
"When I Grow Up
I Want to be
an Astronaut!"
SMITHSONIAN
INSTITUTION

1
00:00:05,190 --> 00:00:03,270
good morning ladies and gentlemen i'm

2
00:00:06,950 --> 00:00:05,200
jack daly the john and adrian mars

3
00:00:08,870 --> 00:00:06,960
director of the smithsonian's national

4
00:00:11,669 --> 00:00:08,880
air and space museum

5
00:00:13,430 --> 00:00:11,679
and it's my privilege to welcome you all

6
00:00:15,669 --> 00:00:13,440
those here in the hall

7
00:00:17,430 --> 00:00:15,679
and those participating via webcast and

8
00:00:19,189 --> 00:00:17,440
nasa tv

9
00:00:22,710 --> 00:00:19,199
to the national advisory committee for

10
00:00:24,390 --> 00:00:22,720
aeronautics centenary a symposium on 100

11
00:00:25,990 --> 00:00:24,400
years of aerospace research and

12
00:00:28,070 --> 00:00:26,000
development

13
00:00:30,630 --> 00:00:28,080

for making this program possible we are

14
00:00:32,870 --> 00:00:30,640
grateful to the national aeronautics and

15
00:00:34,150 --> 00:00:32,880
space administration

16
00:00:36,229 --> 00:00:34,160
and the partnership between the

17
00:00:37,430 --> 00:00:36,239
smithsonian and nasa has existed for

18
00:00:39,270 --> 00:00:37,440
decades

19
00:00:43,990 --> 00:00:39,280
but the relationship between the

20
00:00:46,310 --> 00:00:44,000
smithsonian and naca began a century ago

21
00:00:49,430 --> 00:00:46,320
charles walcott the fourth secretary of

22
00:00:51,990 --> 00:00:49,440
the smithsonian urged that naca be

23
00:00:53,670 --> 00:00:52,000
established and later served as its

24
00:00:55,270 --> 00:00:53,680
chairman

25
00:00:57,270 --> 00:00:55,280
as a scientist he understood the

26
00:00:59,029 --> 00:00:57,280
essential role research would play in

27
00:01:00,869 --> 00:00:59,039
flight technology

28
00:01:03,830 --> 00:01:00,879
furthermore he realized the country's

29
00:01:05,670 --> 00:01:03,840
best interest would be best served by

30
00:01:09,270 --> 00:01:05,680
bringing people with skill

31
00:01:11,109 --> 00:01:09,280
expertise courage and foresight together

32
00:01:13,270 --> 00:01:11,119
he and the other visionaries who helped

33
00:01:15,670 --> 00:01:13,280
create the naca

34
00:01:17,270 --> 00:01:15,680
would be very proud

35
00:01:20,149 --> 00:01:17,280
of the groundbreaking achievements

36
00:01:22,789 --> 00:01:20,159
accomplished by the agency

37
00:01:24,710 --> 00:01:22,799
today nasa is on the cusp of the new era

38
00:01:26,789 --> 00:01:24,720

in space exploration

39
00:01:29,030 --> 00:01:26,799
accomplishing its goals by exercising

40
00:01:30,069 --> 00:01:29,040
all the qualities that made the naca

41
00:01:32,630 --> 00:01:30,079
great

42
00:01:36,230 --> 00:01:32,640
innovation courage hard work diligence

43
00:01:37,910 --> 00:01:36,240
curiosity optimism passion brilliance in

44
00:01:40,069 --> 00:01:37,920
the list goes on

45
00:01:41,670 --> 00:01:40,079
its agenda may be broader than it was a

46
00:01:43,670 --> 00:01:41,680
hundred years ago

47
00:01:45,749 --> 00:01:43,680
and his budget certainly is larger than

48
00:01:48,469 --> 00:01:45,759
the five thousand dollars appropriated

49
00:01:50,310 --> 00:01:48,479
by congress to start the naca

50
00:01:52,310 --> 00:01:50,320
but the mission remains the same the

51
00:01:54,469 --> 00:01:52,320
pursuit of excellence

52
00:01:56,069 --> 00:01:54,479
enjoy the symposium and congratulations

53
00:01:57,830 --> 00:01:56,079
of all of you who are continuing in the

54
00:01:59,030 --> 00:01:57,840
footsteps of this history-making

55
00:02:01,030 --> 00:01:59,040
organization

56
00:02:03,350 --> 00:02:01,040
and it's my honor now to turn the podium

57
00:02:04,550 --> 00:02:03,360
over to the administrator of the

58
00:02:06,709 --> 00:02:04,560
national aeronautics and space

59
00:02:17,030 --> 00:02:06,719
administration the honorable charles

60
00:02:21,270 --> 00:02:18,869
thank you very much general daly and

61
00:02:23,589 --> 00:02:21,280
roger thanks for for organizing all this

62
00:02:26,630 --> 00:02:23,599
thanks all of you for coming out

63
00:02:28,869 --> 00:02:26,640

um you know this is uh

64
00:02:31,990 --> 00:02:28,879
it's a long time in coming you know a

65
00:02:33,830 --> 00:02:32,000
hundred years is is quite a long time

66
00:02:38,150 --> 00:02:33,840
there are some of us who are a lot

67
00:02:40,470 --> 00:02:38,160
closer to it now than we were quite some

68
00:02:42,229 --> 00:02:40,480
time ago and and it's interesting to see

69
00:02:43,910 --> 00:02:42,239
it approach in your life

70
00:02:46,070 --> 00:02:43,920
but who knows

71
00:02:48,470 --> 00:02:46,080
we appreciate all the work that uh the

72
00:02:51,110 --> 00:02:48,480
smithsonian staff has done to host this

73
00:02:54,470 --> 00:02:51,120
symposium about the national advisory

74
00:02:57,190 --> 00:02:54,480
committee for aeronautics or naca

75
00:02:58,790 --> 00:02:57,200
both nasa and the naca have had a long

76
00:03:01,030 --> 00:02:58,800
and very fruitful

77
00:03:03,110 --> 00:03:01,040
relationship with the smithsonian's

78
00:03:04,869 --> 00:03:03,120
national air and space museum as general

79
00:03:08,710 --> 00:03:04,879
daly mentioned in fact

80
00:03:10,869 --> 00:03:08,720
it is literally on display all around us

81
00:03:13,750 --> 00:03:10,879
walking through the museum

82
00:03:15,990 --> 00:03:13,760
to this gallery today it's hard to miss

83
00:03:18,630 --> 00:03:16,000
the bright orange x1 hanging in the

84
00:03:21,030 --> 00:03:18,640
milestones of flight gallery

85
00:03:23,830 --> 00:03:21,040
right nearby it we saw the intimidating

86
00:03:27,350 --> 00:03:23,840
matte black x-15 and above the

87
00:03:29,509 --> 00:03:27,360
escalators the gleaming white d-558

88
00:03:31,830 --> 00:03:29,519

rocket skyrocket

89
00:03:35,910 --> 00:03:31,840
these amazing vehicles were all

90
00:03:38,390 --> 00:03:35,920
developed under naca and one the x-15

91
00:03:40,949 --> 00:03:38,400
was actually flown by nasa

92
00:03:43,270 --> 00:03:40,959
we're thrilled that these artifacts are

93
00:03:44,710 --> 00:03:43,280
lovingly preserved and displayed here on

94
00:03:46,630 --> 00:03:44,720
the national mall

95
00:03:48,470 --> 00:03:46,640
for millions of visitors from around the

96
00:03:50,550 --> 00:03:48,480
world to see

97
00:03:53,190 --> 00:03:50,560
but our relationship with this museum

98
00:03:55,509 --> 00:03:53,200
goes beyond finding a good home for

99
00:03:58,229 --> 00:03:55,519
historic air and spacecraft

100
00:04:00,149 --> 00:03:58,239
the nasa history program and the museum

101
00:04:03,030 --> 00:04:00,159
have a long tradition of working

102
00:04:05,429 --> 00:04:03,040
together to advance the historical study

103
00:04:08,470 --> 00:04:05,439
of our aerospace heritage

104
00:04:11,350 --> 00:04:08,480
today's event is a perfect example

105
00:04:12,710 --> 00:04:11,360
it's been 100 years to the day since the

106
00:04:15,350 --> 00:04:12,720
law passed

107
00:04:17,189 --> 00:04:15,360
creating the naca

108
00:04:19,030 --> 00:04:17,199
through our joint efforts

109
00:04:21,189 --> 00:04:19,040
we've assembled an amazing group of

110
00:04:23,510 --> 00:04:21,199
experts and young scholars to discuss

111
00:04:25,270 --> 00:04:23,520
the legacy and lessons of this

112
00:04:27,189 --> 00:04:25,280
incredible group

113
00:04:29,270 --> 00:04:27,199

for those of us who are pilots and who

114
00:04:30,310 --> 00:04:29,280
have taken the next giant leap into

115
00:04:33,030 --> 00:04:30,320
space

116
00:04:35,270 --> 00:04:33,040
i can honestly say

117
00:04:36,230 --> 00:04:35,280
we wouldn't be where we are without the

118
00:04:38,870 --> 00:04:36,240
first

119
00:04:40,710 --> 00:04:38,880
steps taken by those pioneers

120
00:04:44,310 --> 00:04:40,720
who had the foresight to see where the

121
00:04:47,030 --> 00:04:44,320
new technology of aviation could take us

122
00:04:49,830 --> 00:04:47,040
today every u.s aircraft and u.s air

123
00:04:51,990 --> 00:04:49,840
traffic control tower has nasa develop

124
00:04:54,950 --> 00:04:52,000
technology on board

125
00:04:57,270 --> 00:04:54,960
it has never been more true that nasa is

126
00:05:00,070 --> 00:04:57,280
with you when you fly

127
00:05:02,390 --> 00:05:00,080
back in the 1960s however

128
00:05:04,390 --> 00:05:02,400
in the enthusiasm of tackling the new

129
00:05:07,590 --> 00:05:04,400
missions space

130
00:05:10,870 --> 00:05:07,600
it was easy for both nasa and the public

131
00:05:12,950 --> 00:05:10,880
to forget about the naca

132
00:05:14,870 --> 00:05:12,960
there were exciting and very demanding

133
00:05:18,230 --> 00:05:14,880
new challenges to face

134
00:05:20,550 --> 00:05:18,240
and as great as the naca had been

135
00:05:22,629 --> 00:05:20,560
it was yesterday's news

136
00:05:24,629 --> 00:05:22,639
as time went by it was easy to forget

137
00:05:26,070 --> 00:05:24,639
the fundamental contributions made by

138
00:05:27,749 --> 00:05:26,080

the naca

139
00:05:29,430 --> 00:05:27,759
to the worldwide development of

140
00:05:32,310 --> 00:05:29,440
aeronautics

141
00:05:34,790 --> 00:05:32,320
the huge contributions made by the naca

142
00:05:36,550 --> 00:05:34,800
staff that helped our nation to victory

143
00:05:38,629 --> 00:05:36,560
in world war ii

144
00:05:40,950 --> 00:05:38,639
security during the cold war and to

145
00:05:44,550 --> 00:05:40,960
research that laid the basis for our

146
00:05:46,390 --> 00:05:44,560
space program also faded to memory

147
00:05:49,510 --> 00:05:46,400
but there were a few things that didn't

148
00:05:51,749 --> 00:05:49,520
fade things that came into nasa

149
00:05:52,950 --> 00:05:51,759
at the transition along with the

150
00:05:56,150 --> 00:05:52,960
researchers

151
00:05:59,749 --> 00:05:56,160
staff facilities and aircraft

152
00:06:03,110 --> 00:05:59,759
these critical bits of naca dna

153
00:06:04,870 --> 00:06:03,120
shaped the mold that made nasa made us

154
00:06:08,230 --> 00:06:04,880
who we are today

155
00:06:11,189 --> 00:06:08,240
the first of these was how we work

156
00:06:13,189 --> 00:06:11,199
in partnership with industry academia

157
00:06:15,749 --> 00:06:13,199
even museums i should note and

158
00:06:18,390 --> 00:06:15,759
innovators throughout the world

159
00:06:22,070 --> 00:06:18,400
the second major influence of the naca

160
00:06:24,150 --> 00:06:22,080
on nasa was in what we do

161
00:06:26,230 --> 00:06:24,160
