
00:03:52,949 --> 00:03:50,879
that space science was something they

98
00:03:54,070 --> 00:03:52,959
could not give over to these outside

99
00:03:56,390 --> 00:03:54,080
players

100
00:03:58,550 --> 00:03:56,400
and to the realistically speaking

101
00:04:00,070 --> 00:03:58,560
national academy of sciences

102
00:04:01,670 --> 00:04:00,080
and national science foundation would

103
00:04:03,030 --> 00:04:01,680
have found taking space science to be a

104
00:04:04,229 --> 00:04:03,040
disaster

105
00:04:05,589 --> 00:04:04,239
because it would have come to consume

106
00:04:07,350 --> 00:04:05,599
their budgets

107
00:04:08,229 --> 00:04:07,360
it would have it would have been too

108
00:04:10,789 --> 00:04:08,239
large

109
00:04:12,949 --> 00:04:10,799
the other battle internally within nasa

110
00:04:15,190 --> 00:04:12,959
at this early stage in the space science

111
00:04:17,590 --> 00:04:15,200
program was a dispute over engineering

112
00:04:19,909 --> 00:04:17,600
versus science who's going to head each

113
00:04:21,509 --> 00:04:19,919

program or division within it the

114
00:04:24,150 --> 00:04:21,519
decision was to have if you have an

115
00:04:25,990 --> 00:04:24,160
engineer then you have a space scientist

116
00:04:27,590 --> 00:04:26,000
as a second part

117
00:04:29,189 --> 00:04:27,600
they also had to come up with a relative

118
00:04:31,270 --> 00:04:29,199
share what and

119
00:04:33,510 --> 00:04:31,280
as callahan's talk talked about he gave

120
00:04:35,909 --> 00:04:33,520
you a good look at the overall budget

121
00:04:37,510 --> 00:04:35,919
uh and how it's distributed across the

122
00:04:39,430 --> 00:04:37,520
gross categories he did not have human

123
00:04:42,230 --> 00:04:39,440
spaceflight in there to make the

124
00:04:43,909 --> 00:04:42,240
comparison a little more

125
00:04:44,710 --> 00:04:43,919
fit more with what i'm talking about

126
00:04:47,670 --> 00:04:44,720
here

127
00:04:49,350 --> 00:04:47,680
when apollo comes apollo comes with also

128
00:04:51,830 --> 00:04:49,360
with conflicting

129
00:04:52,790 --> 00:04:51,840
priorities apollo was a political

130
00:04:55,030 --> 00:04:52,800
mission

131
00:04:57,590 --> 00:04:55,040
it had nothing to do with space science

132
00:04:59,430 --> 00:04:57,600
had nothing to do with space exploration

133
00:05:00,710 --> 00:04:59,440
john f kennedy was coming off a bad

134
00:05:02,710 --> 00:05:00,720
period

135
00:05:05,270 --> 00:05:02,720
we had he had been humiliated he felt

136
00:05:06,950 --> 00:05:05,280
that vienna or was going to be at that

137
00:05:09,590 --> 00:05:06,960
he was seen as very weak as president

138
00:05:11,110 --> 00:05:09,600

the cuban in the invasive bay of pigs

139
00:05:13,110 --> 00:05:11,120
had collapsed

140
00:05:15,189 --> 00:05:13,120
uh the president was asked to intervene

141
00:05:17,430 --> 00:05:15,199
he decided not to people were talking

142
00:05:19,430 --> 00:05:17,440
about how he was losing it

143
00:05:21,110 --> 00:05:19,440
what happened was they went out

144
00:05:22,469 --> 00:05:21,120
and looked at

145
00:05:25,350 --> 00:05:22,479
what are some things that the united

146
00:05:27,110 --> 00:05:25,360
states can do on a global scale

147
00:05:29,430 --> 00:05:27,120
that will make or make the point that

148
00:05:30,710 --> 00:05:29,440
we're still a major power that we still

149
00:05:32,870 --> 00:05:30,720
matter

150
00:05:35,110 --> 00:05:32,880
and so the argument was and there was

151
00:05:37,110 --> 00:05:35,120
several different things proposed

152
00:05:38,390 --> 00:05:37,120
lyndon johnson the vice president pushed

153
00:05:39,110 --> 00:05:38,400
hard

154
00:05:41,909 --> 00:05:39,120
for

155
00:05:43,830 --> 00:05:41,919
the space program to be the centerpiece

156
00:05:45,670 --> 00:05:43,840
the apollo mission was also a way to

157
00:05:47,909 --> 00:05:45,680
change the conversation

158
00:05:49,510 --> 00:05:47,919
the united states was losing the space

159
00:05:51,670 --> 00:05:49,520
race

160
00:05:53,110 --> 00:05:51,680
we decided to go not we were not the

161
00:05:54,469 --> 00:05:53,120
first in space we were not the first

162
00:05:55,749 --> 00:05:54,479
human in space

163
00:05:56,629 --> 00:05:55,759

we're going to jump ahead to be the

164
00:05:58,950 --> 00:05:56,639
first

165
00:06:01,270 --> 00:05:58,960
person to land on the lunar surface

166
00:06:03,029 --> 00:06:01,280
within a 10-year period so it's set off

167
00:06:05,830 --> 00:06:03,039
in the space race

168
00:06:06,870 --> 00:06:05,840
in that situation science in the apollo

169
00:06:08,870 --> 00:06:06,880
missions

170
00:06:10,309 --> 00:06:08,880
as has been already mentioned was not a

171
00:06:13,029 --> 00:06:10,319
priority

172
00:06:16,870 --> 00:06:13,039
uh it was clearly seen as secondary

173
00:06:18,469 --> 00:06:16,880
when space science is explicit part of

174
00:06:20,550 --> 00:06:18,479
becomes important is when you get to the

175
00:06:22,390 --> 00:06:20,560
apollo applications program

176
00:06:24,309 --> 00:06:22,400
the problem was the apollo applications

177
00:06:25,749 --> 00:06:24,319
program was cancelled

178
00:06:26,870 --> 00:06:25,759
and what flew

179
00:06:31,909 --> 00:06:26,880
was

180
00:06:34,230 --> 00:06:31,919
they had the telescope there but by the

181
00:06:36,390 --> 00:06:34,240
time they did that the space the space

182
00:06:38,390 --> 00:06:36,400
astronomy people were

183
00:06:41,189 --> 00:06:38,400
fairly clear that they didn't want

184
00:06:43,510 --> 00:06:41,199
humans doing space doing

185
00:06:45,430 --> 00:06:43,520
uh observations you could do it

186
00:06:47,029 --> 00:06:45,440
mechanically now we can get messages

187
00:06:48,950 --> 00:06:47,039
back you can get the images back you can

188
00:06:50,469 --> 00:06:48,960

do a whole variety of things

189
00:06:55,270 --> 00:06:50,479
the golden age

190
00:06:59,510 --> 00:06:55,280
the 1970s as you saw the earlier graph

191
00:07:01,430 --> 00:06:59,520
it has all the various missions it flew

192
00:07:03,029 --> 00:07:01,440
they flew

193
00:07:04,629 --> 00:07:03,039
my argument is

194
00:07:06,230 --> 00:07:04,639
because the space shuttle was under

195
00:07:07,670 --> 00:07:06,240
development

196
00:07:11,029 --> 00:07:07,680
now the space shuttle becomes a

197
00:07:13,589 --> 00:07:11,039
two-edged sword here what you see

198
00:07:16,309 --> 00:07:13,599
is that the space shuttle's development

199
00:07:18,950 --> 00:07:16,319
initially was on target was moving so

200
00:07:21,270 --> 00:07:18,960
the money appropriated to space science

201
00:07:22,870 --> 00:07:21,280
the various missions was not going to be

202
00:07:25,510 --> 00:07:22,880
touched

203
00:07:27,830 --> 00:07:25,520
as you get to the end of the decade

204
00:07:30,790 --> 00:07:27,840
what you begin to see is a space shuttle

205
00:07:32,309 --> 00:07:30,800
falling behind in terms of movement in

206
00:07:33,430 --> 00:07:32,319
terms of uh

207
00:07:35,350 --> 00:07:33,440
development

208
00:07:37,029 --> 00:07:35,360
the shuttle engines were more difficult

209
00:07:39,270 --> 00:07:37,039
than they thought

210
00:07:41,350 --> 00:07:39,280
the building of the tiles was more

211
00:07:44,710 --> 00:07:41,360
difficult and so what you saw were

212
00:07:51,110 --> 00:07:47,270
so while you get to

213
00:07:54,550 --> 00:07:51,120

1979 1980 you have a problem

214
00:07:57,270 --> 00:07:54,560
because the shuttle program needed money

215
00:08:00,150 --> 00:07:57,280
and now you have jane james island's

216
00:08:02,230 --> 00:08:00,160
famous uh slogan which made which made

217
00:08:04,550 --> 00:08:02,240
some big splashes he talked about the

218
00:08:07,830 --> 00:08:04,560
slaughter of the innocents the innocents

219
00:08:09,430 --> 00:08:07,840
were the space science programs they got

220
00:08:10,629 --> 00:08:09,440
uh stopped and

221
00:08:12,469 --> 00:08:10,639
uh

222
00:08:14,710 --> 00:08:12,479
and canceled because the money needed to

223
00:08:16,550 --> 00:08:14,720
be pushed off to this other thing

224
00:08:17,589 --> 00:08:16,560
there was a also

225
00:08:18,790 --> 00:08:17,599
a

226
00:08:20,150 --> 00:08:18,800
push to

227
00:08:22,230 --> 00:08:20,160
go toward what we call shuttle

228
00:08:23,830 --> 00:08:22,240
compatibility

229
00:08:26,309 --> 00:08:23,840
uh president

230
00:08:28,629 --> 00:08:26,319
carter was asked

231
00:08:30,230 --> 00:08:28,639
to do two things

232
00:08:32,310 --> 00:08:30,240
one of them was to approve the science

233
00:08:34,630 --> 00:08:32,320
mission which is we can be talked back

234
00:08:37,509 --> 00:08:34,640
about in a later paper the second thing

235
00:08:39,110 --> 00:08:37,519
was he was asked to cancel

236
00:08:41,350 --> 00:08:39,120
all the

237
00:08:43,589 --> 00:08:41,360
expendable launch vehicles

238
00:08:45,190 --> 00:08:43,599

and move all paid loads to the space

239
00:08:47,350 --> 00:08:45,200
shuttle

240
00:08:48,790 --> 00:08:47,360
that meant space science commercial

241
00:08:50,710 --> 00:08:48,800
military everything would go on the

242
00:08:52,310 --> 00:08:50,720
space shuttle

243
00:08:55,190 --> 00:08:52,320
that way the shuttle generated

244
00:08:56,710 --> 00:08:55,200
sufficient missions to justify the cost

245
00:08:59,030 --> 00:08:56,720
because you go back and look at what are

246
00:09:00,630 --> 00:08:59,040
the costs of shuttle flights

247
00:09:02,550 --> 00:09:00,640
what you see

248
00:09:04,949 --> 00:09:02,560
is things are average across flights

249
00:09:06,870 --> 00:09:04,959
well if you shrink the number of flights

250
00:09:09,910 --> 00:09:06,880
down to five which is what was generally

251
00:09:11,110 --> 00:09:09,920
the average cost go up permission

252
00:09:12,470 --> 00:09:11,120
if you're able to add in all these

253
00:09:15,750 --> 00:09:12,480
payloads

254
00:09:18,150 --> 00:09:15,760
then you have opportunity uh to say oh

255
00:09:20,389 --> 00:09:18,160
it costs not as much

256
00:09:22,870 --> 00:09:20,399
the problem with shuttle compatibility

257
00:09:25,990 --> 00:09:22,880
is that you have to build the payload

258
00:09:27,910 --> 00:09:26,000
all payloads have to be to be

259
00:09:29,030 --> 00:09:27,920
rated as safe enough to fly with the

260
00:09:31,269 --> 00:09:29,040
crew

261
00:09:34,630 --> 00:09:31,279
and that's a major cost uh cost

262
00:09:36,949 --> 00:09:34,640
condition that has to take place

263
00:09:37,829 --> 00:09:36,959

um so what you see

264
00:09:39,910 --> 00:09:37,839
is

265
00:09:42,389 --> 00:09:39,920
that the space shuttle becomes the

266
00:09:44,470 --> 00:09:42,399
driver of the space science program

267
00:09:46,949 --> 00:09:44,480
money has been sucked out of the space

268
00:09:48,710 --> 00:09:46,959
science program to help fund the space

269
00:09:49,750 --> 00:09:48,720
shuttle's development

270
00:09:51,590 --> 00:09:49,760
but

271
00:09:53,750 --> 00:09:51,600
the argument was that they'll get paid

272
00:09:56,070 --> 00:09:53,760
back but the problem is the shuttle

273
00:09:57,350 --> 00:09:56,080
doesn't fly on a set schedule things get

274
00:09:59,750 --> 00:09:57,360
delayed

275
00:10:01,030 --> 00:09:59,760
more importantly you have the problem of

276
00:10:02,389 --> 00:10:01,040
cost

277
00:10:05,750 --> 00:10:02,399
what each

278
00:10:07,829 --> 00:10:05,760
to make a shuttle make a science mission

279
00:10:08,470 --> 00:10:07,839
compatible to fly on the shuttle you had

280
00:10:11,430 --> 00:10:08,480
to

281
00:10:13,670 --> 00:10:11,440
add safety features and redundancies

282
00:10:16,310 --> 00:10:13,680
what that meant was you saw more and

283
00:10:19,430 --> 00:10:16,320
more things be placed on

284
00:10:21,990 --> 00:10:19,440
a particular mission uh some of those

285
00:10:24,069 --> 00:10:22,000
instruments might be incompatible

286
00:10:26,150 --> 00:10:24,079
designing became much more difficult

287
00:10:28,150 --> 00:10:26,160
there was an argument made in a book

288
00:10:30,790 --> 00:10:28,160

done shortly after this period they

289
00:10:33,509 --> 00:10:30,800
talked about the space space science

290
00:10:34,870 --> 00:10:33,519
missions became christmas trees

291
00:10:36,310 --> 00:10:34,880
because you knew if you were going to go

292
00:10:37,750 --> 00:10:36,320
to a planet you're going to have one

293
00:10:39,030 --> 00:10:37,760
shot at it

294
00:10:41,030 --> 00:10:39,040
you might not get another shot for

295
00:10:44,150 --> 00:10:41,040
another decade or so

296
00:10:45,910 --> 00:10:44,160
so everyone had to be on that mission

297
00:10:46,949 --> 00:10:45,920
and so what happens is emissions grow

298
00:10:52,790 --> 00:10:46,959
larger

299
00:10:55,030 --> 00:10:52,800
they have problems and this all comes to

300
00:10:57,350 --> 00:10:55,040
a head 1986

301
00:11:00,710 --> 00:10:57,360
uh with the shuttle accident for first

302
00:11:04,230 --> 00:11:00,720
shuttle accident

303
00:11:06,069 --> 00:11:04,240
the challenger blows up during liftoff

304
00:11:07,509 --> 00:11:06,079
this pushes back a whole series of

305
00:11:09,750 --> 00:11:07,519
missions

306
00:11:12,230 --> 00:11:09,760
but more importantly it undermines the

307
00:11:14,389 --> 00:11:12,240
rationale for having the shuttle be the

308
00:11:16,230 --> 00:11:14,399
one point single point failure in our

309
00:11:19,350 --> 00:11:16,240
launch program

310
00:11:21,350 --> 00:11:19,360
the air force had built a shuttle launch

311
00:11:24,069 --> 00:11:21,360
complex out in california

312
00:11:25,350 --> 00:11:24,079
which they had no intention of using

313
00:11:27,509 --> 00:11:25,360

and they didn't

314
00:11:29,030 --> 00:11:27,519
as soon as the chat probably about as

315
00:11:30,630 --> 00:11:29,040
soon as the challenger blew up they were

316
00:11:32,710 --> 00:11:30,640
canceling it

317
00:11:34,310 --> 00:11:32,720
they want to go back to the expendable

318
00:11:36,230 --> 00:11:34,320
launch vehicle system

319
00:11:38,710 --> 00:11:36,240
what happens within nasa is everything

320
00:11:40,949 --> 00:11:38,720
becomes focused on return to flight

321
00:11:43,990 --> 00:11:40,959
which means budget resources

322
00:11:45,430 --> 00:11:44,000
go toward getting the shuttle black

323
00:11:47,350 --> 00:11:45,440
missions to go that's when you remember

324
00:11:50,949 --> 00:11:47,360
the earlier graph where the only two

325
00:11:53,350 --> 00:11:50,959
things flew mangella and galileo

326
00:11:55,509 --> 00:11:53,360
uh hubble flew late

327
00:11:56,870 --> 00:11:55,519
three uh three years late it was

328
00:12:00,870 --> 00:11:56,880
supposed to be on the next mission after

329
00:12:04,710 --> 00:12:00,880
challenger but it doesn't go until 1989.