like our predecessors studying the shape

162
00:06:27,830 --> 00:06:26,240
of airfoils in the first wind tunnels at

163
00:06:29,189 --> 00:06:27,840

the langley memorial aeronautical

164
00:06:32,070 --> 00:06:29,199
laboratory

165
00:06:34,950 --> 00:06:32,080
nasa is focused on practical solutions

166
00:06:36,550 --> 00:06:34,960
at the cutting edge of technology

167
00:06:39,270 --> 00:06:36,560
this is especially true of our

168
00:06:42,469 --> 00:06:39,280
continuing work on aeronautics where we

169
00:06:44,070 --> 00:06:42,479
are committed to transforming aviation

170
00:06:45,670 --> 00:06:44,080
by dramatically reducing its

171
00:06:49,189 --> 00:06:45,680
environmental impact

172
00:06:51,510 --> 00:06:49,199
maintaining safety in more crowded skies

173
00:06:54,790 --> 00:06:51,520
and paving the way to revolutionary

174
00:06:56,070 --> 00:06:54,800
aircraft shapes and propulsion

175
00:06:59,670 --> 00:06:56,080
finally

176
00:07:01,110 --> 00:06:59,680
another inheritance from the naca is

177
00:07:03,430 --> 00:07:01,120
in literally

178
00:07:05,670 --> 00:07:03,440
who we are

179
00:07:06,950 --> 00:07:05,680
one of the great keys of success of the

180
00:07:10,469 --> 00:07:06,960
naca

181
00:07:13,270 --> 00:07:10,479
was the uncanny ability of director of

182
00:07:16,390 --> 00:07:13,280
aeronautical research george lewis

183
00:07:17,270 --> 00:07:16,400
to find inquisitive inspired and devoted

184
00:07:19,749 --> 00:07:17,280
people

185
00:07:22,150 --> 00:07:19,759
who could look at a problem collect

186
00:07:25,270 --> 00:07:22,160
and analyze the data and come up with

187
00:07:27,350 --> 00:07:25,280
often counter-intuitive solutions

188
00:07:29,990 --> 00:07:27,360

the naca's mission

189
00:07:33,350 --> 00:07:30,000
was a magnet for those sorts of people

190
00:07:35,749 --> 00:07:33,360
and nasa has maintained that tradition

191
00:07:37,830 --> 00:07:35,759
today the same forward thinking and

192
00:07:39,189 --> 00:07:37,840
innovation is fueling our journey to

193
00:07:41,029 --> 00:07:39,199
mars

194
00:07:43,589 --> 00:07:41,039
our commercial partners are developing

195
00:07:46,550 --> 00:07:43,599
new systems to carry astronauts to low

196
00:07:48,390 --> 00:07:46,560
earth orbit from american soil

197
00:07:50,710 --> 00:07:48,400
and nasa is working on the orion

198
00:07:52,469 --> 00:07:50,720
spacecraft in the space launch system

199
00:07:55,589 --> 00:07:52,479
that will take them farther into deep

200
00:07:57,670 --> 00:07:55,599
space than ever before

201
00:07:59,270 --> 00:07:57,680
standing on the shoulders of giants who

202
00:08:01,909 --> 00:07:59,280
first set us on this journey of

203
00:08:03,990 --> 00:08:01,919
discovery and reaching higher

204
00:08:06,309 --> 00:08:04,000
we're going to make the impossible

205
00:08:07,430 --> 00:08:06,319
possible again

206
00:08:11,589 --> 00:08:07,440
so

207
00:08:12,469 --> 00:08:11,599
accomplishments of the naca are well

208
00:08:14,710 --> 00:08:12,479
known

209
00:08:17,029 --> 00:08:14,720
there is much that is not

210
00:08:19,990 --> 00:08:17,039
i hope that over the next two days

211
00:08:22,390 --> 00:08:20,000
you'll have a very productive symposium

212
00:08:23,430 --> 00:08:22,400
like those naca employees of the last

213
00:08:25,510 --> 00:08:23,440

century

214
00:08:26,550 --> 00:08:25,520
don't be afraid to take a hard look at

215
00:08:29,189 --> 00:08:26,560
the data

216
00:08:31,350 --> 00:08:29,199
and follow it to the conclusion

217
00:08:33,829 --> 00:08:31,360
i'm counting on you to reveal knowledge

218
00:08:34,469 --> 00:08:33,839
and lessons from the past that will help

219
00:08:37,350 --> 00:08:34,479
us

220
00:08:38,389 --> 00:08:37,360
in the next 100 years of aerospace

221
00:08:40,550 --> 00:08:38,399
research

222
00:08:59,670 --> 00:08:40,560
good luck have a good time over the next

223
00:09:04,389 --> 00:09:02,630
good morning everyone i am roger wanius

224
00:09:06,710 --> 00:09:04,399
i am associate director for collections

225
00:09:08,949 --> 00:09:06,720
and curatorial affairs here at the

226
00:09:11,590 --> 00:09:08,959
smithsonian institutions national air

227
00:09:14,470 --> 00:09:11,600
and space museum we're ready to begin

228
00:09:16,550 --> 00:09:14,480
with the um with the first presentation

229
00:09:19,430 --> 00:09:16,560
and i'm going to talk

230
00:09:20,949 --> 00:09:19,440
about what is the naca model of research

231
00:09:22,630 --> 00:09:20,959
and development

232
00:09:24,150 --> 00:09:22,640
and there's

233
00:09:25,590 --> 00:09:24,160
some controversy about that to be

234
00:09:26,710 --> 00:09:25,600
perfectly honest

235
00:09:28,389 --> 00:09:26,720
uh

236
00:09:30,070 --> 00:09:28,399
what i would like to

237
00:09:40,949 --> 00:09:30,080
explore this morning

238
00:09:40,959 --> 00:09:46,870

am i missing something

239
00:09:46,880 --> 00:09:51,190
okay

240
00:09:51,200 --> 00:09:54,710
that doesn't seem to help

241
00:10:00,230 --> 00:09:57,509
oh there we go all right

242
00:10:01,990 --> 00:10:00,240
uh this is my game plan for today or

243
00:10:03,910 --> 00:10:02,000
using an aeronautical term my angle of

244
00:10:05,269 --> 00:10:03,920
attack

245
00:10:07,190 --> 00:10:05,279
to talk through

246
00:10:09,829 --> 00:10:07,200
a little bit of an introduction about

247
00:10:12,069 --> 00:10:09,839
the r d structure that the naca created

248
00:10:14,870 --> 00:10:12,079
and then three case studies of how that

249
00:10:17,670 --> 00:10:14,880
particular model unfolded over time

250
00:10:19,190 --> 00:10:17,680
and i do this specifically with the

251
00:10:22,069 --> 00:10:19,200
objective in mind

252
00:10:25,590 --> 00:10:22,079
of focusing on some questions that have

253
00:10:28,790 --> 00:10:25,600
come to light about what is the proper

254
00:10:31,269 --> 00:10:28,800
role forward for nasa as it moves into

255
00:10:32,710 --> 00:10:31,279
the 21st century and there are those who

256
00:10:36,310 --> 00:10:32,720
have suggested

257
00:10:38,150 --> 00:10:36,320
that we should return to the naca roots

258
00:10:41,030 --> 00:10:38,160
and proceed with

259
00:10:44,069 --> 00:10:41,040
with a model of research that is built

260
00:10:45,509 --> 00:10:44,079
upon that particular heritage

261
00:10:47,750 --> 00:10:45,519
i'll talk more about that in a moment

262
00:10:51,030 --> 00:10:47,760
but let me just suggest to you

263
00:10:52,470 --> 00:10:51,040

that that return to the naca model uh to

264
00:10:54,550 --> 00:10:52,480
fully understand that we have to look at

265
00:10:57,030 --> 00:10:54,560
the roots of the of the naca itself and

266
00:10:59,750 --> 00:10:57,040
of course as we all know a hundred years

267
00:11:03,110 --> 00:10:59,760
ago today as a writer to the naval

268
00:11:04,870 --> 00:11:03,120
appropriations act uh there was

269
00:11:06,389 --> 00:11:04,880
an indication that there should be the

270
00:11:08,389 --> 00:11:06,399
creation of the national advisory

271
00:11:09,509 --> 00:11:08,399
committee for aeronautics and in the

272
00:11:11,670 --> 00:11:09,519
charter

273
00:11:13,190 --> 00:11:11,680
very specifically it said to supervise

274
00:11:15,590 --> 00:11:13,200
and direct the scientific study of the

275
00:11:17,269 --> 00:11:15,600
problems of flight with a view to their

276
00:11:18,790 --> 00:11:17,279
practical solution

277
00:11:21,590 --> 00:11:18,800
and to determine the problems which

278
00:11:23,350 --> 00:11:21,600
should be experimentally attacked and to

279
00:11:25,910 --> 00:11:23,360
discuss their solution and their

280
00:11:28,069 --> 00:11:25,920
application to practical problems

281
00:11:30,790 --> 00:11:28,079
if there is anything about this that's

282
00:11:33,030 --> 00:11:30,800
not perfectly understandable

283
00:11:35,269 --> 00:11:33,040
i would be surprised but especially that

284
00:11:38,150 --> 00:11:35,279
practical solution part was one that was

285
00:11:39,910 --> 00:11:38,160
really significant less concerned about

286
00:11:41,750 --> 00:11:39,920
theoretical questions more concerned

287
00:11:43,990 --> 00:11:41,760
about the practical nature of stuff so

288
00:11:50,470 --> 00:11:44,000

what was the naca model for aerospace

289
00:11:53,829 --> 00:11:51,750
obviously

290
00:11:55,590 --> 00:11:53,839
aviation was created in the united

291
00:11:56,389 --> 00:11:55,600
states wright brothers were the first to

292
00:11:58,150 --> 00:11:56,399
fly

293
00:11:59,910 --> 00:11:58,160
tom crouch is in the audience he's been

294
00:12:01,030 --> 00:11:59,920
battling that particular question for

295
00:12:03,350 --> 00:12:01,040
years

296
00:12:04,710 --> 00:12:03,360
and uh and he will tell you point blank

297
00:12:07,190 --> 00:12:04,720
and i will do the same that the rights

298
00:12:08,550 --> 00:12:07,200
were the first to do so on december 17

299
00:12:10,069 --> 00:12:08,560
1903

300
00:12:11,670 --> 00:12:10,079
on the sands near kitty hawk north

301
00:12:13,750 --> 00:12:11,680
carolina

302
00:12:15,430 --> 00:12:13,760
it was a remarkable event

303
00:12:17,590 --> 00:12:15,440
and in the invention of the airplane

304
00:12:20,069 --> 00:12:17,600
within a decade the technological

305
00:12:21,670 --> 00:12:20,079
capabilities had largely moved offshore

306
00:12:23,509 --> 00:12:21,680
to europe

307
00:12:24,790 --> 00:12:23,519
there were a lot of reasons for that

308
00:12:27,350 --> 00:12:24,800
part of it was the wright brothers

309
00:12:28,389 --> 00:12:27,360
themselves and their their patent wars

310
00:12:33,110 --> 00:12:28,399
with

311
00:12:34,150 --> 00:12:33,120
and the naca was in part a specific

312
00:12:34,949 --> 00:12:34,160
attempt

313
00:12:37,670 --> 00:12:34,959

to

314
00:12:39,750 --> 00:12:37,680
recover from that doldrums that the

315
00:12:42,150 --> 00:12:39,760
united states found itself in by the

316
00:12:45,430 --> 00:12:42,160
middle part of the uh

317
00:12:49,269 --> 00:12:45,440
of the arts that are the 15s the 10s and

318
00:12:55,509 --> 00:12:53,269
but as the naca emerged it undertook a

319
00:12:57,269 --> 00:12:55,519
research objective that was focused

320
00:12:59,829 --> 00:12:57,279
largely on supporting industry at least

321
00:13:01,829 --> 00:12:59,839
that was the case initially and there

322
00:13:03,829 --> 00:13:01,839
are those who suggested we should return

323
00:13:05,590 --> 00:13:03,839
to that particular model

324