330
00:12:06,949 --> 00:12:04,720
uh in 1992 the mars observer dies

331
00:12:09,190 --> 00:12:06,959
this was a billion dollar program

332
00:12:11,110 --> 00:12:09,200
uh its death was not

333
00:12:12,470 --> 00:12:11,120
you know solvable we don't know why we

334
00:12:15,509 --> 00:12:12,480
have some

335
00:12:17,509 --> 00:12:15,519
technical what reasons given for it

336
00:12:19,910 --> 00:12:17,519
but what happens is

337
00:12:21,670 --> 00:12:19,920
now you get into the problem of congress

338
00:12:23,670 --> 00:12:21,680

becomes involved

339
00:12:25,269 --> 00:12:23,680
by 1992

340
00:12:27,750 --> 00:12:25,279
there was a

341
00:12:28,949 --> 00:12:27,760
series of controversies

342
00:12:30,949 --> 00:12:28,959
over

343
00:12:33,350 --> 00:12:30,959
the cost of nasa

344
00:12:35,030 --> 00:12:33,360
and the cost of other programs

345
00:12:37,190 --> 00:12:35,040
it comes to a head and a vote on the

346
00:12:39,509 --> 00:12:37,200
international space station versus the

347
00:12:42,470 --> 00:12:39,519
super conducting super collider

348
00:12:44,150 --> 00:12:42,480
the superconducting super collider was a

349
00:12:46,470 --> 00:12:44,160
international project to get to the next

350
00:12:49,110 --> 00:12:46,480
generation of physics

351
00:12:51,509 --> 00:12:49,120
it was cancelled

352
00:12:53,430 --> 00:12:51,519
congress said no more we're not going to

353
00:12:54,870 --> 00:12:53,440
spend any more money

354
00:12:56,790 --> 00:12:54,880
there's an argument about why that

355
00:12:59,590 --> 00:12:56,800
happened one argument is the

356
00:13:02,629 --> 00:12:59,600
superconducting super collider only had

357
00:13:04,629 --> 00:13:02,639
contracts in louisiana and texas

358
00:13:07,430 --> 00:13:04,639
the international space station survived

359
00:13:09,430 --> 00:13:07,440
within one vote

360
00:13:11,430 --> 00:13:09,440
on the house of representatives if a

361
00:13:13,910 --> 00:13:11,440
voter gone the other way

362
00:13:15,829 --> 00:13:13,920
that program would have been canceled

363
00:13:17,670 --> 00:13:15,839

and one of the reasons why it was so

364
00:13:19,269 --> 00:13:17,680
controversial because the space science

365
00:13:21,509 --> 00:13:19,279
community no not the space science the

366
00:13:24,629 --> 00:13:21,519
science community

367
00:13:27,190 --> 00:13:24,639
was had actively and

368
00:13:28,710 --> 00:13:27,200
publicly opposed the international space

369
00:13:30,790 --> 00:13:28,720
station the shuttle

370
00:13:33,110 --> 00:13:30,800
they saw all the money being sucked out

371
00:13:35,110 --> 00:13:33,120
of the sciences in nsf and else

372
00:13:37,430 --> 00:13:35,120
otherwise we've been diverted

373
00:13:41,350 --> 00:13:37,440
to the human space flight program

374
00:13:45,670 --> 00:13:43,350
golden comes in was talked about before

375
00:13:49,269 --> 00:13:45,680
fast better cheaper

376
00:13:51,430 --> 00:13:49,279
faster better cheaper was not an effort

377
00:13:53,670 --> 00:13:51,440
to do more space science

378
00:13:55,509 --> 00:13:53,680
in the sense of expanding budgets

379
00:13:57,990 --> 00:13:55,519
it was an attempt to take a

380
00:13:59,189 --> 00:13:58,000
set budget and carve it out into smaller

381
00:14:00,790 --> 00:13:59,199
pieces

382
00:14:03,430 --> 00:14:00,800
the argument being if we did them

383
00:14:05,430 --> 00:14:03,440
smaller we could fly more frequently etc

384
00:14:07,110 --> 00:14:05,440
it gives it provides a great number of

385
00:14:08,790 --> 00:14:07,120
missions

386
00:14:10,949 --> 00:14:08,800
because it's a reversal of the shuttle

387
00:14:13,110 --> 00:14:10,959
compatibility problem that existed

388
00:14:14,790 --> 00:14:13,120

earlier what happened with the shuttle

389
00:14:16,710 --> 00:14:14,800
earlier was

390
00:14:19,350 --> 00:14:16,720
you know you cost too much

391
00:14:21,590 --> 00:14:19,360
now we can do it in the smaller pieces

392
00:14:24,389 --> 00:14:21,600
and so we get uh many more missions we

393
00:14:26,550 --> 00:14:24,399
can afford failure

394
00:14:27,910 --> 00:14:26,560
which was not true uh in the previous

395
00:14:29,990 --> 00:14:27,920
situation

396
00:14:31,829 --> 00:14:30,000
you have the explorer and discovery

397
00:14:33,829 --> 00:14:31,839
programs for example you have the mars

398
00:14:37,269 --> 00:14:33,839
program is now put on this regular

399
00:14:39,030 --> 00:14:37,279
supposedly every was it 24 26 months you

400
00:14:42,310 --> 00:14:39,040
have a chance to launch

401
00:14:45,189 --> 00:14:42,320
a more optimal thing and so what you see

402
00:14:47,030 --> 00:14:45,199
in the 1990s is this gr this moving away

403
00:14:49,269 --> 00:14:47,040
from the shuttle and the space science

404
00:14:50,949 --> 00:14:49,279
programs begin to have greater

405
00:14:52,870 --> 00:14:50,959
opportunities

406
00:14:54,870 --> 00:14:52,880
uh the space shuttle and the

407
00:14:55,910 --> 00:14:54,880
international space station are moving

408
00:14:57,750 --> 00:14:55,920
along

409
00:15:00,310 --> 00:14:57,760
uh the international space station you

410
00:15:02,470 --> 00:15:00,320
may or not may or may or not remember

411
00:15:03,430 --> 00:15:02,480
what was proposed in 1984 was supposed

412
00:15:05,189 --> 00:15:03,440
to cost

413
00:15:07,350 --> 00:15:05,199

eight billion dollars to be an orbital

414
00:15:09,990 --> 00:15:07,360
by 1992.

415
00:15:13,110 --> 00:15:10,000
it missed by about two decades or a

416
00:15:16,150 --> 00:15:14,949
they continue to have the recurring cost

417
00:15:18,629 --> 00:15:16,160
issues

418
00:15:20,069 --> 00:15:18,639
for some reason the space shuttle

419
00:15:23,509 --> 00:15:20,079
and the international space station have

420
00:15:25,269 --> 00:15:23,519
never been able to work on their budget

421
00:15:26,870 --> 00:15:25,279
you know

422
00:15:29,990 --> 00:15:26,880
and what they did was they imposed

423
00:15:32,629 --> 00:15:30,000
different uh controls on them

424
00:15:34,150 --> 00:15:32,639
you get to 2003 you have the the second

425
00:15:35,910 --> 00:15:34,160
shuttle accident the columbia's lost

426
00:15:37,430 --> 00:15:35,920
during re-entry

427
00:15:38,629 --> 00:15:37,440
um

428
00:15:41,350 --> 00:15:38,639
this

429
00:15:43,829 --> 00:15:41,360
creates an opportunity

430
00:15:47,189 --> 00:15:43,839
that for space science is not

431
00:15:49,030 --> 00:15:47,199
uh particularly useful because you have

432
00:15:52,310 --> 00:15:49,040
the vision for space exploration

433
00:15:54,150 --> 00:15:52,320
announced in 2004 by president bush

434
00:15:55,749 --> 00:15:54,160
president bush was looking for a vision

435
00:15:57,670 --> 00:15:55,759
thing for the presidential election that

436
00:15:59,670 --> 00:15:57,680
year but i will point out to you that

437
00:16:01,829 --> 00:15:59,680
during his re-election campaign he never

438
00:16:03,430 --> 00:16:01,839

mentioned space program at all

439
00:16:05,350 --> 00:16:03,440
i see people now doing for this

440
00:16:07,749 --> 00:16:05,360
particular election people are doing

441
00:16:08,710 --> 00:16:07,759
this oh what are they saying about space

442
00:16:10,710 --> 00:16:08,720
you know

443
00:16:12,870 --> 00:16:10,720
the point is space the space program has

444
00:16:15,670 --> 00:16:12,880
never been a priority in the context of

445
00:16:17,590 --> 00:16:15,680
american politics at any level

446
00:16:19,430 --> 00:16:17,600
think about congress except in

447
00:16:20,710 --> 00:16:19,440
congressional places but even there you

448
00:16:23,269 --> 00:16:20,720
can get elected not be in favor of the

449
00:16:25,269 --> 00:16:23,279
space program in central florida our

450
00:16:26,389 --> 00:16:25,279
congressman a couple of congressmen or

451
00:16:28,550 --> 00:16:26,399
so ago

452
00:16:29,749 --> 00:16:28,560
uh he survived for 10 years retired

453
00:16:31,829 --> 00:16:29,759
voluntarily

454
00:16:33,509 --> 00:16:31,839
he said he what we need to do away with

455
00:16:35,030 --> 00:16:33,519
shuttle

456
00:16:38,069 --> 00:16:35,040
you know we need to do a space program

457
00:16:39,910 --> 00:16:38,079
it's too expensive he changed his mind

458
00:16:42,230 --> 00:16:39,920
but it took a while

459
00:16:44,389 --> 00:16:42,240
and so what i'm saying is the electorate

460
00:16:45,990 --> 00:16:44,399
is not responsive to these questions

461
00:16:48,310 --> 00:16:46,000
what happened with the vision space

462
00:16:49,829 --> 00:16:48,320
exploration is it

463
00:16:52,629 --> 00:16:49,839

required to shutdown of the space

464
00:16:54,230 --> 00:16:52,639
shuttle by 2010 which actually happened

465
00:16:56,550 --> 00:16:54,240
in july 2011.

466
00:16:57,829 --> 00:16:56,560
uh we were supposed to complete the iss

467
00:17:00,949 --> 00:16:57,839
and we were going to abandon it in

468
00:17:03,910 --> 00:17:00,959
either 2015 2016. that's been taken out

469
00:17:04,870 --> 00:17:03,920
of our hands to some extent with the

470
00:17:05,909 --> 00:17:04,880
loss

471
00:17:07,750 --> 00:17:05,919
what they were going to do was start up

472
00:17:09,270 --> 00:17:07,760
the constellation program the aries and

473
00:17:11,029 --> 00:17:09,280
the orion

474
00:17:13,270 --> 00:17:11,039
uh the aries as the launch vehicle the

475
00:17:15,350 --> 00:17:13,280
orion is the crew capsule

476
00:17:17,829 --> 00:17:15,360
space science a good portion of it was

477
00:17:20,390 --> 00:17:17,839
now reoriented to support the vision for

478
00:17:23,429 --> 00:17:20,400
space exploration that is doing with

479
00:17:24,470 --> 00:17:23,439
human biology things related to that

480
00:17:26,470 --> 00:17:24,480
uh

481
00:17:28,870 --> 00:17:26,480
money was started to go to in that

482
00:17:31,190 --> 00:17:28,880
direction away from planetary science in

483
00:17:33,510 --> 00:17:31,200
other areas in 2010 you have a

484
00:17:35,110 --> 00:17:33,520
congressional intervention

485
00:17:36,710 --> 00:17:35,120
uh i'm not sure how well it will hold or

486
00:17:38,549 --> 00:17:36,720
not what it does

487
00:17:40,630 --> 00:17:38,559
is it talks about the space launch

488
00:17:43,110 --> 00:17:40,640

system continues the orion these are the

489
00:17:44,310 --> 00:17:43,120
vestiges left of the vision for space

490
00:17:45,669 --> 00:17:44,320
exploration

491
00:17:47,830 --> 00:17:45,679
on the other hand

492
00:17:50,310 --> 00:17:47,840
going to low earth orbit is no longer

493
00:17:51,990 --> 00:17:50,320
going to be a nasa problem which is what

494
00:17:54,470 --> 00:17:52,000
the shuttle was about

495
00:17:56,070 --> 00:17:54,480
it was it was going to be handled by

496
00:17:57,750 --> 00:17:56,080
commercial vendors

497
00:18:00,150 --> 00:17:57,760
although that may not come as quickly as

498
00:18:03,270 --> 00:18:00,160
some people thought after spacex did

499
00:18:06,710 --> 00:18:03,280
their last launch cargo launched the iss

500
00:18:08,870 --> 00:18:06,720
minor problem the ancillary cargo

501
00:18:10,549 --> 00:18:08,880
the space shuttle the satellite was

502
00:18:11,590 --> 00:18:10,559
dumped too low in orbit and it's already

503
00:18:13,110 --> 00:18:11,600
gone

504
00:18:15,110 --> 00:18:13,120
and that raises questions about human

505
00:18:17,270 --> 00:18:15,120
spaceflight

506
00:18:19,350 --> 00:18:17,280
um

507
00:18:20,950 --> 00:18:19,360
reading through the different things i

508
00:18:22,789 --> 00:18:20,960
recommend there's a book in the back on

509
00:18:23,590 --> 00:18:22,799
exploring the cosmos if you haven't read

510
00:18:25,270 --> 00:18:23,600
it

511
00:18:27,430 --> 00:18:25,280
you'll want to read the introductions

512
00:18:29,110 --> 00:18:27,440
because if you read through those

513
00:18:31,350 --> 00:18:29,120

each of them have

514
00:18:32,549 --> 00:18:31,360
an obligatory

515
00:18:34,390 --> 00:18:32,559
section where they talk about the

516
00:18:35,350 --> 00:18:34,400
relationship to the human exploration

517
00:18:37,270 --> 00:18:35,360
issue

518
00:18:39,110 --> 00:18:37,280
and it's usually negative to the space

519
00:18:40,870 --> 00:18:39,120
science part of the equation

520
00:18:44,310 --> 00:18:40,880
because that's where the money goes

521
00:18:48,150 --> 00:18:44,320
space science has always been ancillary

522
00:18:50,310 --> 00:18:48,160
to nasa's vision of its future

523
00:18:52,470 --> 00:18:50,320
this particular view i'm stating is not

524
00:18:54,950 --> 00:18:52,480
unique but it's based on the nasa action

525
00:18:57,350 --> 00:18:54,960
actions not the rhetoric i've been and

526
00:18:59,430 --> 00:18:57,360
listened to nasa administrators and

527
00:19:01,350 --> 00:18:59,440
others give great speeches about how

528
00:19:02,950 --> 00:19:01,360
wonderful space science is

529
00:19:04,470 --> 00:19:02,960
and they go away and they do other

530
00:19:06,950 --> 00:19:04,480
things

531
00:19:09,029 --> 00:19:06,960
uh the surveys that cuddle surveys

532
00:19:11,510 --> 00:19:09,039
campaigns preserve missions for example

533
00:19:13,909 --> 00:19:11,520
preserve the huddle to get us another

534
00:19:15,909 --> 00:19:13,919
shuttle flight to the hubble was

535
00:19:18,070 --> 00:19:15,919
uh you know done by the public in

536
00:19:19,430 --> 00:19:18,080
response to the public which usually had

537
00:19:21,270 --> 00:19:19,440
a little impact

538
00:19:23,029 --> 00:19:21,280

the community i would argue is now being

539
00:19:26,390 --> 00:19:23,039
divided

540
00:19:28,470 --> 00:19:26,400
because the money is going to be finite

541
00:19:29,990 --> 00:19:28,480
the aspirations are infinite and so

542
00:19:32,150 --> 00:19:30,000
you're going to have to have

543
00:19:33,990 --> 00:19:32,160
and this is where uh listening to some

544
00:19:36,789 --> 00:19:34,000
of the earlier discussion

545
00:19:38,549 --> 00:19:36,799
uh you're going to see you know splits

546
00:19:40,470 --> 00:19:38,559
uh

547
00:19:42,310 --> 00:19:40,480
we're in a time and economic stress

548
00:19:43,510 --> 00:19:42,320
space science will get cut it's already

549
00:19:45,990 --> 00:19:43,520
been cut

550
00:19:48,230 --> 00:19:46,000
it's not immune it has less political

551
00:19:49,510 --> 00:19:48,240
support in the agency at the upper

552
00:19:50,950 --> 00:19:49,520
levels

553
00:19:52,310 --> 00:19:50,960
than human space flight does so if

554
00:19:54,310 --> 00:19:52,320
there's a choice between human space

555
00:19:57,590 --> 00:19:54,320
flight space science the choice is going

556
00:19:58,630 --> 00:19:57,600
to be human space flight

557
00:20:02,549 --> 00:19:58,640
um

558
00:20:04,870 --> 00:20:02,559
be maybe the ought to spin off space

559
00:20:06,630 --> 00:20:04,880
science and give it to the nsf or

560
00:20:08,470 --> 00:20:06,640
the national academy of sciences i don't

561
00:20:10,310 --> 00:20:08,480
think they would take it now

562
00:20:12,630 --> 00:20:10,320
now they understand the real reality the

563
00:20:14,310 --> 00:20:12,640

space science is not cheap it's very

564
00:20:18,470 --> 00:20:14,320
expensive and it has a

565
00:20:23,110 --> 00:20:20,870
this is not what i'm saying isn't

566
00:20:24,870 --> 00:20:23,120
particularly new etc

567
00:20:26,230 --> 00:20:24,880
uh in that sense but i think we need to

568
00:20:30,390 --> 00:20:26,240
think about that

569
00:20:33,110 --> 00:20:30,400
is nasa equipped to do space science

570
00:20:36,870 --> 00:20:33,120
i would argue probably not

571
00:20:37,669 --> 00:20:36,880
and in fact this the split moving

572
00:20:40,230 --> 00:20:37,679
uh

573
00:20:42,470 --> 00:20:40,240
to the space launch system

574
00:20:44,470 --> 00:20:42,480
is important because it moves nasa out

575
00:20:46,870 --> 00:20:44,480
of the business of going to earth orbit

576
00:20:50,390 --> 00:20:46,880
because that dominated for a generation

577
00:20:57,909 --> 00:20:50,400
or two of leadership

578
00:21:03,270 --> 00:21:00,070
thank you very much roger and

579
00:21:05,110 --> 00:21:03,280
thank all of the folks

580
00:21:07,750 --> 00:21:05,120
so we now have five minutes a question

581
00:21:09,510 --> 00:21:07,760
for roger's uh presentation and again

582
00:21:10,549 --> 00:21:09,520
please come to microphone identify

583
00:21:21,110 --> 00:21:10,559
yourself

584
00:21:26,230 --> 00:21:23,830
yeah torrence johnson from jpl i was one

585
00:21:28,149 --> 00:21:26,240
of the guys sitting on the ground as the

586
00:21:30,789 --> 00:21:28,159
project scientist for galileo during

587
00:21:33,990 --> 00:21:30,799
that decade of the 80s but i'd like to

588
00:21:36,470 --> 00:21:34,000

note that the relationships with the

589
00:21:37,909 --> 00:21:36,480
human program in that era were also

590
00:21:39,750 --> 00:21:37,919
somewhat complex i mean we were

591
00:21:41,270 --> 00:21:39,760
dependent on the shuttle as you pointed

592
00:21:45,029 --> 00:21:41,280
out very rightly

593
00:21:48,470 --> 00:21:45,039
and uh after challenger uh

594
00:21:50,870 --> 00:21:48,480
many of the community felt very worried

595
00:21:52,789 --> 00:21:50,880
that after return to flight

596
00:21:54,390 --> 00:21:52,799
that space science wouldn't get very

597
00:21:56,789 --> 00:21:54,400
high priority compared to national

598
00:22:00,390 --> 00:21:56,799
security payloads for instance

599
00:22:01,830 --> 00:22:00,400
and adam truly who was in large measure

600
00:22:03,110 --> 00:22:01,840
responsible for the return to flight

601
00:22:05,510 --> 00:22:03,120
during that period of time put high

602
00:22:08,149 --> 00:22:05,520
priority on the science missions galileo

603
00:22:08,870 --> 00:22:08,159
hubble magellan ulysses

604
00:22:13,430 --> 00:22:08,880
uh

605
00:22:15,350 --> 00:22:13,440
and the crews put

606
00:22:17,190 --> 00:22:15,360
themselves on the line to get them off

607
00:22:19,669 --> 00:22:17,200
even though they knew we would probably

608
00:22:23,190 --> 00:22:19,679
have rather gone on a regular rocket and

609
00:22:25,270 --> 00:22:23,200
so uh at least in that period of time

610
00:22:26,390 --> 00:22:25,280
we have some things to thank the human

611
00:22:28,230 --> 00:22:26,400
program for

612
00:22:30,710 --> 00:22:28,240
yeah they i mean they were there but the

613
00:22:31,990 --> 00:22:30,720

problem was they were they were linked

614
00:22:34,230 --> 00:22:32,000
because

615
00:22:35,909 --> 00:22:34,240
that was a requirement uh

616
00:22:38,149 --> 00:22:35,919
space science would have prospered even

617
00:22:40,549 --> 00:22:38,159
more than four more missions if they had

618
00:22:42,710 --> 00:22:40,559
not been had been forced to become uh

619
00:22:44,149 --> 00:22:42,720
shuttle compatible probably the only one

620
00:22:45,750 --> 00:22:44,159
i would say that it really worked for

621
00:22:47,430 --> 00:22:45,760
was hubble

622
00:22:49,029 --> 00:22:47,440
because by doing it that way we're

623
00:22:51,510 --> 00:22:49,039
actually able to go back and re-service

624
00:22:52,789 --> 00:22:51,520
it but notice when we get to the last

625
00:22:54,390 --> 00:22:52,799
service mission

626
00:22:56,789 --> 00:22:54,400
the then administrator

627
00:22:59,110 --> 00:22:56,799
was sean whatever they were

628
00:23:00,230 --> 00:22:59,120
o'keeffe was opposed because it wasn't

629
00:23:01,990 --> 00:23:00,240
safe

630
00:23:03,590 --> 00:23:02,000
the answer is we've been flying these

631
00:23:05,750 --> 00:23:03,600
missions for

632
00:23:07,270 --> 00:23:05,760
20 years and we had nowhere to go no

633
00:23:08,630 --> 00:23:07,280
there was no safe haven in the space

634
00:23:10,070 --> 00:23:08,640
station

635
00:23:12,070 --> 00:23:10,080
you know so it was kind of an

636
00:23:13,510 --> 00:23:12,080
interesting argument that now safety is

637
00:23:15,510 --> 00:23:13,520
so important

638
00:23:17,669 --> 00:23:15,520

when previously we were flying shuttles

639
00:23:20,149 --> 00:23:17,679
repeatedly because we needed to have

640
00:23:22,390 --> 00:23:20,159
shuttles fly to keep the program visible

641
00:23:24,710 --> 00:23:22,400
to the public yes ma'am

642
00:23:26,710 --> 00:23:24,720
heidi hamill from aura i want to pick up

643
00:23:28,310 --> 00:23:26,720
on your last somewhat provocative

644
00:23:30,950 --> 00:23:28,320
statement that you didn't think nasa was

645
00:23:33,510 --> 00:23:30,960
equipped to do space science um if not

646
00:23:34,830 --> 00:23:33,520
nasa is anybody equipped to do it and if

647
00:23:36,789 --> 00:23:34,840
so

648
00:23:41,350 --> 00:23:36,799
who

649
00:23:44,230 --> 00:23:41,360
one because there's been talks about

650
00:23:45,750 --> 00:23:44,240
nasa's an agency dominated by human

651
00:23:47,350 --> 00:23:45,760
space flight but there's been

652
00:23:49,430 --> 00:23:47,360
suggestions that they spent off the

653
00:23:51,669 --> 00:23:49,440
aeronautics part

654
00:23:53,990 --> 00:23:51,679
space because it's clearly neglected in

655
00:23:58,149 --> 00:23:54,000
the context of the bigger organization

656
00:24:01,110 --> 00:23:59,750
the people that you would have spun it

657
00:24:03,269 --> 00:24:01,120
off to

658
00:24:04,630 --> 00:24:03,279
50 years ago

659
00:24:06,870 --> 00:24:04,640
i think no longer would be willing to

660
00:24:07,669 --> 00:24:06,880
take it national academy of sciences

661
00:24:10,310 --> 00:24:07,679
and

662
00:24:13,110 --> 00:24:10,320
nsf both aggressively made moves to

663
00:24:14,710 --> 00:24:13,120

attempt to run the space science program

664
00:24:15,510 --> 00:24:14,720
i don't think they understood what that

665
00:24:17,190 --> 00:24:15,520
meant

666
00:24:18,549 --> 00:24:17,200
in terms of long term

667
00:24:20,710 --> 00:24:18,559
i don't know if there's anywhere place

668
00:24:23,110 --> 00:24:20,720
to where it will go unless you end up

669
00:24:24,310 --> 00:24:23,120
with a a and there's been proposals over

670
00:24:26,630 --> 00:24:24,320
the years not

671
00:24:28,149 --> 00:24:26,640
gone anywhere to have u.s department of

672
00:24:31,990 --> 00:24:28,159
space

673
00:24:34,149 --> 00:24:32,000
we have some agency that is broader than

674
00:24:36,789 --> 00:24:34,159
uh just you know human space flight and

675
00:24:38,390 --> 00:24:36,799
space science um there's no easy answer

676
00:24:40,149 --> 00:24:38,400
there's no organizational vehicle out

677
00:24:42,870 --> 00:24:40,159
there you have to create one

678
00:24:43,590 --> 00:24:42,880
or one that exists like remember nasa is

679
00:24:52,230 --> 00:24:43,600
a

680
00:24:54,870 --> 00:24:52,240
the

681
00:24:56,230 --> 00:24:54,880
johnson jpl kennedy

682
00:24:57,590 --> 00:24:56,240
i wouldn't kennedy wouldn't kenny

683
00:24:59,350 --> 00:24:57,600
doesn't matter

684