00:13:07,829 --> 00:13:05,600
you know this picture

325
00:13:12,069 --> 00:13:07,839
newt gingrich speaker of the house in

326
00:13:14,150 --> 00:13:12,079
the 1990s in 1995 famously made the

327
00:13:16,870 --> 00:13:14,160
comment that he thought that at the end

328
00:13:19,350 --> 00:13:16,880
of apollo nasa should have been returned

329
00:13:21,190 --> 00:13:19,360
to its naca roots

330
00:13:22,470 --> 00:13:21,200
it should have modified the way in which

331
00:13:24,949 --> 00:13:22,480
it did things

332
00:13:27,910 --> 00:13:24,959
and as it stood at that time he said it

333
00:13:30,230 --> 00:13:27,920
had become obsolescent

334
00:13:33,430 --> 00:13:30,240
he is not the first politician nor would

335
00:13:35,350 --> 00:13:33,440
he be the last to make such a statement

336
00:13:37,750 --> 00:13:35,360
that has been happening periodically

337
00:13:40,949 --> 00:13:37,760
since that time it's also been the case

338
00:13:43,269 --> 00:13:40,959

beforehand and there is also

339
00:13:45,110 --> 00:13:43,279
those who've made made more serious

340
00:13:47,350 --> 00:13:45,120
efforts to try to understand what that

341
00:13:49,110 --> 00:13:47,360
might mean

342
00:13:51,269 --> 00:13:49,120
charles miller who was a nasa official

343
00:13:53,670 --> 00:13:51,279
for a number of years uh and is still

344
00:13:56,230 --> 00:13:53,680
very active is a very astute observer of

345
00:13:58,870 --> 00:13:56,240
lots of things but one of the

346
00:14:01,350 --> 00:13:58,880
approaches that he pursued was an

347
00:14:02,389 --> 00:14:01,360
attempt to try to understand what it

348
00:14:06,790 --> 00:14:02,399
meant

349
00:14:09,829 --> 00:14:06,800
to undertake an naca style research

350
00:14:12,389 --> 00:14:09,839
effort and this is a slide the the lower

351
00:14:15,350 --> 00:14:12,399
right of this particular screen shows a

352
00:14:17,509 --> 00:14:15,360
slide from one of his pre presentations

353
00:14:20,230 --> 00:14:17,519
in which he said

354
00:14:21,829 --> 00:14:20,240
industry is the customer and nasa should

355
00:14:23,990 --> 00:14:21,839
return to a model in which it is

356
00:14:26,069 --> 00:14:24,000
supporting industry his guiding

357
00:14:27,430 --> 00:14:26,079
principle which uh be stated as clearly

358
00:14:29,990 --> 00:14:27,440
as could be stated

359
00:14:32,389 --> 00:14:30,000
build an industry not a program as far

360
00:14:34,870 --> 00:14:32,399
as he was concerned nasa had a set of

361
00:14:36,550 --> 00:14:34,880
programs mostly focused on space flight

362
00:14:38,629 --> 00:14:36,560
they really ought to be working to

363
00:14:39,430 --> 00:14:38,639

support industry in a more

364
00:14:43,269 --> 00:14:39,440
uh

365
00:14:45,189 --> 00:14:43,279
specific and causative manner

366
00:14:47,670 --> 00:14:45,199
and he looked to some of the lessons of

367
00:14:48,949 --> 00:14:47,680
the early naca as an example of how this

368
00:14:50,790 --> 00:14:48,959
might be done

369
00:14:51,829 --> 00:14:50,800
develop a consensus on what needed to be

370
00:14:53,910 --> 00:14:51,839
done

371
00:14:56,870 --> 00:14:53,920
unleash engineers and scientists to

372
00:14:59,829 --> 00:14:56,880
pursue those particular questions

373
00:15:01,829 --> 00:14:59,839
prepare reports studies analyses and

374
00:15:03,829 --> 00:15:01,839
make those available to the outside

375
00:15:05,670 --> 00:15:03,839
world

376
00:15:09,030 --> 00:15:05,680
he also believed that stop the big

377
00:15:11,269 --> 00:15:09,040
projects uh undertake very small things

378
00:15:12,870 --> 00:15:11,279
in his particular vision

379
00:15:14,629 --> 00:15:12,880
if you're going to fail fail fast and

380
00:15:17,189 --> 00:15:14,639
move on

381
00:15:20,629 --> 00:15:17,199
this is one approach and this is a very

382
00:15:22,710 --> 00:15:20,639
specific idea about how an naca style

383
00:15:26,150 --> 00:15:22,720
approach might take place the question

384
00:15:27,990 --> 00:15:26,160
is is this really the naca model and i

385
00:15:30,790 --> 00:15:28,000
would suggest to you that only partially

386
00:15:32,710 --> 00:15:30,800
so the classic model he sort of outlined

387
00:15:34,230 --> 00:15:32,720
it charles sort of outlined it in in the

388
00:15:37,030 --> 00:15:34,240

slide previously

389
00:15:40,150 --> 00:15:37,040
was established by the 1920s and it

390
00:15:42,069 --> 00:15:40,160
stayed in place for some period of time

391
00:15:44,470 --> 00:15:42,079
but was subsumed by other activities

392
00:15:46,629 --> 00:15:44,480
later on obviously research questions

393
00:15:48,069 --> 00:15:46,639
that came from industry and the military

394
00:15:50,790 --> 00:15:48,079
is a part of this

395
00:15:53,269 --> 00:15:50,800
uh those went to the now to the naca

396
00:15:55,030 --> 00:15:53,279
maine committee they were parsed down to

397
00:15:57,670 --> 00:15:55,040
technical subcommittees

398
00:16:00,310 --> 00:15:57,680
they were apportioned out to

399
00:16:02,949 --> 00:16:00,320
through research authorizations to the

400
00:16:05,590 --> 00:16:02,959
naca facilities the laboratories that

401
00:16:07,509 --> 00:16:05,600
were engaged in research

402
00:16:09,110 --> 00:16:07,519
that research took a variety of forms

403
00:16:10,150 --> 00:16:09,120
there was obviously some theoretical

404
00:16:11,670 --> 00:16:10,160
work

405
00:16:13,430 --> 00:16:11,680
there was certainly ground research

406
00:16:16,310 --> 00:16:13,440
especially using

407
00:16:18,629 --> 00:16:16,320
uh wind tunnels that was that became the

408
00:16:21,350 --> 00:16:18,639
first and earliest

409
00:16:23,189 --> 00:16:21,360
and in some respects most significant at

410
00:16:25,509 --> 00:16:23,199
least pre-world war ii

411
00:16:26,790 --> 00:16:25,519
uh set of activities that the nac was

412
00:16:28,470 --> 00:16:26,800
engaged in

413
00:16:31,430 --> 00:16:28,480

you armed a bunch of really smart

414
00:16:33,670 --> 00:16:31,440
engineers with cutting edge

415
00:16:36,790 --> 00:16:33,680
instruments in this case wind tunnels to

416
00:16:39,269 --> 00:16:36,800
do some stunning work and that ground

417
00:16:40,550 --> 00:16:39,279
research translated into flight research

418
00:16:42,550 --> 00:16:40,560
as well

419
00:16:44,310 --> 00:16:42,560
all of that ended up as a technical

420
00:16:47,189 --> 00:16:44,320
report throughout this process there's

421
00:16:49,269 --> 00:16:47,199
feedback loops back to industry military

422
00:16:51,269 --> 00:16:49,279
or whoever the customer might be

423
00:16:55,189 --> 00:16:51,279
that is

424
00:16:58,550 --> 00:16:55,199
a very stylized very simplistic

425
00:17:02,069 --> 00:16:58,560
uh but very basic model of how

426
00:17:03,430 --> 00:17:02,079
that research was conducted

427
00:17:04,630 --> 00:17:03,440
but there's more to it than that

428
00:17:05,909 --> 00:17:04,640
obviously

429
00:17:07,510 --> 00:17:05,919
and

430
00:17:09,029 --> 00:17:07,520
there are a couple of ingredients to

431
00:17:11,270 --> 00:17:09,039
this that i haven't really talked about

432
00:17:12,150 --> 00:17:11,280
yet but one of them is quite important i

433
00:17:15,990 --> 00:17:12,160
believe

434
00:17:18,949 --> 00:17:16,000
and that was the naca report structure

435
00:17:21,029 --> 00:17:18,959
pearl young who you see pictured

436
00:17:25,429 --> 00:17:21,039
in this particular slide came to the

437
00:17:28,789 --> 00:17:25,439
naca's langley laboratory in 1922

438
00:17:30,950 --> 00:17:28,799

and uh she essentially established the

439
00:17:33,270 --> 00:17:30,960
research reporting requirements that

440
00:17:35,110 --> 00:17:33,280
became a standard for the naca

441
00:17:37,669 --> 00:17:35,120
throughout its history and is the

442
00:17:39,669 --> 00:17:37,679
predecessor of the current uh technical

443
00:17:41,110 --> 00:17:39,679
reporting system that exists at nasa

444
00:17:43,270 --> 00:17:41,120
today

445
00:17:45,190 --> 00:17:43,280
it was a very structured top-down

446
00:17:46,230 --> 00:17:45,200
approach he ruled with an iron fist i

447
00:17:47,590 --> 00:17:46,240
don't think there's anybody who would

448
00:17:51,029 --> 00:17:47,600
disagree with that

449
00:17:53,029 --> 00:17:51,039
uh in terms of how uh reports were done

450
00:17:54,310 --> 00:17:53,039
how they were approved how they how

451
00:17:56,630 --> 00:17:54,320
there were concurrences that were

452
00:17:59,190 --> 00:17:56,640
created and how they were distributed

453
00:18:02,150 --> 00:17:59,200
uh and it was a highly successful

454
00:18:03,990 --> 00:18:02,160
program it became so in the 1920s it has

455
00:18:11,909 --> 00:18:04,000
remained so right up to the present in

456
00:18:11,919 --> 00:18:15,190
well

457
00:18:17,750 --> 00:18:16,710
there are a variety of reports that came

458
00:18:19,990 --> 00:18:17,760
out of that obviously the most

459
00:18:22,669 --> 00:18:20,000
significant of those was the technical

460
00:18:25,909 --> 00:18:22,679
report a fully uh developed

461
00:18:26,830 --> 00:18:25,919
well-structured uh uh completely

462
00:18:29,909 --> 00:18:26,840
uh

463
00:18:31,750 --> 00:18:29,919

well-argued report that was

464
00:18:33,430 --> 00:18:31,760
fully understandable to virtually any

465
00:18:35,350 --> 00:18:33,440
engineer who would pick it up with the

466
00:18:36,310 --> 00:18:35,360
with the background and training to to

467
00:18:39,750 --> 00:18:36,320
read it

468
00:18:43,110 --> 00:18:39,760
uh and it went to all manner of outside

469
00:18:44,789 --> 00:18:43,120
uh sources and was useful in that sense

470
00:18:47,270 --> 00:18:44,799
there were a variety of other reports

471
00:18:49,990 --> 00:18:47,280
beyond that i won't go through them all

472
00:18:53,110 --> 00:18:50,000
most of them were of a lesser formal

473
00:18:54,950 --> 00:18:53,120
nature but nonetheless provided useful

474
00:18:57,909 --> 00:18:54,960
technical information to the outside

475
00:18:59,909 --> 00:18:57,919
community uh had they been creating this

476
00:19:01,029 --> 00:18:59,919
in the first part of the 21st century

477
00:19:03,270 --> 00:19:01,039
i'm sure this would have been done

478
00:19:06,230 --> 00:19:03,280
electronically but in those days it was

479
00:19:08,310 --> 00:19:06,240
all printed and distributed through a a

480
00:19:10,870 --> 00:19:08,320
very structured process

481
00:19:11,669 --> 00:19:10,880
and it worked exceptionally well

482
00:19:13,590 --> 00:19:11,679
and