00:25:00,870 --> 00:24:59,360
you know i'm from florida that's

685
00:25:02,310 --> 00:25:00,880
reality so

686
00:25:05,430 --> 00:25:02,320
you might spin them off and create some

687
00:25:07,750 --> 00:25:05,440
smaller agency to just do space science

688
00:25:11,269 --> 00:25:07,760

a quick question and a quick answer okay

689
00:25:12,470 --> 00:25:11,279
a quick comment and question um so i

690
00:25:14,789 --> 00:25:12,480
wanted to challenge you on the same

691
00:25:17,350 --> 00:25:14,799
point it seems to me that what nasa does

692
00:25:20,070 --> 00:25:17,360
get done is space science and what it's

693
00:25:21,669 --> 00:25:20,080
consistently failed at for 30 years is

694
00:25:23,269 --> 00:25:21,679
developing a new human launch vehicle

695
00:25:25,269 --> 00:25:23,279
which i believe it's tried five times

696
00:25:27,430 --> 00:25:25,279
for now so maybe what it should do is

697
00:25:28,549 --> 00:25:27,440
spin off the human space flight side of

698
00:25:30,630 --> 00:25:28,559
the agency

699
00:25:31,350 --> 00:25:30,640
maybe give it to the air force

700
00:25:36,070 --> 00:25:31,360
and

701
00:25:38,070 --> 00:25:36,080
or integrate itself somehow with nsf

702
00:25:40,630 --> 00:25:38,080
well we're actually doing that that was

703
00:25:42,870 --> 00:25:40,640
what the what the new vision is we're

704
00:25:45,430 --> 00:25:42,880
spinning off what the shuttle did

705
00:25:46,549 --> 00:25:45,440
into the commercial sector the military

706
00:25:49,110 --> 00:25:46,559
would be

707
00:25:51,830 --> 00:25:49,120
happy

708
00:25:53,430 --> 00:25:51,840
to take over human space flight

709
00:25:55,269 --> 00:25:53,440
the problem is with now that we've

710
00:25:57,510 --> 00:25:55,279
established and that would be actually

711
00:25:58,870 --> 00:25:57,520
consistent if you go back to american

712
00:26:00,230 --> 00:25:58,880
history the military always led

713
00:26:01,110 --> 00:26:00,240

exploration

714
00:26:03,269 --> 00:26:01,120
uh

715
00:26:04,549 --> 00:26:03,279
exploratory expeditions we talked about

716
00:26:06,390 --> 00:26:04,559
lewis and clark but they're the ones

717
00:26:08,710 --> 00:26:06,400
that explored much of the northern

718
00:26:09,750 --> 00:26:08,720
united states that was part of louisiana

719
00:26:11,430 --> 00:26:09,760
purchase

720
00:26:14,230 --> 00:26:11,440
so that would be a logical way to do it

721
00:26:18,310 --> 00:26:14,240
but the problem is we now have

722
00:26:20,390 --> 00:26:18,320
50 plus years of history of non-military

723
00:26:21,830 --> 00:26:20,400
activity in space in that particular

724
00:26:23,590 --> 00:26:21,840
realm

725
00:26:25,669 --> 00:26:23,600
the soviets never bought it but the

726
00:26:27,510 --> 00:26:25,679
russians haven't either but they said

727
00:26:28,630 --> 00:26:27,520
they have spawned theirs off too

728
00:26:29,830 --> 00:26:28,640
i don't know if there's anyone who could

729
00:26:31,669 --> 00:26:29,840
take it over

730
00:26:33,430 --> 00:26:31,679
presently

731
00:26:35,190 --> 00:26:33,440
require a political earthquake it's not

732
00:26:36,870 --> 00:26:35,200
going to happen based on what reading

733
00:26:38,630 --> 00:26:36,880
the stuff from both presidential

734
00:26:46,070 --> 00:26:38,640
candidates

735
00:26:50,789 --> 00:26:49,269
our final paper is co-authored by two

736
00:26:52,070 --> 00:26:50,799
gentlemen who are going to split their

737
00:26:53,430 --> 00:26:52,080
time and they've decided between

738
00:26:54,789 --> 00:26:53,440

themselves how they're going to split

739
00:26:56,710 --> 00:26:54,799
their time so i'm just going to worry

740
00:26:59,029 --> 00:26:56,720
about the total 20 minutes

741
00:27:00,390 --> 00:26:59,039
and the co-authors are john logsdon who

742
00:27:02,149 --> 00:27:00,400
i think is probably well known to

743
00:27:03,830 --> 00:27:02,159
everybody here even the folks out on the

744
00:27:05,830 --> 00:27:03,840
web but i'll just mention that he is a

745
00:27:07,269 --> 00:27:05,840
professor emeritus of the space policy

746
00:27:10,149 --> 00:27:07,279
institute at george washington

747
00:27:12,870 --> 00:27:10,159
university which he founded and for many

748
00:27:14,470 --> 00:27:12,880
many years he was the director of it

749
00:27:16,789 --> 00:27:14,480
he's published many books and most

750
00:27:18,630 --> 00:27:16,799
recently he published john f kennedy in

751
00:27:20,870 --> 00:27:18,640
the race to the moon which really really

752
00:27:21,830 --> 00:27:20,880
is interesting and i recommend it to all

753
00:27:24,389 --> 00:27:21,840
of you

754
00:27:26,149 --> 00:27:24,399
and duane started off by talking about

755
00:27:28,389 --> 00:27:26,159
the connections that all of us have to

756
00:27:30,149 --> 00:27:28,399
john which i think roger is the only one

757
00:27:32,310 --> 00:27:30,159
on the panel here who has not either

758
00:27:33,990 --> 00:27:32,320
been a student of or worked for john

759
00:27:36,389 --> 00:27:34,000
john was my very first boss here in

760
00:27:37,669 --> 00:27:36,399
washington dc a very very long time ago

761
00:27:39,830 --> 00:27:37,679
and we're not going to admit how long

762
00:27:41,350 --> 00:27:39,840
ago that was but john has had a

763
00:27:43,990 --> 00:27:41,360

tremendous influence on the field of

764
00:27:46,149 --> 00:27:44,000
space policy and so many of us that have

765
00:27:48,389 --> 00:27:46,159
taken it on as our career and his

766
00:27:50,549 --> 00:27:48,399
co-author is andre bormanes who was a

767
00:27:52,149 --> 00:27:50,559
writer and television producer currently

768
00:27:54,230 --> 00:27:52,159
working as a consultant on a new

769
00:27:57,269 --> 00:27:54,240
production of carl sagan's cosmos

770
00:27:58,789 --> 00:27:57,279
television series for fox network he has

771
00:28:00,950 --> 00:27:58,799
a masters in science technology and

772
00:28:02,630 --> 00:28:00,960
public policy from george washington

773
00:28:04,389 --> 00:28:02,640
where he focused on nasa's planetary

774
00:28:09,909 --> 00:28:04,399
science program so john i'll turn it

775
00:28:13,750 --> 00:28:11,750
so that was very clear guidance not to

776
00:28:15,110 --> 00:28:13,760
say what year you came to washington

777
00:28:17,990 --> 00:28:15,120
right

778
00:28:21,190 --> 00:28:18,789
the

779
00:28:23,909 --> 00:28:21,200
idea of this paper uh

780
00:28:26,789 --> 00:28:23,919
in the context of this symposium

781
00:28:29,510 --> 00:28:26,799
is to extract some lessons from history

782
00:28:32,630 --> 00:28:29,520
to what's perceived as a current crisis

783
00:28:35,430 --> 00:28:32,640
uh this current crisis is mild it's a 20

784
00:28:37,110 --> 00:28:35,440
percent cut in the planetary program

785
00:28:38,549 --> 00:28:37,120
what i'm going to talk about are several

786
00:28:42,149 --> 00:28:38,559
occasions where the program was

787
00:28:44,789 --> 00:28:42,159
threatened with its virtual survival uh

788
00:28:46,789 --> 00:28:44,799

the work uh that i'm going to talk about

789
00:28:50,070 --> 00:28:46,799
and that andre is going to talk about

790
00:28:52,470 --> 00:28:50,080
really dates back uh first to a

791
00:28:54,950 --> 00:28:52,480
assignment from a long ago nasa chief

792
00:28:57,669 --> 00:28:54,960
historian silver sylvia freeze who asked

793
00:28:59,750 --> 00:28:57,679
me to look at why nasa never flew a

794
00:29:04,149 --> 00:28:59,760
mission to halley's comet

795
00:29:05,990 --> 00:29:04,159
uh that led to a study of of the 1981

796
00:29:07,110 --> 00:29:06,000
attempt to shut down the planetary

797
00:29:09,430 --> 00:29:07,120
program

798
00:29:12,549 --> 00:29:09,440
uh which i finished about the time that

799
00:29:15,110 --> 00:29:12,559
andre came to gw for his study and he

800
00:29:18,870 --> 00:29:15,120
built on that for his master's thesis

801
00:29:21,750 --> 00:29:18,880
looking at kind of what happened after

802
00:29:24,470 --> 00:29:21,760
the program survived the 1981 crisis so

803
00:29:27,269 --> 00:29:24,480
that's that's the origins of this i hope

804
00:29:29,110 --> 00:29:27,279
we can draw some some lessons for the

805
00:29:31,590 --> 00:29:29,120
the current situation

806
00:29:32,950 --> 00:29:31,600
unlike the uh earlier papers this one's

807
00:29:34,630 --> 00:29:32,960
pretty close to the ground this

808
00:29:36,149 --> 00:29:34,640
describes

809
00:29:37,750 --> 00:29:36,159
people

810
00:29:40,870 --> 00:29:37,760
actual decisions

811
00:29:43,190 --> 00:29:40,880
uh the process by which those decisions

812
00:29:43,990 --> 00:29:43,200
are made politics

813
00:29:46,549 --> 00:29:44,000

which

814
00:29:49,750 --> 00:29:46,559
rears its head i won't even call it ugly

815
00:29:51,830 --> 00:29:49,760
uh in in in this process as if after all

816
00:29:55,029 --> 00:29:51,840
public money allocated through a

817
00:29:55,909 --> 00:29:55,039
political process uh so

818
00:29:59,029 --> 00:29:55,919
uh

819
00:30:02,070 --> 00:29:59,039
we called it survival crisis is it this

820
00:30:02,080 --> 00:30:05,669
sensitive huh

821
00:30:10,549 --> 00:30:07,430
but there have actually been several

822
00:30:13,830 --> 00:30:10,559
survival crises that have been mentioned

823
00:30:15,190 --> 00:30:13,840
in passing already this morning 1967

824
00:30:17,269 --> 00:30:15,200
the congress

825
00:30:21,590 --> 00:30:17,279
canceled a mission that was going to

826
00:30:24,549 --> 00:30:21,600
launch two mars landers on a saturn 5

827
00:30:27,110 --> 00:30:24,559
called it that time voyager and it as a

828
00:30:29,269 --> 00:30:27,120
uh aftermath of that

829
00:30:31,669 --> 00:30:29,279
administrator jim webb canceled the

830
00:30:35,590 --> 00:30:31,679
whole planetary program had it

831
00:30:37,909 --> 00:30:35,600
reinvented by a man named john naugle uh

832
00:30:40,710 --> 00:30:37,919
and and that reinvention led to the

833
00:30:44,870 --> 00:30:40,720
program that was executed in the 70s

834
00:30:47,269 --> 00:30:44,880
uh in the mid 70s after uh uh

835
00:30:48,870 --> 00:30:47,279
viking was launched and i think after

836
00:30:50,870 --> 00:30:48,880
viking was launched

837
00:30:53,110 --> 00:30:50,880
and voyagers were about to be launched

838
00:30:55,750 --> 00:30:53,120

the then associate administrator for

839
00:30:59,190 --> 00:30:55,760
space science noel henners told congress

840
00:31:01,990 --> 00:30:59,200
we're going out of business uh and and

841
00:31:04,950 --> 00:31:02,000
in reaction to that the leed center for

842
00:31:07,669 --> 00:31:04,960
planetary work that is jpl with a new

843
00:31:09,830 --> 00:31:07,679
director bruce murray tried to reinvent

844
00:31:14,549 --> 00:31:09,840
the program in a different fashion to

845
00:31:17,110 --> 00:31:14,559
can get continuing support didn't work

846
00:31:20,549 --> 00:31:17,120
and in 1981 with the new reagan

847
00:31:24,789 --> 00:31:20,559
administration coming into office

848
00:31:27,590 --> 00:31:24,799
the very survival of the program was in

849
00:31:29,590 --> 00:31:27,600
jeopardy and that was the that is the

850
00:31:31,990 --> 00:31:29,600
the main kind of core of this

851
00:31:34,310 --> 00:31:32,000
presentation there have been survival

852
00:31:36,789 --> 00:31:34,320
crises at least of some programs since

853
00:31:39,110 --> 00:31:36,799
you'll hear scott hubbard talk tomorrow

854
00:31:42,789 --> 00:31:39,120
about reinventing the mars program out

855
00:31:44,789 --> 00:31:42,799
after the 1999 failures in the program

856
00:31:47,509 --> 00:31:44,799
so

857
00:31:51,269 --> 00:31:47,519
this is a recurrent phenomena

858
00:31:53,909 --> 00:31:51,279
bruce murray came to jpl in 1976 as

859
00:31:56,549 --> 00:31:53,919
director he had been working with jpl as

860
00:32:00,710 --> 00:31:56,559
as a caltech professor many of you in

861
00:32:02,549 --> 00:32:00,720
this room knew bruce know bruce uh uh

862
00:32:05,590 --> 00:32:02,559
he's much better at giving directions

863
00:32:07,509 --> 00:32:05,600

than listening uh

864
00:32:11,350 --> 00:32:07,519
see those are the people that know birth

865
00:32:13,669 --> 00:32:11,360
uh and he has a very broad gauged uh

866
00:32:15,509 --> 00:32:13,679
view of life and he said what jpl had

867
00:32:16,470 --> 00:32:15,519
been doing with dull

868
00:32:19,590 --> 00:32:16,480
was

869
00:32:22,389 --> 00:32:19,600
putting forth gray mice for approval and

870
00:32:25,029 --> 00:32:22,399
what he wanted was purple pigeons

871
00:32:28,149 --> 00:32:25,039
missions that had not only scientific

872
00:32:30,149 --> 00:32:28,159
merit but also pizzazz exploratory

873
00:32:32,230 --> 00:32:30,159
interest public interest

874
00:32:33,830 --> 00:32:32,240
and he developed a list of those

875
00:32:36,070 --> 00:32:33,840
missions you see that

876
00:32:39,029 --> 00:32:36,080
on on the screen

877
00:32:42,070 --> 00:32:39,039
and rather quickly he decided the most

878
00:32:45,990 --> 00:32:42,080
purple of the purple pigeons given the

879
00:32:48,310 --> 00:32:46,000
once every 76 years a visit of comet

880
00:32:51,669 --> 00:32:48,320
halley to the inner solar system was to

881
00:32:54,870 --> 00:32:51,679
go rendezvous with comet halley plus a

882
00:32:56,630 --> 00:32:54,880
new idea had had emerged at jpl

883
00:32:58,789 --> 00:32:56,640
lou friedman will be here tomorrow one

884
00:33:01,669 --> 00:32:58,799
of the major proponents of it which were

885
00:33:04,789 --> 00:33:01,679
solar sails so what

886
00:33:07,909 --> 00:33:05,750
i guess

887
00:33:08,710 --> 00:33:07,919
uh

888
00:33:11,590 --> 00:33:08,720

what

889
00:33:14,389 --> 00:33:11,600
uh bruce wanted to get was a mission

890
00:33:16,070 --> 00:33:14,399
using solar sails to rendezvous with

891
00:33:18,789 --> 00:33:16,080
halle in its met

892
00:33:21,830 --> 00:33:18,799
retrograde orbit

893
00:33:23,590 --> 00:33:21,840
that didn't last very long the community

894
00:33:25,669 --> 00:33:23,600
at nasa headquarters in the space

895
00:33:27,430 --> 00:33:25,679
science community were very skeptical of

896
00:33:29,750 --> 00:33:27,440
solar sails

897
00:33:32,549 --> 00:33:29,760
preferred a different propulsion system

898
00:33:34,389 --> 00:33:32,559
called solar electric or ion drive

899
00:33:36,310 --> 00:33:34,399
propulsion

900
00:33:38,470 --> 00:33:36,320
were successful in convincing nasa

901
00:33:39,350 --> 00:33:38,480
management that that was the only way to

902
00:33:42,710 --> 00:33:39,360
go

903
00:33:44,470 --> 00:33:42,720
uh and and nasa management

904
00:33:47,269 --> 00:33:44,480
uh did not

905
00:33:49,590 --> 00:33:47,279
put sold or electric into the approval

906
00:33:52,950 --> 00:33:49,600
queue in time for a halle rendezvous

907
00:33:55,269 --> 00:33:52,960
mission uh and so it the rendezvous went

908
00:33:59,669 --> 00:33:55,279
away rather quickly but the magic of

909
00:34:04,710 --> 00:34:02,470
maintained itself uh and so the the

910
00:34:06,549 --> 00:34:04,720
scientific community and particularly

911
00:34:09,349 --> 00:34:06,559
the common community reinvented a

912
00:34:11,430 --> 00:34:09,359
mission that would go by halle

913
00:34:13,030 --> 00:34:11,440

and so you could call it halle mission

914
00:34:15,669 --> 00:34:13,040
but would actually rendezvous with a

915
00:34:17,430 --> 00:34:15,679
different comet temple too

916
00:34:19,270 --> 00:34:17,440
and it would use solar electric

917
00:34:21,270 --> 00:34:19,280
propulsion

918
00:34:26,310 --> 00:34:21,280
unfortunately from the point of view of

919
00:34:29,190 --> 00:34:26,320
comet advocates that mission was in uh

920
00:34:30,790 --> 00:34:29,200
third in the queue of planetary missions

921
00:34:33,430 --> 00:34:30,800
that the community wanted to get

922
00:34:37,990 --> 00:34:35,990
space science missions i should say uh

923
00:34:41,430 --> 00:34:38,000
first was the gamma-ray observatory what

924
00:34:44,389 --> 00:34:41,440
became compton second was venus orbiting

925
00:34:46,550 --> 00:34:44,399
imaging radar which in modified fashion

926
00:34:47,750 --> 00:34:46,560
became magellan and then the halley

927
00:34:50,149 --> 00:34:47,760
mission

928
00:34:52,869 --> 00:34:50,159
it actually got to president ken uh

929
00:34:55,510 --> 00:34:52,879
carter kennedy president carter's desk

930
00:34:57,510 --> 00:34:55,520
of which mission to approve and he had

931
00:34:59,670 --> 00:34:57,520
been reading the new york times science

932
00:35:03,030 --> 00:34:59,680
reporter walter sullivan's book about

933
00:35:05,349 --> 00:35:03,040
black holes and he said a dozen dozen

934
00:35:07,910 --> 00:35:05,359
gamma rays and black holes go together

935
00:35:10,870 --> 00:35:07,920
that sounds pretty neat let's do that

936
00:35:12,950 --> 00:35:10,880
we have an engineerish

937
00:35:14,950 --> 00:35:12,960
president making kind of program

938
00:35:17,829 --> 00:35:14,960

decisions interesting

939
00:35:20,150 --> 00:35:17,839
phenomenon through all of this what

940
00:35:22,150 --> 00:35:20,160
happened was a split in the science

941
00:35:23,670 --> 00:35:22,160
community and including the planetary

942
00:35:26,310 --> 00:35:23,680
science community

943
00:35:28,870 --> 00:35:26,320
between the purists it was still then

944
00:35:30,950 --> 00:35:28,880
the space science board

945
00:35:33,510 --> 00:35:30,960
now the space studies board that gives

946
00:35:35,349 --> 00:35:33,520
it a little broader mandate that said

947
00:35:38,390 --> 00:35:35,359
science uberalis

948
00:35:41,510 --> 00:35:38,400
in determining the priorities of of

949
00:35:44,310 --> 00:35:41,520
nasa's planetary missions uh

950
00:35:46,150 --> 00:35:44,320
and and would did not think it was the

951
00:35:48,950 --> 00:35:46,160
board's jurisdiction to look at the

952
00:35:50,230 --> 00:35:48,960
other aspects of the mission plus people

953
00:35:53,270 --> 00:35:50,240
like

954
00:35:56,950 --> 00:35:53,280
bruce murray and rather quickly with him

955
00:36:00,150 --> 00:35:56,960
carl sagan lou friedman

956
00:36:02,470 --> 00:36:00,160
founded the planetary society advocating

957
00:36:04,790 --> 00:36:02,480
for different classes of missions so as

958
00:36:08,870 --> 00:36:04,800
the reagan administration came into

959
00:36:11,270 --> 00:36:08,880
office it faced a divided planetary

960
00:36:13,030 --> 00:36:11,280
science community

961
00:36:15,430 --> 00:36:13,040
reagan of course came into office with

962
00:36:17,430 --> 00:36:15,440
the idea of cutting the federal budget

963
00:36:19,349 --> 00:36:17,440

hired as his budget director a young man

964
00:36:21,349 --> 00:36:19,359
named a former congressman named david

965
00:36:23,349 --> 00:36:21,359
stockman who came

966
00:36:26,790 --> 00:36:23,359
to that task with a vengeance i think he

967
00:36:29,190 --> 00:36:26,800
really liked it uh and

968
00:36:32,230 --> 00:36:29,200
carter had approved in his outgoing

969
00:36:34,550 --> 00:36:32,240
budget the venus radar mission

970
00:36:37,349 --> 00:36:34,560
stockman quickly rescinded that new

971
00:36:39,670 --> 00:36:37,359
start but also said to nasa you've got

972
00:36:41,270 --> 00:36:39,680
to cut one of your three approved

973
00:36:44,230 --> 00:36:41,280
science missions

974
00:36:45,910 --> 00:36:44,240
galileo hubble or the international

975
00:36:48,390 --> 00:36:45,920
solar polar mission which you'll hear

976
00:36:50,550 --> 00:36:48,400
about tomorrow i think

977
00:36:53,750 --> 00:36:50,560
and nasa

978
00:36:57,270 --> 00:36:53,760
chose to cut the joint u.s

979
00:37:00,470 --> 00:36:57,280
european u.s nasa esa

980
00:37:03,990 --> 00:37:00,480
shades of exomars uh

981
00:37:05,829 --> 00:37:04,000
cooperative project uh much to the

982
00:37:08,710 --> 00:37:05,839
chagrin of our european

983
00:37:11,670 --> 00:37:08,720
colleagues uh

984
00:37:13,910 --> 00:37:11,680
and all along during this there was this

985
00:37:16,710 --> 00:37:13,920
side issue of of

986
00:37:19,430 --> 00:37:16,720
murray going outside the normal nasa

987
00:37:22,950 --> 00:37:19,440
chain of command and the normal process

988
00:37:28,069 --> 00:37:22,960

of space science to advocate

989
00:37:31,430 --> 00:37:29,589
there's a picture in here i guess it's

990
00:37:33,750 --> 00:37:31,440
still coming

991
00:37:35,589 --> 00:37:33,760
i'll talk about it in a minute

992
00:37:38,069 --> 00:37:35,599
you had a new nasa administrator and

993
00:37:40,390 --> 00:37:38,079
deputy administrator jim beggs and hans

994
00:37:44,390 --> 00:37:40,400
mark

995
00:37:47,270 --> 00:37:44,400
mr beggs tried very hard to get guidance

996
00:37:49,829 --> 00:37:47,280
from the white house on what policy it

997
00:37:52,230 --> 00:37:49,839
wanted for the space program given the

998
00:37:53,430 --> 00:37:52,240
low budget marks he was given

999
00:37:55,109 --> 00:37:53,440
uh

1000
00:37:57,349 --> 00:37:55,119
he didn't get that

1001
00:37:59,270 --> 00:37:57,359
guidance and he started threatening all

1002
00:38:00,950 --> 00:37:59,280
right if i've got to operate at this

1003
00:38:03,750 --> 00:38:00,960
budget level either i've got to cut

1004
00:38:05,589 --> 00:38:03,760
money from the shuttle or stop one major

1005
00:38:08,390 --> 00:38:05,599
activity and the one i would pick is

1006
00:38:11,589 --> 00:38:08,400
probably planetary

1007
00:38:13,190 --> 00:38:11,599
uh that threat got nowhere

1008
00:38:15,670 --> 00:38:13,200
uh this in a

1009
00:38:17,270 --> 00:38:15,680
letter to omb

1010
00:38:19,589 --> 00:38:17,280
to david stockman

1011
00:38:23,030 --> 00:38:19,599
you can read it but the bottom line is

1012
00:38:24,310 --> 00:38:23,040
not only end the planetary program but

1013
00:38:28,310 --> 00:38:24,320

uh

1014
00:38:29,910 --> 00:38:28,320
de-access jpl it would make jpl surplus

1015
00:38:33,030 --> 00:38:29,920
to

1016
00:38:34,950 --> 00:38:33,040
nasa's requirements

1017
00:38:36,069 --> 00:38:34,960
good question of whether begs was

1018
00:38:38,790 --> 00:38:36,079
serious

1019
00:38:40,390 --> 00:38:38,800
or playing the washington monument game

1020
00:38:41,349 --> 00:38:40,400
you know putting forward a proposal he

1021
00:38:45,030 --> 00:38:41,359
thought

1022
00:38:45,040 --> 00:38:53,510
problem was it was acceptable

1023
00:38:58,470 --> 00:38:55,270
and omb

1024
00:39:02,069 --> 00:38:58,480
when it came back with the nasa mark in

1025
00:39:05,349 --> 00:39:02,079
november of 1981 not only had no money

1026
00:39:08,390 --> 00:39:05,359
for future planetary but cut galileo

1027
00:39:09,510 --> 00:39:08,400
which would have had the uh effect of of

1028
00:39:11,829 --> 00:39:09,520
uh

1029
00:39:14,470 --> 00:39:11,839
ending the planetary program

1030
00:39:16,630 --> 00:39:14,480
with a final decision to be made in

1031
00:39:18,390 --> 00:39:16,640
december

1032
00:39:21,829 --> 00:39:18,400
with the staff support at the white

1033
00:39:23,430 --> 00:39:21,839
house level the omb paper said even

1034
00:39:25,910 --> 00:39:23,440
though it's successful we've got to cut

1035
00:39:28,710 --> 00:39:25,920
it if we are going to save some money

1036
00:39:31,430 --> 00:39:28,720
and the new science advisor jay keyworth

1037
00:39:34,230 --> 00:39:31,440
george keyworth iii saying cutting the

1038
00:39:37,190 --> 00:39:34,240

program is good management

1039
00:39:40,550 --> 00:39:37,200
so your staff support at the white house

1040
00:39:42,470 --> 00:39:40,560
level for the space program

1041
00:39:44,550 --> 00:39:42,480
was urging the end of the planetary

1042
00:39:45,349 --> 00:39:44,560
program

1043
00:39:47,349 --> 00:39:45,359
who

1044
00:39:49,670 --> 00:39:47,359
were involved in this

1045
00:39:52,790 --> 00:39:49,680
politics of decision making there's the

1046
00:39:54,870 --> 00:39:52,800
picture i wanted uh

1047
00:39:57,109 --> 00:39:54,880
these are the three founders of the

1048
00:39:59,270 --> 00:39:57,119
planetary society bruce murray carl

1049
00:40:00,230 --> 00:39:59,280
sagan and lou friedman

1050
00:40:03,109 --> 00:40:00,240
lou

1051
00:40:03,910 --> 00:40:03,119
here then was dark i wonder whether mine

1052
00:40:04,790 --> 00:40:03,920
was

1053
00:40:07,750 --> 00:40:04,800
uh

1054
00:40:09,670 --> 00:40:07,760
in the late 70s or 1980 the other person

1055
00:40:14,390 --> 00:40:09,680
was one of the early advisers to the

1056
00:40:19,190 --> 00:40:16,870
they had started the planetary society

1057
00:40:21,109 --> 00:40:19,200
to campaign for the halle mission

1058
00:40:23,349 --> 00:40:21,119
and it flooded the white house with

1059
00:40:26,550 --> 00:40:23,359
thousands of letters which were never

1060
00:40:29,109 --> 00:40:26,560
opened which were sent to nasa

1061
00:40:31,510 --> 00:40:29,119
but advocating a single mission not the

1062
00:40:33,670 --> 00:40:31,520
planetary program at all

1063
00:40:35,589 --> 00:40:33,680

the planetary science community was

1064
00:40:38,309 --> 00:40:35,599
debating whether it should get into the

1065
00:40:40,309 --> 00:40:38,319
political advocacy business or whether

1066
00:40:44,230 --> 00:40:40,319
that would stain the purity of their

1067
00:40:48,390 --> 00:40:45,990
say that the public was involved through

1068
00:40:50,069 --> 00:40:48,400
the planetary society

1069
00:40:51,990 --> 00:40:50,079
the people that counted were the people

1070
00:40:58,390 --> 00:40:52,000
that were worried about the future of

1071
00:41:02,390 --> 00:41:00,150
and there had been a

1072
00:41:05,829 --> 00:41:02,400
a trustees committee on the future of

1073
00:41:09,270 --> 00:41:05,839
jpl formed at caltech chaired by a woman

1074
00:41:10,870 --> 00:41:09,280
named mary scranton she was a wife

1075
00:41:12,150 --> 00:41:10,880
you have to be old to remember some of

1076
00:41:13,910 --> 00:41:12,160
these names

1077
00:41:16,390 --> 00:41:13,920
she was a wife of the former governor of

1078
00:41:19,109 --> 00:41:16,400
pennsylvania bill scranton

1079
00:41:21,589 --> 00:41:19,119
who had run for president and herself a

1080
00:41:22,870 --> 00:41:21,599
very effective operator in republican

1081
00:41:26,230 --> 00:41:22,880
politics

1082
00:41:29,030 --> 00:41:26,240
uh then the democratic

1083
00:41:31,430 --> 00:41:29,040
president of caltech murph goldberger

1084
00:41:33,829 --> 00:41:31,440
got involved in this and they started

1085
00:41:35,910 --> 00:41:33,839
coming to washington and trying to exert

1086
00:41:39,030 --> 00:41:35,920
their influence on this

1087
00:41:41,270 --> 00:41:39,040
and at the end game they were successful

1088
00:41:43,829 --> 00:41:41,280

nothing that the community did on its

1089
00:41:45,910 --> 00:41:43,839
own would have produced the result they

1090
00:41:48,150 --> 00:41:45,920
got to people in the senate and in

1091
00:41:50,790 --> 00:41:48,160
particular got to senate majority leader

1092
00:41:53,910 --> 00:41:50,800
howard baker and convinced him to write

1093
00:41:56,309 --> 00:41:53,920
a letter to directly to ronald reagan

1094
00:41:58,150 --> 00:41:56,319
supporting the planetary program

1095
00:42:00,870 --> 00:41:58,160
and he did

1096
00:42:04,069 --> 00:42:00,880
and whether that letter ever got to

1097
00:42:08,069 --> 00:42:04,079
president reagan or not it produced the

1098
00:42:11,270 --> 00:42:08,079
compromise to have enough money to

1099
00:42:12,950 --> 00:42:11,280
allow galileo to continue and to give

1100
00:42:16,630 --> 00:42:12,960
the program

1101
00:42:19,829 --> 00:42:16,640
having kind of nearly escaped death time

1102
00:42:28,309 --> 00:42:19,839
to reinvent itself and that is where

1103
00:42:35,510 --> 00:42:31,589
thank you john thank you marcia

1104
00:42:36,470 --> 00:42:35,520
i hope i uh is this the uh remote

1105
00:42:37,990 --> 00:42:36,480
ah

1106
00:42:40,069 --> 00:42:38,000
great

1107
00:42:42,790 --> 00:42:40,079
so as john said in the uh in the wake of

1108
00:42:45,910 --> 00:42:42,800
this uh near-death experience there was

1109
00:42:48,950 --> 00:42:45,920
a perceived need to try to come up with

1110
00:42:50,309 --> 00:42:48,960