483
00:19:15,430 --> 00:19:13,600
with the exception of classified reports

484
00:19:17,029 --> 00:19:15,440
and those that were done for partic for

485
00:19:19,430 --> 00:19:17,039
particular clients

486
00:19:21,110 --> 00:19:19,440
uh that was confidential in nature those

487
00:19:28,230 --> 00:19:21,120
were pretty much freely available to

488
00:19:33,190 --> 00:19:30,710

beginning in 1926

489
00:19:36,310 --> 00:19:33,200
there was also what has been come to be

490
00:19:38,390 --> 00:19:36,320
known as the naca inspection or what

491
00:19:40,070 --> 00:19:38,400
amounts to an industry conference and

492
00:19:41,430 --> 00:19:40,080
here you can see a photograph of the

493
00:19:43,350 --> 00:19:41,440
participants

494
00:19:45,830 --> 00:19:43,360
of one of those industry conferences in

495
00:19:48,150 --> 00:19:45,840
the 1930s taking in the full-scale

496
00:19:49,990 --> 00:19:48,160
tunnel down at the what is now the

497
00:19:51,750 --> 00:19:50,000
langley research center in those days

498
00:19:53,029 --> 00:19:51,760
the langley memorial aeronautical

499
00:19:55,909 --> 00:19:53,039
laboratory

500
00:19:58,870 --> 00:19:55,919
and uh and and it's obviously

501
00:20:01,750 --> 00:19:58,880
a photograph that was posed but you get

502
00:20:04,710 --> 00:20:01,760
a sense of the size of these particular

503
00:20:06,549 --> 00:20:04,720
activities and uh and

504
00:20:08,549 --> 00:20:06,559
something about the broad-based nature

505
00:20:09,750 --> 00:20:08,559
of who was involved

506
00:20:12,710 --> 00:20:09,760
these

507
00:20:14,470 --> 00:20:12,720
were very useful exercises the naca was

508
00:20:18,070 --> 00:20:14,480
able to show off its research

509
00:20:20,470 --> 00:20:18,080
capabilities it was also able to hear

510
00:20:22,789 --> 00:20:20,480
from all of the participants their

511
00:20:24,630 --> 00:20:22,799
particular needs desires

512
00:20:26,390 --> 00:20:24,640
and wants when it came to research

513
00:20:28,149 --> 00:20:26,400

topics and the kind of knowledge that

514
00:20:30,470 --> 00:20:28,159
they were seeking that might be useful

515
00:20:32,310 --> 00:20:30,480
to them and those

516
00:20:33,990 --> 00:20:32,320
often got translated into research

517
00:20:36,710 --> 00:20:34,000
authorizations

518
00:20:39,830 --> 00:20:36,720
that would then find their way to

519
00:20:42,310 --> 00:20:39,840
naca researchers at langley and later on

520
00:20:43,909 --> 00:20:42,320
at ames and lewis

521
00:20:47,190 --> 00:20:43,919
laboratories

522
00:20:49,110 --> 00:20:47,200
and were useful in a variety of settings

523
00:20:50,630 --> 00:20:49,120
as they pursued their technological

524
00:20:52,710 --> 00:20:50,640
capabilities

525
00:20:55,669 --> 00:20:52,720
i should mention by the way that that

526
00:20:58,070 --> 00:20:55,679
photograph of the full-scale tunnel

527
00:21:00,470 --> 00:20:58,080
that tunnel has has been demolished it

528
00:21:03,270 --> 00:21:00,480
was a national historic landmark but

529
00:21:05,270 --> 00:21:03,280
there was a need at langley to do other

530
00:21:09,590 --> 00:21:05,280
things with that space so there was the

531
00:21:11,270 --> 00:21:09,600
proper documentation and all of the uh

532
00:21:14,149 --> 00:21:11,280
undertakings that are necessary for a

533
00:21:16,950 --> 00:21:14,159
historic landmark and we saved and we

534
00:21:19,669 --> 00:21:16,960
have just mounted in our milestones of

535
00:21:21,990 --> 00:21:19,679
flight hall you should go over there at

536
00:21:24,549 --> 00:21:22,000
some point during our conference and

537
00:21:26,549 --> 00:21:24,559
genuflect before it

538
00:21:29,669 --> 00:21:26,559

one of the two

539
00:21:31,590 --> 00:21:29,679
fans that powered the wind tunnel

540
00:21:33,110 --> 00:21:31,600
it is a stunning

541
00:21:34,549 --> 00:21:33,120
huge

542
00:21:37,029 --> 00:21:34,559
impressive

543
00:21:38,870 --> 00:21:37,039
somewhat overpowering object

544
00:21:43,190 --> 00:21:38,880
that

545
00:21:46,070 --> 00:21:43,200
the significance of of the wind tunnel

546
00:21:47,029 --> 00:21:46,080
effort in general at the naca but also

547
00:21:50,149 --> 00:21:47,039
of the

548
00:21:51,750 --> 00:21:50,159
uh particular efforts of that full-scale

549
00:21:55,110 --> 00:21:51,760
wind tunnel which was a remarkable

550
00:21:57,430 --> 00:21:55,120
facility uh from the point that it was

551
00:21:58,789 --> 00:21:57,440
first inaugurated in the 1930s until it

552
00:22:07,830 --> 00:21:58,799
was finally

553
00:22:14,149 --> 00:22:11,270
now the naca efforts of the

554
00:22:17,270 --> 00:22:14,159
1920s the reporting structure that was

555
00:22:18,549 --> 00:22:17,280
created the process whereby information

556
00:22:21,430 --> 00:22:18,559
flowed from

557
00:22:24,070 --> 00:22:21,440
industry military whoever

558
00:22:26,310 --> 00:22:24,080
to the naca researchers the research

559
00:22:28,950 --> 00:22:26,320
authorization process to create the

560
00:22:30,950 --> 00:22:28,960
formalized structure whereby a

561
00:22:32,310 --> 00:22:30,960
particular research project

562
00:22:34,149 --> 00:22:32,320
could unfold

563
00:22:36,870 --> 00:22:34,159

served very well especially in that

564
00:22:39,110 --> 00:22:36,880
1920s and 30s time frame

565
00:22:41,990 --> 00:22:39,120
as the naca undertook enormously

566
00:22:43,990 --> 00:22:42,000
significant aerodynamics research

567
00:22:46,789 --> 00:22:44,000
especially aerodynamics but also later

568
00:22:48,630 --> 00:22:46,799
on got into propulsion and a few other

569
00:22:51,669 --> 00:22:48,640
areas as well

570
00:22:53,350 --> 00:22:51,679
and at some level it helped to fuel the

571
00:22:55,190 --> 00:22:53,360
the aeronautical revolution of that

572
00:22:57,350 --> 00:22:55,200
particular era i show a picture here of

573
00:22:59,750 --> 00:22:57,360
a dc-3

574
00:23:02,789 --> 00:22:59,760
perhaps the quintessential

575
00:23:04,870 --> 00:23:02,799
airplane airplane of the 1930s

576
00:23:07,830 --> 00:23:04,880
as it

577
00:23:09,270 --> 00:23:07,840
as the industry and aviation as a whole

578
00:23:11,510 --> 00:23:09,280
moved from

579
00:23:14,950 --> 00:23:11,520
biplanes made out of

580
00:23:17,750 --> 00:23:14,960
made out of wood and canvas to

581
00:23:20,230 --> 00:23:17,760
metal monoplanes with capabilities to do

582
00:23:22,549 --> 00:23:20,240
a lot more than anything that was

583
00:23:23,510 --> 00:23:22,559
available before that time

584
00:23:29,669 --> 00:23:23,520
the

585
00:23:32,230 --> 00:23:29,679
are exemplars of that particular

586
00:23:34,950 --> 00:23:32,240
research effort and the naca's role

587
00:23:36,470 --> 00:23:34,960
in making those possible is well known i

588
00:23:39,029 --> 00:23:36,480

think to most of the people in this

589
00:23:41,510 --> 00:23:39,039
particular room uh but it was a

590
00:23:43,750 --> 00:23:41,520
significant development forward and the

591
00:23:46,149 --> 00:23:43,760
naca's role in

592
00:23:47,350 --> 00:23:46,159
furthering those capabilities uh was

593
00:23:49,430 --> 00:23:47,360
quite real

594
00:23:51,830 --> 00:23:49,440
that is in some respects the classic

595
00:23:53,029 --> 00:23:51,840
model that charles miller and others

596
00:23:56,470 --> 00:23:53,039
have pointed to

597
00:23:58,470 --> 00:23:56,480
when they talk about the the naca role

598
00:24:01,350 --> 00:23:58,480
the naca model of research and

599
00:24:04,310 --> 00:24:01,360
development uh and it's that 20s and 30s

600
00:24:05,830 --> 00:24:04,320
concept it changed in world war ii

601
00:24:08,230 --> 00:24:05,840
pretty fundamentally there's still some

602
00:24:10,470 --> 00:24:08,240
efforts to do the same type of work no

603
00:24:12,950 --> 00:24:10,480
question about it but there's much more

604
00:24:14,630 --> 00:24:12,960
move toward other bigger activities oh i

605
00:24:17,590 --> 00:24:14,640
should also say something about

606
00:24:20,149 --> 00:24:17,600
navigational systems and i i love

607
00:24:22,549 --> 00:24:20,159
the particular picture on the left

608
00:24:24,470 --> 00:24:22,559
of the

609
00:24:25,830 --> 00:24:24,480
of salt lake city of temple square the

610
00:24:28,470 --> 00:24:25,840
mormon temple

611
00:24:31,269 --> 00:24:28,480
you see in the distance and the famous

612
00:24:33,269 --> 00:24:31,279
mormon tabernacle in the foreground

613
00:24:35,669 --> 00:24:33,279

with a sign on top of the mormon

614
00:24:40,070 --> 00:24:35,679
tabernacle that says salt lake airport

615
00:24:43,990 --> 00:24:41,909
that was a very common navigational

616
00:24:45,029 --> 00:24:44,000
system early on

617
00:24:50,470 --> 00:24:45,039
and

618
00:24:51,990 --> 00:24:50,480
tops of of uh of train stations all

619
00:24:53,750 --> 00:24:52,000
around the united states they usually

620
00:24:56,549 --> 00:24:53,760
painted the name of the town

621
00:24:58,470 --> 00:24:56,559
uh it's a navigational system and this

622
00:25:00,789 --> 00:24:58,480
was put onto the top of the mormon

623
00:25:04,310 --> 00:25:00,799
tabernacle in 1924

624
00:25:06,149 --> 00:25:04,320
it remained there until 1947

625
00:25:08,549 --> 00:25:06,159
to give you a sense of how that was

626
00:25:10,630 --> 00:25:08,559
useful air traffic control of course was

627
00:25:14,470 --> 00:25:10,640
rudimentary and you can see an example

628
00:25:15,990 --> 00:25:14,480
of that from the about 1931 but some of

629
00:25:19,110 --> 00:25:16,000
that technology

630
00:25:21,669 --> 00:25:19,120
was matured in naca laboratories and of

631
00:25:24,149 --> 00:25:21,679
course the naca and its successor nasa

632
00:25:25,909 --> 00:25:24,159
have continued to to be involved in this

633
00:25:27,430 --> 00:25:25,919
particular type of research right up to

634
00:25:29,350 --> 00:25:27,440
the present

635
00:25:31,750 --> 00:25:29,360
i love this picture from

636
00:25:34,149 --> 00:25:31,760
ames research center of its uh of its

637
00:25:37,269 --> 00:25:34,159
air traffic control center of the future

638
00:25:39,029 --> 00:25:37,279

and efforts to try to

639
00:25:41,669 --> 00:25:39,039
to move forward in this particular arena

640
00:25:44,390 --> 00:25:41,679
right up to to today there is no part of

641
00:25:47,110 --> 00:25:44,400
an airplane that has not been touched by

642
00:25:49,190 --> 00:25:47,120
the naca and nasa over time

643
00:25:51,750 --> 00:25:49,200
or of any part of the infrastructure

644