a strategy a way of ensuring that this

1111
00:42:51,270 --> 00:42:50,319
kind of thing was not going to happen

1112
00:42:54,710 --> 00:42:51,280
again

1113
00:42:57,109 --> 00:42:54,720

and already in late 1980 the nasa

1114
00:42:59,030 --> 00:42:57,119
administrator at the time robert frosh

1115
00:43:00,870 --> 00:42:59,040
had approved the creation of an ad hoc

1116
00:43:01,990 --> 00:43:00,880
subcommittee of the nasa advisory

1117
00:43:04,870 --> 00:43:02,000
council

1118
00:43:07,030 --> 00:43:04,880
uh to specifically develop strategy for

1119
00:43:09,589 --> 00:43:07,040
solar system system exploration in the

1120
00:43:11,030 --> 00:43:09,599
uh 1985-2000

1121
00:43:12,870 --> 00:43:11,040
time frame

1122
00:43:14,790 --> 00:43:12,880
was led by john naugle who mentioned

1123
00:43:16,230 --> 00:43:14,800
earlier a physicist who had worked at uh

1124
00:43:17,990 --> 00:43:16,240
nasa in the uh

1125
00:43:20,230 --> 00:43:18,000
in their science of it in late 60s and

1126
00:43:21,270 --> 00:43:20,240
early 70s and had a very successful run

1127
00:43:23,589 --> 00:43:21,280
there

1128
00:43:25,510 --> 00:43:23,599
so um

1129
00:43:28,870 --> 00:43:25,520
ultimately the the

1130
00:43:30,069 --> 00:43:28,880
essec solar system exploration committee

1131
00:43:34,950 --> 00:43:30,079
um

1132
00:43:36,069 --> 00:43:34,960
a plan based on uh three classes of

1133
00:43:38,309 --> 00:43:36,079
missions

1134
00:43:40,230 --> 00:43:38,319
and uh duane had mentioned earlier that

1135
00:43:41,990 --> 00:43:40,240
complex had been around for a while the

1136
00:43:43,109 --> 00:43:42,000
committee on planetary exploration

1137
00:43:43,990 --> 00:43:43,119
essentially

1138
00:43:46,069 --> 00:43:44,000

they had

1139
00:43:48,950 --> 00:43:46,079
assigned priorities to unanswered

1140
00:43:51,109 --> 00:43:48,960
questions regarding uh the solar system

1141
00:43:53,990 --> 00:43:51,119
its origin its evolution the evolution

1142
00:43:55,430 --> 00:43:54,000
and origin of life and so forth essec

1143
00:43:57,990 --> 00:43:55,440
was trying to turn

1144
00:43:59,750 --> 00:43:58,000
their priorities into a series of of

1145
00:44:02,150 --> 00:43:59,760
missions

1146
00:44:04,309 --> 00:44:02,160
and uh they came up with three classes

1147
00:44:06,309 --> 00:44:04,319
of missions that they wanted to propose

1148
00:44:08,230 --> 00:44:06,319
uh in the 100 million dollar range

1149
00:44:09,430 --> 00:44:08,240
observer missions these would be based

1150
00:44:11,349 --> 00:44:09,440
on

1151
00:44:12,550 --> 00:44:11,359
commercially

1152
00:44:14,630 --> 00:44:12,560
produced

1153
00:44:16,950 --> 00:44:14,640
earth orbiting spacecraft

1154
00:44:18,309 --> 00:44:16,960
a so-called mariner mark ii mission

1155
00:44:21,109 --> 00:44:18,319
which would

1156
00:44:22,870 --> 00:44:21,119
take the venerable

1157
00:44:25,109 --> 00:44:22,880
approach of the mariner missions and try

1158
00:44:26,790 --> 00:44:25,119
to standardize that into a common bus

1159
00:44:27,829 --> 00:44:26,800
that could be used for a variety of

1160
00:44:29,829 --> 00:44:27,839
missions

1161
00:44:32,790 --> 00:44:29,839
to the outer planets

1162
00:44:34,950 --> 00:44:32,800
and finally uh more in the uh sort of

1163
00:44:37,190 --> 00:44:34,960

bruce murray purple pigeon class

1164
00:44:38,470 --> 00:44:37,200
so-called viking missions which would uh

1165
00:44:40,870 --> 00:44:38,480
potentially

1166
00:44:42,790 --> 00:44:40,880
you know cost on the order of of a

1167
00:44:44,630 --> 00:44:42,800
billion dollars or more and do and do

1168
00:44:47,190 --> 00:44:44,640
big high-profile kinds of science and

1169
00:44:49,910 --> 00:44:47,200
exploration

1170
00:44:52,470 --> 00:44:49,920
so they produced a report a core program

1171
00:44:54,150 --> 00:44:52,480
they had to choose between a so-called

1172
00:44:56,390 --> 00:44:54,160
balanced program where they basically

1173
00:44:58,309 --> 00:44:56,400
tried to satisfy as many interested

1174
00:44:59,990 --> 00:44:58,319
parties as possible or focus on a

1175
00:45:02,069 --> 00:45:00,000
particular

1176
00:45:04,309 --> 00:45:02,079
scientific question in planetary

1177
00:45:05,910 --> 00:45:04,319
exploration they went with the balance

1178
00:45:07,109 --> 00:45:05,920
program

1179
00:45:09,670 --> 00:45:07,119
their uh

1180
00:45:11,430 --> 00:45:09,680
proposed core missions for new starts in

1181
00:45:13,510 --> 00:45:11,440
the 1980s were the

1182
00:45:15,270 --> 00:45:13,520
venus radar mapper which became magellan

1183
00:45:17,910 --> 00:45:15,280
which was launched on the

1184
00:45:18,950 --> 00:45:17,920
shuttle atlantis i believe in 1989 are

1185
00:45:21,349 --> 00:45:18,960
there about

1186
00:45:22,790 --> 00:45:21,359
mars geoscience climatology orbiter

1187
00:45:25,750 --> 00:45:22,800
which we will talk about again in a

1188
00:45:27,829 --> 00:45:25,760

moment common rendezvous asteroid flyby

1189
00:45:29,430 --> 00:45:27,839
craft and

1190
00:45:31,750 --> 00:45:29,440
the mission that later became cassini

1191
00:45:34,470 --> 00:45:31,760
these were two mariner mark ii

1192
00:45:36,069 --> 00:45:34,480
spacecraft proposals

1193
00:45:37,430 --> 00:45:36,079
so

1194
00:45:38,790 --> 00:45:37,440
we all know that

1195
00:45:43,030 --> 00:45:38,800
magellan went on to have a very

1196
00:45:48,950 --> 00:45:46,790
the observer side of this equation these

1197
00:45:51,670 --> 00:45:48,960
small 100 million dollar missions based

1198
00:45:55,990 --> 00:45:51,680
on uh existing commercially developed

1199
00:45:57,750 --> 00:45:56,000
spacecraft uh never really took hold uh

1200
00:46:00,630 --> 00:45:57,760
it was pretty clear as they were

1201
00:46:01,750 --> 00:46:00,640
developing this uh this mars orbiter

1202
00:46:03,430 --> 00:46:01,760
that

1203
00:46:04,550 --> 00:46:03,440
there was never going to be an observer

1204
00:46:06,630 --> 00:46:04,560
series

1205
00:46:08,870 --> 00:46:06,640
the the one spacecraft that was likely

1206
00:46:10,950 --> 00:46:08,880
to get off the ground get to mars

1207
00:46:12,630 --> 00:46:10,960
was uh was later what was called mars

1208
00:46:14,630 --> 00:46:12,640
observer and of course

1209
00:46:16,230 --> 00:46:14,640
been almost 17 years by the time that

1210
00:46:17,670 --> 00:46:16,240
spacecraft was launched since we'd sent

1211
00:46:18,950 --> 00:46:17,680
a mission to mars

1212
00:46:20,309 --> 00:46:18,960
everybody and his brother who had an

1213
00:46:21,990 --> 00:46:20,319

interest in mars wanted to get an

1214
00:46:23,510 --> 00:46:22,000
instrument on that mission and naturally

1215
00:46:25,510 --> 00:46:23,520
the costs grew

1216
00:46:28,630 --> 00:46:25,520
exponentially

1217
00:46:29,829 --> 00:46:28,640
um mariner mark ii for both kraft and

1218
00:46:31,670 --> 00:46:29,839
cassini

1219
00:46:34,550 --> 00:46:31,680
was considered a way to save money by

1220
00:46:36,710 --> 00:46:34,560
getting this common bus developed um

1221
00:46:38,309 --> 00:46:36,720
unfortunately that that was also an idea

1222
00:46:39,430 --> 00:46:38,319
that never really uh that never really

1223
00:46:42,550 --> 00:46:39,440
took hold

1224
00:46:44,550 --> 00:46:42,560
as jason pointed out earlier when uh

1225
00:46:46,870 --> 00:46:44,560
the mars observer spacecraft uh

1226
00:46:48,630 --> 00:46:46,880
approached mars it uh fell silent

1227
00:46:50,390 --> 00:46:48,640
possibly due to a ruptured fuel line

1228
00:46:53,190 --> 00:46:50,400
that may have sent the spacecraft into a

1229
00:46:55,349 --> 00:46:53,200
uh an uncontrolled tumble this is one of

1230
00:46:57,030 --> 00:46:55,359
the few images that uh

1231
00:46:58,150 --> 00:46:57,040
that we returned from mars on that

1232
00:46:59,349 --> 00:46:58,160
mission

1233
00:47:01,190 --> 00:46:59,359
um

1234
00:47:02,790 --> 00:47:01,200
and again the idea that uh we could

1235
00:47:04,390 --> 00:47:02,800
establish an observer series for

1236
00:47:06,790 --> 00:47:04,400
missions to the inner planet based on

1237
00:47:08,710 --> 00:47:06,800
commercially developed spacecraft

1238
00:47:11,190 --> 00:47:08,720

uh was unfortunately a good idea that

1239
00:47:12,230 --> 00:47:11,200
just never came to fruition

1240
00:47:14,230 --> 00:47:12,240
craft

1241
00:47:16,790 --> 00:47:14,240
was a troubled program

1242
00:47:19,349 --> 00:47:16,800
on several levels primarily i think

1243
00:47:21,030 --> 00:47:19,359
technical issues at least initially were

1244
00:47:22,630 --> 00:47:21,040
a problem for kraft there was an

1245
00:47:24,390 --> 00:47:22,640
instrument a penetrator that was going

1246
00:47:25,109 --> 00:47:24,400
to be launched from this spacecraft into

1247
00:47:27,430 --> 00:47:25,119
the

1248
00:47:29,990 --> 00:47:27,440
surface of a comet and return data from

1249
00:47:31,589 --> 00:47:30,000
uh in situ measurements of

1250
00:47:33,430 --> 00:47:31,599
the ices and

1251
00:47:35,270 --> 00:47:33,440
minerals and so forth that we'd expected

1252
00:47:36,710 --> 00:47:35,280
to find in a comet

1253
00:47:37,910 --> 00:47:36,720
candidate

1254
00:47:41,270 --> 00:47:37,920
problems with the development of the

1255
00:47:43,589 --> 00:47:41,280
penetrator added costs um

1256
00:47:45,750 --> 00:47:43,599
somehow in the budgeting process craft

1257
00:47:47,670 --> 00:47:45,760
was allocated only something like 250

1258
00:47:50,150 --> 00:47:47,680
million dollars whereas cassini the

1259
00:47:51,910 --> 00:47:50,160
mission to what became cassini mission

1260
00:47:54,630 --> 00:47:51,920
to orbit saturn and drop a probe into

1261
00:47:56,069 --> 00:47:54,640
the atmosphere of titan uh received the

1262
00:47:57,670 --> 00:47:56,079
lion's share of the budget on the order

1263
00:48:00,710 --> 00:47:57,680

of you know

1264
00:48:02,230 --> 00:48:00,720
1.4 1.5 billion at some point

1265
00:48:04,790 --> 00:48:02,240
so um

1266
00:48:07,109 --> 00:48:04,800
craft was considered not the sexy

1267
00:48:09,990 --> 00:48:07,119
mission of the two uh there was a

1268
00:48:12,710 --> 00:48:10,000
perception uh that one could argue with

1269
00:48:14,710 --> 00:48:12,720
that this uh saturn orbiter would be of

1270
00:48:16,470 --> 00:48:14,720
much greater interest to the public

1271
00:48:18,150 --> 00:48:16,480
and craft ultimately kind of became

1272
00:48:19,670 --> 00:48:18,160
contingency money for the development of

1273
00:48:23,349 --> 00:48:19,680
cassini

1274
00:48:24,950 --> 00:48:23,359
so um john and i uh we'll talk about

1275
00:48:27,349 --> 00:48:24,960
these last couple of slides the

1276
00:48:28,710 --> 00:48:27,359
discovery program oh no i'm sorry

1277
00:48:30,069 --> 00:48:28,720
oh we were supposed to go to i thought

1278
00:48:32,549 --> 00:48:30,079
john and i were going to do conclusions

1279
00:48:34,309 --> 00:48:32,559
together that's my mistake we had 20

1280
00:48:35,750 --> 00:48:34,319
minutes well then let us both take

1281
00:48:37,270 --> 00:48:35,760
questions and you can look at this slide

1282
00:48:38,309 --> 00:48:37,280
while we're doing it

1283
00:48:42,870 --> 00:48:38,319
how's that

1284
00:48:47,430 --> 00:48:44,710
so perhaps i'll ask the first question

1285
00:48:49,030 --> 00:48:47,440
what were your concluding remarks

1286
00:48:51,030 --> 00:48:49,040
it's very kind of you

1287
00:48:52,630 --> 00:48:51,040
um

1288
00:48:54,390 --> 00:48:52,640

basically that

1289
00:48:55,910 --> 00:48:54,400
as john mentioned at the beginning there

1290
00:48:58,069 --> 00:48:55,920
have been a series of crises in the

1291
00:48:59,589 --> 00:48:58,079
program and it's uh you know it's likely

1292
00:49:04,470 --> 00:48:59,599
to continue what i find kind of

1293
00:49:06,230 --> 00:49:04,480
astonishing is not so much the fact that

1294
00:49:08,549 --> 00:49:06,240
you know we don't spend a lot of money

1295
00:49:10,150 --> 00:49:08,559
on planetary exploration but we spend as

1296
00:49:11,990 --> 00:49:10,160
much as we do

1297
00:49:13,430 --> 00:49:12,000
considering the history of nasa and the

1298
00:49:16,150 --> 00:49:13,440
program and considering the budget

1299
00:49:18,390 --> 00:49:16,160
environment i i think planetary science

1300
00:49:21,190 --> 00:49:18,400
is probably doing pretty well for a

1301
00:49:23,910 --> 00:49:21,200
field that was essentially invented uh

1302
00:49:26,710 --> 00:49:23,920
in the early 1960s because of other

1303
00:49:28,829 --> 00:49:26,720
needs yeah i would add to that that that

1304
00:49:31,430 --> 00:49:28,839
there is stability in the program

1305
00:49:35,030 --> 00:49:31,440
discovery line missions continue and

1306
00:49:36,950 --> 00:49:35,040
they don't seem to be very controversial

1307
00:49:38,549 --> 00:49:36,960
the issue is is

1308
00:49:41,589 --> 00:49:38,559
for the community is whether it's going

1309
00:49:45,670 --> 00:49:41,599
to get the big flash emissions uh that

1310
00:49:47,990 --> 00:49:45,680
were in the decadal survey uh or not and

1311
00:49:50,630 --> 00:49:48,000
and i think what

1312
00:49:52,630 --> 00:49:50,640
this whole history suggests is that

1313
00:49:54,950 --> 00:49:52,640

that's not going to happen purely on

1314
00:49:58,069 --> 00:49:54,960
scientific merit alone that there really

1315
00:50:01,430 --> 00:49:58,079
does need to be some added dimension of

1316
00:50:03,589 --> 00:50:01,440
public attractiveness uh if if the

1317
00:50:05,349 --> 00:50:03,599
community hopes to

1318
00:50:08,950 --> 00:50:05,359
get get the things it really would like

1319
00:50:13,349 --> 00:50:10,630
got questions

1320
00:50:15,430 --> 00:50:13,359
yeah alan ladwig from nasa um you just

1321
00:50:16,870 --> 00:50:15,440
mentioned that to do some of these

1322
00:50:19,510 --> 00:50:16,880
bigger things would have to have

1323
00:50:21,829 --> 00:50:19,520
something to attract the public and one

1324
00:50:23,510 --> 00:50:21,839
of jason's concluding thoughts was that

1325
00:50:26,470 --> 00:50:23,520
the space science community needed to

1326
00:50:27,589 --> 00:50:26,480