00:25:52,789 --> 00:25:51,760
associated with flight in the united

645
00:25:56,070 --> 00:25:52,799
states

646
00:25:57,430 --> 00:25:56,080
that has not been a part of the naca

647
00:26:04,950 --> 00:25:57,440
nasa effort

648
00:26:09,350 --> 00:26:06,310
now as

649
00:26:11,510 --> 00:26:09,360
world war ii progressed and especially

650
00:26:14,470 --> 00:26:11,520
in the aftermath of world war ii there

651
00:26:16,470 --> 00:26:14,480
are modifications to this naca model

652
00:26:19,029 --> 00:26:16,480
it's no longer just

653
00:26:20,950 --> 00:26:19,039
a let's take some research questions

654
00:26:23,190 --> 00:26:20,960
from an outside entity let's move

655
00:26:25,669 --> 00:26:23,200
forward with internal research efforts

656
00:26:27,110 --> 00:26:25,679
and published reports it moves in a much

657
00:26:29,590 --> 00:26:27,120
different direction

658
00:26:32,549 --> 00:26:29,600
and the the signature programs of the

659
00:26:34,310 --> 00:26:32,559
naca in the aftermath of world war ii

660
00:26:35,669 --> 00:26:34,320
uh are fundamentally public-private

661
00:26:37,350 --> 00:26:35,679
partnerships

662
00:26:38,549 --> 00:26:37,360
in which

663
00:26:41,110 --> 00:26:38,559

the

664
00:26:43,830 --> 00:26:41,120
military is involved nasa's

665
00:26:45,430 --> 00:26:43,840
naca and later on nasa is involved

666
00:26:47,430 --> 00:26:45,440
uh and uh

667
00:26:49,269 --> 00:26:47,440
and and so are the industry uh

668
00:26:52,310 --> 00:26:49,279
individuals the classic example of this

669
00:26:55,510 --> 00:26:52,320
and you can see this image uh of of many

670
00:26:57,669 --> 00:26:55,520
of the x-planes uh from the post world

671
00:27:00,549 --> 00:26:57,679
war ii era and in the center of course

672
00:27:02,149 --> 00:27:00,559
is the orange bell x1

673
00:27:06,789 --> 00:27:02,159
that

674
00:27:10,070 --> 00:27:06,799
talk about ever so briefly

675
00:27:12,070 --> 00:27:10,080
the bell x-1 a an attempt to pursue

676
00:27:14,310 --> 00:27:12,080
supersonic flight

677
00:27:15,830 --> 00:27:14,320
in the aftermath of world war ii became

678
00:27:17,510 --> 00:27:15,840
a very early partnership a very

679
00:27:19,029 --> 00:27:17,520
successful one

680
00:27:21,269 --> 00:27:19,039
in which

681
00:27:23,350 --> 00:27:21,279
the army air forces and later the u.s

682
00:27:25,029 --> 00:27:23,360
air force

683
00:27:27,430 --> 00:27:25,039
participated in the program as a full

684
00:27:28,789 --> 00:27:27,440
partner along with bell

685
00:27:30,389 --> 00:27:28,799
aviation and

686
00:27:32,710 --> 00:27:30,399
the naca

687
00:27:34,230 --> 00:27:32,720
that particular effort was

688
00:27:37,350 --> 00:27:34,240

totally successful and we all know the

689
00:27:39,590 --> 00:27:37,360
stories of of chuck yeager and uh and

690
00:27:42,310 --> 00:27:39,600
the first flight faster than the speed

691
00:27:43,110 --> 00:27:42,320
of sound in october of 1947 as a result

692
00:27:44,950 --> 00:27:43,120
of that

693
00:27:47,350 --> 00:27:44,960
but it wasn't just a stunt and that's a

694
00:27:50,389 --> 00:27:47,360
very important thing to understand uh

695
00:27:51,990 --> 00:27:50,399
there was a very firm research program

696
00:27:55,190 --> 00:27:52,000
and it was intellectually led by the

697
00:27:57,830 --> 00:27:55,200
naca and people such as john stack at

698
00:28:00,310 --> 00:27:57,840
the the langley laboratory as well as

699
00:28:01,590 --> 00:28:00,320
walt williams who took the leadership of

700
00:28:04,470 --> 00:28:01,600
the uh

701
00:28:07,190 --> 00:28:04,480
of the naca operation in murak out in

702
00:28:10,070 --> 00:28:07,200
the dry lake beds of southern california

703
00:28:12,389 --> 00:28:10,080
uh really provided the intellectual

704
00:28:13,669 --> 00:28:12,399
illumination necessary to proceed with

705
00:28:15,190 --> 00:28:13,679
this

706
00:28:19,430 --> 00:28:15,200
the

707
00:28:21,350 --> 00:28:19,440
in bell aircraft was also a full partner

708
00:28:23,590 --> 00:28:21,360
in this process but so was the air force

709
00:28:26,149 --> 00:28:23,600
contributing much of the money

710
00:28:27,990 --> 00:28:26,159
and obviously critical personnel

711
00:28:29,590 --> 00:28:28,000
among them chuck yeager

712
00:28:31,990 --> 00:28:29,600
to this particular effort and it was

713
00:28:34,389 --> 00:28:32,000

enormously successful not just for a

714
00:28:36,230 --> 00:28:34,399
one-off stunt kick the tires and fly the

715
00:28:37,430 --> 00:28:36,240
thing faster than the speed of sound but

716
00:28:39,029 --> 00:28:37,440
a reasoned

717
00:28:41,510 --> 00:28:39,039
research program in which they

718
00:28:43,269 --> 00:28:41,520
incrementally moved from subsonic

719
00:28:44,870 --> 00:28:43,279
through transonic and into supersonic

720
00:28:46,630 --> 00:28:44,880
flight

721
00:28:49,990 --> 00:28:46,640
a very useful

722
00:28:53,269 --> 00:28:50,000
set of activities they fully uh

723
00:28:55,909 --> 00:28:53,279
re deserved the collier trophy that they

724
00:28:58,630 --> 00:28:55,919
received for these particular efforts

725
00:28:59,909 --> 00:28:58,640
now i want to say one thing about

726
00:29:01,190 --> 00:28:59,919
uh

727
00:29:02,950 --> 00:29:01,200
some

728
00:29:04,230 --> 00:29:02,960
efforts that have been made to try to

729
00:29:05,669 --> 00:29:04,240
say chuck yeager was not the first

730
00:29:06,789 --> 00:29:05,679
person to fly faster than the speed of

731
00:29:09,990 --> 00:29:06,799
sound

732
00:29:11,350 --> 00:29:10,000
and um a north american test pilot by

733
00:29:13,350 --> 00:29:11,360
the name of wheaties welch and some of

734
00:29:16,070 --> 00:29:13,360
you may know that name

735
00:29:17,110 --> 00:29:16,080
presumably flew an f-86 experimental

736
00:29:18,470 --> 00:29:17,120
flight

737
00:29:20,470 --> 00:29:18,480
faster than the speed of sound just a

738
00:29:25,029 --> 00:29:20,480

few days before the

739
00:29:29,430 --> 00:29:27,669
diddy or didn't he who knows uh there

740
00:29:30,950 --> 00:29:29,440
are people who say that they heard sonic

741
00:29:31,909 --> 00:29:30,960
booms

742
00:29:33,190 --> 00:29:31,919
fine

743
00:29:34,470 --> 00:29:33,200
there are people who say they've seen

744
00:29:36,789 --> 00:29:34,480
ufos

745
00:29:39,190 --> 00:29:36,799
does that make it true

746
00:29:41,909 --> 00:29:39,200
the um

747
00:29:43,350 --> 00:29:41,919
but walt williams had the best response

748
00:29:46,549 --> 00:29:43,360
to any of this

749
00:29:49,510 --> 00:29:46,559
and it really bespeaks the naca approach

750
00:29:50,710 --> 00:29:49,520
to how they did everything

751
00:29:55,110 --> 00:29:50,720
okay

752
00:29:57,190 --> 00:29:55,120
if he did this show me the data

753
00:29:58,549 --> 00:29:57,200
there is no data to show

754
00:30:00,789 --> 00:29:58,559
um

755
00:30:03,269 --> 00:30:00,799
personally i doubt he did it if he did

756
00:30:04,310 --> 00:30:03,279
he probably did it in a dive and had he

757
00:30:06,830 --> 00:30:04,320
done so he probably would have pulled

758
00:30:09,830 --> 00:30:06,840
the wings off but uh

759
00:30:11,350 --> 00:30:09,840
nonetheless williams's response was

760
00:30:12,630 --> 00:30:11,360
really an appropriate one i think in a

761
00:30:15,190 --> 00:30:12,640
lot of ways

762
00:30:18,070 --> 00:30:15,200
uh so that's another model a

763
00:30:19,830 --> 00:30:18,080

public-private partnership in which

764
00:30:22,230 --> 00:30:19,840
everybody brings something to the table

765
00:30:23,830 --> 00:30:22,240
and is successful at doing this the naca

766
00:30:25,350 --> 00:30:23,840
mastered this in the aftermath of world

767
00:30:27,510 --> 00:30:25,360
war ii and they did it repeatedly with

768
00:30:30,070 --> 00:30:27,520
the x-plane series the great example

769
00:30:30,950 --> 00:30:30,080
which spills into the nasa era

770
00:30:34,470 --> 00:30:30,960
is the

771
00:30:36,470 --> 00:30:34,480
research reports are very much a part of

772
00:30:39,110 --> 00:30:36,480
this process but also the direct data

773
00:30:41,029 --> 00:30:39,120
that is uh it is transmitted in a

774
00:30:44,470 --> 00:30:41,039
variety of different ways

775
00:30:46,870 --> 00:30:44,480
and these become projects that

776
00:30:48,710 --> 00:30:46,880
look more like what nasa does down the

777
00:30:51,510 --> 00:30:48,720
road than what

778
00:30:59,350 --> 00:30:51,520
the naca did in a pre-world war ii era

779
00:31:04,230 --> 00:31:01,669
the naca also began to reach into space

780
00:31:05,830 --> 00:31:04,240
in that period after world war ii and in

781
00:31:07,269 --> 00:31:05,840
this particular instance i would suggest

782
00:31:10,310 --> 00:31:07,279
to you that the projects that they were

783
00:31:13,269 --> 00:31:10,320
involved in look even more like what we

784
00:31:15,269 --> 00:31:13,279
would come to know as nasa research and

785
00:31:16,870 --> 00:31:15,279
development efforts

786
00:31:19,269 --> 00:31:16,880
and the programs

787
00:31:20,630 --> 00:31:19,279
of space exploration

788
00:31:25,110 --> 00:31:20,640

that emerged

789
00:31:27,190 --> 00:31:25,120
in the 1960s uh in 1944 jerome hunsaker

790
00:31:28,310 --> 00:31:27,200
many of you are familiar with him

791
00:31:31,190 --> 00:31:28,320
uh

792
00:31:32,389 --> 00:31:31,200
basically wrote a a a letter in which he

793
00:31:34,070 --> 00:31:32,399
said you know we really need to start

794
00:31:36,070 --> 00:31:34,080
exploring these issues

795
00:31:38,070 --> 00:31:36,080
uh that we have to work on propulsion

796
00:31:40,710 --> 00:31:38,080
and aerodynamics and materials and all

797
00:31:42,870 --> 00:31:40,720
the other questions associated with a

798
00:31:45,029 --> 00:31:42,880
very high speed flight

799
00:31:47,110 --> 00:31:45,039
for national security purposes for for

800
00:31:48,549 --> 00:31:47,120
guided missile development for a variety

801
00:31:50,070 --> 00:31:48,559
of other reasons and maybe even to

802
00:31:52,149 --> 00:31:50,080
explore space

803
00:31:54,230 --> 00:31:52,159
and those are

804
00:31:55,590 --> 00:31:54,240
efforts that we need to try to focus on

805
00:31:58,950 --> 00:31:55,600
right now

806
00:32:01,430 --> 00:31:58,960
uh so the nacas interest in missiles and

807
00:32:03,430 --> 00:32:01,440
rockets comes right at the end of world

808
00:32:06,789 --> 00:32:03,440
war ii and they begin to move out on

809
00:32:10,389 --> 00:32:06,799
this uh in 1945 and 46.

810
00:32:12,549 --> 00:32:10,399
they create in august of 1946 a formal

811
00:32:15,110 --> 00:32:12,559
organization to lead this effort the

812
00:32:17,990 --> 00:32:15,120
pilotless aircraft research division

813
00:32:19,590 --> 00:32:18,000

located at at the langley laboratory

814
00:32:20,950 --> 00:32:19,600
under the leadership of robert gilruth

815
00:32:23,750 --> 00:32:20,960
and many of you are familiar with robert

816
00:32:26,389 --> 00:32:23,760
gilruth who would go on to lead the

817
00:32:28,789 --> 00:32:26,399
space task group as the person with the

818
00:32:30,389 --> 00:32:28,799
most experienced associated with rockets

819
00:32:32,230 --> 00:32:30,399
and missiles

820
00:32:35,669 --> 00:32:32,240
to lead the experience

821
00:32:39,110 --> 00:32:35,679
to develop project mercury in 1959

822
00:32:41,190 --> 00:32:39,120
60 and 61 and ultimately to found and be

823
00:32:43,590 --> 00:32:41,200
the first director of the manned

824
00:32:44,789 --> 00:32:43,600
spacecraft center in houston when it was

825
00:32:47,110 --> 00:32:44,799
created

826
00:32:56,389 --> 00:32:47,120
and obviously renamed the johnson space

827
00:32:59,590 --> 00:32:57,990
they built a facility where they could

828
00:33:01,430 --> 00:32:59,600
launch these rockets out of wallops

829
00:33:03,029 --> 00:33:01,440
island it's still in existence it's

830
00:33:05,269 --> 00:33:03,039
being used for a lot more than just

831
00:33:07,430 --> 00:33:05,279
these little tiny rockets that that the

832
00:33:08,950 --> 00:33:07,440
pard was engaged in at that particular

833
00:33:12,789 --> 00:33:08,960
point in time but there is an aerial

834
00:33:15,269 --> 00:33:12,799
view of the research station that was on

835
00:33:17,509 --> 00:33:15,279
wallops island there's not much to it

836
00:33:20,870 --> 00:33:17,519
you can see a few buildings there and

837
00:33:22,950 --> 00:33:20,880
you can see a ramp down on the southern

838
00:33:24,950 --> 00:33:22,960

part down on the uh the bottom part of

839
00:33:27,350 --> 00:33:24,960
that particular image

840
00:33:29,350 --> 00:33:27,360
where they would use as a

841
00:33:39,350 --> 00:33:29,360
guide to launch these

842
00:33:43,110 --> 00:33:40,870
i've already talked about this robert

843
00:33:45,350 --> 00:33:43,120
gilroy served as the head of pard and

844
00:33:48,389 --> 00:33:45,360
most of the early people associated with

845
00:33:50,470 --> 00:33:48,399
human space flight and nasa uh in that

846
00:33:52,549 --> 00:33:50,480
late 50s early 60s period come out of

847
00:33:54,470 --> 00:33:52,559
that particular organization they were

848
00:33:56,789 --> 00:33:54,480
working in the transonic realm initially

849
00:33:58,310 --> 00:33:56,799
they moved into supersonic

850
00:34:00,149 --> 00:33:58,320
they tried to get to hypersonic and

851
00:34:02,789 --> 00:34:00,159
never made it but nonetheless they were

852
00:34:03,590 --> 00:34:02,799
engaged in those particular activities

853
00:34:05,269 --> 00:34:03,600
they

854
00:34:07,430 --> 00:34:05,279
developed small

855
00:34:08,230 --> 00:34:07,440
solid propellant rockets

856
00:34:12,069 --> 00:34:08,240
that

857
00:34:14,230 --> 00:34:12,079
understanding what was happening once

858
00:34:16,869 --> 00:34:14,240
again it's a research project

859
00:34:19,030 --> 00:34:16,879
their intent is to gather knowledge and

860
00:34:20,230 --> 00:34:19,040
they were quite successful at doing that

861
00:34:23,349 --> 00:34:20,240
they launched something for the first

862
00:34:24,550 --> 00:34:23,359
time on the 4th of july in 1945 even

863
00:34:26,869 --> 00:34:24,560

before the

864
00:34:30,310 --> 00:34:26,879
pilotless aircraft research division was

865
00:34:32,310 --> 00:34:30,320
created at langley but nonetheless they

866
00:34:35,190 --> 00:34:32,320
they were able to do it here's uh the

867
00:34:36,470 --> 00:34:35,200
initial check launch of a small rocket

868
00:34:37,589 --> 00:34:36,480
and you can see it's not terribly

869
00:34:40,310 --> 00:34:37,599
impressive

870
00:34:41,829 --> 00:34:40,320
but uh but it's everybody every every

871
00:34:45,829 --> 00:34:41,839
journey has to start somewhere and this

872
00:34:49,510 --> 00:34:47,349
rockets got a little bit bigger you can

873
00:34:52,950 --> 00:34:49,520
see they're not terribly large but this

874
00:34:55,589 --> 00:34:52,960
is an october 1945 test launch

875
00:34:58,230 --> 00:34:55,599
another small particular rocket testing

876
00:35:00,790 --> 00:34:58,240
ballistic shapes testing

877
00:35:04,470 --> 00:35:00,800
wings and what might work the research

878
00:35:06,310 --> 00:35:04,480
from this fled fed into other activities

879
00:35:08,550 --> 00:35:06,320
that nasa had especially with the end

880
00:35:10,790 --> 00:35:08,560
with the with the x1 and other projects

881
00:35:11,990 --> 00:35:10,800
afterwards but uh

882
00:35:14,310 --> 00:35:12,000
all of those

883
00:35:16,150 --> 00:35:14,320
uh activities

884
00:35:18,870 --> 00:35:16,160
helped with the development of rocket

885
00:35:20,870 --> 00:35:18,880
technology

886
00:35:23,190 --> 00:35:20,880
and of course they didn't end there

887
00:35:25,030 --> 00:35:23,200
this is actually after nasa is created

888
00:35:27,270 --> 00:35:25,040

but in 1959

889
00:35:29,910 --> 00:35:27,280
launching out a wallops

890
00:35:32,390 --> 00:35:29,920
on a small booster but still much larger

891
00:35:34,390 --> 00:35:32,400
than those early ones a

892
00:35:36,069 --> 00:35:34,400
the little joe which tested the

893
00:35:37,430 --> 00:35:36,079
ballistic capsule for the mercury

894
00:35:39,670 --> 00:35:37,440
program

895
00:35:42,870 --> 00:35:39,680
so there's a succession of efforts

896
00:35:45,270 --> 00:35:42,880
throughout this period in which the naca

897
00:35:47,750 --> 00:35:45,280
is engaged in ever more sophisticated

898
00:35:49,829 --> 00:35:47,760
research associated with rocketry and

899
00:35:53,430 --> 00:35:49,839
space flight

900
00:35:54,870 --> 00:35:53,440
and that is a different model yes they

901
00:35:57,349 --> 00:35:54,880
were able to

902
00:35:59,190 --> 00:35:57,359
provide knowledge to other organizations

903
00:36:00,950 --> 00:35:59,200
like the military

904
00:36:03,030 --> 00:36:00,960
but they are also using this to feed

905
00:36:04,710 --> 00:36:03,040
back into their own efforts and it looks

906
00:36:05,510 --> 00:36:04,720
a whole lot more

907
00:36:07,510 --> 00:36:05,520
like

908
00:36:09,750 --> 00:36:07,520
the nasa efforts for project mercury

909
00:36:13,670 --> 00:36:09,760
gemini and apollo than do some of the

910
00:36:15,270 --> 00:36:13,680
other naca efforts of the time

911
00:36:18,230 --> 00:36:15,280
all right well let me let me just wrap

912
00:36:21,190 --> 00:36:18,240
this up by by making some comments

913
00:36:22,390 --> 00:36:21,200

there is a classic model of naca

914
00:36:24,390 --> 00:36:22,400
research

915
00:36:25,750 --> 00:36:24,400
and it's not a bad model in a whole lot

916
00:36:27,589 --> 00:36:25,760
of ways

917
00:36:29,430 --> 00:36:27,599
in which

918
00:36:31,190 --> 00:36:29,440
research questions come from a variety

919
00:36:32,790 --> 00:36:31,200
of sources there are projects that are

920
00:36:35,349 --> 00:36:32,800
undertaken to try to learn the answers

921
00:36:38,550 --> 00:36:35,359
to those questions and that data is

922
00:36:40,710 --> 00:36:38,560
provided to whomsoever wishes to have it

923
00:36:42,630 --> 00:36:40,720
it's not just an industry it never was

924
00:36:45,510 --> 00:36:42,640
just an industry thing

925
00:36:47,030 --> 00:36:45,520
uh it was not necessarily just about

926
00:36:49,270 --> 00:36:47,040
building an industry although that was

927
00:36:50,710 --> 00:36:49,280
certainly a part of the task

928
00:36:53,510 --> 00:36:50,720
and uh

929
00:36:54,550 --> 00:36:53,520
but it's a moving target it never stays

930
00:36:56,069 --> 00:36:54,560
static

931
00:36:58,310 --> 00:36:56,079
and so

932
00:37:00,150 --> 00:36:58,320
when we talk about returning to the naca

933
00:37:02,069 --> 00:37:00,160
routes we have to ask the question what

934
00:37:04,069 --> 00:37:02,079
routes are we talking about

935
00:37:06,069 --> 00:37:04,079
there are then obviously public-private

936
00:37:09,589 --> 00:37:06,079
partnerships associated with the x-plane

937
00:37:11,990 --> 00:37:09,599
programs of the 1940s and 50s

938
00:37:13,670 --> 00:37:12,000

and of course into the 1960s and 70s

939
00:37:15,750 --> 00:37:13,680
nasa pursued

940
00:37:17,750 --> 00:37:15,760
and then obviously

941
00:37:19,670 --> 00:37:17,760
the pilotless aircraft research division

942
00:37:22,790 --> 00:37:19,680
and its activities as well

943
00:37:25,510 --> 00:37:22,800
those are

944
00:37:27,670 --> 00:37:25,520
slightly different activities undertaken

945
00:37:29,750 --> 00:37:27,680
in a slightly different manner with

946
00:37:31,990 --> 00:37:29,760
slightly different

947
00:37:35,349 --> 00:37:32,000
customers and clients

948
00:37:36,710 --> 00:37:35,359
and all of them are a part of the naca

949
00:37:37,829 --> 00:37:36,720
research

950
00:37:40,950 --> 00:37:37,839
model

951
00:37:43,670 --> 00:37:40,960
that's the point i would make

952
00:37:44,390 --> 00:37:43,680
with that i am going to close if there

953
00:37:46,550 --> 00:37:44,400
are

954
00:37:49,670 --> 00:37:46,560
questions or comments or anybody wants

955
00:37:50,710 --> 00:37:49,680
to hurl anything at me now is your

956
00:37:52,630 --> 00:37:50,720
chance

957
00:37:54,870 --> 00:37:52,640
if you wish to

958
00:37:57,829 --> 00:37:54,880
to do so i would ask you to come to the

959
00:38:06,470 --> 00:37:57,839
microphone over here identify yourself

960
00:38:15,670 --> 00:38:08,870
okay

961
00:38:19,990 --> 00:38:17,990
yes dr lonnie is

962
00:38:22,150 --> 00:38:20,000
naca was involved in all of this and at

963
00:38:23,510 --> 00:38:22,160

the same time we had

964
00:38:25,589 --> 00:38:23,520
the

965
00:38:27,910 --> 00:38:25,599
laboratories uh

966
00:38:29,670 --> 00:38:27,920
from the navy and the army air corps

967
00:38:31,030 --> 00:38:29,680
doing other sorts of research i know