make space science a national priority

1327
00:50:30,630 --> 00:50:27,599
uh

1328
00:50:32,390 --> 00:50:30,640
how do you see that happening and what

1329
00:50:34,069 --> 00:50:32,400
would the mission have to look like to

1330
00:50:36,150 --> 00:50:34,079
make space science be a national

1331
00:50:38,549 --> 00:50:36,160
priority given the history you just went

1332
00:50:40,710 --> 00:50:38,559
through andre is in the uh public

1333
00:50:41,829 --> 00:50:40,720
entertainment has just let him answer

1334
00:50:44,630 --> 00:50:41,839
that

1335
00:50:46,390 --> 00:50:44,640
uh i you know i i really see

1336
00:50:48,470 --> 00:50:46,400
nothing on the horizon that could make

1337
00:50:51,270 --> 00:50:48,480
it a national priority i think we have

1338
00:50:53,109 --> 00:50:51,280

so many other priorities today that

1339
00:50:56,309 --> 00:50:53,119
you know something to something uh

1340
00:50:58,309 --> 00:50:56,319
astonishing like the discovery of

1341
00:50:59,829 --> 00:50:58,319
evidence of past life or present life on

1342
00:51:01,349 --> 00:50:59,839
mars i think would certainly raise the

1343
00:51:03,829 --> 00:51:01,359
profile and make it

1344
00:51:06,470 --> 00:51:03,839
probably uh you know a national priority

1345
00:51:08,390 --> 00:51:06,480
at a greater level than it is today

1346
00:51:10,950 --> 00:51:08,400
uh i think it would take a discovery of

1347
00:51:13,589 --> 00:51:10,960
that magnitude to sort of

1348
00:51:15,990 --> 00:51:13,599
really really direct uh more substantial

1349
00:51:18,390 --> 00:51:16,000
resources toward planetary exploration

1350
00:51:20,710 --> 00:51:18,400
these days you know and getting out to

1351
00:51:22,790 --> 00:51:20,720
jupiter with the juno mission and

1352
00:51:25,349 --> 00:51:22,800
finding something really exciting out

1353
00:51:27,510 --> 00:51:25,359
there might energize the europa mission

1354
00:51:30,069 --> 00:51:27,520
that everybody wants to fly

1355
00:51:32,230 --> 00:51:30,079
uh but

1356
00:51:34,230 --> 00:51:32,240
a good job of salesmanship needs to be

1357
00:51:36,870 --> 00:51:34,240
done in packaging and

1358
00:51:38,549 --> 00:51:36,880
you know we're back to the era of purple

1359
00:51:40,870 --> 00:51:38,559
pigeons i mean what are the purple

1360
00:51:43,990 --> 00:51:40,880
pigeons for the 2020s i guess it's the

1361
00:51:50,790 --> 00:51:45,670
mikhail

1362
00:51:52,150 --> 00:51:50,800
john i would like to return your back to

1363
00:51:56,470 --> 00:51:52,160

beginning of

1364
00:52:00,549 --> 00:51:58,230
it was the time with

1365
00:52:02,950 --> 00:52:00,559
it was a great excitation behind the

1366
00:52:06,150 --> 00:52:02,960
planetary missions you know both in

1367
00:52:09,030 --> 00:52:06,160
soviet union and in usa

1368
00:52:11,030 --> 00:52:09,040
and it's not accidentally just that it's

1369
00:52:15,190 --> 00:52:11,040
at that time

1370
00:52:16,790 --> 00:52:15,200
the first nasa delegation came to moscow

1371
00:52:18,710 --> 00:52:16,800
it was headed

1372
00:52:21,349 --> 00:52:18,720
by george lowe

1373
00:52:27,109 --> 00:52:21,359
deputy administrator for nasa

1374
00:52:31,190 --> 00:52:29,349
john nogle

1375
00:52:34,790 --> 00:52:31,200
was one of the

1376
00:52:37,750 --> 00:52:34,800
member and i had a chance to be in the

1377
00:52:39,750 --> 00:52:37,760
soviet delegation which was headed by

1378
00:52:41,910 --> 00:52:39,760
former president of soviet academy of

1379
00:52:47,349 --> 00:52:41,920
science mississauga

1380
00:52:49,510 --> 00:52:47,359
and in 1971 the first agreement

1381
00:52:51,589 --> 00:52:49,520
between nasa and russian academy of

1382
00:52:53,910 --> 00:52:51,599
science was signed

1383
00:52:55,670 --> 00:52:53,920
and the first in the history

1384
00:52:57,190 --> 00:52:55,680
joint working group

1385
00:52:59,750 --> 00:52:57,200
was set up

1386
00:53:02,549 --> 00:52:59,760
and it was headed co-chaired

1387
00:53:03,990 --> 00:53:02,559
by noel henners also you mentioned and

1388
00:53:06,549 --> 00:53:04,000

myself

1389
00:53:08,870 --> 00:53:06,559
and we just very

1390
00:53:10,549 --> 00:53:08,880
work very actively developing different

1391
00:53:13,430 --> 00:53:10,559
kind of plans

1392
00:53:15,589 --> 00:53:13,440
and at the first issue for example this

1393
00:53:18,630 --> 00:53:15,599
was some kind of the bridging during

1394
00:53:21,990 --> 00:53:18,640
operation of mars 3 and mariner 9 just

1395
00:53:24,150 --> 00:53:22,000
at the real time you know information

1396
00:53:26,829 --> 00:53:24,160
exchange it was absolutely incredible

1397
00:53:31,430 --> 00:53:26,839
for the people who said in the deep

1398
00:53:34,150 --> 00:53:31,440
status deep net network uh in crimea and

1399
00:53:35,589 --> 00:53:34,160
just suspected me even being american

1400
00:53:38,630 --> 00:53:35,599
spy you know

1401
00:53:41,589 --> 00:53:38,640
absolutely fantastic

1402
00:53:42,950 --> 00:53:41,599
okay so the question is

1403
00:53:45,910 --> 00:53:42,960
you know

1404
00:53:48,470 --> 00:53:45,920
it's quite well developed

1405
00:53:50,870 --> 00:53:48,480
just until reagan administration came to

1406
00:53:53,670 --> 00:53:50,880
the office and it was absolutely

1407
00:53:55,510 --> 00:53:53,680
abruptly cancelled you know all

1408
00:53:57,750 --> 00:53:55,520
cooperative efforts

1409
00:54:00,150 --> 00:53:57,760
so the question is do you think there

1410
00:54:03,190 --> 00:54:00,160
are still some ground in order to make

1411
00:54:05,109 --> 00:54:03,200
this cooperative program more solid or

1412
00:54:07,510 --> 00:54:05,119
there was no chance regardless which

1413
00:54:09,030 --> 00:54:07,520

administration came to the power

1414
00:54:11,190 --> 00:54:09,040
um

1415
00:54:13,349 --> 00:54:11,200
yeah you look back and you see missed

1416
00:54:15,030 --> 00:54:13,359
opportunities uh

1417
00:54:17,750 --> 00:54:15,040
uh

1418
00:54:19,750 --> 00:54:17,760
not only cooperation in in robotic space

1419
00:54:21,109 --> 00:54:19,760
science but also cooperation in human

1420
00:54:23,109 --> 00:54:21,119
space flight

1421
00:54:25,030 --> 00:54:23,119
little known as the fact that the apollo

1422
00:54:26,470 --> 00:54:25,040
soyuz test project was supposed to be

1423
00:54:29,349 --> 00:54:26,480
the first step

1424
00:54:31,349 --> 00:54:29,359
followed by a shuttle rendezvous with a

1425
00:54:33,109 --> 00:54:31,359
soviet space station

1426
00:54:38,150 --> 00:54:33,119
and

1427
00:54:39,670 --> 00:54:38,160
uh joint work on on a space station uh

1428
00:54:41,190 --> 00:54:39,680
that was canceled not by the reagan

1429
00:54:43,750 --> 00:54:41,200
administration but by the carter

1430
00:54:46,309 --> 00:54:43,760
administration after the invasion of

1431
00:54:48,390 --> 00:54:46,319
afghanistan uh

1432
00:54:52,309 --> 00:54:48,400
and and really resuscitated under the

1433
00:54:54,630 --> 00:54:52,319
reagan administration from 1987 on uh

1434
00:54:59,030 --> 00:54:54,640
but the the broader issue

1435
00:55:03,349 --> 00:55:01,349
another editorial judgment of the

1436
00:55:06,549 --> 00:55:03,359
withdrawal of the us from the exomars

1437
00:55:09,910 --> 00:55:06,559
cooperation is international cooperation

1438
00:55:13,510 --> 00:55:09,920

is one of the themes that could elevate

1439
00:55:15,270 --> 00:55:13,520
planetary exploration above pure science

1440
00:55:17,510 --> 00:55:15,280
to something with political and

1441
00:55:19,910 --> 00:55:17,520
international significance the fact that

1442
00:55:21,430 --> 00:55:19,920
we've chosen not to pursue that path is

1443
00:55:22,630 --> 00:55:21,440
unfortunate

1444
00:55:24,470 --> 00:55:22,640
thank you very much we're going to move

1445
00:55:29,349 --> 00:55:24,480
to our broader panel discussion thank

1446
00:55:33,030 --> 00:55:31,270
so all the panelists have said in the

1447
00:55:35,030 --> 00:55:33,040
order in which you spoke people remember

1448
00:55:36,710 --> 00:55:35,040
which speech you gave so roger if you

1449
00:55:39,430 --> 00:55:36,720
could sit in the middle and

1450
00:55:42,309 --> 00:55:39,440
jason here duane

1451
00:55:49,349 --> 00:55:44,470
so bill did we absolutely have to be

1452
00:55:52,390 --> 00:55:49,359
that 11 45 or 11 50 okay what

1453
00:55:54,390 --> 00:55:52,400
11 46 all right we have until 11 46. so

1454
00:55:58,230 --> 00:55:54,400
it's a few minutes anyway so

1455
00:55:59,670 --> 00:55:58,240
uh greg did you still have a question

1456
00:56:01,990 --> 00:55:59,680
you don't have to sit down just because

1457
00:56:04,150 --> 00:56:02,000
their talk was over so thanks marsha and

1458
00:56:05,990 --> 00:56:04,160
again say who you are and please be

1459
00:56:07,430 --> 00:56:06,000
considerate of others by being brief i

1460
00:56:09,750 --> 00:56:07,440
will be greg vane from the jet

1461
00:56:11,190 --> 00:56:09,760
propulsion lab the this is an

1462
00:56:12,710 --> 00:56:11,200
observation which will lead to a

1463
00:56:15,109 --> 00:56:12,720

question very quickly

1464
00:56:17,430 --> 00:56:15,119
about 15 years ago charles alachi who

1465
00:56:20,630 --> 00:56:17,440
was then assistant director at jpl

1466
00:56:22,230 --> 00:56:20,640
working for ed stone marshalled spa

1467
00:56:23,670 --> 00:56:22,240
planetary scientists from across the

1468
00:56:26,230 --> 00:56:23,680
nation to come up with a road map for

1469
00:56:28,230 --> 00:56:26,240
solar system exploration and through

1470
00:56:30,230 --> 00:56:28,240
force of will he managed to get

1471
00:56:32,230 --> 00:56:30,240
everybody to come together on the idea

1472
00:56:33,829 --> 00:56:32,240
of search for life and it was really

1473
00:56:36,069 --> 00:56:33,839
interesting how much resistance there

1474
00:56:37,510 --> 00:56:36,079
was in the planetary community at that

1475
00:56:40,309 --> 00:56:37,520
time for fear that we would have another

1476
00:56:43,109 --> 00:56:40,319
viking uh incident here where you went

1477
00:56:45,270 --> 00:56:43,119
to find it and you didn't find it so the

1478
00:56:47,109 --> 00:56:45,280
question is and in fact one of you did

1479
00:56:49,190 --> 00:56:47,119
in fact pick up on this as a potential

1480
00:56:51,829 --> 00:56:49,200
theme for rallying the public support

1481
00:56:53,589 --> 00:56:51,839
that we need in order to secure a future

1482
00:56:55,349 --> 00:56:53,599
for planetary could you guys expand on

1483
00:56:57,990 --> 00:56:55,359
that do you think that that is a

1484
00:57:03,829 --> 00:56:58,000
genuinely serious uh

1485
00:57:08,150 --> 00:57:05,829
is that a theme that will help us unite

1486
00:57:09,270 --> 00:57:08,160
the public well

1487
00:57:12,630 --> 00:57:09,280
andre you

1488
00:57:14,390 --> 00:57:12,640

say you write this stuff

1489
00:57:16,470 --> 00:57:14,400
well i have a certain bias in that sense

1490
00:57:18,470 --> 00:57:16,480
i i'm particularly and i think most

1491
00:57:19,829 --> 00:57:18,480
people are particularly interested in

1492
00:57:21,510 --> 00:57:19,839
the question of whether or not there is

1493
00:57:24,069 --> 00:57:21,520
life on other worlds

1494
00:57:26,150 --> 00:57:24,079
if you uh talk to people casually who

1495
00:57:28,390 --> 00:57:26,160
are not working in the field of

1496
00:57:29,430 --> 00:57:28,400
planetary exploration or space science i

1497
00:57:31,190 --> 00:57:29,440
think that

1498
00:57:34,069 --> 00:57:31,200
that's the question that most frequently

1499
00:57:36,230 --> 00:57:34,079
comes up but of course that's we have no

1500
00:57:37,750 --> 00:57:36,240
idea whether or not uh we'll be able to

1501
00:57:38,710 --> 00:57:37,760
answer that question in the foreseeable

1502
00:57:41,109 --> 00:57:38,720
future

1503
00:57:43,190 --> 00:57:41,119
so does that make it

1504
00:57:45,190 --> 00:57:43,200
a rationale that continues into the

1505
00:57:47,990 --> 00:57:45,200
indefinite future or something that

1506
00:57:50,309 --> 00:57:48,000
could lead to failure well if well

1507
00:57:52,870 --> 00:57:50,319
both you know i mean it is a rationale

1508
00:57:54,710 --> 00:57:52,880
for for looking at the spectra of some

1509
00:57:56,950 --> 00:57:54,720
of the exoplanets we've been discovering

1510
00:57:59,190 --> 00:57:56,960
we have missions at least

1511
00:58:00,230 --> 00:57:59,200
on paper that could conceivably do uh

1512
00:58:02,789 --> 00:58:00,240
you know the kind of infrared

1513
00:58:04,630 --> 00:58:02,799

spectroscopy you would need to uh

1514
00:58:06,390 --> 00:58:04,640
to characterize the atmosphere of an

1515
00:58:09,030 --> 00:58:06,400
exoplanet orbiting another star and

1516
00:58:11,109 --> 00:58:09,040
determine whether or not there are uh

1517
00:58:13,670 --> 00:58:11,119
chemicals out of equilibrium methane and

1518
00:58:15,190 --> 00:58:13,680
oxygen and ozone and so forth and i

1519
00:58:17,510 --> 00:58:15,200
think that that's very exciting that's a

1520
00:58:19,510 --> 00:58:17,520
pretty long-term prospect and there is

1521
00:58:21,829 --> 00:58:19,520
no guarantee of success you may look at

1522
00:58:23,349 --> 00:58:21,839
all these planets and discover that you

1523
00:58:25,270 --> 00:58:23,359
know there's nothing much of interest

1524
00:58:27,109 --> 00:58:25,280
there or maybe you you know maybe the

1525
00:58:29,670 --> 00:58:27,119
technique will prove to be inadequate to

1526
00:58:32,549 --> 00:58:29,680
the task so there there is a risk in on

1527
00:58:34,309 --> 00:58:32,559
that side of it but just in terms of i

1528
00:58:35,109 --> 00:58:34,319
think dan golden was a big advocate of

1529
00:58:40,710 --> 00:58:35,119
this

1530
00:58:42,470 --> 00:58:40,720
nasa yeah origins what's nasa really

1531
00:58:44,470 --> 00:58:42,480
about the origin of life whether it

1532
00:58:46,470 --> 00:58:44,480
exists elsewhere in the universe

1533
00:58:48,390 --> 00:58:46,480
i find that probably the most compelling

1534
00:58:50,789 --> 00:58:48,400
question that that nasa could

1535
00:58:53,270 --> 00:58:50,799
potentially answer

1536
00:58:55,589 --> 00:58:53,280
whether or not that's enough to uh to

1537
00:58:58,309 --> 00:58:55,599
generate greater public support

1538
00:59:00,390 --> 00:58:58,319

for a more strategic approach to

1539
00:59:02,230 --> 00:59:00,400
the answer to that question i leave that

1540
00:59:04,470 --> 00:59:02,240
to others who are more much better

1541
00:59:08,470 --> 00:59:04,480
versed in the politics of it than me

1542
00:59:10,150 --> 00:59:08,480
does any other panelists have a burning

1543
00:59:12,630 --> 00:59:10,160
addition to that or shall we move on to

1544
00:59:16,390 --> 00:59:12,640
the next question i i would say one

1545
00:59:18,549 --> 00:59:16,400
thing the problem with finding life is

1546
00:59:19,750 --> 00:59:18,559
you have scientific finding in life and

1547
00:59:21,589 --> 00:59:19,760
then you have

1548
00:59:23,270 --> 00:59:21,599
movie finding life

1549
00:59:25,670 --> 00:59:23,280
unless we find a skeleton with a guy

1550
00:59:27,430 --> 00:59:25,680
with a club on mars

1551
00:59:29,510 --> 00:59:27,440
i think it's going to be a very abstract

1552
00:59:30,870 --> 00:59:29,520
kind of question i mean you saw that in

1553
00:59:32,470 --> 00:59:30,880
all the

1554
00:59:33,910 --> 00:59:32,480
discussion about the meteorite which

1555
00:59:36,390 --> 00:59:33,920
allegedly had

1556
00:59:38,549 --> 00:59:36,400
you know something in nasa ran with it

1557
00:59:40,309 --> 00:59:38,559
and as the scientific community got done

1558
00:59:42,390 --> 00:59:40,319
with it there wasn't much left

1559
00:59:44,390 --> 00:59:42,400
at a few burnt spots on the ground i

1560
00:59:46,710 --> 00:59:44,400
mean that's reality you know i think

1561
00:59:48,950 --> 00:59:46,720
that life if we had

1562
00:59:51,270 --> 00:59:48,960
either they come to us or we go out and

1563
00:59:53,430 --> 00:59:51,280

find them i think the public doesn't

1564
00:59:55,109 --> 00:59:53,440
care which way we do it the problem is

1565
00:59:57,670 --> 00:59:55,119
they want real life not what they what

1566
00:59:58,549 --> 00:59:57,680
we talk about oh you have a few bacteria

1567
01:00:02,309 --> 00:59:58,559
you know

1568
01:00:07,190 --> 01:00:05,510
okay there's a question on this side

1569
01:00:09,030 --> 01:00:07,200
can i pick this up it's a little awkward

1570
01:00:10,390 --> 01:00:09,040
speaking from there hi thank you so much

1571
01:00:12,390 --> 01:00:10,400
for your interesting papers janet for

1572
01:00:13,829 --> 01:00:12,400
testing princeton university i wanted to

1573
01:00:15,670 --> 01:00:13,839
push on an interesting tension that i

1574
01:00:17,750 --> 01:00:15,680
noticed across some of the papers in

1575
01:00:19,349 --> 01:00:17,760
which there was um a back and forth

1576
01:00:21,030 --> 01:00:19,359
between a kind of more personal voice

1577
01:00:22,710 --> 01:00:21,040
and then a more institutional voice and

1578
01:00:25,589 --> 01:00:22,720
that came a lot through the use of the

1579
01:00:28,069 --> 01:00:25,599
passive so i heard a lot of congress

1580
01:00:29,589 --> 01:00:28,079
allocated or craft just didn't seem to

1581
01:00:32,230 --> 01:00:29,599
be as sexy

1582
01:00:35,270 --> 01:00:32,240
um and i can't tell who or if the

1583
01:00:36,789 --> 01:00:35,280
historical actors were that were behind

1584
01:00:38,549 --> 01:00:36,799
making that actually make a difference

1585
01:00:40,230 --> 01:00:38,559
and i think that really came to the fore

1586
01:00:41,990 --> 01:00:40,240
in in john's talk when suddenly there

1587
01:00:43,510 --> 01:00:42,000
were people individual people that were

1588
01:00:45,670 --> 01:00:43,520

very important in producing an

1589
01:00:47,030 --> 01:00:45,680
institutional moment and i'm wondering

1590
01:00:48,630 --> 01:00:47,040
for the papers that you've discussed

1591
01:00:49,990 --> 01:00:48,640
today although i'm a sociologist i

1592
01:00:52,230 --> 01:00:50,000
completely understand the importance of

1593
01:00:53,829 --> 01:00:52,240
taking a macro in an institutional view

1594
01:00:55,829 --> 01:00:53,839
if there are some moments in some of

1595
01:00:58,150 --> 01:00:55,839
those uh historical moments that you

1596
01:01:00,309 --> 01:00:58,160
discuss in which there are

1597
01:01:01,750 --> 01:01:00,319
individuals whose whose role is really

1598
01:01:03,910 --> 01:01:01,760
made whose voice has really made the

1599
01:01:06,309 --> 01:01:03,920
difference in steering that larger

1600
01:01:09,030 --> 01:01:06,319
institutional ship

1601
01:01:10,309 --> 01:01:09,040
from my own perspective

1602
01:01:11,910 --> 01:01:10,319
i think that what you're seeing is

1603
01:01:16,710 --> 01:01:11,920
trying to compress 40 pages of a paper

1604
01:01:20,470 --> 01:01:18,789
my impression is that most of the major

1605
01:01:21,510 --> 01:01:20,480
decisions made

1606
01:01:23,430 --> 01:01:21,520
uh

1607
01:01:25,589 --> 01:01:23,440
regarding planetary science do have to

1608
01:01:27,589 --> 01:01:25,599
do with with human personalities i think

1609
01:01:29,270 --> 01:01:27,599
it's a tremendously important aspect to

1610
01:01:32,309 --> 01:01:29,280
consider

1611
01:01:34,950 --> 01:01:32,319
you know i i slipped skipped over in a

1612
01:01:38,069 --> 01:01:34,960
slide it was on the slide the position

1613
01:01:41,109 --> 01:01:38,079

taken by the nasa deputy administrator

1614
01:01:44,309 --> 01:01:41,119
in 1981 hans mark who thought that

1615
01:01:46,549 --> 01:01:44,319
planetary science was kind of trivial

1616
01:01:49,270 --> 01:01:46,559
and believed that astrophysics

1617
01:01:51,990 --> 01:01:49,280
which had by that time a decadal survey

1618
01:01:53,109 --> 01:01:52,000
had plans for the grand observatories

1619
01:01:56,549 --> 01:01:53,119
was a

1620
01:01:59,349 --> 01:01:56,559
a higher priority area of science and

1621
01:02:03,109 --> 01:01:59,359
dr mark was able to get that position

1622
01:02:06,470 --> 01:02:03,119
into the nasa position uh while in his

1623
01:02:09,190 --> 01:02:06,480
period in washington so i uh

1624
01:02:10,150 --> 01:02:09,200
certainly personalities in positions

1625
01:02:13,029 --> 01:02:10,160
matter

1626
01:02:14,870 --> 01:02:13,039
in making decisions that's those of us

1627
01:02:17,829 --> 01:02:14,880
that live in this town

1628
01:02:20,470 --> 01:02:17,839
you know thrive on that

1629
01:02:23,430 --> 01:02:20,480
ralph you get the last final brief

1630
01:02:25,190 --> 01:02:23,440
question yes ma'am

1631
01:02:26,470 --> 01:02:25,200
so it's a slightly different question

1632
01:02:28,309 --> 01:02:26,480
about

1633
01:02:30,230 --> 01:02:28,319
sorry john i don't want to block the

1634
01:02:33,109 --> 01:02:30,240
camera here slightly different question

1635
01:02:35,349 --> 01:02:33,119
about about the resources and educating

1636
01:02:37,990 --> 01:02:35,359
and pr and all that

1637
01:02:39,910 --> 01:02:38,000
is part of the problem that we as a

1638
01:02:41,990 --> 01:02:39,920

technical community have not

1639
01:02:43,750 --> 01:02:42,000
appropriately educated

1640
01:02:45,349 --> 01:02:43,760
not only the public but also the

1641
01:02:48,789 --> 01:02:45,359
non-technical

1642
01:02:50,230 --> 01:02:48,799
uh decision makers about how much it

1643
01:02:53,029 --> 01:02:50,240
really cost

1644
01:02:54,870 --> 01:02:53,039
to build a flawless purple pigeon is the

1645
01:02:56,710 --> 01:02:54,880
is that part of the problem

1646
01:02:59,190 --> 01:02:56,720
uh and again that's sort of turning the

1647
01:03:00,870 --> 01:02:59,200
whole issue of resources on its head but

1648
01:03:02,870 --> 01:03:00,880
you know with you know there was a seven

1649
01:03:04,789 --> 01:03:02,880
minutes of terror with uh with curiosity

1650
01:03:07,270 --> 01:03:04,799
landing but it works so no problem we

1651
01:03:09,270 --> 01:03:07,280
can do it again right it's easy to do

1652
01:03:10,789 --> 01:03:09,280
and it is is is that part is that part

1653
01:03:12,309 --> 01:03:10,799
of the problem do we need to be

1654
01:03:15,109 --> 01:03:12,319
seriously do we need to be doing a

1655
01:03:16,470 --> 01:03:15,119
better job success creates expectations

1656
01:03:17,270 --> 01:03:16,480
and you want success

1657
01:03:21,829 --> 01:03:17,280
uh

1658
01:03:24,309 --> 01:03:21,839
sword i i guess i would i would add

1659
01:03:26,789 --> 01:03:24,319
ralph that that one of the

1660
01:03:28,829 --> 01:03:26,799
issues is educating the scientific

1661
01:03:31,589 --> 01:03:28,839
community

1662
01:03:32,789 --> 01:03:31,599
that appealing to the public is not

1663
01:03:36,230 --> 01:03:32,799

dirty

1664
01:03:39,029 --> 01:03:36,240
uh you know it's not unseemly uh

1665
01:03:41,670 --> 01:03:39,039
to to tell stories uh

1666
01:03:43,190 --> 01:03:41,680
that that putting a narrative like the

1667
01:03:46,150 --> 01:03:43,200
seven minutes of terror which i think

1668
01:03:48,230 --> 01:03:46,160
was a very effective narrative

1669
01:03:49,990 --> 01:03:48,240
you know because once you get curiosity

1670
01:03:51,029 --> 01:03:50,000
down there then everybody's focused and

1671
01:03:52,870 --> 01:03:51,039
say

1672
01:03:56,150 --> 01:03:52,880
now look now what let's let's see what

1673
01:03:59,029 --> 01:03:56,160
it does but it really focused uh on on

1674
01:03:59,910 --> 01:03:59,039
the spacecraft i think it was was great

1675
01:04:01,109 --> 01:03:59,920
pr

1676
01:04:03,589 --> 01:04:01,119
uh

1677
01:04:08,950 --> 01:04:06,230
a little submarine around going around

1678
01:04:10,789 --> 01:04:08,960
the oceans of europa

1679
01:04:14,069 --> 01:04:10,799
you know gets the image of that or a

1680
01:04:17,910 --> 01:04:14,079
mars airplane i mean there are

1681
01:04:19,829 --> 01:04:17,920
images of stuff uh you know you folks at

1682
01:04:22,789 --> 01:04:19,839
jpl are going to have fun trying to

1683
01:04:23,829 --> 01:04:22,799
capture something like that with pluto

1684
01:04:26,470 --> 01:04:23,839
uh

1685
01:04:30,630 --> 01:04:26,480
when you get a few blurry images but

1686
01:04:36,549 --> 01:04:33,589
i'd just like to add that um uh you know

1687
01:04:38,630 --> 01:04:36,559
you you asked about educating the public

1688
01:04:40,549 --> 01:04:38,640

on how this stuff you know

1689
01:04:41,589 --> 01:04:40,559
how come this stuff costs so much and

1690
01:04:43,029 --> 01:04:41,599
and uh

1691
01:04:45,029 --> 01:04:43,039
i got to say i've worked in this field

1692
01:04:47,430 --> 01:04:45,039
for quite a while and i still don't know

1693
01:04:49,829 --> 01:04:47,440
why it costs so much i mean i've been on

1694
01:04:51,829 --> 01:04:49,839
aircraft carriers that cost two billion

1695
01:04:53,510 --> 01:04:51,839
dollars and then i've you know looked

1696
01:04:55,190 --> 01:04:53,520
into clean rooms and so many points to

1697
01:04:56,710 --> 01:04:55,200
the spacecraft and that's one billion

1698
01:04:58,069 --> 01:04:56,720
dollars and you know the aircraft

1699
01:05:01,029 --> 01:04:58,079
carrier is a heck of a lot bigger and

1700
01:05:02,710 --> 01:05:01,039
has nuclear reactors and i i honestly

1701
01:05:05,589 --> 01:05:02,720
don't understand

1702
01:05:08,390 --> 01:05:05,599
why some of these things that are not

1703
01:05:11,510 --> 01:05:08,400
physically big objects

1704
01:05:12,630 --> 01:05:11,520
cost so much money

1705
01:05:14,630 --> 01:05:12,640
and

1706
01:05:16,309 --> 01:05:14,640
so if i don't know it

1707
01:05:18,230 --> 01:05:16,319
if i can't figure it out and i've been

1708
01:05:19,750 --> 01:05:18,240
doing this for a while i think it's a

1709
01:05:21,430 --> 01:05:19,760
really difficult thing to try and

1710
01:05:22,630 --> 01:05:21,440
explain that to the general public which

1711
01:05:24,710 --> 01:05:22,640
of course

1712
01:05:26,230 --> 01:05:24,720
doesn't know the cost of uh you know

1713
01:05:27,430 --> 01:05:26,240

doesn't know how much we spend on a lot

1714
01:05:29,829 --> 01:05:27,440
of different things that the government

1715
01:05:30,710 --> 01:05:29,839
provides so i'm it may be an impossible

1716
01:05:31,990 --> 01:05:30,720
task

1717
01:05:33,910 --> 01:05:32,000
and i'm afraid that we're going to have

1718
01:05:36,069 --> 01:05:33,920
to continue this at lunch

1719
01:05:38,630 --> 01:05:36,079
about 30 seconds can you do it okay the

1720
01:05:39,910 --> 01:05:38,640
curiosity landing was important because

1721
01:05:42,150 --> 01:05:39,920
it was seven minutes to tear everybody

1722
01:05:43,670 --> 01:05:42,160
understood this but what was the next

1723
01:05:46,309 --> 01:05:43,680
image

1724
01:05:48,390 --> 01:05:46,319
curiosity is using its shovel

1725
01:05:50,549 --> 01:05:48,400
to see if it works now that's

1726
01:05:53,109 --> 01:05:50,559
scientifically very important but that's

1727
01:05:54,870 --> 01:05:53,119
not exciting that's not exactly driving

1728
01:05:55,990 --> 01:05:54,880
the public's attention you know

1729
01:05:58,710 --> 01:05:56,000
something they think looks like a

1730
01:06:00,390 --> 01:05:58,720
lawnmower reaches out with and pulls in

1731
01:06:02,630 --> 01:06:00,400
some dirt

1732
01:06:04,390 --> 01:06:02,640
and so i think it's hard to do it you

1733
01:06:05,990 --> 01:06:04,400
can do the seven minutes of terror but

1734
01:06:09,589 --> 01:06:06,000
what happens after that

1735
01:06:11,430 --> 01:06:09,599
the science which is not going to be

1736
01:06:12,710 --> 01:06:11,440
attention grabbing unless you're a

1737
01:06:13,829 --> 01:06:12,720
scientist

1738
01:06:15,910 --> 01:06:13,839

well i think we've had a very

1739
01:06:18,309 --> 01:06:15,920
provocative discussion to start off the

1740
01:06:19,670 --> 01:06:18,319
seminar it's going to be an exciting day

1741
01:06:21,270 --> 01:06:19,680
and a half to follow this starting with

1742
01:06:22,390 --> 01:06:21,280
jim green's talk in just a few minutes

1743
01:06:23,829 --> 01:06:22,400
and i'd like to thank all of you for

1744
01:06:25,750 --> 01:06:23,839
being such a wonderful audience and the