968
00:38:32,870 --> 00:38:31,040
mccookfield did a lot of work in

969
00:38:34,710 --> 00:38:32,880
propellers

970
00:38:36,710 --> 00:38:34,720
we had the folks up the road here doing

971
00:38:37,750 --> 00:38:36,720
a lot of hydrodynamics with flying boats

972
00:38:40,230 --> 00:38:37,760
and so on

973
00:38:41,829 --> 00:38:40,240
did naca work with these people on the

974
00:38:44,150 --> 00:38:41,839
research side to make sure they weren't

975
00:38:46,390 --> 00:38:44,160
researching the same stuff providing

976
00:38:48,470 --> 00:38:46,400
information uh sort of cross-channel

977
00:38:50,710 --> 00:38:48,480
between the different laboratories yeah

978
00:38:52,069 --> 00:38:50,720
okay uh absolutely they worked with

979
00:38:55,349 --> 00:38:52,079
everybody that's out there doing these

980
00:38:57,190 --> 00:38:55,359
kinds of work so um the various uh

981
00:38:59,030 --> 00:38:57,200
military services that had their own r d

982
00:39:01,030 --> 00:38:59,040
capabilities mccook field or whatever it

983
00:39:02,550 --> 00:39:01,040
happened to be yes there's constant

984
00:39:04,710 --> 00:39:02,560
information that flows back and forth

985
00:39:06,790 --> 00:39:04,720
some of it's very informal i mean one of

986
00:39:08,230 --> 00:39:06,800
the things that happens and shouldn't

987
00:39:09,589 --> 00:39:08,240
surprise anyone

988
00:39:12,790 --> 00:39:09,599

that um

989
00:39:14,790 --> 00:39:12,800
that things like the naca inspection or

990
00:39:16,310 --> 00:39:14,800
that annual conference that takes place

991
00:39:18,630 --> 00:39:16,320
is a place where everybody sort of

992
00:39:20,710 --> 00:39:18,640
gathers and as you might expect as they

993
00:39:22,310 --> 00:39:20,720
would always do

994
00:39:24,790 --> 00:39:22,320
the engineers would sit down and talk to

995
00:39:26,550 --> 00:39:24,800
each other so it could be quite informal

996
00:39:27,910 --> 00:39:26,560
but they were also involved in

997
00:39:31,190 --> 00:39:27,920
formulating some of the research

998
00:39:33,829 --> 00:39:31,200
questions they were also uh

999
00:39:36,870 --> 00:39:33,839
involved in answering some of those

1000
00:39:38,630 --> 00:39:36,880
questions helping to to shape how the

1001
00:39:40,390 --> 00:39:38,640
structure of the of the research was

1002
00:39:42,550 --> 00:39:40,400
going to go

1003
00:39:45,109 --> 00:39:42,560
certain pieces of that research might be

1004
00:39:47,589 --> 00:39:45,119
done by the navy or the army or somebody

1005
00:39:50,230 --> 00:39:47,599
else uh as well and would all factor

1006
00:39:51,829 --> 00:39:50,240
together it's it's it wasn't a perfect

1007
00:39:53,510 --> 00:39:51,839
system in the sense that there wasn't

1008
00:39:55,829 --> 00:39:53,520
perfect communication

1009
00:40:00,069 --> 00:39:55,839
but there was a lot more crosstalk than

1010
00:40:08,069 --> 00:40:01,670
anybody else

1011
00:40:11,910 --> 00:40:10,230
just to ask back in those days were

1012
00:40:13,910 --> 00:40:11,920
there cases where the industry would

1013
00:40:16,309 --> 00:40:13,920

come in and they would contract for the

1014
00:40:17,030 --> 00:40:16,319
research facility but they were keeping

1015
00:40:20,870 --> 00:40:17,040
it

1016
00:40:24,630 --> 00:40:20,880
basically

1017
00:40:26,870 --> 00:40:24,640
renting the facilities well they uh

1018
00:40:27,990 --> 00:40:26,880
there was instances in which industry

1019
00:40:30,710 --> 00:40:28,000
would

1020
00:40:32,390 --> 00:40:30,720
uh provide funds to offset costs

1021
00:40:34,390 --> 00:40:32,400
associated with research

1022
00:40:36,069 --> 00:40:34,400
i'm not aware of instances and there's

1023
00:40:37,589 --> 00:40:36,079
some people in the audience who actually

1024
00:40:39,109 --> 00:40:37,599
have more knowledge about this than i do

1025
00:40:41,270 --> 00:40:39,119
and i see glenn bugos sitting here and i

1026
00:40:42,470 --> 00:40:41,280
see jim hansen and people like that who

1027
00:40:43,750 --> 00:40:42,480
probably know the answer to that

1028
00:40:47,190 --> 00:40:43,760
question

1029
00:40:50,390 --> 00:40:47,200
but i'm not aware of individual outside

1030
00:40:52,390 --> 00:40:50,400
entities coming into the naca facility

1031
00:40:53,990 --> 00:40:52,400
and actually doing the work

1032
00:40:56,150 --> 00:40:54,000
they might be

1033
00:40:58,069 --> 00:40:56,160
with the engineers at some point helping

1034
00:41:00,230 --> 00:40:58,079
in some way but

1035
00:41:02,790 --> 00:41:00,240
usually if there was an arrangement like

1036
00:41:04,950 --> 00:41:02,800
that the naca performed the research

1037
00:41:06,390 --> 00:41:04,960
gave it back to them and it was work for

1038
00:41:07,190 --> 00:41:06,400

hire in many ways

1039
00:41:09,109 --> 00:41:07,200
and

1040
00:41:10,550 --> 00:41:09,119
this was a source of contention to be

1041
00:41:12,790 --> 00:41:10,560
perfectly honest

1042
00:41:14,710 --> 00:41:12,800
the um

1043
00:41:17,510 --> 00:41:14,720
obviously

1044
00:41:19,829 --> 00:41:17,520
the more well-heeled industry

1045
00:41:21,190 --> 00:41:19,839
organizations could afford to do this

1046
00:41:22,630 --> 00:41:21,200
and they might be quite willing to do

1047
00:41:23,670 --> 00:41:22,640
that

1048
00:41:25,510 --> 00:41:23,680
but

1049
00:41:28,230 --> 00:41:25,520
since this is a facility that's paid for

1050
00:41:30,790 --> 00:41:28,240
by tax dollars and the researchers are

1051
00:41:32,550 --> 00:41:30,800
government employees

1052
00:41:34,950 --> 00:41:32,560
should they be engaged in that that was

1053
00:41:37,190 --> 00:41:34,960
a constant sort of

1054
00:41:39,030 --> 00:41:37,200
push me pull you in terms of of

1055
00:41:44,790 --> 00:41:39,040
discussions about these sorts of issues

1056
00:41:50,790 --> 00:41:47,750
jason hi jason callahan uh i'm curious

1057
00:41:52,230 --> 00:41:50,800
about the relative size of the naca

1058
00:41:53,589 --> 00:41:52,240
during these different periods of

1059
00:41:55,190 --> 00:41:53,599
research and development so you said in

1060
00:41:56,069 --> 00:41:55,200
the in the 20s and 30s when they were

1061
00:41:57,270 --> 00:41:56,079
sort of

1062
00:41:59,270 --> 00:41:57,280
uh

1063
00:42:02,470 --> 00:41:59,280

focused on technical reports as opposed

1064
00:42:04,230 --> 00:42:02,480
to in the the war years or the post war

1065
00:42:05,829 --> 00:42:04,240
years uh

1066
00:42:07,670 --> 00:42:05,839
what what what were the

1067
00:42:10,550 --> 00:42:07,680
the the sizes of

1068
00:42:13,109 --> 00:42:10,560
during this time yeah uh well i mean the

1069
00:42:16,550 --> 00:42:13,119
agency began obviously very small

1070
00:42:18,550 --> 00:42:16,560
and uh it wasn't until 1920 that the uh

1071
00:42:20,150 --> 00:42:18,560
the langley uh facility was actually

1072
00:42:22,470 --> 00:42:20,160
sort of stood up and and started

1073
00:42:24,150 --> 00:42:22,480
operating uh and

1074
00:42:26,630 --> 00:42:24,160
you know for the first few years you've

1075
00:42:28,550 --> 00:42:26,640
got a hundred couple hundred people

1076
00:42:30,790 --> 00:42:28,560
so it's not a large not a large

1077
00:42:33,270 --> 00:42:30,800
organization at all there's a small

1078
00:42:36,309 --> 00:42:33,280
staff that's in washington mostly john

1079
00:42:37,430 --> 00:42:36,319
victory and george lewis and people like

1080
00:42:39,190 --> 00:42:37,440
that

1081
00:42:40,790 --> 00:42:39,200
and then you've got these volunteers and

1082
00:42:42,950 --> 00:42:40,800
they were volunteers who were members of

1083
00:42:45,030 --> 00:42:42,960
the committee

1084
00:42:46,950 --> 00:42:45,040
so

1085
00:42:50,309 --> 00:42:46,960
it stayed relatively small until the

1086
00:42:52,309 --> 00:42:50,319
1930s it began to be plused up in

1087
00:42:54,710 --> 00:42:52,319
in response to the war threat that peop

1088
00:42:56,790 --> 00:42:54,720

that everybody saw uh by the latter part

1089
00:42:59,109 --> 00:42:56,800
of the 1930s and of course

1090
00:43:00,309 --> 00:42:59,119
uh it was just one facility

1091
00:43:07,910 --> 00:43:00,319
until

1092
00:43:09,349 --> 00:43:07,920
after his death that's a little bit

1093
00:43:11,430 --> 00:43:09,359
later but

1094
00:43:14,470 --> 00:43:11,440
the cleveland and the bay area

1095
00:43:15,750 --> 00:43:14,480
facilities were opened and at that point

1096
00:43:17,589 --> 00:43:15,760
you move from

1097
00:43:18,630 --> 00:43:17,599
a few hundred employees to a few

1098
00:43:21,750 --> 00:43:18,640
thousand

1099
00:43:23,750 --> 00:43:21,760
but it's still a small operation uh it

1100
00:43:24,470 --> 00:43:23,760
it continues to grow through world war

1101
00:43:27,990 --> 00:43:24,480
ii

1102
00:43:29,910 --> 00:43:28,000
and sort of tops out 1945ish

1103
00:43:32,790 --> 00:43:29,920
there's obviously some decline in the

1104
00:43:34,069 --> 00:43:32,800
aftermath of the war but not as much as

1105
00:43:35,349 --> 00:43:34,079
you might think

1106
00:43:36,550 --> 00:43:35,359
uh and

1107
00:43:39,270 --> 00:43:36,560
there's something else i guess i should

1108
00:43:42,069 --> 00:43:39,280
say about this the naca i i mean there

1109
00:43:44,550 --> 00:43:42,079
are engineers that come out of schools

1110
00:43:48,069 --> 00:43:44,560
and if you're interested in aviation

1111
00:43:49,670 --> 00:43:48,079
in the 1920s 30s 40s 50s

1112
00:43:50,470 --> 00:43:49,680
and i would suggest even right up to the

1113
00:43:51,990 --> 00:43:50,480

day

1114
00:43:55,270 --> 00:43:52,000
you know the gold standard for a place

1115
00:43:56,950 --> 00:43:55,280
to work would be the naca or nasa

1116
00:43:59,109 --> 00:43:56,960
where you could do this great cutting

1117
00:44:01,430 --> 00:43:59,119
edge research i mean if you weren't

1118
00:44:03,589 --> 00:44:01,440
motivated by money obviously if if that

1119
00:44:05,190 --> 00:44:03,599
wasn't the principal driver

1120
00:44:07,510 --> 00:44:05,200
doing these very rewarding research

1121
00:44:09,670 --> 00:44:07,520
projects would be a big attraction

1122
00:44:11,030 --> 00:44:09,680
bob gilruth has a

1123
00:44:14,230 --> 00:44:11,040
has a a

1124
00:44:17,990 --> 00:44:15,829
interview that is available and you can

1125
00:44:19,990 --> 00:44:18,000
all read it online if you wish

1126
00:44:23,270 --> 00:44:20,000
that was conducted by folks here in the

1127
00:44:24,790 --> 00:44:23,280
museum who um and he talks about coming

1128
00:44:26,790 --> 00:44:24,800
out of the university of minnesota in

1129
00:44:28,550 --> 00:44:26,800
1927 and

1130
00:44:31,349 --> 00:44:28,560
my gosh he could have gone to all these

1131
00:44:34,230 --> 00:44:31,359
various places and he didn't want to

1132
00:44:36,390 --> 00:44:34,240
he wanted to be an naca researcher and

1133
00:44:37,910 --> 00:44:36,400
and do that cutting research and i i

1134
00:44:39,430 --> 00:44:37,920
think that's replicated over and over

1135
00:44:42,390 --> 00:44:39,440
and over again

1136
00:44:43,829 --> 00:44:42,400
the sense of collegiality the sense of

1137
00:44:45,670 --> 00:44:43,839
fulfillment that one can have by

1138
00:44:48,950 --> 00:44:45,680

undertaking a research project and

1139
00:44:51,750 --> 00:44:48,960
seeing it through to fruition uh made

1140
00:44:53,510 --> 00:44:51,760
the nac a unique place to work and a lot

1141
00:44:55,510 --> 00:44:53,520
of it was pretty basic research not

1142
00:44:57,190 --> 00:44:55,520
specifically tied to an individual

1143
00:44:58,309 --> 00:44:57,200
engineering problem associated with one

1144
00:45:00,230 --> 00:44:58,319
airplane

1145
00:45:01,829 --> 00:45:00,240
uh but but something broader than that

1146
00:45:03,710 --> 00:45:01,839
and that was very attractive to a lot of

1147
00:45:05,510 --> 00:45:03,720
people and it's sort of a

1148
00:45:07,750 --> 00:45:05,520
non-hierarchical approach that was

1149
00:45:09,829 --> 00:45:07,760
present in the naca that certainly

1150
00:45:12,150 --> 00:45:09,839
wasn't present in the military research

1151
00:45:13,670 --> 00:45:12,160
labs or a lot of other places that one

1152
00:45:17,430 --> 00:45:13,680
might might think of where you could

1153
00:45:20,950 --> 00:45:19,190
and

1154
00:45:23,109 --> 00:45:20,960
as i said it's a place that a lot of

1155
00:45:26,950 --> 00:45:23,119
people wanted to be and competition was

1156
00:45:26,960 --> 00:45:34,150
anybody else

1157
00:45:37,349 --> 00:45:36,230
great talk roger jim hansen auburn

1158
00:45:39,030 --> 00:45:37,359
university

1159
00:45:40,550 --> 00:45:39,040
by the way before jim starts for those

1160
00:45:43,829 --> 00:45:40,560
of you who don't know

1161
00:45:45,910 --> 00:45:43,839
he is the historian of langley not

1162
00:45:47,589 --> 00:45:45,920
anymore but he's written two books about

1163
00:45:49,270 --> 00:45:47,599

the history of that center and they are

1164
00:45:51,510 --> 00:45:49,280
standard works and i copped from them

1165
00:45:53,670 --> 00:45:51,520
liberally to do this paper

1166
00:45:55,109 --> 00:45:53,680
well i'm not i'm especially glad i just

1167
00:45:58,790 --> 00:45:55,119
came up here now so

1168
00:46:00,230 --> 00:45:58,800
uh roger one aspect of the of the nac

1169
00:46:01,430 --> 00:46:00,240
model that i'd like to hear you talk

1170
00:46:02,710 --> 00:46:01,440
about is

1171
00:46:04,470 --> 00:46:02,720
what i would guess i would call the

1172
00:46:07,430 --> 00:46:04,480
relative invisibility of the

1173
00:46:10,550 --> 00:46:07,440
organization compared to nasa and and i

1174
00:46:11,910 --> 00:46:10,560
mean there were people even up to 1957

1175
00:46:13,589 --> 00:46:11,920
in the united states that would i don't

1176
00:46:15,829 --> 00:46:13,599
know if you had a poll taken they

1177
00:46:18,230 --> 00:46:15,839
wouldn't even know about naca and that's

1178
00:46:20,390 --> 00:46:18,240
certainly not true for nasa

1179
00:46:21,829 --> 00:46:20,400
and part of it was the size of the staff

1180
00:46:25,030 --> 00:46:21,839
some of it was

1181
00:46:28,230 --> 00:46:25,040
the budget wasn't all that big

1182
00:46:30,470 --> 00:46:28,240
and the invisibility of nasa of naca

1183
00:46:32,790 --> 00:46:30,480
with the public

1184
00:46:34,710 --> 00:46:32,800
had some advantages

1185
00:46:36,710 --> 00:46:34,720
for the agency

1186
00:46:38,630 --> 00:46:36,720
one thing about the research when i

1187
00:46:40,950 --> 00:46:38,640
looked at your chart

1188
00:46:43,270 --> 00:46:40,960

about the model is

1189
00:46:45,190 --> 00:46:43,280
the engineers at these laboratories

1190
00:46:46,790 --> 00:46:45,200
because i mean they obviously were

1191
00:46:49,430 --> 00:46:46,800
scrutinized by their

1192
00:46:51,510 --> 00:46:49,440
bosses in washington but they also did a

1193
00:46:53,109 --> 00:46:51,520
lot of things that they i mean it wasn't

1194
00:46:55,910 --> 00:46:53,119
just that they were responding to

1195
00:46:57,349 --> 00:46:55,920
military or industry requests for you

1196
00:46:59,270 --> 00:46:57,359
know studies of this or that they were

1197
00:47:01,829 --> 00:46:59,280
coming up with their own ideas and they

1198
00:47:03,190 --> 00:47:01,839
were bootlegging a lot of things that

1199
00:47:04,630 --> 00:47:03,200
even their bosses in washington

1200
00:47:07,030 --> 00:47:04,640
sometimes didn't know about the most

1201
00:47:08,950 --> 00:47:07,040
famous incident being the thermonuclear

1202
00:47:10,950 --> 00:47:08,960
fusion experiment that eastman jake with

1203
00:47:13,349 --> 00:47:10,960
jacobs and arthur kantrowitz is are

1204
00:47:15,190 --> 00:47:13,359
involved in in the 1930s which when

1205
00:47:17,589 --> 00:47:15,200
george lewis finds out about it he shuts

1206
00:47:19,030 --> 00:47:17,599
it down pretty pretty quickly but i just

1207
00:47:19,829 --> 00:47:19,040
wondered if you could if you could talk

1208
00:47:22,790 --> 00:47:19,839
about

1209
00:47:24,870 --> 00:47:22,800
that model and how uh

1210
00:47:26,870 --> 00:47:24,880
you know the fact that it was so small

1211
00:47:29,349 --> 00:47:26,880
and so and it didn't have much of a

1212
00:47:31,510 --> 00:47:29,359
public affairs operation kristen starr

1213
00:47:33,829 --> 00:47:31,520

we'll talk about that uh later in the

1214
00:47:36,309 --> 00:47:33,839
conference uh how that fits into the

1215
00:47:39,990 --> 00:47:36,319
model and how that might translate

1216
00:47:45,109 --> 00:47:40,000
good or bad to you know to the idea

1217
00:47:46,230 --> 00:47:45,119
of of using the naca model more for nasa

1218
00:47:47,270 --> 00:47:46,240
right

1219
00:47:48,790 --> 00:47:47,280
uh

1220
00:47:50,230 --> 00:47:48,800
yeah good that's a good point and they

1221
00:47:51,430 --> 00:47:50,240
did fly under the radar quite a bit

1222
00:47:53,190 --> 00:47:51,440
there's no question about that part of

1223
00:47:55,190 --> 00:47:53,200
that was just the nature of the fact

1224
00:47:57,349 --> 00:47:55,200
that it's a small organization

1225
00:47:59,430 --> 00:47:57,359
and uh doesn't have much of a public

1226
00:48:01,750 --> 00:47:59,440
stature it's certainly not doing

1227
00:48:03,270 --> 00:48:01,760
spectacular sort of rocket launches most

1228
00:48:05,270 --> 00:48:03,280
of the time

1229
00:48:07,270 --> 00:48:05,280
there's some stuff out at the

1230
00:48:11,270 --> 00:48:07,280
out of wallops as i said in the 1940s

1231
00:48:13,510 --> 00:48:11,280
and 50s but most of those are not are

1232
00:48:15,589 --> 00:48:13,520
so they certainly don't stack up to the

1233
00:48:17,270 --> 00:48:15,599
kinds of activities that nasa was

1234
00:48:18,230 --> 00:48:17,280
engaged in with human space flight

1235
00:48:21,109 --> 00:48:18,240
effort

1236
00:48:24,790 --> 00:48:21,119
and and i guess i would suggest that

1237
00:48:27,349 --> 00:48:24,800
the relative invisibility of the naca

1238
00:48:29,910 --> 00:48:27,359

uh was really built around this this

1239
00:48:32,710 --> 00:48:29,920
kind of kind of question that it it

1240
00:48:36,309 --> 00:48:32,720
wasn't viewed as a public

1241
00:48:37,589 --> 00:48:36,319
relations activity in ways that

1242
00:48:39,510 --> 00:48:37,599
the nasa

1243
00:48:41,349 --> 00:48:39,520
human space flight program was in the

1244
00:48:42,950 --> 00:48:41,359
1960s

1245
00:48:43,829 --> 00:48:42,960
i mean

1246
00:48:44,870 --> 00:48:43,839
the

1247
00:48:47,589 --> 00:48:44,880
yes

1248
00:48:49,829 --> 00:48:47,599
human space flight is a big

1249
00:48:52,470 --> 00:48:49,839
issue it costs a lot of money

1250
00:48:54,230 --> 00:48:52,480
but it's also viewed as a cold war

1251
00:48:56,470 --> 00:48:54,240
initiative and we want everybody to see

1252
00:48:57,430 --> 00:48:56,480
what's going on here and what what nasa

1253
00:48:59,990 --> 00:48:57,440
can do

1254
00:49:02,230 --> 00:49:00,000
so there is a concerted effort to make

1255
00:49:03,750 --> 00:49:02,240
sure that everybody sees what's going on

1256
00:49:05,670 --> 00:49:03,760
with that

1257
00:49:07,829 --> 00:49:05,680
and that was something that the naca

1258
00:49:09,510 --> 00:49:07,839
never had to worry about i would also

1259
00:49:12,309 --> 00:49:09,520
suggest however that some of those

1260
00:49:15,349 --> 00:49:12,319
x-plane programs

1261
00:49:17,910 --> 00:49:15,359
without trying to do so

1262
00:49:19,829 --> 00:49:17,920
got some attention

1263
00:49:21,910 --> 00:49:19,839

it's obviously not shooting john glenn

1264
00:49:26,390 --> 00:49:21,920
into orbit but it's it's not

1265
00:49:28,069 --> 00:49:26,400
insignificant uh as well so

1266
00:49:31,270 --> 00:49:28,079
there's a little bit of both in both

1267
00:49:33,030 --> 00:49:31,280
sides but yeah the invisibility was real

1268
00:49:35,109 --> 00:49:33,040
largely because

1269
00:49:37,349 --> 00:49:35,119
it wasn't meant to be something that

1270
00:49:39,270 --> 00:49:37,359
everybody was going to view in the same

1271
00:49:44,790 --> 00:49:39,280
way that the nasa programs were for

1272
00:49:47,910 --> 00:49:45,670
all right

1273
00:49:49,670 --> 00:49:47,920
anybody got anything else

1274
00:49:52,870 --> 00:49:49,680
with that i will

1275
00:49:56,630 --> 00:49:52,880
if not i will yield back my time

1276
00:49:59,510 --> 00:49:56,640
uh and uh and we will take a short break

1277
00:50:01,190 --> 00:49:59,520
i believe